OFF - SITE EMERGENCY PLAN

AHMEDABAD DISTRICT

REVISED BY

DISTRICT CRISIS GROUP

AHMEDABAD

JANUARY – 2026

FOREWORD

The increase in chemical activities increase with the development of industries in Ahmedabad District, which also posed a threat of emergency involving sudden release of gas, fire, explosion etc. The effects of a major accident in an industrial set up are not always restricted to the boundaries of the industrial installations. They may spill over to the surrounding and environment in vicinity. The several protective measures & efforts are made against such threat of emergency by industries, in spite of that we can not eliminate occurrence of emergency, which may strike at any time.

To mitigate such type of chemical accident, Ahmedabad District Crisis Group has revised & updated Ahmedabad District off Site Emergency Plan.
Shri U.J.Raval, Dy. Director, Industrial Safety & Health and Member Secretary, District Crisis Group and his colleague have put effort into revision of the Document.

I appeal to all the members of the concerned departments, organisations, agencies etc. to prepare own action plan by constituting workable taskforce to handle & control such industrial emergency by adequate resources at own level.

I thank all the members of committee, who have contributed valuable inputs in revision of this plan.

(SHRI SUJEET KUMAR., IAS)
Chair Person
District Crisis Group,
Ahmedabad
&
Collector & District Magistrate,
Ahmedabad

PREFACE

Considering the increasing activities on storage and transportation of huge quantity of hazardous chemicals in the industries, the process of updating and reviewing of existing Off-Site industrial emergency plan is necessary. Further, the said plan is also required to incorporate statutory requirements as well as certain guidelines issued by various authorities.

In the preparation of this document, the following various statutory instruction as well as guidelines issued by different authorities, periodicals, documents, chronicle, published books on the subject etc. are referred in good faith. I thankful to all.

1. The Factories Act 1948(1987) and The Gujarat Factories Rules 1963(2004)
2. The Disaster Management Act 2005 and The Gujarat State Disaster Management Act 2003.
3. Chemical Accidents (Emergency Planning, Preparedness and Response) Rules-1996 (2000).
4. Manufacture, Storage and Import of Hazardous Chemical Rules 1989(2000).
5. National Disaster Management Guidelines, Chemical Disasters (Industrial)-2007
6. APELL: Awareness and Preparedness for Emergencies at Local Level – Chemical Emergency Prevention, Preparedness & Response (1995) - National Response Team – National Safety Council, Mumbai.
7. Major Accident Hazards Control and Techniques. CLI-Mumbai.
8. Planning of Off-Site Response for Chemical Hazards – Circulated by Environmental and Forest Department New Delhi.
9. Major Hazard Control – I. L. O. Geneva.
10. The guideline on the preparation on On-site and Off-site Emergency Plan issued by Chief Inspector of Factories, Gujarat State.
11. Off-site Action Plan for Handling Emergency in Chemical Unit – Vadodara District (Revised Edition) & Off-Site Emergency Plan prepared by Bharuch District Crisis Group- 2005.
12. Draft-III, Guidelines for preparation of Off-Site-Emergency Plans; for Ministry of Environment and Forests, Government of India, June- 2009.
13. Papers, Articles or Techniques as published in periodicals, Chronicles, magazines, books, Journals by experts, authorities, etc.

PREFACE

I, hereby request to all government departments, emergency services and other agencies/organisation, which are involved in the industrial and transportation emergency, to go through the information and details furnished in the documents and keep and maintain properly equipped with adequate resources at their command and control to meet any Chemical emergency in the district. It is also necessary to prepare own working instruction amongst the participating members/persons.

I am thankful to **Shri P. M. Shah,** Director of Industrial Safety & Health, Gujarat State and **Shri C. P. Dholu**, Jt. Director of Industrial Safety & Health, Ahmedabad Region for the guidance and advice in revision of this document.

I am again thankful for the help, co-operation and information provide by M.A.H. installation located in Ahmedabad District.

Date:

(SHRI U. J. RAVAL)
Member Secretary,
District Crisis Group;Ahmedabad
&
Dy. Director,
Industrial Safety & Health;
Ahmedabad

OFF-SITE EMERGENCY PLAN – 2026

AHMEDABAD DISTRICT CRISIS GROUP

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OFF - SITE EMERGENCY PLAN

AHMEDABAD DISTRICT

DESCRIPTION

SECTION

PART: 1

REVISED BY

DISTRICT CRISIS GROUP

AHMEDABAD

JANUARY – 2026

INDUSTRIAL EMERGENCY-OFF-SITE EMERGENCY PLAN

CHAPTER - 1

1.1 INTRODUCTION

The chemicals are always potential to threat of mishaps, if not properly taken care because of inherent properties of chemicals. Further, activities on storage, process, handling or transportation of large quantities of chemicals are increased, which may turn into chemical accident or emergency, if not controlled properly.

Presently, different agencies / government departments either, central, State or local self Government, such as Disaster Management Authority, Department of Industrial Safety & Health, Petroleum & Explosive safety Organisation (PESO), Environment Pollution Control Board, Transport Authorities, Municipal Corporation, Local Health Authorities etc. which prescribe Rules, regulations or instructions on safety for hazardous chemicals. In spite of strict enforcement of such Regulations & Rules, the possibility of accidents cannot be ignored & such accident leads to damage to life, property and environment also.

However, occurrences of Industrial emergency caused through chemical accidents can be minimised by proper planning on safety.

The primary objectives of Disaster Management Plan are to equip ourselves with necessary & required resources, training and information for prompt implementation and the set of actions to be undertaken in the event of an industrial accident posing hazards to the industries and the public in the vicinity.

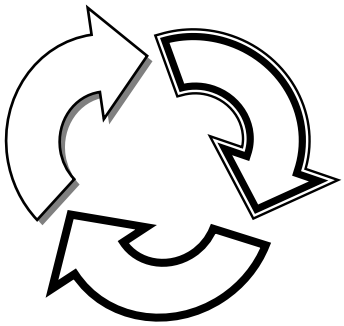
This document seeks to address the wide range of issues that need to be dealt with in order to ensure effective emergency handling with chemical safety, i.e., the actions that should be taken by Government Authorities, organisation, Industries, Agency, Communities and other stakeholders, to minimise the likelihood that an accident will occur (prevention); to mitigate consequences of accidents through emergency planning, risk communication (preparedness/mitigation); and to limit the adverse consequences to health, the environment and property in the event of an accident (response). It also includes actions that are needed to learn from the experiences of accidents and other unexpected events (follow-up) to reduce future incidents (prevention).

It is often difficult to clearly delineate which issues and actions fall within each of these stages, and there is significant overlap among them. Therefore, the entire process is sometimes described as a "Safety Continuum" or "Emergency Management Cycle".

Emergency Management Cycle

Prevention

Avoiding incidents and reducing impacts, and learning from experience to reduce vulnerability



Preparedness

Being alert, ready and trained to act prior to the onset of an accident

Response

Managing the consequences of an accident and providing immediate relief, as well as taking steps towards restoring and returning to normality

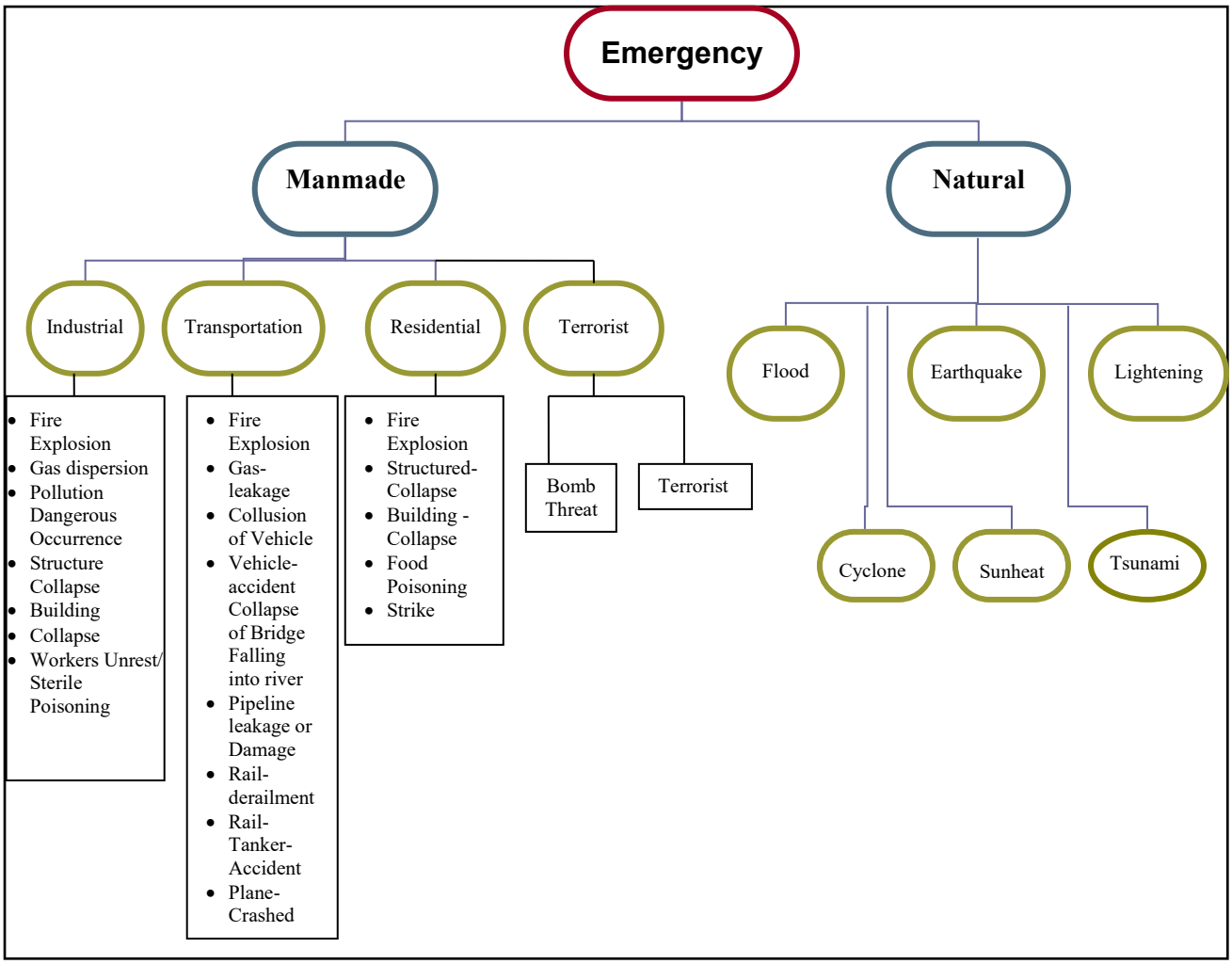
1.2 TYPE OF EMERGENCY

The emergency can be classified broadly in the following manner;

(1) Natural Calamity.

(2) Man made Emergency

Further, Emergency can be classified in the following way;



1.3 INVOLVEMENT OF GOVT. IN CHEMICAL ACCIDENTS

The management of chemical installation has prepared the on-site emergency plan to mitigate any chemical emergency, for the chemicals stored, handled, processed or used at his site. Now, in case chemical emergency strikes and the management could not control by utilising own resources, in the miserable conditions, efforts made by government to provide helps in form of expertise, resources, responding actions etc as per the gravity of situations and control the situation which will save or minimise the damages to life, property and environment. Introduction of C.A.(EPPR) Rules-1996 is direct involvement of government's departments during chemical accidents/emergency.

1.4 LEVEL OF EMERGENCY

The level of Industrial Emergency can be classified according to the gravity of the situation at site. The command and control will follow as per the level of emergency.

1.4.1 Level – I : On Site Emergency

The type of emergency arise in the unit, which can be handled and controlled by the management with own resources as per On-site emergency plan prepared, is called as On-site or Level–I emergency.

1.4.2 Level – II : Local Crisis

While the Level – I is uncontrollable by the management, the further more help is needed, the neighbouring units or mutual aided local units will provide their resources to tackle the situation. The emergency of the unit which handle and control by the out side resources, is called as Mutual Aided Local Crisis or Level – II. Further, this type of emergency may govern by The Local Crisis Group.

1.4.3 Level – III : District Crisis

Even after putting efforts as explained in Level – II, the situation becomes uncontrollable and worst; The District Crisis Group will take over the charge to handle the emergency situation. This will term as Level – III.

1.4.4 Level – IV : State Crisis / National Crisis

Considering the gravity and situation of the emergency that it cannot be controlled by the Local or District Crisis Group, The State/National Crisis Group has to command and control such crisis by utilizing all resources from the State or Nation, as prevailing circumstances.

1.5 LEGAL BACK GROUND

The growth of chemical section has led to increase in manufacture, storage and use of hazardous chemicals resulting in enhanced threat to accident, unlike emergencies caused due to natural disasters, some of which are difficult to prevent. The chemical accidents can be prevented, and impacts minimised by better planning, preparedness and response. To achieve this objective, a document, the off site emergency plan for handling chemical disaster is considered essential.

The regulatory framework on chemical safety could be traced back to the Factories Act, 1948(1987) and chemical class specific regulation lies in the Explosive Act 1884(1963) and Petroleum Act-1934. Later on umbrella act, The Environment (Protection) Act – 1986 was enacted, which also deals with chemical management and safety. Further, Oil Industries Safety Directorate is also issued certain directives on industrial chemical emergency. Similarly, other concerned department/implementing authorities have given certain instructions/guidelines. Expert persons/institutes have published articles on this subject.

In view of the large losses of life and property, the central government has institutionalized the disaster management and focus on prevention, enhanced level of preparedness, prompt and effective responsibility and capacity

building. The efforts are illustrated as below:

1.5.1 RESOLUTION OF 1986

After the 'Bhopal Gas Tragedy" (MIC release accident at Union Carbide, 1984) the government felt an immediate need to be more cautious about handling of hazardous chemicals. Immediately after the incident, different State Governments in India started improving the emergency preparedness to combat and control the chemical disasters.

Gujarat is one of the highly industrialized states in India and has large numbers of small, medium and large chemical industries spread throughout the state. In response to the preparedness requirement for handling off-site chemical emergencies, Gujarat Government has passed a resolution in 1986, to constitute the District Contingency Plan Committees for Five Districts having large number of MAH installations, viz. Ahmedabad, Vadodara, Bharuch, Surat, & Valsad. Legal origin of Off- site Emergency Plan began with this movement.

1.5.2 Chemical Accidents (Emergency Planning, Preparedness and Response) Rules'1996

The Government of India published the "Chemical Accidents (Emergency Planning, Preparedness and Response) Rules-1996 (CA (EPPR) Rules)" under the environment (Protection) Act-1986. The main objectives of the rules are to provide administrative structure at different levels (central, state, district and local) for effective planning, preparedness and response to chemical accidents. Crisis groups at such levels have been defined with their composition and functions under these rules. Further, various definitions; like Hazardous Chemicals, Chemical Accident, MAH installations, Off-site emergency Plan, Transport etc are explained. C.A. (EPPR) Rules-1996 are given at **Annexure-31**.

1.5.3 The Gujarat State Disaster Management Act, 2003

In wake of the massive earthquake in Gujarat, the State Government passed The Gujarat State Disaster Management Act in 2003 (hereinafter referred to as 'The Act", for effective management of disasters. The Act covers all types of disasters (natural and man-made).

The Act identifies authorities for disaster management, functions of the state government and its various departments, establishment, constitution and functions of the Authority (Gujarat State Disaster Management Authority — GSDMA, has been formed under these provisions), etc. The functions include collection of data, repository of information, preparation of emergency plans and public awareness for disaster management, relief, rehabilitation and reconstruction, etc.

The Act also defines Powers and Duties of various functionaries in the disaster management activity such as CEO of GSDMA, State Relief Commissioner, District Collector, Local Authorities, Police, Fire, Civil Defence personnel, communities, private sector organizations, private agencies /persons, etc.

The act also defines the authority for declaration of disaster prone, or disaster affected area and delegates powers to different authorities for

disaster management activities such as power of entry, power to remove difficulties, etc.

1.5.4 The Disaster Management Act, 2005 & Rules 2006

The Govt. of India has published the ACT and Rules to provide an institutional framework, for drawing up and monitoring the implementation of plans of the disaster management and facilitate the government machinery in mitigating the eventuality of the disaster. Further, it provides constitution, power, and functions of the National Authority, State Authority, and District Authority etc.

1.5.5 National Disaster Management Guidelines (Chemical Disasters) April 2007 (NDMG-CD)

The objectives of the guidelines are to formulate a single national plan integrating existing awareness, prevention, preparedness, response, relief and rehabilitation plans and follow a life cycle approach.

1.6 CRISIS GROUPS

In order to respond a chemical emergency, various co-ordinated efforts are made by Government, constituting crisis groups at various level; i.e. local level, District level, state level or central level.

The following Crisis Alert Systems are constituted as per 'Chemical Accidents (Emergency Planning, Preparedness and Response) Rules-1996 (2000) under the Environment (Protection) Act 1986.

(1) Central Crisis Group – The apex body at the Central Level
(2) State Crisis Group – The apex body at the State Level
(3) District Crisis Group –The apex body at the District Level
(4) Local Crisis Group – The apex body at the Local Level

1.7 FUNCTIONS OF CRISIS GROUPS

The functions of crisis alert groups, as per Rule-4 of C.A.(EPPR) Rules-1996; can be summarised as below:

(1) Set up a functional control room at such place as it deems fit.
(2) Set up an information net working system with the state and district control rooms.
(3) Appoint adequate staff and experts' man to the functional control rooms.
(4) Publish a list of Major accident Hazardous Installations.
(5) Publish a list of major chemical accidents in chronological order.
(6) Publish a list of members of Central, State, and District Crisis Groups.
(7) Take measures to create awareness amongst the public with a view to prevent chemical accidents.

1.8 EMERGENCY PLAN

The chemical emergency control plans have two separate identities as per gravity of the incidence.

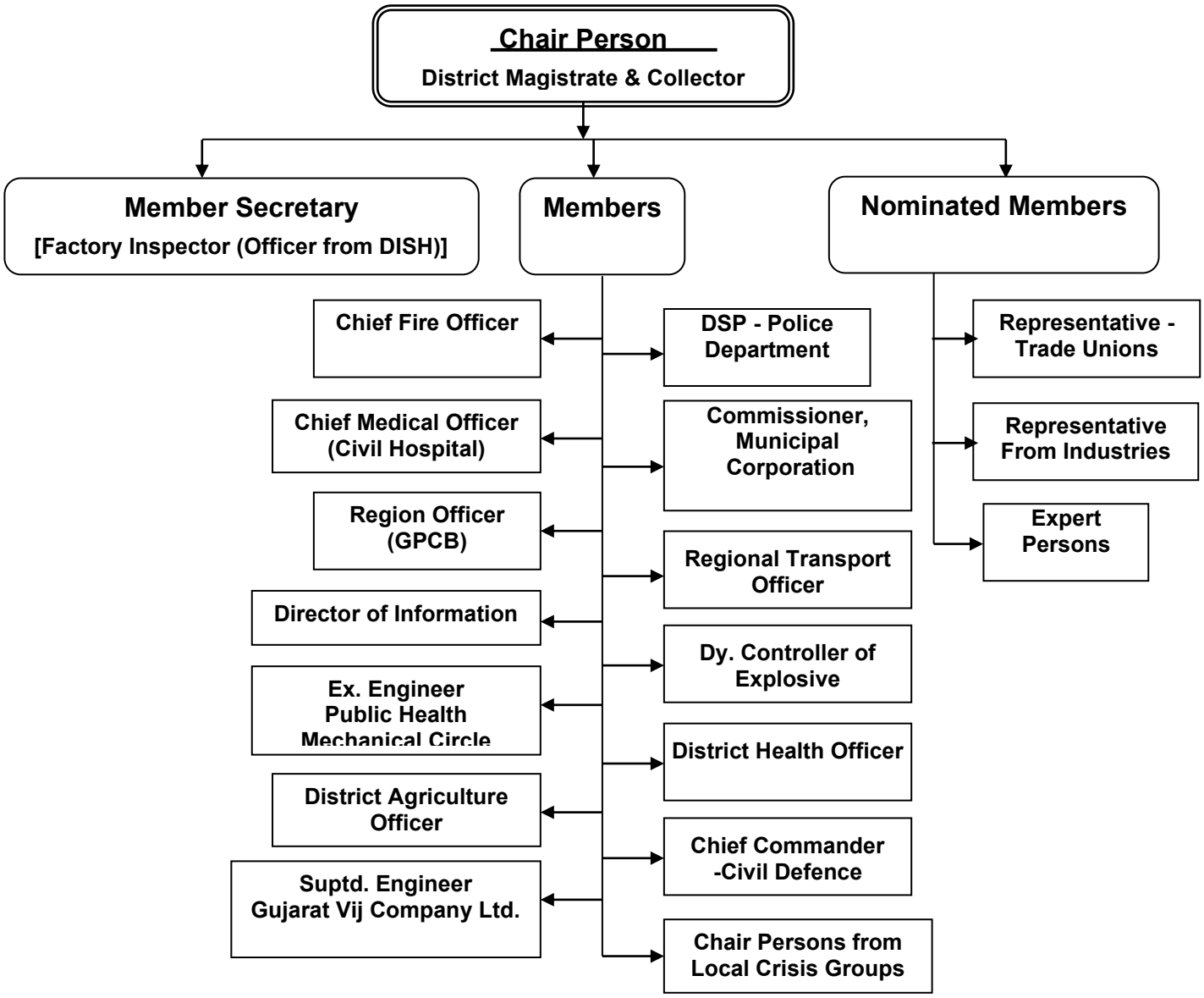
1. On-Site Emergency Plan
2. Off-Site Emergency Plan

The first is to be prepared by an industrial unit as per provisions under statute and under the guidance of government & local authorities, while second one is to be prepared by the District Crisis Group with the help of government machinery and other resources; as per Schedule 12 of Rule-14 under MSIHC Rules-1989(2004)

1.9 DISTRICT CRISIS GROUP

It is the direct government participation in handling & controlling the chemical emergency, involving existing government officers in efforts to mitigate chemical accidents/ emergency by constituting the District Crisis Group at District level; as per C.A. (EPPR) Rules-1996. The functions and composition are specified in the said Rules.

The management is multi-stakeholder approach. The Chair Person of the body is District Magistrate. Member Secretary is an Officer from Office of Director of Industrial Safety and Health (Factory Inspectorate). The other members are from emergency services, like, fire; police, medical & health, and other various government officers, NGO, Experts, other organisations, as they are designated. Further, Chair Person can nominate as members from certain suggested categories. The structure of DCG is indicated in the chart as below;



1.10 AID & ASSISTANCE FOR FUNCTIONING OF DISTRICT CRISIS GROUP

As per Rule 12.1 of the Chemical Accident (Emergency, Planning Preparedness and Response) Rule – 1996(2000) "The Major Accident Hazard installations" in the industrial pocket in the district shall aid, assist and facilitate functioning of the District Crisis Group.

1.11 OCCUPIERS OF MAH-UNITS TO PAY

The occupier of M.A.H. Units, as per legal and in principle has to bear the cost of loss of life, property, materials, machineries, pollution & environmental degradation etc. as applicable legal liability and in form of compensation.

1.12 STAGES OF THE EMERGENCY PLAN

There are three basic structures or stages to be considered in preparation of emergency planning, as per below.

1.12.1 STAGE : 1 Pre-emergency Period

It is the normal working period or preparatory stage for preparation, planning, obtaining resources and facilities etc. The member secretary with consent from Chair Person will conduct meetings, collect details on chemical accidents, identify M.A.H. Units, collect on-site emergency plans, their details, M.S.D.S. of hazardous chemicals, assess type of emergency & responding actions, suggest the resources against probable risks and hazards, along with maintaining emergency facilities etc works are carried out by on-behalf of DCG. Further, Member Secretary with approval by Chair Person, is carried out the work of preparation of Off-site Emergency Plan; review and modification of Off-site Emergency Plan time to time. Further, it includes preparedness, awareness, training parts and conduction of massive mock-drill/exercise during the normal working. Other members have to plan & prepare their readiness to mitigate chemical emergency at any time. Thus it is the important stage, which can be evaluated during actual emergency.

1.12.2 STAGE :2 During Emergency

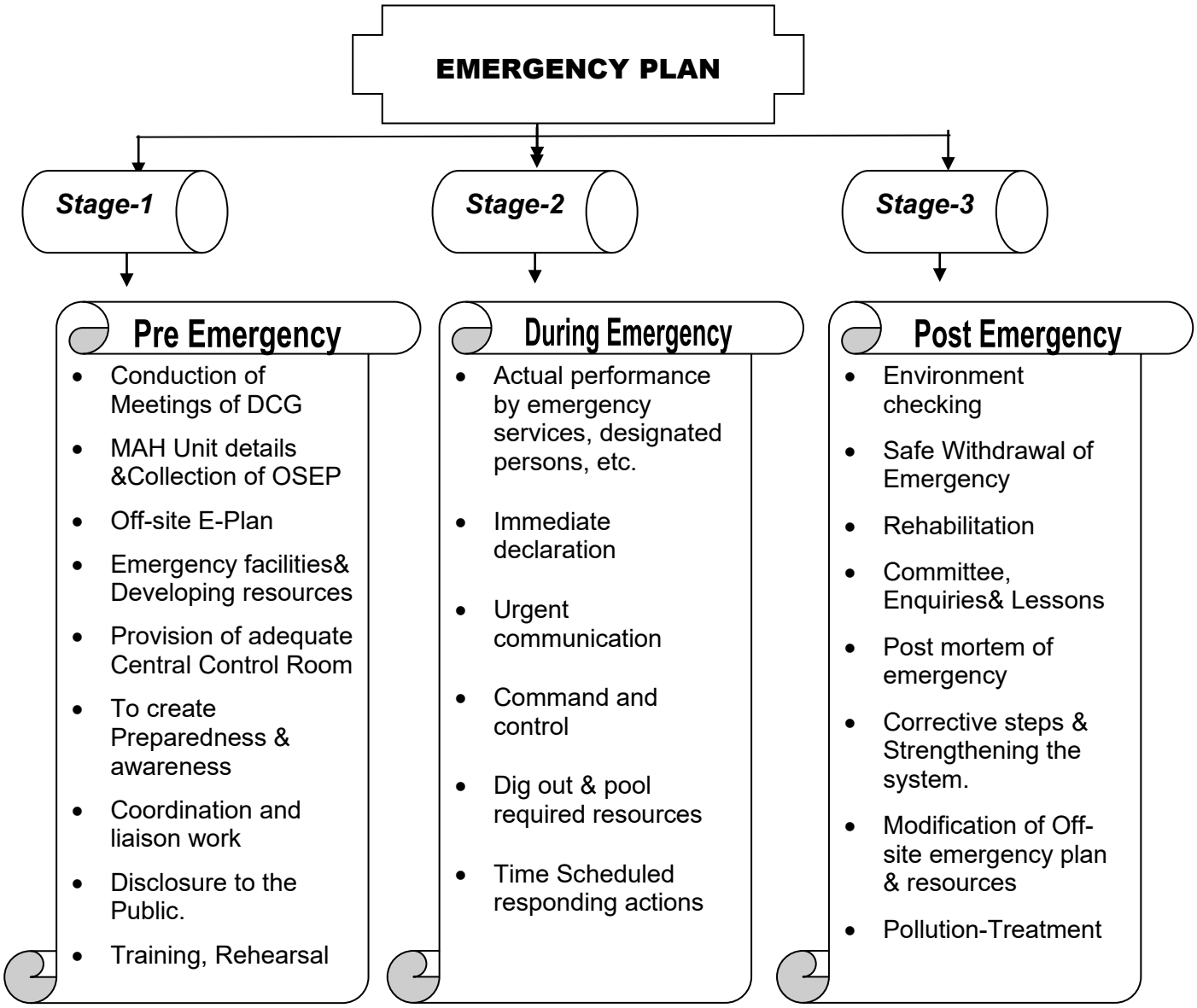
It is the actual emergency period, performance of the specific duties and responsibility of the emergency services and designated members of DCG, with use of planned resources in systematic ways. Various responding actions carried out by emergency services and other members of DCG to handle and control the industrial emergency in minimum period with coordinated way under command of chair person of DCG.

1.12.3 STAGE :3 Post Emergency

On controlling the emergency, work on safe withdrawal of emergency, safe rehabilitation, the inquiry, investigation on cause of chemical accident, improvement of resources, modification of Off-site Emergency Plan, corrective steps, Treatment of Pollution etc are processed, the stage is called as post emergency period. A meeting of DCG will be called and discussed the issues. The report will be prepared on the chemical accident & submitted to State Crisis Group.

The above stages are indicated in chart as given below:

CHART



1.13 OFF SITE EMERGENCY PLAN

Off-Site Emergency Plan is prepared to provide procedures and other details to mitigate chemical accidents in coordinated way (level-II or Level-III) by crisis group for the industrial pockets. The Crisis Group is composition of officers; selected from Government departments; (either Central or State), Emergency Services, organisations, NGO etc. Emergency services mean external bodies; out side of industrial unit; which are available to handle major accidents and their consequences. e.g. Fire Services, Police Department, Health & Medical Services etc. Off-site Emergency Plan is developed as per provisions under Schedule-12 of Rule-14(1) of MSIHC Rules-1989(2000) and different directives, various guide lines, instructions, etc issued by various authorities.

Elements of Off-site emergency Plan include as below;

1. **Organisation:** Details of command structures, Governing Body, Planning, warning system, responding procedures, control room, etc.

2. **Communication:** Communication centre, call signs, net work, emergency telephone numbers, personnel involvement, message conveying system, etc.
3. **Specialized emergency equipment:** Specified fire fighting equipment, JCB, bulldozers, Loaders, Lifting cranes, etc.
4. **Expert Knowledge:** Specialized emergency technique in chemical field, Knowledge of new development.
5. **Resources:** adequate resources and maintenance, trained persons
6. **Facilities :** adequate and suitable facilities.
7. **Meteorological data:** Weather details of area.
8. **Demography:** Population details of surrounding.
9. **Volunteer Organisations:** Volunteer services during & post emergency.
10. **Public Disclosure:** Information on type of emergency, consequences, protective measures, safe shelters, instructions, announcements.
11. **Chemical details:** Fact-sheets of MAH Installations, MSDS of hazardous chemicals, Contact Persons, maximum credible scenarios etc.
12. Assessment of risk and consequences on major Hazardous chemicals.
13. Medical & Health facilities
14. **Training:** Mock drill/exercise, etc

Thus, Off-Site Emergency Plan is important document on preparedness on major chemical accidents providing useful information/details, as mentioned above para, to all members of DCG during periods of pre-emergency, actual emergency and post emergency. Officer from Director, Industrial Safety and Health (Factory Inspector) is initiator in preparation & modification of Off-Site Emergency Plan under guidance of DISH, Gujarat State and Chair Person, Ahmedabad District Crisis Group.

AHMEDABAD DISTRICT CRISIS GROUP

CHAPTER - 2

2.1 INTRODUCTION

"Ahmedabad District Crisis Group" is a government initiative committee, as apex body to deal with the major chemical accidents and to provide expert guidance for handling chemical accidents in MAH Factories of Ahmedabad District. The committee has coordination with Local crisis Group and State Crisis Group. The members of the District Crisis Group are selected from high rank and experienced senior officers from various government departments, emergency services, non-govt. organisation and private sectors from the Ahmedabad District; andcommittee is re-constituted time to time. The members have to perform the role and responsibilities under District Crisis Group. The members are identified as Designated Persons.

Further, the members have to well prepare for Major Hazardous Accidents during preparatory period and to maintain the adequate resources at their level.

2.2 AHMEDABAD DISTRICT

2.2.1 GENERAL

Looking to the geographical condition, the different industrial pockets are located on Ahmedabad City and other parts of the district in forms of GIDC or private industrial estates or scattered. The several industries are storing, handling, processing or using huge quantities of hazardous chemicals. Further, large numbers of vehicles like, lorry, trucks, tankers, carriers, containers, etc; are transporting various hazardous chemicals by roads, or rail; from one place to other place, moving and as NH-8,NH-8A,NH-8C passing through city and district also.

Ahmedabad District is situated on the eastern side of Gujarat State; spreaded between 22° 2' & 23° 26' Northern Latitude and 71° 38' & 73° 4' Eastern Longitude. Ahmedabad city is the administrative headquarter of this District.

The surroundings of the District are as per follows:

- *North Side : Gandhinagar and Mehsana District*
- *East Side : Kheda District*
- *West side : Surendranagar District*
- *South Side : Bhavanagar District*

The total land area of District is 7205.33 Sq. Mtr.; having 486 Villages and

total population 70, 59,056 (2011). Rivers in the district, like Sabaramti, Khari, Meshvo, Bhadar, Nilakha.

Various industrial pockets are located on its periphery and other parts of the district where several industries, storing and handling hazardous chemicals.

2.2.2 TALUKAS

There are 09 Talukas in Ahmedabad District with following details.

Sr. No.	Taluka	Area Sq. Km	Total Villages	Population
1.	Daskroi	656.59	64	2,33,925
2.	Sanand	784.56	67	1,95,005
3.	Bavla	789.89	48	1,24,000
4.	Dholka	1004.65	71	1,66,641
5.	Viramgam	810.91	68	1,31,680
6.	Detroj	427-94	52	76,555
7.	Mandal	475.26	37	58,064
8.	Dhandhuka	1763.47	46	74,960
9.	Dholera	920	33	32,475
Total (2011)		7205.33	486	10,93,305

2.2.3 DEMOGRAFIC DETAILS

The population of different area/ Villages/Cities are to be collected and to keep separately.

2.2.4 OTHER DETAILS

Further, other details in respect to the District are given below;

1. Primary School : 2077	1. Hospitals : 251
2. Secondary School : 565	2. Primary Health Centre : 27
3. Higher Secondary Schools : 267	3. Primary Health Sub Centre : 160
4. Colleges : 61	4. Dispensary : 383
5. Post Offices : 284	5. Family Planning Centre : 89
6. Forest Area : 11.37 Sq. KMS	6. Child Welfare Centre : 17
7. Irrigated Area : 892.55 Sq. KMS	7. Maternity Hospital :151

2.2.5 MAP OF THE DISTRICT

The map of the Ahmedabad District is given at **Annexure -2.**

2.3 WEATHER DATA

Meteorogical detail of Ahmedabad District is given at **Annexure-19.**

2.4 AHMEDABAD DISTRICT CRISIS GROUP

2.4.1 GENERAL

Ahmedabad District Crisis Group is constituted as per C.A. (EPPR) Rules-1996. The members are selected from various Govt. departments, organisation, agencies, industries, NGO and other categories to get effective result.

The designated persons have to perform the role and responsibility for the purpose of major chemical accidents / emergency, as apex body in the District; under Schedule VII of Rule 8-b of Chemical Accidents (Emergency, Planning Preparedness and Response) Rules – 1996(2000).

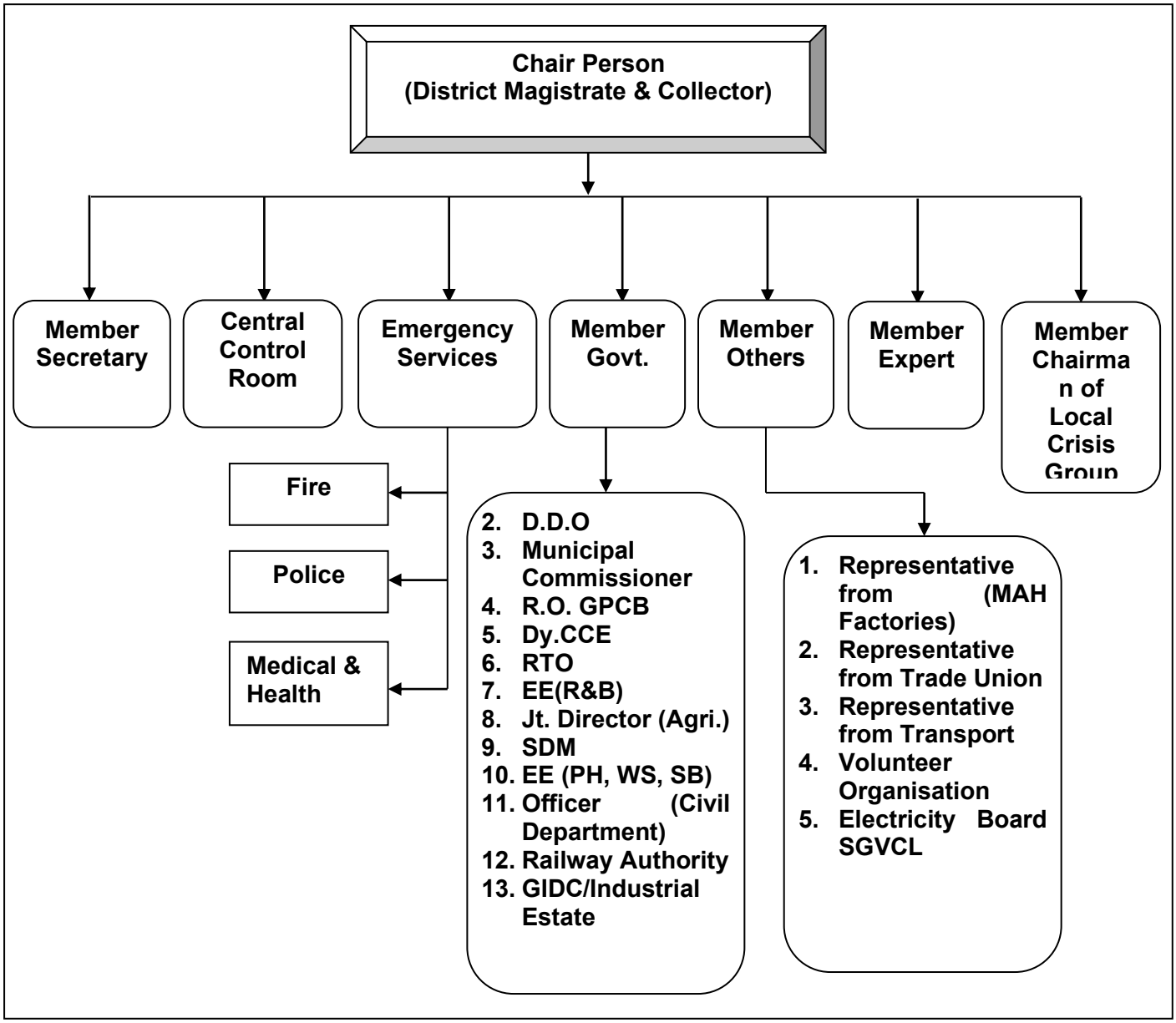
2.4.2 FUNCTIONS

The main functions of the District Crisis Group as per Rule 8 & 9 of C.A. (EPPR) Rules, are;

(1) DCG is an apex body in the District to deal with Major chemical accidents & to provide expert guidance for handling Chemical accidents.
(2) To prepare off-site Emergency Plan for the District.
(3) To review all the on-site emergency plans prepared by the occupiers of MAH Units for the preparation of off-site emergency plan.
(4) Identification of Off-site emergency situations in the industrial pockets
(5) Assessment on vulnerability area.
(6) The management on Major chemical accidents at the site, within the District & setting of response facilities.
(7) To conduct training programme on emergency preparedness and response procedures.
(8) Continuous monitor every Major chemical accident.
(9) To operate the central control room to carryout the functions, duties, plan-proceedings, meetings, record keeping, information, data, computers with requisite staff.
(10) To forward report on the Major chemical accidents to the State Crisis Group.
(11) To conduct at least one full scale mock-drill/rehearsal/simulation of a within fifteen days chemical accidents at a site each year and forward a report of the strength and weakness of the plan to the State Crisis Group.
(12) To modified & update Off-site emergency plan at regular interval with the views of:
    a. Major Accidents / incidents occurred during the period.
    b. Addition/alteration of Major Accident Hazardous Units in the District.
    c. Incorporating the additional resources and facilities created.
    d. Experience gain during actual emergency.
(13) The District Crisis Group shall meet every forty five days and send a report to the State Crisis Group.
(14) To ensure continuous information flow from the District to the Central and State Crisis Groups.

2.4.3 THE STRUCTURE

The structure of Ahmedabad District Crisis Group is given; in chart; as below:



2.4.4 COMPOSITION

The present composition of Ahmedabad District Crisis Group is appended at **Annexure -3**.

2.4.5 INDUSTRIAL POCKETS OF AHMEDABAD DISTRICT CRISIS GROUP

There are Nos.**35 M.A.H. Units** in the District as identified by the DISH-Office, Ahmedabad; Industrial pockets as identified in the Ahmedabad District according to industrial growth and location of M.A.H. Installations/Units are as given below;

1. Ahmedabad-1: Vatva–Narol Industrial Pocket=17 M.A.H. Units
2. Ahmedabad-2 : Odhav- Rakhiyal-Naroda-Sabarmati Industrial Pocket=04 M.A.H. Units
3. Ahmedabad-3: Sanand-Dholka-Dhandhuka-Viramgam,Mandal,Detroj Industrial Pocket-=14 M.A.H.Units

2.5 INCIDENT REPORTING PROTOCOL

Generally, most major chemical accidents are happened at the odd-time and the appropriate authorities get the authentic information vary late, so required helps could not reach in time. In this circumstance, first information reaching in time is important factor. If LCG has handled the situation, then; it should report immediately on starting actions to the DCG. Otherwise the Site-Main Controller or responsible person from affected installation/MAH Unit or any other responsible person from neighbouring industries or lay-man will immediately inform to the off- site Authorities, either to Fire, Police, Central Control Room, District Collector, or Directorate of Industrial Safety & Health., with at least following details, if possible:

(1) Identity himself by name, designation & organization
(2) Location of incident (Name of factory with location, Plant/Section/ Department)
(3) Involvement of chemicals (Name of probable chemicals)
(4) Type of emergency (Fire, Explosion, Toxic Release, along with direction of gas cloud movement, damages etc)
(5) Time (Probable time of started & reporting)
(6) The type of help & resumes actual required.(Type of fire equipment, neutralising agent, short route)

It is also possible that any other person who see/ hear the fire/ explosion incident and informs the police or fire, before they receive call from the affected unit.

The information receiving officer/person will verify & confirm the said news and conveying to other emergency services and mobilise to the incident place. This part is said as Incident Reporting Protocol and it is the origin of the activating Off-site Emergency Plan.
Further, the Chair Person; DCG has to communicate report on development of event to State Crisis Group.

2.6 ANATOMY OF EMERGENCY

Important elements of mitigation of major chemical accident are emergency planning, preparedness, recognition and responding actions. The phases of anatomy of chemical emergency are described as;

1. Recognition of type of major chemical incident;
2. Warning phase;
3. Responding phase;
4. Recovery, rehabilitation & reconstruction phase.

MANAGEMENT OF MAJOR CHEMICAL ACCIDENTS

CHAPTER - 3

3.1 INTRODUCTION

The implementation of accident prevention measures at an industrial installation is an internal function of the unit. It is termed as emergency at on-site. It is called as on- site emergency, level-I. Further, if the gravity of the incidence is very high like, more numbers of injury, fatality, damages, and it develops to off-site consequences, it becomes the responsibility of external authorities to apply counter measure efforts to control such incidence with minimizing the damage to men, materials & environment. It will identified as Off-site emergency, level-II, again, if high toll rate then, it will identified as level-III or Level-IV Here, the government have come foreword and constituted alert group systems at various levels to tackle such chemical emergency. Off-site Emergency Plan for the industrial pockets of the district is prepared to manage the chemical emergency/disaster, involving officers from government and other agency.

3.2 DETAILS TO BE COLLECTED FROM MAH UNITS

The management of M.A.H.Units of the District has to submit their On-site Emergency Plan to the D.C.G. for preparation of Off-site Emergency Plan of the District as per Rule 9 (d) of the C.A. (E.P.P.R.) Rules-1996.The following major details shall be required from the management of M.A.H.Units:

1. Type of chemical Accident, involved chemical, with quantities, worst scenarios, effect(which can escalate in to off-site emergency), probable duration, casualties, damaged,
2. Location of Hazardous chemicals with stock, and their M.S.D.S.
3. Resources can be spared by the management of Affected Unit.
4. List of S.M.C., I.C., Key Person, Essential Workers, with their contact numbers.
5. Location of Safe Assembly Point, Emergency Control Point with In-charge Person, Parking Area and Approach route, Medical centre, etc.
6. List of required helps, resources (Type of Fire Fighting materials, Damage Control System, Repair Items etc), Neutralising Agents, Type of emergency equipment, etc.
7. Matter to notify to Public, Evacuation arrangement.
8. Arrangement of disposal of waste, clean up; etc.

3.3 APPROACHES TO CLASSIFYING CHEMICAL ACCIDENTS

When any chemical accident strikes at the industrial units or during transportation, the first step is to identify such incident in common terms, as

given below:

1. Type of chemical involved and state (Liquid, Gas, Solid, Powder, Lump, Compressed substance).
2. Type of Incident (Fire, Gas Dispersion, Explosion, Liquid spreading, Collapse of structures, Falling, Bursting of vessel, inhalation of toxic/poisonous gas, etc.)
3. Source of release and maximum storage quantity.
4. Size of area contaminated or to be contaminated
5. Numbers of people exposed to at risk at the site.
6. Routes of exposure/dispersion
7. Medical Consequences
8. Contact person with phone or mobile numbers.

In chemical terms, type of incidence- groups mean;

(1) Flammable,
(2) Toxic,
(3) Corrosive,
(4) Poisonous,
(5) Explosive, etc.

3.4 MANAGEMENT

The members of DCG should have proper knowledge and basic details/data on matters of off-site emergency with respect to installations with hazardous chemicals stored or used. Further, it is suggested to entrust responsibility to one of senior and experienced persons/officers from DCG, who will plan to ensure full requirement of infrastructures, equipment, trained persons at the off-site level by preparing in;

1. Short term Plan,(0-2/3 Years);
2. Medium Term Plan, (0-4/5 Years); and
3. Long Term Plan (0-6/7 Years)

For implementation of all identified steps and categorised under Off-site Emergency Plan.

Members of DCG have to manage the chemical accidents. The essential details/information shall be collected and updated during pre emergency period.

The required details for managing plan are listed as below;

A. MANAGEMENT PLAN:

(1) The procedure to get information on accidents/emergency.
(2) Role & Responsibility of members & Emergency Services
(3) Work-Coordination between Members
(4) Chart on conveying messages
(5) Arrangement of Central Control Room & Alarm system
(6) Responding Actions

B. BASIC DETAILS ON CHEMICAL MATTERS:

(1) List of M.A.H. Installations of the District
(2) Probable Major Accident Scenarios
(3) M.S.D.S. & Salient Properties of some chemicals
(4) Care for safe handling of some chemicals
(5) Colour Code System for Pipe Lines
(6) List of Expert Persons
(7) Special Medical Treatment and Antidots
(8) A proposed Scale for Grading of chemical disasters.
(9) Some Major Accidents in India
(10) List of relevant Statute on hazardous chemicals
(11) Glossary of Terms and Definitions
(12) C.A. (EPPR) Rules-1996.

3.5 FIRST INFORMATION

Some times, first information may get by Fire-officer / Police department/ Factory Inspector (DISH) / CCR, then it will be communicated to Chair Person for further actions. However, the first response team, who has the knowledge of the area, identification of hazards of storage or transportation of hazardous chemicals in the area, formulation of emergency organizations at different levels, who identified key person for rendering effective response during chemical emergency; is the frontal organization that is responsible to initiate response for all types of off-site emergencies. It should be ensured that messages, in correct method shall be reached to concern persons in time with required type of helps or resources. On getting messages, the concern persons must reach immediately at the place of incident and start responding actions at their level, with communicating to respective authority.

3.6 EMERGENCY SERVICES

The emergency services, who may get first information on chemical accident, they should reach to the incidence site earliest and render their services. They have to communicate the message, with actions taken & required further helps/resources to Chair Person and other members in time. The emergency services means;

1) Fire Services
2) Police Department
3) Medical & Health Services
4) Other Supporting Services

3.7 WORK-COORDINATION BETWEEN MEMBERS

The prime requirement during a chemical emergency is well-coordinated & collective efforts for effective management and control. This calls for identification of personnel and resources that will be involved in each function of emergency response such, as fire fighting, medical, rescue and combat, communication, etc. These personnel will function as a team for each distinct activity and may or may not be involved in all types of activities.

For effective handling such situations, the response agencies need to be in a good state of operational readiness and this requires meticulous planning on

their part. While each member needs to identify and train first and second alternate officers, who can act on their behalf during their absence at the time of emergency handling emergency situations.

3.8 SUB-COMMITTEE OF DCG FOR GRAVE INCIDENT

The separate sub-committee can be constituted as per large scale grave situation of chemical accident, as per suggested as below;

(1) Management Group :

a. Under Head of Chair Person;
b. Members; consist of: Commandants from Police, Fire, Medical, Health;
c. Member Secretary,
d. Expert persons,
e. Site Main Controller of the affected unit,
f. Information Officer,
g. Municipal Commissioner,
h. District Development Officer,
i. I/Central Control Room,
j. Chair Person of LCG, etc.

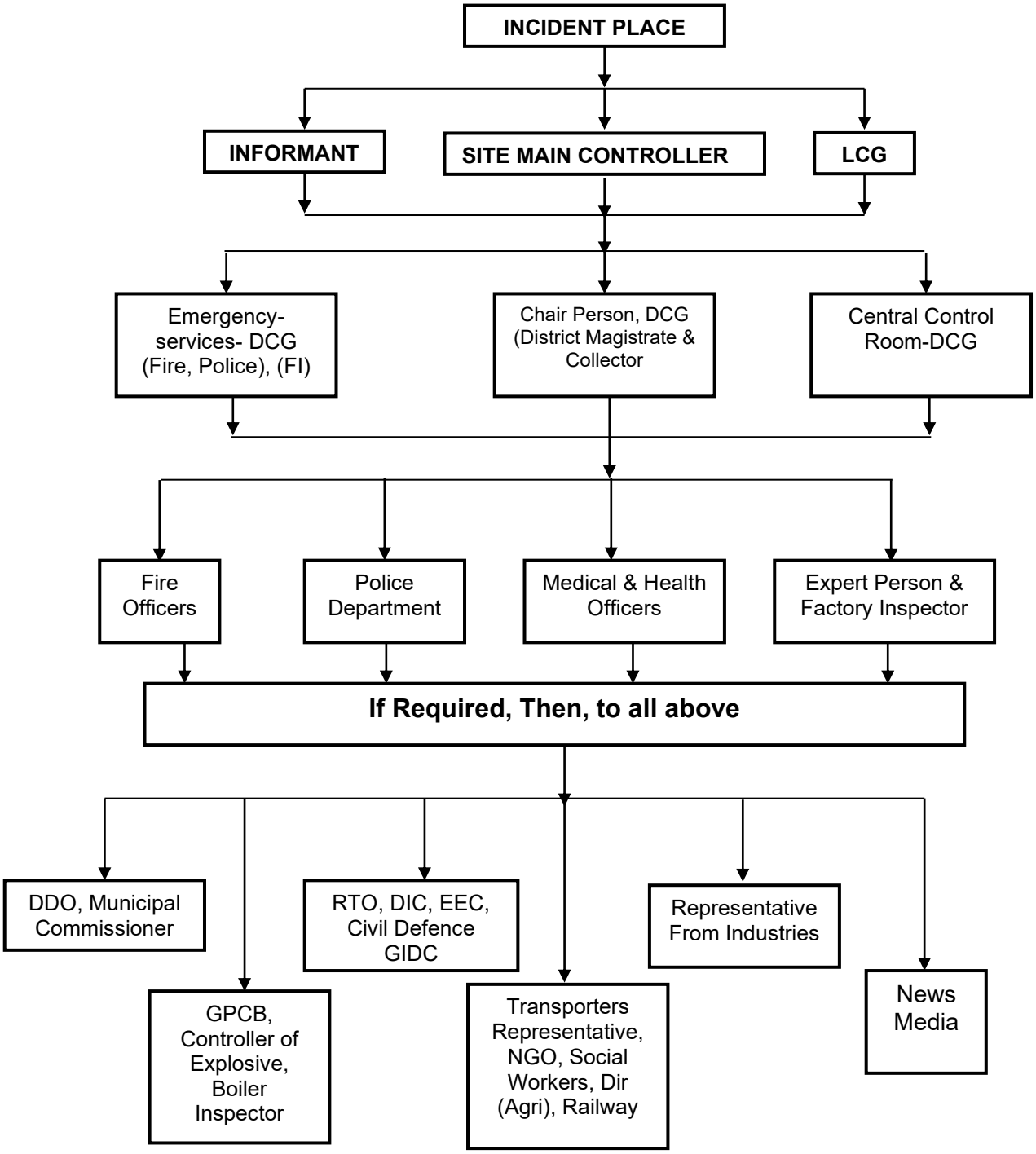
(2) Working Group; consist of:

Task Force, consisting of persons from Police, Fire, Medical and Health Departments/organisations.
RTO, Civil supply, Water, Drainage, Waste Disposal, etc Authority.
GPCB- Officer, Officer from PESO, Boiler-Inspector, etc...
Incident Controller from affected unit, Technical Experts, Volunteer Group, etc...

3.9 CHART ON CONVEYING MESSAGE

The success of the emergency depends on reaching correct message and immediate actions on site by emergency management which includes emergency services and members of DCG. It is the real performance by members during emergency period and post emergency period.

The flow of message/information or directives to each member during chemical emergency is indicated in the chart given as below;



3.10 ROLE & RESPONSIBILITIES OF DESIGNATED PERSONS

The various actions are to be performed by designated persons to handle & control the chemical accidents timely, pre-decided and in coordinated way under the guidance of Chair Person, DCG.

Combating the emergency and minimizing the damage to people, property and environment; depends on the following factors;

1. Lapsed time between striking of emergency and communication to emergency services.
2. Effective, perfect, and immediate communication of emergency messages to the respective designated persons.
3. Response, time-activation & mobilization of resources at appropriate places.
4. Quality of decision making at site and at Central Control Room.
5. Deployment of resources in effective manner.

Generally Members of DCG are engaged in their own routing work and all of sudden getting message on chemical accident, they have to equip immediately and concentrate on emergency situation. In order to achieve higher order of controlling emergency on the site effectively, their roles and responsibilities shall be specifically defined. The involved designated person are requested to prepare own action plan for their Task force with adequate & necessary resources /facilities, keeping in view of risk involve in the chemical accidents; as specified their role & responsibilities. The guidelines for purpose of awareness, alertness & preparedness to tackle such emergency are indicated in forgoing Para.

3.10.1 CHAIR PERSON (DISTRICT MAGISTRATE & COLLECTOR)

Being Chair Person of District Crisis Group, he will be in over all charge & command of DCG & has to assist the members for responding emergency actions to control the chemical accidents effectively and urgently in the industrial pockets of the District; in case of chemical accident/ emergency Level-III. The Member Secretary will coordinate the work with the members during pre emergency period. Chair-Person has to ensure that participating members should have to perform their assigned roles effectively with adequate resources.

The role and responsibilities of the Chair person, includes:

A). To call & conduct the meetings.

B). To assist in preparation or updating of off-site emergency plan for the District by reviewing the on-site emergency plans of MAH Units.

C). To ensure abilities to perform the role of each involved emergency services and designated members effectively.

D). To activate and maintain the Central Control Room round the clock with essential facilities.

E). To assess situation during emergency and have to declare the industrial emergency, call and direct the emergency services & designated persons to respond the industrial emergency by providing reinforcement and support by pooling the required resources from the District.

F). The arrangement for rescue, evacuation, shelter, food, water, clothing,

and transportation to affected area, as per situation. Announcement on industrial emergency to the public in vicinity of the affected Unit.

G). If situation could not control even after utilising resources at his command, it should be reported to SCG immediately and then SCG will take charge of situation.

H). To keep inform to the higher authority time to time.

I). To declare the withdrawal or termination of emergency.

J). To look after rehabilitation, restoration, cleanliness etc on post-emergency actions.

K). To submit the reports on industrial emergency to SCG.

L). To conduct the mock drill / exercise on industrial emergency.

3.10.2 MEMBER SECRETARY: Dy. Director of Industrial Safety & Health (Factory Inspector)

The major role of Member Secretary has to perform coordination with members of D.C.G. &preparation of Off-site Emergency Plan for District during pre-emergency period i.e. preparatory work. However, as Member Secretary of District Crisis Group, his role includes;

A). To arrange & attend the meetings of District Crisis Group in consultation with Chair Person, as Member-Secretary of D.C.G.

B). To identify Major Accident Hazardous units in industrial pockets & maintain up to date list and submission of details to D.C.G.

C). To feed technical & chemical data & information in respect of M.A.H. industrial units situated in the District. To provide technical inputs to ensure safety, health & environment of workers, properties and population in vicinity.

D). To prepare or update the off-site emergency plan for District Crisis Group. The Off-site emergency plan should dovetail with the on-site emergency plan as prepared by the major accident hazardous units in the industrial pockets.

E). To advice & guide the proper & effective handling actions as required by emergency services/designated persons during chemical emergency.

F). To help to conduct the mock drills, post emergency inquiry etc.

G). Other duties as specified by Chair Person of District Crisis Group.

3.10.3 MEMBER- FIRE SERVICES (FIRE COMMANDANT)

Most probably, the first information regarding any incidence / event / fire / gas leakage is received by the fire services. Thus, fire service, being first informant has to play the major role during the industrial emergency.

A). To participate the meetings, Mock Drill / Rehearsal & training.

B). Inspection, Survey & assess the situation during emergency & to report.

C). Immediate response actions to control the industrial emergency, under intimation to Central Control Room or Chair Person.

D). Proper training to fight against industrial hazards and knowledge of identification of such hazards.

E). Rescue, Evacuation, Removal of debris, Pollution control and other emergency work as directed or instructed.

F). To maintain the proper and adequate fire fighting, equipments, neutralizing media, self-breathing apparatus, emergency equipments, personnel protective equipments with maintaining in working order.

G). The knowledge & information on different type of alternative resources, various types of extinguishing media, neutralizing media, chemical properties and their hazards with safe handling procedure.

H). Liaison & coordination with Central Control Room and other emergency services.

I). To prepare their own details action plan & to ensure the adequate facilities & provisions to handle the industrial emergency.

J). Other duties as required during actual emergency.

3.10.4 MEMBER- POLICE DEPARTMENT (POLICE COMMANDANT)

Another authority who gets the first information on incident / accident is police department. The following actions are to be carried out by police department for industrial emergency purpose.

A). To participate the meetings & Mock Drill / Rehearsal & Training.

B). To assess the situation during emergency and report immediately.

C). To maintain the law and order during the industrial emergency. To control the traffic and control the affected area.

D). To protect the life of people, inside, outside as well as road movers.

E). To protect the property & environment. Announcement during emergency to public in the vicinity of the affected Unit.

F). Evacuation, rehabilitation, shelter & transportation work & other arrangement during the industrial emergency as per prevailing situation.

G). Help & assist to make area clean, removing of any structure and other similar work as required during actual emergency.

H). Liaison & coordination with Central Control Room and other emergency services / organization / agencies.

I). To prepare their own detailed action plan & to ensure the adequate facilities & provisions to handle the industrial emergency & train participating person for industrial emergency.

J). Other duties as required during actual emergency.

3.10.5 MEMBER- MEDICAL & HEALTH (COMMANDANT) -

The health and medical services have to play vital role following the emergency. One fold is proper & timely treatments to the victims, injured or affected persons. Other fold is to safe guard the public health.

The following actions are suggested for health & medical services.

A). To participate the meetings & Mock Drill / Rehearsal & Training.

B). To ensure the adequate arrangement & preparedness for special medical

treatment with antidotes and trained doctors, Para-medical staff, as specified in toxicology at the time of industrial emergency in District.

C). On declaration of emergency or on receiving the message or information, prompt medical facilities shall be set up e.g. first aid post, casualty receiving centre/ camp, as per gravity of situation at site. Similarly, arrangement for emergency operation or special treatment on chemical burn, injury, gas dispersion etc with adequate arrangement. To provide Hospital Base services.

D). Identification of dead bodies and post mortem arrangement.

E). To maintain upto-date list with telephone nos. of services of doctors, hospitals, ambulance, primary health center, Para-medical staff, vehicle to meet the emergency situation.

F). Arrangement to inform the upto-date status time to time to Central Control Room, Chair Person, relatives of injured or admitted patients, emergency services etc.

G). Arrangement to safe guard the public health in case of development of epidemic situation or pollution & announcement on specific safety measures to be taken by public at the time of industrial emergency situation.

H). To advice & guide the District Crisis Group in respect of medical & health part, time to time.

I). Provisions for proper and adequate medicines, life saving drugs, equipments, antidotes etc. related to chemical accidents.

J). To prepare own detailed action plan to ensure the effective handling and response during industrial emergency.

K). Liaison & coordination with Central Control Room, Chair Person, Emergency Services organization, agency and other related person.

L). Other duties as required during actual emergency.

3.10.6 MEMBER- DISTRICT DEVELOPMENT OFFICER

Being a responsible person of District and member of DCG, he has to ensure all work related to industrial emergency shall be given prime importance and provide all helps with in his command.

A). To participate meeting, mock drill & training.

B). Ensure the different authorities, agencies, organization, persons, as specified their role, should participate immediately during industrial emergency in District Pocket area.

C). To advice & guide to the District Crisis Group.

D). Liaison & co-ordination with Chair Person, Central Control Room, emergency services, organization, agencies, person etc.

E). Other duties as specified by District Crisis Group.

3.10.7 MEMBER- MUNICIPAL COMMISSIONER

Being highest authority of the Ahmedabad-city & member of DCG, Ahmedabad Municipal Commissioner has to provide the facilities, helps & arrangements as required during industrial emergency. However, his role can be described as below;

1. To participate meetings, mock drill and depute a responsible officer for the industrial emergency purpose.
2. To arrange to receive causalities during an emergency under the control of Corporations' Hospitals.
3. To arrange to mobilize the fire fighting equipments and facilities.
4. To arrange to provide medical supplies and equipments to Civil Hospital / Municipal Hospitals.
5. To arrange to check occupational health effects to the citizens and to take actions accordingly.
6. To arrange to make schools and other premises available for shelters.
7. To arrange to blow the city sirens for alarming the public.
8. To arrange to inform the concerned department-heads to provide facilities such as water, sewage, electricity, medical and health, education department etc. Convey them keep ready to provide available facilities during emergencies.
9. To arrange to rehabilitate evacuated population affected during the emergency.
10. To arrange other helps and facilities as required during actual emergency.

3.10.8 MEMBER - REGIONAL OFFICER- GPCB

The authority or officer from Gujarat Pollution Control Board is the member of District Crisis Group, who has to perform the role as per following:

A). To participate meetings, mock drills / exercises and training.

B). To prepare own detailed action plan to ensure the effective control of industrial emergency & subsequent action.

C). Liaison with Central Control Room, Chair Person, Emergency Services, Organization agencies & other related persons.

D). Advice & guidance to the District Crisis Group in respect of environment protection in the industrial pocket.

E). To provide the technical input regarding environment and evaluate the contamination or adverse health effect during industrial emergency.

F). To provide the details & information on development of emergency situation and suggest regarding safe level area to the life and suggest area to be evacuated and other safety measures.

G). To measure the safe level and suggest for restoration & restarting of work before termination of emergency.

H). Liaison and co-ordination with emergency services & expert persons etc.

I). Other duties or work as directed by District Crisis Group or Chair person.

3.10.9 MEMBER- Dy. CONTROLLER OF EXPLOSIVE(PESO)

Dy. Controller, Petroleum & Explosive Safety Organisation, has to attend the meeting, exercise/mock Drill and Training. He has to provide the details /information of the units with in their command. Follow the instruction as directed by the Chair person or DCG.

3.10.10 MEMBER- REGIONAL TRANSPORT OFFICER

A). To participate meeting, mock drills & training
B). Respond to collector and police instructions about emergency transport actions and to coordinate the work.
C). Provide adequate transport facilities required for both persons and materials during chemical emergency.
D). Arrange for deployment of vehicles with full fuel levels.
E). Streamline traffic flow and parking yard movement.
F). Co-ordinate deployment of private vehicles, if required.
G). To prepare own detailed action plan to ensure effective handling on industrial emergency.

3.10.11 MEMBER- DIRECTOR, INDUSTRIES CENTRE

He has to attend the meeting, exercise/mock Drill and Training. He has to provide the details /information of the units with in their command. Follow the instruction as directed by the Chair person or DCG.

3.10.12 MEMBER- Jt. DIRECTOR (Agri)

He has to attend the meeting, exercise/mock Drill and Training. He has to provide the details /information on agriculture with in their command. Follow the instruction as directed by the Chair person Or DCG.

3.10.13 MEMBER- DIVISIONAL MANAGER, WESTERN RAILWAY

On getting message at the time of disaster from Chairperson, Emergency Services or Central Control Room, the Divisional Manager, Western Railway, Ahmedabad will act as follows:

1. To follow the standing instruction to all railway gates to take actions as asked by the Station Master.
2. To decide authority level of railway staff to take actions.
3. To carry out evacuation by railway, if required.
4. To take care of floating population at railway stations and on board travellers.
5. To issue the standing instruction to Station Masters on up and down railway stations, to stop the train as soon as emergency message is received from C.C.R. or Authority.
6. To attend the meeting, exercise/mock Drill and Training.
7. Follow the instruction as directed by the Chair person or D.C.G.

3.10.14 MEMBER- CIVIL DEFENSE COMMANDENT

A). To participate meeting, mock drills & training
B). To prepare own detailed action plan to ensure effective handling on industrial emergency
C). To assist police in rescue and evacuation work during emergency.
D). To provide security, cordoning the area and other services as required during the industrial emergency.
E). Co-ordination with Central Control Room & Emergency Services.
F). Follow the instruction as directed by the Chair person of D.C.G.

3.10.15 MEMBER- REGIONAL OFFICER,GIDC

He has to attend the meeting, exercise/mock Drill and Training. He has to provide necessary help and other details /information of the units with in their command. Follow the instruction as directed by the Chair person of D.C.G.

3.10.16 MEMBER- Representatives from MAH Units

The management of major accident hazardous unit has to maintain update on-site emergency plan with necessary details with accurate information and a correct assessment of the situation. The site main controller is responsible to provide report immediately on occurrence of chemical accident at his unit with specific details, development and needed help from District Crisis Group. He will arrange & provide all resources, equipments, manpower, and communication network from his own unit and co-ordinate with District Crisis Group to combat the industrial emergency. He will co-ordinate with chairperson, Central Control Room, emergency services etc. participation in meeting, mock drill etc. Follow the instruction as directed by the Chair person of D.C.G.

3.10.17 MEMBER- ELECTRICAL ENGINEER, Electricity Board (CGVCL)

A). Arrange for un-interrupted power supply, if needed.
B). Arrange for lighting at temporary medical camps, rallying points and parking yards.
C). Take care of electrical equipment within damage affected zone.
D). Arrange for switching off power supply if requested by authority.
E). To participate meeting, mock drills & training
F). To prepare own detailed action plan to ensure effective handling on industrial emergency
G). Follow the instruction as directed by the Chair person of DCG.

3.10.18 MEMBER- EXPERTS

The chemical manufacturing activities along with large storages of various chemicals are day-to-day increasing. The chemical emergency often gives very short time to respond their containment. Therefore, it requires specific

knowledge of hazards with special treatment and their consequences. This needs chemical & technical expertise in handling of large-scale toxic and hazardous chemical emergency. They will provide careful evacuation of emergency and advise prompt responding actions to control the emergency if required. The planned responding resources will help to control such emergency.) Follow the instruction as directed by the Chair person of DCG.

3.10.19 MEMBER- CHAIR PERSON (LOCAL CRISIS GROUP)

Being a chair person of the Local Crisis Group, the member of DCG, has to provide all the information of the units under his command as & when asked for. Further, he has to report, if any chemical accident occurs within his industrial pocket and development. Follow the instruction as directed by the Chair person of DCG.

3.10.20 MEMBER- Volunteer Organizations (N.G.O.)

The volunteer organization / services can play vital role to convince the person / public to evacuate the residence / place and to shift to safe shelter timely, in case of such situation happen during Chemical emergency. To save the life of public is more important factor, which will be successfully carried out by the volunteer organization. Follow the instruction as directed by the Chair person Or DCG.

3.11 CENTRAL CONTROL ROOM

3.11.1 INTRODUCTION

The Central Control Room is the place under the control of chairman of District Crisis Group, where the operations to handle the emergency are directed and co-ordinated. It is the centre of mobilisation of information, liaison, communication, coordination, meeting place, etc related to activities on chemical emergency actions.

3.11.2 FUNCTIONS

The Central Control Room should be equipped to receive and transmit the message/information and directives from and to the Chairman; DCG, members, areas of the incident, emergency services, public, mutual aiders, private organizations and other sources.

In addition to the means of communication, the CCR should be equipped with relevant data and equipments. The In-Charge of CCR should be conversant with the developing situation and enable them to plan accordingly. CCR has to work round the clock during all the period.

3.11.3 LOCATION

It should be situated in an area of minimum risk and close to road to allow for ready access, with adequate communication facility.

3.11.4 ROLE OF CCR

There are three phases of activities to meet the emergency:

Phase I	During Normal Circumstances (Pre-emergency Period)
Phase II	During Actual emergency Handling (During Emergency Period)
Phase III	After Emergency (Post Emergency Period)

3.11.4.1 *PHASE -1 :DURING NORMAL CIRCUMSTANCES*

1. The Central Control would be operated on round the clock basis, by a selected staff of 2 or 3 persons to receive any information about the incidents.
2. It should be kept in readiness to meet the emergency role.
3. The prime function of Central Control Room is to get correct information and spread the correct massage or details to requisite places/agencies immediately and speedily.
4. To maintain the following at CCR:
    a. Updated district contingency plan - 10 Copies
    b. General Situation Map – covering whole area showing Road /Railway crossing, shelters, Factories, Base Hospitals, Casualty Reception Centers etc.
    c. Suitable information to enable securing of relevant expertise services from other sources, if necessary.
    d. List of persons required to take over command of specific emergency operations, their residential address with telephone numbers.
    e. Update the charts displayed at CCR.
5. The In Charge of CCR will also maintain periodic touch with emergency /services and external agencies, with a view to obtain their resource position.
6. In consultation with Member Secretary and chairman, the CCR will arrange to simulate/exercise the emergency plan, then problem areas identified & remedial measures incorporated in the plan.
7. CCR shall co-ordinate to impart training and arrange public awareness programme in the respective areas with the help of voluntary/ industrial organizations.
8. Other work as allotted by Chairperson & District Crisis Group.

3.11.4.2 *PHASE II :DURING ACTUAL EMERGENCY*

1. On getting information about incident /accident, the station in charge of CCR with consultation of Chairman, DCG and emergency services, should arrange to blow sirens, fixed at various places and calls for all respective agencies /commanders and their team to take up positions at the CCR & place, as decided on duties on declaration of emergency.
2. In charge of CCR has to confirm that the emergency services have reported and started the works to predetermined places and gets the details of the scene of the incident.
3. In the event of emergency, the primary need will be to pull the local

resources of the Industrial units into co-ordinated actions, arrange additional resources from city Municipal authority, Govt. Agencies, Voluntary Organizations and if required involve State & National Governmental, Non-Governmental and voluntary/professional/non-professional agencies into actions.

4. As per situation of the incident, the following procedure for communication to general public may be adopted:
   i. To clearly communicate life saving information to the trapped in endangered area.
   ii. Official statement of instructions to the general public regarding general information on emergency situation so that rumours will not spread.
   iii. Announcement advising people to leave a critical zone & go to pick up points for safe designated shelter.
   iv. Announcement regarding the extent of potential threats /or danger and what actions are required by them during the evaluation or rescue.

3.11.4.3 ***AFTER EMERGENCY***

1. To continue about the restoration of normalcy to the affected areas & emergency services after getting clearance from environmental authorities & Chairman DCG.
2. Compile the final status of all kinds of information and furnish to Chairman DCG after the emergency.
3. To prepare a report about the activities carried out at CCR & the difficulties faced with the remedial actions to the Chairman, DCG.
4. To preserve relevant records and equipment for the subsequent enquiry into the cause and circumstances of the disaster /emergency.
5. To arrange debriefing meeting to get more details from each agency.

3.11.5 SIREN CODE

❖ To establish a warning system for different level of emergencies, it Is Important to note that wailing tones of siren for emergency purpose must be distinct from normal usage by the Industries for begin/end of shifts. Suggested modes for emergency purpose are:

- For accident scenarios having off-site consequences — short out bursts of 5 seconds for 2 minutes.

- For All-Clear signal: A long siren of 1 minute duration.

3.12 Formats

DCG is apex body in the district and to keep the certain records of every chemical accident happened in the district as indicated at **Annexure 32**, as per C.A. (EPPR) Rules1996. Further, Format for mock-drill is given at **Annexure-29** and details on conducted mock-drills are given at **Annexure-30**.

CHEMICAL CRUNCH

CHAPTER - 4

4.1 GENERAL

Chemical means a basic structure that used in chemistry or produced by chemistry. Hazard means something that is dangerous (1) a Fire Hazard, (2) a Health Hazard, (3) an Occupational Hazard (4) a something unpleasant that happens to people who do a particular job. Further, Chemicals have different properties like Fire, Explosion, Toxic, Corrosion, Poisonous, Reactive etc.

The large numbers of industrial units are engaged in manufacturing various chemical-products and they are storing, handling, using large & bulk quantities of different hazardous chemicals. It has also resulted into the heavy transportation & movement of hazardous chemicals by vehicles; like tankers, trucks, carriers, Lorries, etc. on road/rail.

Chemical accidents/disasters may occur due to process deviations concerning the chemistry of the process, pressure, temperature or other identified parameters with regard to the state of substance i.e. solid, liquid or gas; proximity to other toxic substances and probability of runaway reaction due to the incidental mixing of two or more hazardous chemicals with dissimilar properties.

In addition, it may be due to hardware failure, resulting in large-scale spills of toxic substances (in any form) due to loss of containment, or an explosion. Further, Boiling Liquid Expanding Vapour Explosion may occur due to any source of ignition (like any type of spark, shock, frictional force etc) on the chemicals during transportation.

The effect can be further compounded by micro-meteorology of the area, wind speed and direction, rate of precipitation, toxicity/quantity of chemical released, population in the reach of release, probability of formation of lethal mixtures and other industrial activities being performed in closure vicinity.

It is very important to understand that that the state of the chemical substance (solid, liquid or gas) contributes substantially to the gravity of the accident and affects control measures.

The release of compressed gas gives rise to thermal and cryogenic stresses,

which may also impact the surrounding structures or building, compounding the damage.

Any human/mechanical failure may cause large scale spills of liquids or of compressed gases like Chlorine or Liquefied Petroleum Gas (LPG), which can directly affect human lives and the environment.

4.2 HAZARDOUS CHEMICALS

The total nos. of Hazardous Chemicals by name are 684 in part-II, and Part –I provides as Indicative Criteria of chemicals by properties of Toxic, Flammable, Explosives; as provided in the "Manufacturer, Storage or Import of Hazardous Chemicals- Rules-1989(2000)". Similarly, The list of Hazardous Chemicals by name are 432 by name Part –II, and Part-I provides similar indicative criteria of chemicals by properties of Toxic, Flammable, Explosives as provided in the "Gujarat Factories Rules-1963 (2004)", and "Chemical Accidents(Emergency Planning, Preparedness & Response)- Rules- 1996". Thus, certain hazardous chemicals; as identified by names as per above Rules, alongwith United Nations' Numbers, C.A.S. Nos.; and Hazardous Classification are given in the Table below;

TABLE

Sr. No.	Major Hazardous Chemical	UN NO	CAS No	Hazardous Classification	Schedule-I of MSIHC Rules 1989 (2000)	Schedule-I of Rule 68-J of GFR1963 (2004)	Schedule-I of CA (EPPR) Rules - 1996
1	2	3	4	5	6	7	8
1.	Acetic Acid	2789	64-19-7	C	2	-	-
2.	Acrilonitrile	1093	107-13-1	T,R	12	6	6
3.	Ammonia	1005	7664-41-7	T	31	16	16
4.	Aniline	1547		T	37	21	21
5.	Benzene	1114	71-73-2	T,F	56	32	32
6.	Chlorine	1017	7782-50-5	T	119	88	84
7.	Chloro Sulphonic Acid	1754	7790-94-5	C	136	110	106
8.	Ethyl Acetate	1173	141-78-6	F	247	-	-
9.	Ethylene Oxide	1040	75-21-8	T,F,R	269	200	196
10.	Ethion	3018	563-10-2	T	245	186	182
11.	Motor Spirit (Petrol)	1203	8006-61-9	F	Part I (b) (iv)	Part I (b) (ii)	Part I (b) (ii)
12.	LPG	1075	68476-85-7	F,E	347	243	242
13.	Methyl Alcohol	1230	67-56-1	F	-	259	258
14.	Oleum	1831	8014-95-7	C	444	301	301
15.	Parathion		56-38-2	T	466	315	315
16.	Phorate		298-02-2	T	490	334	333
17.	Sulphuric Acid	1830	7664-93-9	C	591	371	370
18.	Thionyl Chloride	1836	7719-09-7	C	620	387	386
19.	Toluene	1294	108-88-3	F	628	389	388

20.	Xylene	1307	1330-20-7	T,F	-	430	429
21.	Propane	1978	74-98-6	F	347	243	242

C: Corrosive, E: Explosive, F: Flammable, R: Reactive, T: Toxic

4.3 MAJOR CHEMICAL ACCIDENT (Definition)

The definitions of word "Major Chemical Accident" or "Major Accident" are expressed as below:

4.3.1 MAJOR CHEMICAL ACCIDENT

An occurrence including any particular major emission, fire or explosion involving one or more hazardous chemicals and resulting from uncontrolled developments in the course of industrial activity or transportation or due to natural events leading to serious effects both immediate or delay, inside or outside the installation likely to cause substantial loss of life and property including adverse effects on the environment. --Rule 2(f) of C, A, (EPPR) Rules -1996.

4.3.2 MAJOR ACCIDENT

"MAJOR ACCIDENT" means an incident involving loss of life or outside the site or ten or more injuries inside and /or one or more injuries outside or release of toxic chemical or explosion or fire or spillage of hazardous chemical resulting in "on-site" or "off-site" emergencies or damage to equipment leading to stoppage of process or adverse effects to the environment.

- Rule 68-J (1) (d) of Gujarat Factories Rules-1963 (2004).
- Rule 2(j) of M.S. & I. of H.C. Rules-1989(2000).

4.4 IMPACT OF CHEMICAL ACCIDENTS/DISASTERS

Accidents on chemical which are near missing or minor types, do not much impact or damage, but in case of major accidents, involved large volume of inventories of hazardous chemicals or high toll of injuries, or release of toxic gas or spillage of hazardous chemicals or explosion, called as Major Chemical Accident/Emergency/Disaster; cause extensive loss of life, damage to property and adverse effect on environment. Further, emergency situation arises all of sudden and at most unexpected time with high potential to cause havoc. In addition to above, the major consequences of chemical disaster include impact on livestock, flora and fauna, the environment (air, soil, water) and tremendous losses to the industries.

4.5 MAH CRITERIA

The industrial unit; where the quantity of hazardous chemical used for manufacture, process, store, handle is more than threshold quantity as specified in Schedule 2 or 3 of C.A. (EPPR) Rules-1996, is identified as Major Accident Hazards (MAH) Installation/Unit. Further, it is provided that each MAH Unit has to prepare on-site emergency Plan as prescribed under Schedule 8-A of Rule-68-J of Gujarat Factories Rules-1963(2004). Some of the chemicals indicating their threshold quantity are listed in table given below;

Threshold Quantity

Schedule 3 under Rule 68-J of GFR-1963(2004) and MSIHC – 1989 (2000)

Sr. No.	Group	No.	Chemicals	CAS No.	Threshold Quantity
1.	I	38	Ethion	563-12-2	100 Kg
2.	I	73	Parathion	56-38-2	100 Kg
3.	I	76	Phorate	298-02-2	100 Kg
4.	II	102	Acrylonitrile	107-13-1	20 T
5.	II	105	Ammonia	7664-41-7	50 T
6.	II	108	Chlorine	7782-50-5	10 T
7.	II	121	Sulphur Trioxide	7446-11-9	15 T
8.	III	140	Ethylene Oxide	75-21-8	5 T
9.	V	1	Flammable Gases	-	15 T
10.	V	2	Highly Flammable Liquids F. P $<23^0$C, BP$>20^0$C	-	1000 T

4.6 TYPES OF CHEMICAL ACCIDENT SCENARIOS

Emergency preparedness is structured on maximum credible chemical accidents on chemical properties and maximum storage or process of the chemicals. However, it is pertinent to discuss the type and escalation of chemical emergency situation, which may arise from Liquid Flammable Material release or Toxic Material release.

4.6.1 Flammable Substance Release

The following examples show how events involving flammable materials may need different planned responses:

- **A major fire but with no danger of an explosion, e.g. fire in oil storage tank:**

  The hazards would be prolonged high levels of thermal radiation and smoke. It is unlikely that anyone outside the site would be affected immediately. Only houses close to and directly exposed to severe thermal radiation would need to be evacuated. In some cases, it might be desirable to evacuate those areas severely affected by smoke.

- **A fire threatening a major item of plant or a storage tank containing hazardous materials:**

  As a part of the on site assessment, the consequences of such an event should have been estimated and the area that it might be necessary to evacuate determined. Hence, the appropriate response might be to evacuate those potentially at risk.

- **A fire similar to (ii) above, but developing too quickly to allowing no time for evacuation:**

  The best possible response might be to advise people to remain indoors away from windows and shielded from line of sight of fire. Evacuation should NOT be attempted if there is a significant risk that fireball or BLEVE could occur while the people were in the open.

- **Catastrophic**

  For some major catastrophic events that occur without warning, it may not be possible to take prior emergency action. However, most such events are of very short duration. The role of emergency services would be to rescue and do medical treatment of the victims, extinguishing secondary fires etc. on emergency basis.

4.6.2 Explosion

Explosions may be variously classed as.

1. Chemical Explosions./Thermal Explosion
2. Physical Explosions
3. Mechanical Explosion
4. Dust Explosions
5. Electrical Explosions
6. Nuclear Explosions

Explosions are frequently accompanied by fires and occur under similar circumstances. They may be sub-divided in to:-

1. Confined explosions in buildings, boilers, process plants, storages, Godowns etc.
2. Unconfined vapour cloud explosions.

Both confined and unconfined vapour cloud explosions usually originate in a leak of gas or vapour or vaporising liquid into the atmosphere.

Flammable gas-air mixtures have limits of detonability which have in many cases been determined and which lie within the flammability limits. On their sudden release to atmosphere trough vents, leaks etc, they form clouds which will depend upon the released quantity, physical properties, wind velocity, readily spread over the site. As most of the hydrocarbons gases are heavier than air, they fill up pits, pipes, trenches and other low lying areas. An explosion will occur if such a mixture of hydrocarbon and air within certain concentrations come in contact with a source of ignition. The leakage shall be quickly isolated and shall be allowed to disperse.

4.6.3 Toxic Substance Release

The following examples show how events involving toxic materials may need different planned responses.

- **A slow intermittent release e.g. Through a leaking relief valve:**

  It would be unlikely that any one outside the site would be severely affected immediately, although many of the notifiable substances have irritant properties or an unusual smell. If there were reason to foresee that the release would not be controlled quickly or would grow with time, it might be desirable to evacuate those people nearest to the site or release and most closely downwind of it, provided that this evacuation would, increase their safety.

- **A fire or mechanical damage that threatened an installation containing toxic materials:**

  If the fire could not be controlled and there will likely to be a reasonable period before over pressurisation or plant failure can occur, evacuation might be appropriate. Once again priority should be given to those nearest the plant (in full directions) and those in an appropriate sector. (30°, downwind)

- **Rapid event with a limited duration e.g. The fracture of a component that could be isolated within a reasonable time:**

  Incident that grow and are immediately controlled should warrant evacuation. Any toxic cloud formed would be limited in size and would be likely to drift past a particular spot relatively quickly. The best place for people in the area would be indoors, upstairs with windows and doors closed.

4.7 SOME FAILURE CASES AND CONSEQUENCES

The some failure cases and consequences are given in the following table:

Sr. No.	Failure Cause	Consequences
1.	Flammable storage tank e.g. Hydrocarbon, HSD, Petrol, Acrylonitrile, Toluene & Benzene, Xylene, Solvent, Methanol, etc.	Fire, Smoke, Radiation Heat
2.	Toxic gas storage container/ tonner /tank- e.g. Chlorine, Phosgene, Ammonia	Toxic Gas Dispersion
3.	Toxic liquid storage Tank e.g. Sulphuric Acid, Oleum, etc.	Toxic Fumes or liquid spreading
4.	Flammable Gas Tank/ Tanker e.g. LPG, E.O. Propane, Propylene, etc.	Explosion, Blast, UVCE, BLEVE, Fire, Smoke
5.	Toxic Poisonous liquid Tank Acetic Acid, Sodium Cyanide, Carbon di sulphide, Hydrogen Fluoride, Aniline, Bromine, Sulphur Dioxide, Sulphur Trioxide	Poisonous gas Dispersion, Vapour, Fume, Cloud
6.	Tank Explosion containing gas like CO2 , N2	Deficiency of Oxygen or Asphyxiation.

NOTE: UVCE: Unconfined Vapour Cloud Explosion.
BLEVE: Boiling Liquid Expanding Vapour Explosion

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4.8 LEVEL OF EFFECTS

4.8.1 Radiation & Burn

LPG or Hydrocarbon Vapour released accidentally will normally spread out in the direction of the wind. If its finds an ignition source before being dispersed below Lower Explosive Limit, a flash fire is likely to occur and the flame may travel back to the source of the leak. Any other flammable substances within flash fire are likely to catch fire and a secondary fire may cause various degrees of burn.

The following tables indicate the damage effect due to radiation.

Table – 1 - Damage Due to Radiation Heat Intensity

Radiation Intensity [kw/sq.m.]	Type of Damage
0.7	Equipment to solar radiation
1.6	Will cause discomfort to long explosion
4.5	Sufficient to cause pain to personnel (First degree of burn is likely)
12.5	Minimum energy required for piloted ignite of wood, plastics etc.
25.00	Minimum energy required to ignite of wood.
37.5	Sufficient to Cause Damage to process equipment

Table – 2- Physiological effect of Radiation

Radiation Intensity [kw/sq.m.]	Type of Effect
65	Blistering of skin is caused
125	First Degree burns
250	Second Degree burns
375	Third Degree burns

NOTE: 1st Degree Burns: Involve only epidermis. (Sum burn is example). Blisters may occur.
2nd Degree Burns: Whole epidermis along with portion of dermis is affected.
3rd Degree Burns: Involves whole of epidermis & dermis. Sub-coetaneous tissues may also be affected.

4.8.2 Over Pressure &Blast Pressure

Table -1–EFFECT OF OVER PRESSURE ON BUILDING/ STRUCTURE

Over Pressure		Effect
Bar	Psi.	
0.7	10.0	Total destruction of conventional structures.
0.5	7.2	Unreinforced brick panels 200-300 mm thick fail.
0.3	4.3	Cladding of light industrial buildings ruptured. Self-framing steel panel building demolished.
0.2	2.9	50% destruction of brickwork in house.
0.15	2.2	Particle collapse of walls and roof of houses.
0.1	1.4	Steel flame of clad building distorted.
0.07	1.0	Partial demolition of houses.
0.05	0.07	Minor damage to house structures.
0.03	0.04	Windows shattered. Occasional damage of frame.

Table -2- DAMAGE EFFECT OF BLAST OVER PRESSURE

Blast Over Pressure (psi)	DAMAGE LEVER
5	Major structural damage would be fatal to people inside or under the structure.
3	Storage tank failure
2.5	Ear drum failure
2	Reportable damage storage tanks, pumps etc.
1	Window pane breakages causing injuries

Table – 3 - OVERPRESSURE Vs CAUSALITY PROBABILITY

Over Pressure		Causality # Probability
Bar	Psi	
<0.07	<1.0	0
0.07-0.21	1.0-3	0.1
0.21-0.34	3-4.9	0.25
0.34-0.48	4.9-6.7	0.7
>0.48	>6.7	0.85

Causality includes fatalities and injuries derived from nuclear explosion pressure wave.

4.9 TYPICAL GAS DISPERSION

The most adverse impacts are due to the toxic / flammable gas releases at ground level and in down-wind direction. Further, the basic dispersion equation for concentration from ground level release can be calculated from Gaussian Formula also

As per down-wind scaling law, the following tables give the gas dispersion for Ammonia, Chlorine & LPG.

Table – 1: Ammonia Gas Dispersion

Considering Wind Velocity V = 2.3 Meter / Second			
Sr. No.	**Mass Release in Tons**	**Range of Evacuation in Meters**	**Time required for contaminated air to reach in minutes**
1	1	230	1.7
2	3	360	2.6
3	5	450	3.3
4	10	600	4.3
5	20	810	5.9
6	30	960	7.0
7	40	1080	7.8
8	50	1190	8.6

Table – 2: Chlorine Gas Dispersion

Considering Wind Velocity V = 2.3 Meter / Second			
Sr. No.	**Mass Release in Tons**	**Range of Evacuation in Meters**	**Time required for contaminated air to reach in minutes**
1	1	360	2.4
2	3	570	3.8
3	5	710	4.7
4	10	950	6.3
5	20	1270	8.5
6	30	1500	10.0
7	40	1690	11.3
8	50	1860	12.4

Table – 3: Liquefied Petroleum Gas (LPG)

Considering Wind Velocity V = 2.3 Meter / Second			
Sr. No.	**Mass Release in Tons**	**Range of Evacuation in Meters**	**Time required for contaminated air to reach in minutes**
1	1	150	1.0
2	3	240	1.7
3	5	290	2.0
4	10	390	2.7
5	20	530	3.7
6	30	630	4.4
7	40	710	4.9
8	50	780	5.4

Table – 4: Gas Dispersion Concentration

The basic dispersion equation for concentration from ground level release can be calculated from Gaussian Formula.

Assuming leak rate (Q) = 3 kg./Sec i.e. 3 X 10^6 mg/sec and velocity (u) = 2 & 5 m/sec., downwind concentration of some gases at various distances are calculated and tabulated as follows:					
Product	**Maximum concentration (PPM) in downwind direction at distance X wind velocity = 2 m/sec**				
	1KM	2KM	3KM	4KM	5KM
(A) (2 M / Sec)					
Chlorine	4.11	1.03	0.45	0.26	0.16
SO_3	3.65	0.91	0.41	0.23	0.15
Phosgene	2.95	0.74	0.33	0.18	0.12
Ammonia	0.68	0.17	0.08	---	---
(B) (5 M / Sec)					
Chlorine	1.64	0.41	0.18	0.18	0.06
SO_3	1.46	0.36	0.16	0.09	0.05
Phosgene	1.18	0.30	0.13	0.07	0.05
Ammonia	1.5	0.3	0.15	0.07	---

4.10 M.S.D.S. AND SALIENT PROPERTIES OF SOME CHEMICALS

Material Safety Data Sheets of major chemicals stored, handled, processed or used by the chemical units in the District are produced at **Appendix-F**. The salient chemical properties of certain hazardous chemicals, used in the industrial pockets are indicated at the **Annexure-5**.

4.11 CARE FOR SAFE HANDLING OF SOME CHEMICALS

Procedure for Safe handling of chemical is essential as each chemical has different properties. The said matters are explained in **Annexure-21.**

4.12 COLOUR CODE SYSTEM FOR PIPE LINES

The colour code system for pipe lines for different substances as per Indian Standard-, IS-2379:1990 is given at **Annexure-24.**

4.13 PROBABLE TYPE OF CHEMICAL ACCIDENTS IN DISTRICT

The Survey on probable type chemical accidents based on the existing storages, which may likely to happen in the industrial pockets are indicated at **Annexure-20.**

4.14 A PROPOSED SCALE FOR GRADING OF CHEMICAL DISASTERS

A proposed Scale for grading of chemical disasters; as suggest at **Annexure-25** of National Disaster Management Guidelines- Chemical Disaster, New Delhi; (Augest-2006).

4.15 SPECIAL MEDICAL TREATMENT & ANTIDOTS

Details on special medical treatments & antidotes for some chemicals are given at **Annexure-22**. The details on burns and their treatments are included in the said Annexure.

4.16 LIST OF EXPERT PERSONS

List of expert persons from the district in given at **Annexure- 13.**

4.17 SOME MAJOR ACCIDENT IN INDIA

Some typical major chemical accidents occurred in INDIA in the period from 2001 to 2024.

4.18 LIST OF RELEVANT STATUTE ON HAZARDOUS SUBSTANCES

The List of Relevant Statute on Hazardous Substances is given at **Annexure-27**.

4.19 GLOSSARY OF TERMS AND DEFINATION

The words on chemical accidents and technical terms generally used are explained at the **Annexure-30.**

4.20 CHEMICAL ACCIDENT(EPPR) RULES-1996

The Rules on chemical accidents (Emergency Planning, Preparedness and respond) Rules-1996 is given at **Annexure-31.**

HANDLING OF EMRGENCY DURING TRANSPORTATION

CHAPTER - 5

5.1 MAJOR CORRIDORS FOR TRANSPORTATION OF HAZARDOUS CHEMICALS

The major routes of transport-vehicles by roads in Ahmedabad District are considered as below;

(1) National Highway No. 8,
(2) National Highway No. 8-A
(3) National Highway No. 8-C
(4) State Highway Ahmadabad-Viramgam
(5) Approach Roads/village Roads, etc.

5.1.1 National Highway No. 8

This 30 Km stretch enters the District at Naroda and exits near Bareja after passing through the city. Ahmedabad bypass has also been constructed which passes through Naroda, Saijpur, Vatva, Bapunagar, Isanpur and Narol, which together have more than half of the total MAH units in the District. It is the starting point of the 'Ahmedabad — Vapi" chemical corridor of the State, which has a large concentration of chemical industries. It also caters to the interstate transient traffic of hazchem and other goods. From an independent study conducted on behalf of M0EF, It is noted that one chemical carrier passes Aslali crossing every five minutes, which shows that the movement of hazchem transportation and also the potential for accidents involving them in the District is very high.

5.1.2 National Highway No. 8A

This 70 km stretch bifurcates at Naroda to form NH-8 (towards Vadodara) and NH-8A towards Rajkot and Porbandar. After Naroda, it passes through the city or one can take the city Bypass right up to Narol (as part of NH8) and then over to Sarkhej. The traffic, including chemical carriers, on this road is also very heavy.

5.1.3 National Highway No. 8C :

This stretch is between Sarkhej and Gandhinagar where it meets NH8 for going towards Delhi. Technically it is an extension of NH8A towards Gandhinagar. This road caters to the traffic between Saurashtra and Northern India which includes hazchem traffic from Rajkot, Jamnagar and Kandla. Rajkot District has 16 MAH units, Jamnagar has the largest grass root refinery and Kandla has chemical jetties catering to chemical import and export.

5.1.4 Ahmadabad — Viramgam State Highway :

This stretch starting from Sarkhej in Ahmedabad goes via Sanand Taluka and Viramgam Taluka which have 6 and 2 MAH units respectively. This highway provides connection to Surendranagar and also Kandla from Ahmedabad. It is a good four lane road with light traffic.

5.1.5 Internal Roads In Industrial Estates :

The Internal roads in industrial estates such as Naroda, Vatva and Odhav are In bad shape. Actually there are no roads and only kuchha path in front of units like Shiv Chem and Shri Chlochem etc. Similarly the internal roads at lyava Vasna in Sanand taluka and Ajanta industrial Estate are also in very poor condition. Several chemical carriers have to traverse on these roads and the condition becomes worst during monsoon. Therefore, it is essential to improve the public roads.

5.2 MAJOR HAZCHEMS TRANSPORTED

Based on the results of an earlier study conducted by the MOEF, following are the major hazchem transported through the District,

NH 8		NH 8A	
Benzene	Ethylene Dichloride	Acrylonitrile	Ethylene Dichlorlde
Butadiene	Styrene	Benzene	Naphtha
C4 mix	Naphtha	Chlorine	Formaldehyde
Caustic soda	Liquid Ammonia	Caustic Soda	Kerosene
Chlorine	Oleum	Furnace Oil	LPG
Kerosene	Methanol	Hydrochloric Acid	Pesticides
LPG	Sulphuric Acid	Carbon Tetra Chloride	Cyclohexanone
Light Diesel Oil	Ethylene Oxide	Light Diesel Oil	Ethylene Oxide
ChloroSulphonic Acid	Thyonil Chloride	ChloroSulphonic Acid	Thyonil Chloride

5.2.1 Potential Hazard IN Transportation

As mentioned above, various hazardous chemicals are transported through out the District. With heavy transportation activity within the District, the potential for accidents also increases correspondingly. Accidents scenarios have been visualized for major hazardous chemicals passing through the District as per the details given at above Table. The purposes of transport of the different chemicals are derived as below;

1. Dispatching the hazardous chemicals by manufactures' units within or outside the District.
2. Receiving the hazardous chemicals to Units/Factories from manufactures located within or outside the District.
3. Receiving hazardous chemicals in Bulk from Bulk- storage terminals through pipelines or dispatching to the users within or outside the District.
4. Transit traffic of hazardous chemicals lorry/ tankers/truck/containers/

carrier passing through the major corridors of the District.

5. Receiving, storing, or dispatching hazardous chemicals by stockist, godown, pump-station, depot, etc for purpose of selling, reselling, repacking, transit-stay, stocking etc.

Thus, transport emergency can happen anywhere in the District, and area and population likely to get affected will depend on the location and prevalent meteorological conditions in the area.

Transport & Accident Scenarios

Sr. No.	Transport Accident Scenario	Area Likely to be Affected
1.	Failure of Chlorine Tonner	1 to 1.4 km downwind
2	Failure of Acid/Alkali tanker	Immediate surroundings and burns to persons coming in direct contact with the substance
3.	Ammonia leak from cylinder	Varying, depending on the capacity of the cylinder but not more than 1 km
4.	Ammonia leak from a tanker	Up to 3 km downwind
5.	Escape of explosive gases from cylinder followed by explosion	Explosion may cause over pressure upto 50 m for a short duration. However, pieces of damaged cylinder may travel upto 100 m from the accident site
Sr. No.	**Transport Accident Scenario**	**Area Likely to be Affected**
6.	LPG leak from tanker followed by fire/explosion	Thermal radiation and overpressure effects will be upto 200m for short duration. BLEVE may result first degree burns up to 150m and also cause secondary fires depending on the location of occurrence.
7.	Spill/leak of flammable petroleum products followed by fire	Thermal radiation effects of unconfined pool fire will be felt upto 25 m from the pool edge for the duration of fire
8	Spill leak of CS2 followed by fire in a road tanker	Thermal radiation effects of unconfined pool fire will be felt upto 30 m from the pool edge. For the duration of fire. Burning of CS2 results in formation of toxic sulphur dioxide, effects of which may be felt upto a distance of 2 km from the accident site.
9.	Spill/leak of solvents and other flammable chemicals such as Toluene, Methanol, Benzene and Xylene followed by fire	Thermal radiation effects of unconfined pool fire will be felt upto 15 m from the pool edge. For the duration of fire.

Other factors that will have bearing on the extent of damage are:

- Rate of chemical release –As per the guidelines of the MoEF, we have considered catastrophic failure of container. However, it seldom happens in actual incidents and the material escapes from the container at a much lesser rate. lower rates pose lesser risks.-- Unfavourable
- Location : high population density – Unfavourable
- First response by the driver, if possible – Favourable
- Prompt action by response agencies - Favourable

5.3 RAIL TRANSPORTATION

In addition to the hazchem transportation by road trucks/tankers, some of such materials, particularly petroleum products, are also transported by rail tankers. The largest refinery of Indian Oil Corporation Ltd. is located very close to Ahmedabad, at Vadodara. Bulk transportation of refinery products, such as Motor Spirit, Diesel, Kerosene, Aviation Turbine Fuel, Furnace Oil, Mineral Turpentine Oil LPG, etc to different parts of the country is also undertaken by rail tankers. The typical capacities for different petroleum products along with the damage distances under worst case scenario are tabulated below:

Sr. No.	Product	Rail Tank Wagon Capacity (MT)	Scenario	Damage Distance (m)
1	Motor Spirit	47	Pool Fire	142
2	Diesel/LSHS	53	Pool Fire	112
3	Kerosene	51	Pool Fire	121
4	Naphtha	47	Pool Fire	142
5	Aviation Turbine Fuel	51	Pool Fire	121
6	Mineral Turpentine Oil	52	Pool Fire	105
7	Furnace Oil	52	Spill	--
8	Liquefied Petroleum Gas	35	BLEVE	515

BLEVE: Boiling Liquid Expanding Vapour Explosion

Damage Distance Is calculated for Injury zone radius corresponding to first degree burns. Furnace oil needs an initiator to burn, will not catch in presence of spark.

5.4 MOTOR VEHICLE ACT- 1988

Under the provisions of the Central Motor Vehicles Rules-1989(2000), every Motor Vehicle carrying hazardous substances should comply with certain regulations. Such as,

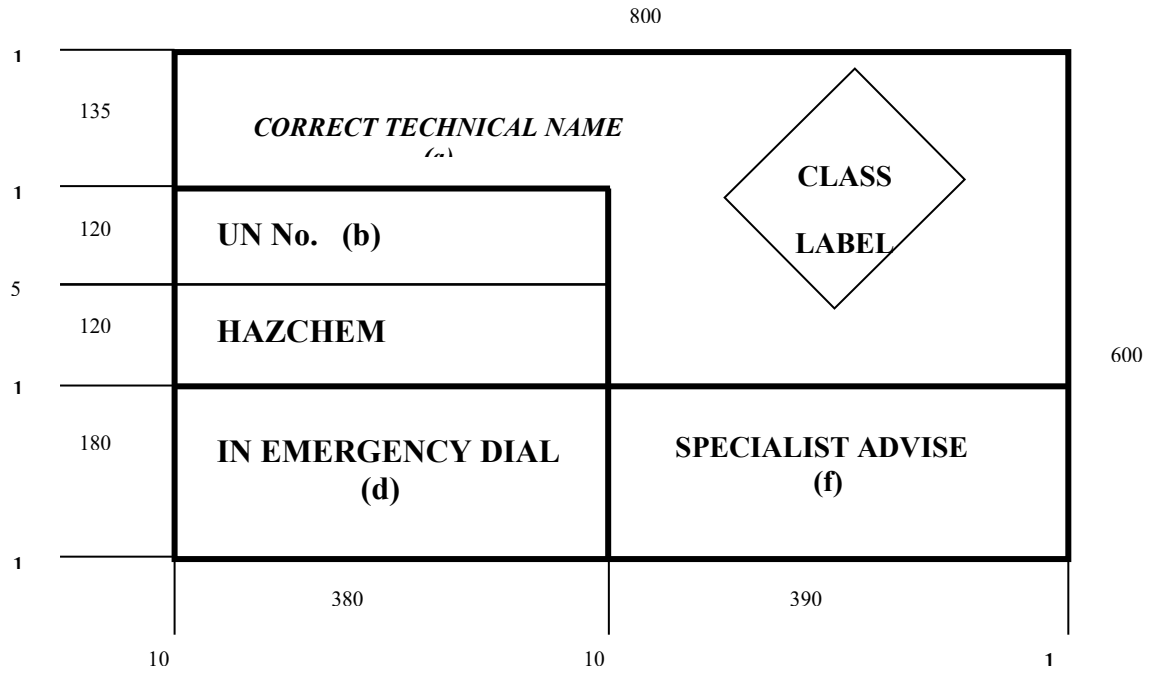
1. Emergency Information Panel
2. Trem Card
3. Emergency Kit
4. Trained Driver
5. Spark Arrester.

5.5 EMERGENCY INFORMATION PANEL

The emergency information panel provides details in the event of emergency. It indicates the correct Technical Name of the substance being transported, its UN No., Hazchem Code and UN Hazard Class Label (Diamond Shaped). The panel also provides emergency telephone no., specialist advice in case of emergency. The vehicle should have emergency information panel on both

sides and on the rear.

The size (600 MM x 800 MM) and shape of the panel is shown below:



(a) ***Correct Technical Name***

The correct Technical name of contain / substance should be indicated at this corner.

(b) ***UN Number***

The relevant UN Hazard Class Label (UN Symbol) has to be displayed on the front part of the vehicle (Central Motor Vehicle Rules 129, 134).

The UN Committee has classified various hazardous substances according to the risk involved. Each hazardous substances included in the list has been allocated a unique four-digit number, which is the substance's UN Number. Since the Numbers are in Arabic Letters, it helps in ready identification of the chemical being transported e.g.

Ammonia	=	1005	Petrol	=	1203
Chlorine	=	1017	Ethylene Oxide	=	1040
LPG	=	1075	Kerosene	=	1223
Methanol	=	1230			

5.5.1 HAZCHEM CODE

The Hazchem Code is an emergency action code designed by the London Fire Brigade. It enables the fire brigade to know at once the action to be taken in case of fire or spillage e.g.

Ammonia	=	2PE	Petrol	=	3YE
Chlorine	=	2XE	Ethylene Oxide	=	2PE
LPG	=	2WE	Kerosene	=	3Y
Methanol	=	2PE			

Hazchem Code

1 : Jet
2 : FOG
3 : Foam
4 : Dry Agent

P	V	Full Body Protective Clothing with BA	Dilute
R			
S	V	SBA	
S		SBA for FIRE Only	
T		SBA	
T		SBA for FIRE Only	
W	V	FULL	Contain
X			
Y	V	SBA	
Y		SBA for FIRE Only	
Z		SBA	
Z		SBA for FIRE Only	
E	Consider Evacuation		

V : Can be Violently or even explosively reactive

Full : Full Body Protective Clothing with BA

SBA : Self Breathing Apparatus Plus Protective Gloves

Dilute : May be used Plenty of Water.

Contain : Prevent, by any means, available, Spillage from entering drains or water courses.

P : R : Use Water than Drain into gutter. Use pressured Air suit

S : T : Use SBA Set. Use Water & Drain into gutter

W : X : Use Pressured Suit

Y : Z : Use SBA Set Don't allow effluent water into gutter.

(c) In Emergency Dial

The Telephone No. of the contact person in case of emergency.

Class Label

Chemicals have been grouped into nine basic classes depending on the nature of the hazard. Shaped label bearing a pictorgram for quick hazard recognition classes. It is hazard-warning sign by different Diamond represented numerically from 1 to 9 which are given below:

Class-1 : Explosives

Class-2 : Gases, Compressed, Liquefied, Dissolved under pressure or deeply refrigerated

Class-3	:	Flammable Liquids
Class-4	:	Flammable Solids, Substances Liable to Spontaneous Combustion, Substance which on contact with water emit flammable gases.
Class-4.1	:	Flammable Solids
Class-4.2	:	Substances liable to spontaneous combustion
Class-4.3	:	Substances which in contact with water emit flammable gases
Class-5	:	Oxidizing Substances, Organic Peroxides
Class-5.1	:	Oxidizing Substances
Class-5.2	:	Organic Peroxides
Class-6	:	Poisonous (Toxic) & infections substance
Class-6.1	:	Poisonous (Toxic) Substance
Class-7	:	Radioactive Substances
Class-8	:	Corrosives
Class-9	:	Miscellaneous Dangerous Substances

Each United Nations Hazard Class Label has a distinctive diamond. Each label also has a characteristics background colours.

Colour	Hazard Type
Orange	Explosives
Red	Flammable
Blue	Water Reactive
Yellow	Oxidizing Substance
White	Toxic / Infections
Yellow & White	Radio Active
Black & White	Corrosive

(d) Special Advice

The fire extinguishing media, special protection system etc. can be given briefly.

5.5.2. TREM CARD

Written information in Trem Card

As a precaution against any accident or emergency that may occur during carriage, the driver shall be supplied with instructions in writing specifying concisely;

a. The nature of the danger presented by the dangerous substances carried and the necessary safety measures that must be taken to avert that danger
b. The action to be taken and treatment to be given in the event of persons coming into contact with the dangerous substances being carried or with any substances which might escape there from;
c. The measures to be taken in case of fire and, in particular, the extinguishing methods and/or agents or groups of extinguishing methods and / or agents not to be used.
d. The measures to be taken in case of breakage or deterioration of packing or of the dangerous substances being carried, particularly where such

dangerous substances have spilled over the road.

These instructions shall be supplied to the carrier at the latest when the transport order is given, so as to enable him to take all necessary steps to ensure that the employees concerned are aware of these instructions and are capable of carrying them out efficiently.

5.6 EMERGENCY KIT

The Emergency Kit consists of Personal Protective Equipment, Self Breathing Apparatus, Fire Extinguishers, and Safety Equipments etc. as per statutory requirements, which should keep with the vehicle during transportation of hazardous chemicals.

5.7 TRAINED DRIVER

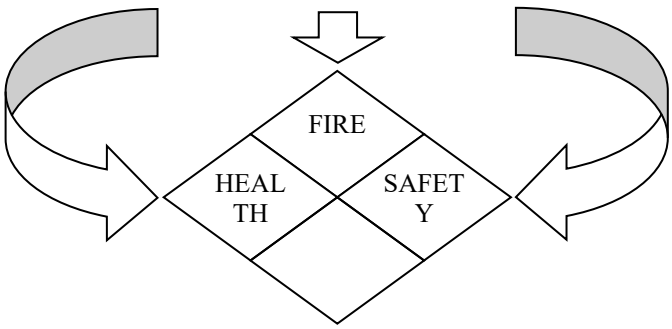
It is necessary to train the drivers, police and fire brigade people in handling of hazardous chemicals and meeting the emergencies arising out of leakages and spillages of chemicals. The lead and initiative should be taken by the manufacturer for training.

Driver has to maintain vehicle, accessories, protective clothing, safety equipments, and Emergency kit in good condition and he should be trained to handle all these equipments effectively. The drivers must be fully conversant with the product they carry. They must be conversant with the Trem Card and get accordingly in an emergency. They should keep the Trem Card in a safe place. Driver should maintain the emergency information panel in position on carriers as specified and prescribed manner. In case of mishap, driver should be reported immediately to the nearest Police Station.

5.8 TRANSPORTATION SIGNALS

Following Systems adopted for hazardous goods transportation to identify quickly the degree of hazards. Adopted from National Fire Prevention Association (NFPA) Standard – 704.

	BLUE	RED	YELLOW
	IDENTIFICATION OF HEALTH HAZARD	IDENTIFICATION OF FLAMMABILITY	IDENTIFICATION OF REACTIVITY
Signal	**Type of Possible Injury**	**Susceptibility to burning**	**Susceptibility to Release of Energy**
4	Materials, which on very short exposure could cause death or major residual injury even though prompt medical treatment, were given.	Materials which will rapidly or completely vaporize at atmospheric pressure and normal ambient temperature and which will burn.	Materials, which are readily capable of detonation or of explosive decomposition or reaction at normal temperatures and pressures.
3	Materials, which on short exposure could cause serious temporary or residual injury even through prompt medical treatment, were given.	Liquids and solids that can be ignited under almost all ambient temperature conditions.	Materials that are capable or detonation or explosive reaction but require a strong initiating source or that must be heated under confinement before initiation, or react explosively with water.
2	Materials, which on intense or continued exposure could cause temporary incapacitation or possible residual injury unless prompt medical treatment is given.	Materials that must be moderately heated or exposed to relatively high ambient temperatures before ignition can occur.	Materials that are normally unstable and readily undergo violent chemical changes but do not detonate also materials that may react with water violently, or that may form potentially explosive mixtures with water.
1	Materials, which on exposure would cause irritation but only, minor residual injury even if no treatment is given.	Materials that must be pre-heated before ignition can occur.	Materials that are normally stable, but that can become unstable at elevated temperatures and pressures, or that may react with water with some release of energy, but / not violently.
0	Materials which on exposure under fire conditions would offer no hazard beyond that of ordinary combustible	Materials that will not burn.	Materials that are normally stable even under fire explosive conditions, and that are not reactive with water.



MAJOR ACCIDENT RESPONSE PROCEDURE

CHAPTER - 6

6.1 INTRODUCTION

The most important part of response is prompt and well prepared actions by emergency services & designated persons (Members) of the DCG, so that the incident can be control immediately and causalities or damages will be minimum or remain under control.

It is not possible to include and discuss every action, which should be taken first during emergency. It is also not possible to describe entire actions on emergency situation, because of the different situation in each chemical accident. The basic principle of handling emergency, that may be relied upon, who have the knowledge and experience to assess the situation and give direction as per the objectives as quickly as possible. Some times, it is a natural gift and it is an art by heart. However, the aim is to control the situation by safest way in a limited time within existing available resources. Further, it should be handled with such a care that minimum loss of life, property and environment. In short, the objectives of the plan should successfully comply with.

Further, response time will differ for different chemical accident of industries depending upon many factors like, quantity, lethality, meteorology of the region, handling and controlling methods etc.

No body should wait for others, immediate actions with available resources or if required call more specific resources with immediate effects, should have started without delay. Further, the working groups should report the development of incident time to time, to the authorities and keep them informed the actions completed or actions are on hand etc. The liaison and coordination with all working groups are important factors during response time.

6.2 TEAM COORDINATION

Designated persons/Members (Response teams including emergency services)of DCG have to workout detailed response procedures on their role & responsibilities with existing infrastructures, manpower, resources, prevailing practices etc.

Further, certain thumb practices shall be adopted during response period, as some of illustrated below:

(1) A senior and expert person from each services is to be made responsible for inter/intra agency coordination.
(2) First assess the situation/type of incident- scale for Grading of chemical grading(as per **Annexure-25**), then arrange minimum time taken for responding actions by physical presence and operation of the designated mobile hardware, equipments, manpower, resources etc.
(3) Proper communication facilities between different designated persons for proper flow of information and review/ improvement.
(4) Police–officer will take overall charge at the site/off-site situation, until arrival of the District Collector or his representative at the scene.
(5) RTO has to make promptly transport arrangement, if evacuation necessary.

6.3 MESSAGES

Generally, most chemical accidents are happened at the odd-time and the appropriate authorities get the authentic information vary late, so required helps could not reach in time. In this circumstance, first information reaching in time is important factor. The Site-Main Controller or responsible person from affected installation/MAH Unit or any other responsible person from neighbouring industries or Chair Person of LCG, OR lay-man will immediately inform to the DCG Authorities, either to Fire, Central Control Room, District Collector, Police, or Directorate of Industrial Safety & Health., with at least following details, if possible:

a. Identify himself by name, designation & organization
b. Location of incident (Plant, Section Department)
c. Involvement of chemical(Name of probable chemical)
d. Provide the type of chemical emergency (Fire, Gas leakage, Liquids spreading, Explosion, etc)
e. The type of actual help & resources required.

It is also possible that any other person who see/ hear the fire/ explosion incident and informs the police or fire, before they receive call from the affected unit.

If Local Crisis Group involved and if incident could not controlled by them, chairman/responsible persons from LCG will communicate immediately to the DCG-Authority.

The information receiving officer/person will confirm the said news and communicate to Chair Person-DCG & other emergency services and mobilise to the incident place. This part is said as message-protocol and it is the origin of the activating Off-site Emergency Plan.

6.4 DECLARATION OF EMERGENCY & Immediate Response

On receiving information on chemical accident, the first respondent (Fire/Police) will immediately deploy first batch of response team to the

location. On assessing situation and after discussing with SMC, Emergency Services, Expert persons, Dy, DISH etc Chair person of DCG (District Collector) will declare EMERGENCY PERIOD for particular area, accordingly announcement will follow.

On assessing situation, they will further reinforce their teams by deploying additional resources pooling from surrounding area so that effective first response can be redial at site. In the meantime, they will keep inform with details, to the District Collector; DCG, Central Control Room, and other authorities, and along with asking additional requirement of resources in terms of manpower and equipment etc.

6.5 ACTIVATION OF OFF-SITE EMERGENCY PLAN

On declaration of chemical emergency for particular industrial pocket, Off-site emergency plan of DCG put in operation.

The Members of DCG including emergency services along with designated persons will start functioning to control incidence as pre-decided way or according to the prevailing situation under intimation to Chair Person and Central Control Room and report development of incidence time to time to Chair Person and C.C.R.

6.6 RESPONSE BY DESIGNATED MEMBERS OF DCG

On recognising the type of Chemical accident, the responding actions or line of actions follow by command structures according to the procedures as laid down. The major active parts on handling & controlling of emergency are soldier by emergency services with consent by Chair Person of DCG. The passive actions supported by various members of DCG as directed by Chair Person of DCG. The suggested responding actions by different key designated persons are explained as below.

6.7 CHAIR PERSON, DCG (DISTRICT MAGISTRATE & COLLECTOR)

On receipt of information on the chemical accident, the Chair Person (DC) will rush to the site, if grave serious incident, otherwise, get further details from CCR/Emergency Services on the incident. The DC will confirm the news with SMC/Chair Person of LCG / Dy.DISH, then consulting with SMC, experts, Dy.DISH, emergency services and others, after assessing situation, he will declare “industrial emergency” & put in operation Off-site Emergency plan, and order to start response actions to the emergency services/designated persons etc and report immediately. Ask central control room to get details time to time & report immediately. As development of situation and based on the inputs from the Emergency Services, and opinion by experts, SMC, members identify the requirement of additional and more resources, then DC will arrange to pool and mobilize such resources.

- In case of grave serious incident, on visiting site, discussing with SMC/Dy DISH/ Expert / emergency Services etc, and assessing situation, he is authorised to declare the emergency. He summon to all emergency services & designated persons to respond by use of their available resources at site, DC will report to higher authority asking more resources to control such emergency if required .
- Further, if evacuation required, then order to emergency services & transport and evacuation coordinators to carry out accordingly.

Please refer the chart at **Annexure-6**.

6.8 POLICE DEPARTMENT: EMERGENCY SERVICES

On getting information from responsible person/lay man/Fire/CCR/LCG on the chemical accident, and as a first respondent and as part of emergency services, the Police officer will get confirm and deploy first team to start initial responding actions & assess the situation and report to the DC, CCR, Other Emergency Services. On getting further instruction, depute more persons for further necessary responding actions to the incident place under intimation to DCG/CCR.

In other case, on declaration of Emergency by DCG, put adequate staff for responding actions with coordinating the activities as per prevailing situation; as per role & responsibilities; under intimation to District Collector, CCR, Fire and other authorities. However, primarily immediate actions have to arrange by team as suggested as below;

- ✶ Controlling traffic near the affected areas.
- ✶ Arrangement for emergency vehicles to move without obstruction to the incident site at the earliest.
- ✶ Ensuring law and order at the incident site during emergency.

As explosion scenarios seldom give time for a structured response, however, areas that may get affected due to possibility of secondary explosions, only need to be evacuated.

- ✶ Report the situation, time to time to the authorities, DC, CCR, etc.
- ✶ The duty/work as directed by Chair Person / CCR

Please refer the chart at **Annexure-8**.

6.9 Fire Department: EMERGENCY SERVICES

As getting information from responsible person/lay man/Police/CCR/LCG on the chemical accident, and as first respondent as part of emergency services, the Fire service commandant will reach the site & assess the situation and report to the DC, CCR, Other Emergency Services and simultaneously start the necessary responding actions immediately under intimation to DCG/CCR.

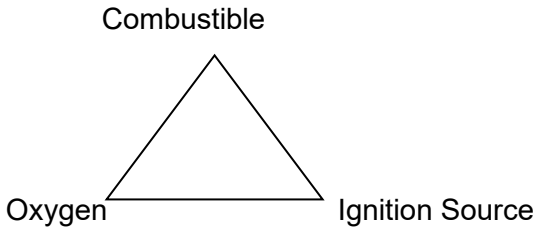
In other case, on declaration of Emergency by DCG, put adequate staff for responding actions with coordinating the activities as per prevailing situation; as per role & responsibilities; under intimation to District

Collector, CCR, Police and other authorities.

However, the following general points on chemical accident are illustrated which shall be carefully considered before starting actions.

a) ***Fire Components***

For a fire to happen, three components are required as depicted below:-



Cutting off the supply of any one of the above three components can help in getting the fire under control. Therefore the major activities that the fire team will undertake will be directed towards cutting off the supply of one of more of these components.

b) ***Removing the Source of Ignition***

Water is the far most reliable source for extinguishing fires. However, it may not be applicable on substances, which are lighter than water, insoluble in water or incompatible with water.

During the entire operations, the Leading Fire Men (LFM) would keep the fire service coordinator informed of the development so as to enable him to plan and deploy additional resources at the incident location.

c) ***Provide Rescue and Evacuation Services***

As fire department personnel are adequately trained to rescue trapped people from collapsed structures. The fire response team will help the industry-personnel in rescuing the people, till the time rescue team arrives. In case of evacuation, fire response team will coordinate the work with other emergency services.

Please refer the chart at **Annexure-7**.

6.10 MEDICAL & HEALTH SERVICES: EMERGENCY SERVICES

On receipt of information from the DCG (District Collector) or Central Control Room (CCR), the District Medical Commandant shall dispatch medical teams to the incident site under intimation to DCG, CCR, and other authorities. On reaching the emergency site, the medical teams will start the

emergency activities, as per gravity of incident like:

a) Establishment of Triage Stations

Mass casualty situations will require establishment of field hospitals to take care for the injured and to identify, stabilize, and transport more serious cases to the base hospitals. Medical team will categorize the victims in the following manner at triage station:-

- **Red** for critical, such victims should to be sent to the hospital in the first available ambulance. Medical Officer manning the triage station will maintain a checklist for the number of victims sent to a particular hospital. Further, he can give status of the victims to their relatives.
- **Yellow** for stable, such victims need to be sent to the hospital when there is room available in an ambulance after all the critical victims have been sent.
- **Green** for walking wounded, to be provided with first aid and treatment for shock and trauma.

The registers shall be maintained separately for each type.

b) Medical Support for Response Personnel

It is presumed necessary, properly equipped medical personnel with one or more ambulances shall be made available to treat injured personnel as necessary. A register shall be maintained separately for such persons.

c) Base Hospital

Treatment, operation etc to the seriously injured person shall be carried out at the base hospital, as declared. Post mortem of dead body will be conducted at this hospital. Further, the arrangement of proper treatment on occupational disease as per toxicology shall be made. The register shall be maintained separately for such treated persons.

d) Medical Support at Temporary Shelters

Once the evacuees are at the shelter, it is the responsibility of local Medical coordinator to ensure their well-being. For this, the medical coordinator will assign team(s) to take care of people who become ill during evacuation or later. The doctors assigned this work should be aware of the signs and symptoms of exposure to flammable/explosive material and smoke so that they can easily identify victims and provide them with necessary treatment & care. Facilities should also be available for care of the handicapped and elderly.

Please refer the chart at **Annexure-9**.

6.11 MEMBER SECRETARY : FACTORY INSPECTOR(DISH)

Being a Member Secretary (DY. DISH); he is involved in preparatory activities during pre-emergency period, like as; arrangement of meeting of DCG, identify MAH Units and their details, preparation of Off-Site Emergency Plan & updation, Arrangement of mock-drill/rehearsal & training, chemical accidents and investigation etc. Further, Member Secretary will provide details in respect of development of chemical scenarios, chemical reaction, type of neutralising agents, M.S.D.S. of involved chemicals, etc with chemicals and Factory's information during emergency period.

6.12 EXPERTS GROUP

Large quantities of various chemicals are stored, handled and transported the District. These chemicals have different properties. If these chemicals go beyond control & resulted into chemical emergency, the special and specific responding actions/tricks are to be required to control such chemicals. Therefore, chemical-experts can advice specific control measures on this occasion. The list of expert persons is given at **Annexure-13**.

6.13 TRANSPORT COORDINATOR

The arrangement of shifting people like, school children, old age, residents of hospitals/nursing homes and public who do not own vehicles, are required to safe shelters/ places by buses / trucks / vans / ambulances and other vehicles during emergency or evacuation. The transport coordinators/RTO has to make arrangement for the adequate numbers of vehicles of to shift.

The prime responsibility rests with the local transport coordinator who, on receipt of information about the emergency from District Central Control Room (CCR), will direct the fleet (drivers) and coordinate the following transport activities during an emergency :-

- He will also be responsible for ensuring that any needed response equipment, material and personnel are arranged promptly to the scene of an accident and for ensuring an adequate state of operational readiness, thus consolidating the management of all transport related activities.
- Arrange for the fleet of vehicles at a pre-designated location so that they can shift the affected population to safer areas (Shelter/Rehabilitation Centres),
- Make coordinating efforts with vulnerable areas such as schools, hospitals, nursing homes, cinema halls, shopping malls, etc. for evacuation of people to safer places.
- He shall also be responsible for arranging the protective equipment, clothing, devices, and any decontamination and/or treatment supplies that may be required by ambulance personnel in an actual emergency.

6.14 LIAISON & PUBLIC RELATIONS COORDINATOR

The Public Relations coordinator shall undertake the following tasks to help reduce confusion, facilitate information transfer, reduce problems that might be otherwise caused by a lack of organization, and reduce the incidence of unfounded rumours.

- Compile a list of telephone numbers of local radio and television station personnel who can initiate special "on air" announcements.
- Establish a firm policy among all local officials and response personnel as to who should or should not speak to media personnel.

6.15 OTHER MEMBERS

The other members have to perform their duties as on need base or as order by Chair Person or DCG.

6.16 CENTRAL CONTROL ROOM

Functioning of Central Control Room (CCR)

Central Control Room has to perform duties on urgent basis during emergency period. Major part of work is effective communication to Chair Person, members of DCG and other persons as directed by Chair Person and members. CCR has to maintain emergency telephone numbers (updated), Off-Site Emergency Plan, maps, Toxicology details, chemical details emergency equipment providers' contact numbers, and these should be readily available at the CCR. Further, CCR has to maintain the all required records, registers, messages etc.

6.17 WARNING SIREN

- ***Public Warning***

Public warning can be done by:

- Clarion bell (Domed Brass bell) mounted on Jeep
- Public address system mounted Jeeps; Pre-recorded cassettes/CD can also be used. It should address the type of emergency, what they should do and where they should reach (Safe location).
- Siren installed in the city area should be blown.

- ***SIREN CODE***

1.	"One" long blow of "One" minute duration	Alert Siren
2.	Continuous wailing high-pitched blow for "5 minutes"	Evacuation Siren
3.	Continuous blow for "5 minutes"	All Clear

POST EMERGENCY ACTIONS CHAPTER - 7

7.1 INTRODUCTION

Once the situation at the site is under control, the spill/leak has been plugged, fire has been extinguished, the emission of vapours to the atmosphere has been effectively checked and a SAFE signal has been passed its time for the follow up exercise. Details of post-emergency activities are given below in order of priority.

7.2 INSPECTION AFTER FIRE OR EXPLOSION

The large fires can have major effects over a vast area. Similarly major explosion could damage or destroy numerous buildings and any nearby bridges or tunnels. In either case, residents of partially damaged buildings will want to know, if the structures are safe to occupy or they await repairs. Questions pertaining to the safety of highway or railway bridges must be resolved quickly to avoid traffic complications.

It is important to note that inspection personnel may require special precautions (i.e., chemical protective gear) in addition to normal safety equipment and in those cases where the structure may still be contaminated by hazardous residues.

Technical coordinators shall be responsible for coordinating inspection of the structural integrity of damaged buildings, bridges, or other structures in the aftermath of a fire or explosion through expert agencies.

7.3 POST-INCIDENT TESTING FOR CONTAMINATION

To some extent, this item overlaps with monitoring of concentrations. However, activity in “Action Plan” covers sampling and analysis during the initial phases of a response action while this one is concerned with the potential for persistent after effects.

Personnel of the Gujarat Pollution Control Board shall undertake to check homes, stored foods, crops, water (ground & surface) and animals that may become part of the human food chain for possible chemical contamination. Help may be sought from the industries having capabilities for monitoring/ testing of contaminant in the target items.

7.4 WASTE DISPOSAL

After a major accident, it may become necessary for public authorities to undertake disposal of hazardous wastes. This requires knowledge of Hazardous Waste (Management & Handling) Rules, 1989 (as amended in 2000 and 2003) of the Ministry of Environment & Forests, Govt. of India. The location of approved and authorized disposal sites and the proper procedures

for transporting and transferring wastes to these sites have also to be taken care of. Local authorities should seek assistance from the state department of environment. The items unfit for human consumption will also form part of the Hazardous waste, which needs to be disposed off in accordance with the above mentioned Rules.

7.5 WASTE GENERATION

Different hazards are evaluated as describe above. It is also necessary to lay down of waste generated due to chemical emergency related to transport accidents or industrial events, Further, it should be evaluated associated risks and evolved mechanisms to handle such hazardous wastes. The proper procedures and adequate equipment shall be considered during actual chemical emergency.

7.6 CLEANUP OF DEAD OR CONTAMINATED LIVESTOCK OR WILDLIFE

Contaminated animals must be sent to veterinary hospital for decontamination & treatment. A large number of animal carcasses, hundreds of cows or chickens or thousands of fish can pose a variety of health hazards. Emergency response plans do not typically address this topic, possibly because it is somewhat distasteful, but the topic is worthy of consideration during the planning process where applicable. Where oil spills may contaminate waterfowl, consideration might be given to the formation of work crews to collect, clean, and care for the animals under the direction of experienced personnel. State and local public works agencies can provide assistance in planning for this activity. Local veterinarians and animal conservation groups may also be helpful, but in all cases, it is the responsibility of medical coordinator to ensure that personnel will not be placed at risk of adverse safety or health impacts by their actions.

7.7 PROVISION OF ALTERNATE WATER SUPPLIES

There are a number of circumstances under which a potable water supply may become unfit for human consumption for a time and require replacement. This is most commonly accomplished by bringing in supplies of bottled water and/or tankers/trailers capable of carrying water. The later are available from local Municipal Corporation. Tankers carrying milk are another possibility for consideration once thoroughly cleaned. It is the responsibility of transport coordinator in association with the social workers for arranging potable water for consumption of personnel engaged at the incident site. The potential sources of potable water are wells of water intake point of River, and ground water from neighbouring villages/towns/agricultural areas where possibility of ground water pollution due to spillage of contaminants is minimum.

7.8 RE-ENTRY INTO EVACUATED AREAS

Based on the assessment of the situation at the site, the DCG would take decision on the termination of emergency. Before this, however, several issues need to be resolved by the members of DCG. Re-entry being again as complex as the evacuation operation, would require the respective coordinators to perform their functions such as transportation of evacuees

back to their respective residential areas, restoration of electricity, gas, water supplies, post-accident monitoring of concentration, etc.

7.9 CHECK LIST FOR POST EMERGENCY

The issues/activities thus required are listed at Table Below in order of priority. However, as some of these are parallel activities, the decision should be taken based on actual site conditions.

The activities listed below are as illustration and only those, which are essential for return of the normalcy. However, as the last item suggests, regular training to all sections of the society is also of equal importance.

Table : Post Emergency Activities

Activity	Responsibility
Check The Industrial Unit For Possible Secondary Effect Of Delayed Relapse.	Technical Experts
Provide Notification At The Shelters Of Termination Of Emergency	Communications Coordinator
Restoration Of Water, Electricity And Gas Supplies	Utilities Coordinator
Arrange For Transportation Of Evacuees Back To Residence	Transportation Coordinator
Restoration Of Law And Order In The Affected Areas	Security Coordinator
Establish Grievance Cell	Liaison & PR Coordinator And Chairperson Of DCG
Hold Press Conference	Public Relations Coordinator
Arrange For Providing Interim Relief To The Affected People	District Collector
Undertake Accident Investigation And Documentation	Technical Coordinator
Arrange Further Relief To The Affected People Based On Claim Applications	District Collector
Plan Updating, If So Required	DCG
Provide Training To Community And Staff	DCG

7.10 CAPACITY BUILDING

Creation of proper infrastructure for Off-site Emergency Plan will serve as a strong back-up for management of chemical accidents. Latest safety hardware, software & instrument, dedicated transportation services, HAZCHEM van, information networking system, proper chemical casualty treatment kits, poison control centre, prompt and effective mechanisms with dedicated operatives, Critical detection system, Protection PPE, monitoring instruments, Adequate resources & neutralising agents etc are major influence factors for management of chemical accidents.

EMERGENCY INSTRUCTION TO THE GENERAL PUBLIC

CHAPTER - 8

8.1 THE NOTIFICATION OF EMERGENCY

The systems of declaration of emergency are illustrated to announce /alert/warn the public as any one of below;

1. Public address system
2. Blow horns/ Bells
3. Sirens / Hooters
4. Telephone message / Fax Messages / Hot lines/ Pager / E-Mails / Mobile Phone / Satellite systems/ Satellite Truncking/ Public address System
5. Sending messages through a messengers
6. Rushing personally to the Central Control Room or to the nearest Police Department or Fire Department for declaration of emergency
7. Raising of Flag for denoting the level of natural calamities
8. Ham Radio
9. VHF link
10. By any other source by which information can reach to the public in time.

8.2 CATEGORY OF ALARM SYSTEMS

The following alarm system may be considered which will identify the various level of emergency.

8.2.1 First Level Warning (FIRE ALARM)

- For an accident / incident within the unit
- Hooter / Siren –Short, intermittent

8.2.2 Second Level Warning

When the District Authority receives information that a toxic or flammable gas has leaked then the siren has to be sounded in order to facilitate early evacuations from the unit.

- Siren – A wailing short and long intermittent siren notification of emergency

8.2.3 Third Level Warning (All Clear)

When the District Authority considers that the accident / incident is under control, emergency is withdrawing and it is safe for re-entry.

- Siren – A wailing, long and continues, intermittent siren

8.3 GENERAL INSTRUCTION TO THE PUBLIC

In case of a major chemical emergency may affect areas outside the works/factory-premises, the surrounding public will be alerted with public address system/other way by Police or Government Authorities or nearby industrial concerns. The siren / hooter will blow, to indicate arising the emergency situation.

Announcement will indicate type of emergency arise, if possible to hear or start the Radio / TV for further instruction & act accordingly. the public have to take prompt actions to protect them-selves and rush to the safe shelter as instructed by the authority.

First of all to ascertain/confirm which type of emergency arise:

a. Fire
b. Explosion
c. Gas Leakage / Release
d. Collapse of Building, Bursting of Vessel etc.
e. Natural Calamities

In case of Gas Leakage/dispersion type chemical incidence, then to know the type of gas, whether flammable, toxic or poisonous?

The following actions are suggested as per prevailing situation: Otherwise follow the instruction as issued by the authority;

8.3.1 Flammable Gas

1. Be calm, don't get panicky.
2. Do not light Bidi / Cigarette / Lighter etc.
3. Shut down open flame, gas, and electrical instruments or any source of ignition.
4. Do not move any vehicle in the area.
5. Do not go near the incident & don't allow any others.
6. Shut down the windows, doors etc & seat open ground or terrace.
7. Follow the instruction as directed by the authority.

8.3.2 Toxic or Poisonous Gas

1. Cover your nose with wet hand kerchief / cloth and breathe through it.
2. Come out in open, check the wind direction and move away quickly in perpendicular direction of wind. (cross wind direction)
3. Immediately go & try to get to a higher elevation, if gas is heavier than air (like chlorine, as it settle in low lying area).
4. Follow the instruction and reach safe shelter as instructed notified by Government Authority or Public authority.

8.3.3 General Instruction

(A) DO'S

a. Listen radio, T.V. or Public Addressing System.
b. Emergency will be communicated by public addressing system /TV/ Radio or siren (Siren-code wailing sound for one minute).
c. Follow the instruction & convey to others accordingly.
d. On announcement of withdrawal of emergency or clearance

Siren, start your routine work.

e. On enquiry, deposit your statement as required by authority at the time of investigating the incident.

f. Co-operate, Help and Assist the person(s) / authority handling the emergency and rescue operation.

(B) <u>DON'T</u>

1. Do not get panicky, be calm.
2. Do not approach the site of incident as a spectator.
3. Do not approach unnecessarily for information or more enquiries.
4. Do not allow unnecessarily crowd nearby incident place.
5. Do not believe in rumours unnecessarily.

REHEARSAL / EXERCISE / MOCK DRILL

CHAPTER - 9

9.1 SUBJECT

Exercise / Rehearsal / Simulation on Off-Site Emergency Plan, Considering any one of the event related with hazardous chemical which may create maximum credible scenario.

9.2 AIM

It is necessary that all aspect of emergency plan is tested, often to ensure that they carry out their responsibility & function as specified and in particular to:

9.2.1 Test the response from emergency services, and other govt. departments, local agencies, volunteer groups, media etc.

9.2.2 Test and evaluate the interaction of various agencies / authorities involved and ensure that all components are properly coordinated.

9.2.3 Evaluate the available resources, equipments, its effectiveness, accuracy etc.

9.2.4 Gain experience to create the confidence to handle & control the emergency amongst the participating persons, members and others.

9.3 AUTHORITY OF EXERCISE / REHEARSAL

The chair person is hold to assume responsibilities & make decisions as per legitimate. The member-secretary will works as co-ordinators for mock drill purpose.

9.4 TABLE DISCUSSION

The first part of exercise is 'Table Top' exercises to test that emergency plan do not interrupt the day-to-day running of their concerns. This will identify the difficulties involved and practical approaches. The scenarios will be decided and consideration shall be given to live practical involving all concerned at suitable intervals, in addition to those of a theoretical nature. Care should be taken as the mock drill shall not create any panicky to any person or injury to any person.

9.5 BLUE PRINT

A blue print will be prepared as guideline to act, for a selected scenario. The details, maps, affected areas, role & responsibility will be specific and information will be supplied to all concerned persons. The scenario will be explained by co-ordinator/member secretary. The Off Site Emergency Plan will be helpful.

9.6 CODE-NAME FOR REHEARSAL

The code name shall be give to identify the case of rehearsal not real incident. So that, on getting message there will be no panicky amongst the operative person. If real emergency arise, then there will be no code-name. Further, the code name will be announced to conveying the message to authority, operative persons, etc.

9.7 NATURE

Origin, Date & time, location and Duration of exercise etc. will be pre-decided in particular manner.

9.8 AFFECTED AREA

It is the indication of the spread of disaster. This will be reflected in Blue print & give details of original place, units, surrounding identities, villages, roads, locations etc.

9.9 EMERGENCY CONTROL CENTRE

An Emergency Control Centre will be established for exercise purpose where communication & other activities can be performed. The control center will have emergency facilities. The required documents like Off-Site Emergency Plan, details on weather conditions, list of persons to participate, emergency scenario, maps, affected areas, emergency telephone numbers, list of hospitals, list of emergency vehicle & equipment will be kept ready. An experienced & expert person will be posted in Control Room.

9.10 PREPARATION STAGE

The responsibilities & duties will be allotted to each group, services and involving all personnel. Educative meeting will be arranged to explain the role of each participant. Blue print, scenarios and arrangements will be discussed at large. Charts, maps, Posters, Banners etc. will be prepared for good performance.

9.11 RESOURCES AND FACILITIES

Certain essential facilities shall be provided to the participants as required during actual emergency period. Further, adequate resources shall be made available to handle the situation. The some dummy-person have to select as

to play and act as dead, serious injured, minor injury for purpose of realization of scenario, and they will be identified by colour badges like, RED indicates as dead, GREEN indicates as immediate admission to the hospital for operation, YELLOW indicates first aid treatment, WHITE indicates no physical injury. The Experienced person shall be invited as OBSERVERS and separate identity cards shall be issued to them.

9.12 SEQUENTIAL ACTIONS

The whole exercise /rehearsal will be arranged in sequential actions as per off-site emergency plan. Thus rehearsal will be conducted, as actual performance.

9.13 OBSERVATIONS

The outsiders / third party will perform the role of observers and they will submit their reports on various site- observations with shortcomings & good features.

9.14 DE-BRIEF MEETING

On completion of exercise, a de-brief meeting will convene to discuss the conducted exercise, give views on performance of each areas; explain difficulties, resources, limitation, planning etc. All these observations, with corrective steps will be noted & reports will be prepared.

9.15 PHOTOGRAPHS, VIDEO & PRESS COVERAGE

Photography, vediography will be carried out for the work performed. The reports of such exercise will be sent to press for coverage. Leaflets and Pamphlets will be issued to the public to educate them for the emergency.

9.16 FORMAT FOR REHEARSAL / EXERCISE / MOCK DRILL

A format for rehearsal / exercise / mock drill is given in **Annexure-28.**

9.17 CONDUCTED EXERCISE / MOCK DRILL

A detail on conducted exercise / mock drill by DCG, Ahmedabad, is given at in **Annexure-29.**

OFF - SITE EMERGENCY PLAN

AHMEDABAD DISTRICT

ANNEXURE

SECTION

REVISED BY

DISTRICT CRISIS GROUP

AHMEDABAD

JANUARY – 2026

ANNEXURE –1

AHMEDABAD District Crisis Group

EMERGENCY TELEPHONE NUMBERS

Sr. No.	Designation / Post	Telephone Number
A.	CONTROL ROOMS	
1.	**Central Control Room, Collector Office, Ahmedabad**	**079-27551681**
2.	**State Control Room**	**079-23259452 23256720 23259029 23220630**
3.	**Police**	**100**
4.	**Fire**	**101**
5.	**Ambulance**	**108**
6.	**Police Control Room**	**25630200, 25620359**
7.	**Disaster Control Room**	**1096, 27560511**
8.	**Disaster Risk Management, Ahmedabad-Municipality Collector Office**	**26580952 M-98254 98315**
B.	HELP LINE: Emergency SERVICE Hot-Line ERC	**1077**
1.	**Earthquake Help line**	**1092**
2.	**Gas leaks Services**	
3.	**AMC Help line Services**	**1051**
4.	**Customer Care Helpline (Torrent Power Ltd.) Electrical**	**22551912, 66551912 7096040381**
C.	COLLECTORALAY – AHMEDABAD:	
1.	**Collector, Ahmedabad. EPBX**	**27561970-77, Ext-402**
2.	**Collector & District Magistrate, Ahmedabad**	**27551681**
3.	**P.A. to Collector**	**27551681, 27551044**
4.	**District Supply Officer**	**27551691**
5.	**Prant Officer – City**	**02717 223351/52**
6.	**Chitnis to Collector**	**27561970**
7.	**R. A. C.**	**27551047**
8.	**Dy. Collector - Dhandhuka**	**02713-222006**
9.	**Mamaltadar, Disaster Management**	**27561970-77, Ext-402**
10.	**City Mamlatdar**	**27552245**
11.	**Dashkroi Mamlatdar**	**Shri H. R. Parmar +91 7567000399**
12.	**Sanand Mamlatdar**	**Shri C. L. Sutariya +91 7567000268**
13.	**Dholka Mamlatdar**	**Shri Siddharth Trivedi +91 84011 85692**
14.	**Dhandhuka Mamlatdar**	**Shri Vijay Dabhi +91 9277757314**
15.	**Bavla Mamlatdar**	**Mr Ghanshyam Patel +91 8849657712**
16.	**Detroj Mamlatdar**	**Shri D G Chavda +91 9624255001**
17.	**Mandal Mamlatdar**	**Shri H.N. Raval +91 9429436294**
18.	**Ranpur Mamlatdar**	**+91 7567000338**
19.	**Viramgam Mamlatdar**	**ShriMayurdhwajsinh Rathod +91 9924099543**
20.	**Vatva Mamlatdar**	**Shri R.B. Mori +91 7574953053**
D.	**DISTRICT PANCHAYAT**	
1.	**D.D.O.**	**25506487, 25501101**
2.	**T.D.O., City/AHM (PURV)**	**27560256**
3.	**T.D.O., City/AHM (PACCHIM)**	**27551201**
4.	**T.D.O., Viramgam**	**02715-234082**
5.	**T.D.O., Sanand**	**02717-223351/52**
6	**T.D.O., Mandal**	**02715-253493**
7	**T.D.O., Bavla**	**02714-231073**
8	**T.D.O., Detroj**	**02715-255644**
9	**T.D.O., Dholka**	**02714-222503 02714-220077**
10.	**T.D.O., Dhandhuka**	**02713-223018**
11.	**T.D.O., Ranpur**	**02711-238635**
12	**T.D.O, DASKROI**	**22970058**
E.	POLICE DEPARTMENT	
1.	**Police Commissioner, Ahmedabad**	**Shri G.S, Malik 25633636, 25630200, 25633434 9978406277**
2	**Jt. Commissioner, Ahmedabad**	**25633332**
3.	**Dy. Police Commissioner, Ahmedabad**	**26460193**
4.	**Police Superintendent, Ahmedabad (Rural)**	**079-26890440 Fax-22686145**
5.	**Add. Police Commissioner, Admin.**	**25633535**
6.	**Asst. Police Commissioner, Traffic**	**25633232, 26561590/1580**
7.	**Asst. Police Commissioner, Head Quarter**	**25633700**
F.	WELFARE & OTHER ORGANISATION	
1.	**AWAG (Ahmedabad Women's Action Group)**	**26441214/ 26442466**
2.	**AGA KHAN Rural Support Programme (India)**	**27540421**
3.	**Blind People's Association**	**26305082 / 26304070**
4.	**(R.O.H.F.W.) (Central Govt.) (Bapunagar)**	**22742447**
5.	**Jyoit Sangh**	**25351708 / 25353908**
6.	**Missionariees of Charatiy**	**27559050**
7.	**S.E.W.A. (Self Employed Women's Asso.)**	**25506477 / 25506444 / 1**
8.	**Sadvichar Parivar Vilalang Punarvaas Center**	**26860197**

ANNEXURE –1

Continue…

AHMEDABAD District Crisis Group

A. EMERGENCY TELEPHONE NUMBERS

Sr. No.	*Designation / Post*	*Telephone Number*	*Sr. No.*	*Designation / Post*	*Telephone Number*
F.	*WELFARE & OTHER ORGANISATION (Continue...)*		*I.*	*AMBULANCE (Continue...)*	
9.	***Ahmedabad Motor Transport Asso,***	***25712535***	***5.***	***Navdeep Emergency Services***	
10.	***Apang Manav Mandal, Vastrapur***	***26302643***	***6.***	***6.1 Income Tax –Day***	***27543333***
11.	***ATIRA***	***26307921***		***6.2 Income Tax –Night***	***98250 29977***
12.	***Ahmedabad Textile Mills Asso.***	***26582273***		***Mission Life India 24 hours***	***98250 06000***
13.	***O.N.G.C., (H.R. A'Bad)***	***23290329 / 23290399/ Asset Mgmt. - 23290050***			
14.	***Ellisbridge, Sports Club & Gymkhana***	***26440371/ 26425240***	*J.*	*DISTRICT PANCHAYAT, Lal Darwaja*	
15.	***Gandhi Ashram***	***27557277/ 25506477***	***1.***	***DISTRIC OFFICE (BHADRA)***	***7698592826***
16.	***Gujarat Vidhyapith***	***07927540746***	***2.***	***General***	
G.	*HOSPITALS*		*K.*	*FIRE AHMEDABAD*	
1.	***Civil Hospital – Asarwa***	***079-22680732, 079-22683721 Mr Jagdish Solanki 9825387497***	***1.***	***Fire Station, Paldi HQ***	***079-22148465-67, 9726415822***
2.	***Civil Hospital – Sola***	***079-27661516-27 Mr Pradip Patel 7567897491 Srushree Pina Soni 75678997489***	***2.***	***Naroda F.S.***	***079-22200715 9227898717***
3.	***Civil Hospital – Gandhinagar***	***23221932***	***3.***	***Odhav F.S.***	***079-22875434 9924860117***
4.	***LG Hospital –Maninagar***	***25461380-83***	***4.***	***Control Room***	***101,102, 9227898720***
5.	***V. S. Hospital – Ellisbridge***	***26577621-26***	***5.***	***Sabarmati F.S.***	***079-27507302***
6.	***Dr. Jivraj Mehta Hospital***	***26639839, 26639840-43***	***6.***	***Jashodanagar F.S.***	***079-29709728 9227898716***
7.	***Sardaben Hospital***	***22924261 to 64***	***7.***	***Aslali F.S.***	***7069013728***
8.	***SVP HOSPITAL***	***079-26436666***	***8.***	***Bopal F.S.***	***7069013707***
9.	***Apollo Hospital***	***66701811-66701801***	**L.**	**OTHER GOVERNMENT OFFICES**	
10.	***Gov. Akhandanad Ayurved College***	***Shri Hardit Shah 9824068760***			
H.	*BLOOD BANKS*		***1.***	Jt. Director Industrial Safety & Health	Mr C P Dholu 9277722777 07925502346-47-49-56-64
1.	***Cross World Blood Bank, Stadium Road***	***26568004, 26401959***	***2.***	District Health Officer	Dr S B Parmar 7567880300 25507076
2.	***Green Cross Voluntary Blood Bank & Pathology RIA Lab (24 Hrs.)***	***079-65136744***	***3.***	Dy. Chief Controller of Explosive (PESO)	0265-2225159, 2361035
	2.1 Paldi	***26578824***	***4.***	JtDir, District Information Centre	26305895, 26306737
	2.2 Maninagar Lab	***25461864***	***5.***	G. M, District Industries Centre	25508302
	2.3 Stadium Road	***26468821***	***6.***	State Transport	25463382 /96
3.	***Gujarat Blood Bank & Pathology Lab (24 Hrs.)***	***9712148978***	***7.***	R.T.O.	27559696, 27559697
	3.1 Maninagar	***25461641***	***8.***	Water Supply	079-25500208
4.	***Indian Red Cross Society, Paldi***	***26651833, 26650855***	***9.***	Weather Information	22861413, 22865012
5.	***Kanavati Blood Bank & Pathology, Naranpura***	***27479742***	***10.***	G.P.C.B. (AMC)	Dr Tallika Patel 99743 80240

6.	***Prathma Blood Centre***	***9879608641***		***11.***	GSWAN (24 Hour)	23254497, 23256600
I.	*AMBULANCE*			***12.***	DIR, ESIC – Panchdeep Bhavan,Ashram Road	27540990, 27541866
1.	***AMC – Ambulance Services***	***102***		***13.***	Commi. of Relief	23251509, 23251900
2.	***Emergency – Help***	***108***		***14.***	Dir, Agriculture	27506052, 25506874
3.	***Dr. J.J. Vora Memorial Gen. Hospital***	***27543333 / 9825029977***		***15.***	R.O. GPCB, Ahmedabad	07927556634
4.	***GVK EMRI (108)***	***079-22814896 8238088789***		***16***	Ahmedabad Urban Dev. Autho	27545055

AHMEDABAD District Crisis Group

A. EMERGENCY TELEPHONE NUMBERS

Sr. No.	*Designation / Post*	*Telephone Number*		*Sr. No.*	*Designation / Post*	*Telephone Number*
M.	**OTHER GOVERNMENT OFFICES (Continue...**			**M.**	**OTHER GOVERNMENT OFFICES (Continue...**	
17.	*Gujarat Water Supply & Sewage Board*			***19.***	***Dholera SIR***	***079-29750501***
	Jalbhavan, Ahmedabad	***9978441113 to 117***		***20.***	***Dir, State Health &Family Welfare, Sukhramnagar, Ahmedabad***	***22771160***
18.	*Dead Animal Removal/Drainage Problem/Garbage*			***21.***	***S.T. department***	***25462552***
1	***AMC Cattle Nuisance Control***	***25359650***		***22.***	***Ahmedabad Medical Association***	***097268 88775***
2	***AMC Dead Animal Removal Help***	***32984152***		***23.***	***Gujarat Chambers of Commerce***	***079-26582302***

B. Control Room Details

Sr. No.	*Name*	*Contact Person*	*Jurisdiction*	*Location*	*Telephone No.*
1	***District Crisis Control Room***	***District Collector***	***Ahmedabad District***	***Collector Office, Ahmedabad***	***07927551046 07927551047 07927551691 07927561970***
2	***Local Crisis Control Room***	***SDM & Dy. Collector***	***Vatva-Narol Industrial Area***	***SDM, Lal Darwaja, Ahmedabad***	***079-27560256***
3	***Local Crisis Control Room***	***SDM & Dy. Collector***	***Odhav, Rakhial Industrial Area***	***SDM, Daskroi Ahmedabad***	***079-22970058***
4	***Local Crisis Control Room***	***SDM & Dy. Collector***	***Sanand, Bavla, Viramgam, Mandal Taluka***	***SDM, Sanand***	***02717-223351/52***
5	***Local Crisis Control Room***	***SDM & Dy. Collector***	***Gota***	***SDM, Ahmedabad West***	***27551201***
6	***Local Crisis Control Room***	***SDM & Dy. Collector***	***Dholka***	***SDM, Ahmedabad***	***02714-222433***
7	***Police Control Room***	***Shri G S Malik***	***Police Commisioner Shahibag***	***Ahmedabad***	***079-25633636 079-25630200 079-25633434 9978406277***
8.	***Ahmedabad Muni. Corp Control Room***	***------- AS MENTIONED BELOW ------***			

ANNEXURE –1

Continue…

C. Ahmedabad Muni. Corporation / Control Room

Sr. No.	*City Area*	*Phone No*
1.	***Head Control Room – Tagore Hall***	***25353858/ 7819862804, Fax-26580623, 25350926***
	Vasana Barrage	***26613136***
2.	***Central Control Room – Danapith***	***25353858, 25353717, Fax-25350926, 25391811 – Ext. 718, 719***
	Jamalpur Control	***25352472 / 25397637***
	Dudheshwar Control	***25628222***
	Victoria Garden	***25390501***
3.	***North Zone Office***	***22801182 / 22842926 / 7819816528***
4.	***East Zone - Viratnagar Control Room***	***22970422 / 22970423***
	Chakudia Control Room	
	Odhav Control Room	***32981155 / 32910246***
	Bhaipura – Hatkeshwar Control Room	***32983072 / 32981362***
	Nikol Control Room	***22700160 / 32981362***
5.	***South Zone – Bage Firdosh***	***25465255. 5344.5399, 25854096 / 32981149 / 32943052***
	Isanpur	***25331630 / 32981328***
	South Zone Main Office	***25465255 / 5344 / 5399***
6.	***West Zone – Usmanpura Control Room***	***27550910 / 32943182 / 37552047***
7.	***New West Zone – Sarkhej Control Room***	***26823399 / 26824593***
	Vejalpur Control Room	***26813378 / 26813278***
	Ranip Control	***27523409 / 27524669***
	Chandkheda Control	***32981396 / 27496400***

ANNEXURE –2

AHMEDABAD District Crisis Group

MAP OF AHMEDABAD DISTRICT

ANNEXURE –2-A

AHMEDABAD District Crisis Group

MAP OF INDUSTRIAL POCKETS, AHMEDABAD-1& 2

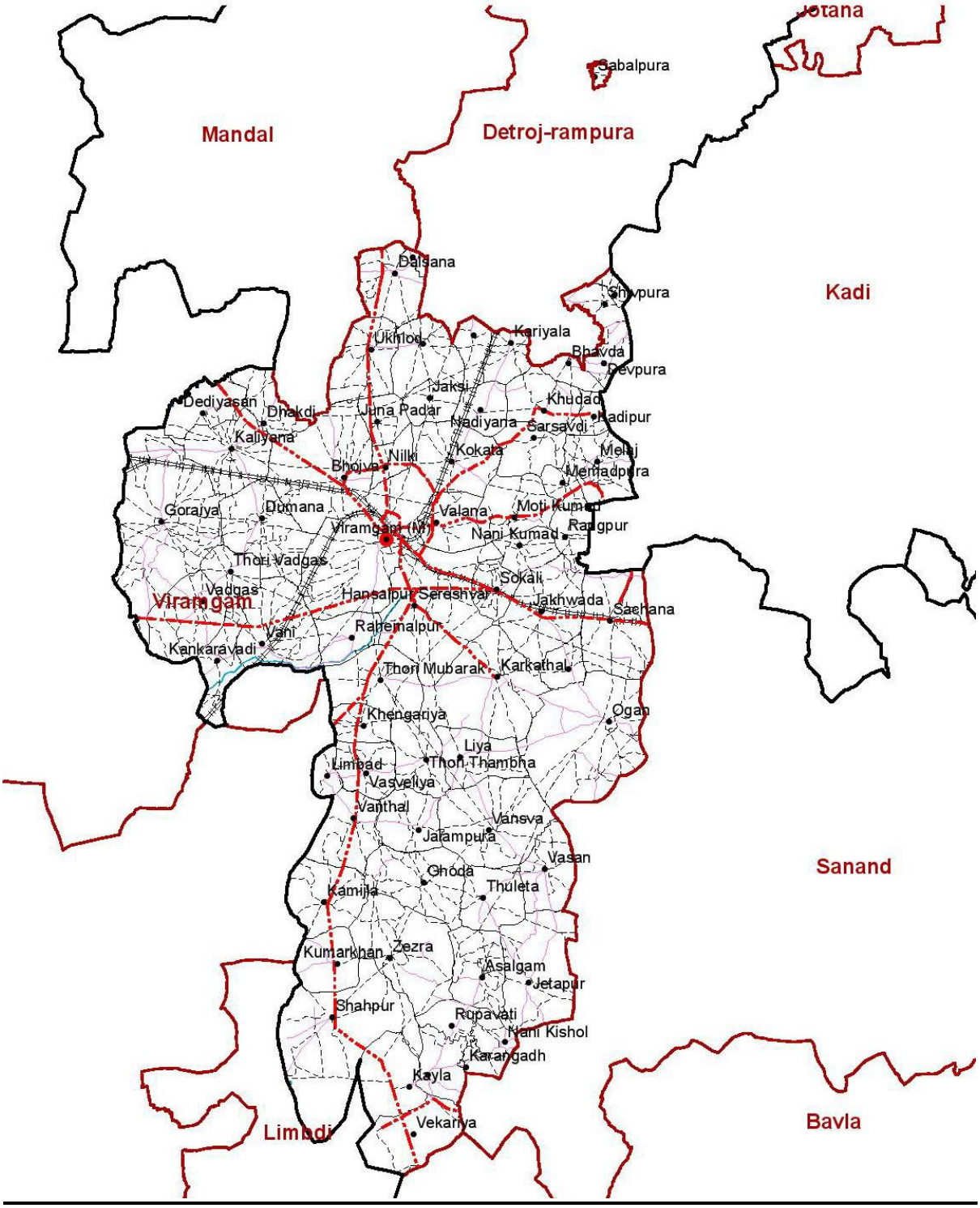
(VATVA, NAROL, ODHAV, RAKHIYAL, NARODA & SABARMATI

ANNEXURE –2-B

AHMEDABAD District Crisis Group

MAP OF INDUSTRIAL POCKET, AHMEDABAD- 3

(SANAND, BAVLA, VIRAMGAM, MANDAL)



ANNEXURE –3

AHMEDABAD DISTRICT CRISIS GROUP

COMPOSITION OF THE AHMEDABAD DISTRICT CRISIS GROUP

Sr. No.	Name	Position in DCG	Office/Deptt	Phone Numbers	
				Office	Mobile/ Residence
1.	2	3	4	5	6
1.	Shri Sujeet Kumar– IAS, Collector & District Magistrate, Ahmedabad	Chair Person	Collector Office, Subhash Bridge Circle, Ahmedabad	079-27551681	99084 06201
2.	Shri U.J.Raval, Dy. Director of Industrial Safety & Health	Member Secretary	Shram Bhavan, 5th Floor, Rustam Kama Marg, Near Gun House, Khanpur, Ahmedabad	079-25502349	6353083112
3.	Shri Shri Banchhanidhi Pani. IAS, Municipal Commissioner	Member	Office of the Mahanagar Seva Sadan, Sardar Patel Bhavan,Danapith, Ahmedabad	079-25391830	9712967724
4.	Shri G. S. MALIK IPS Police Commissioner Ahmedabad	Member	Police Commissioner Office, Shahibaug, Ahmedabad	079-25633636, 079-25630200	997840 62777
5.	Shri Om Jat DSP, Ahmedabad Rural	Member	Makraba, Ahmedabad	079-26890440	99784 06342
6.	Shri Videh Khare District Development Officer	Member	District Panchayat Lal Darwaja, Ahmedabad	079-25506487	99784 06226
7.	Shri Vasantkuvarba Parmar SDM & Dy. Collector and Chair Person Local Crisis Group-1 Vatva-Narol	Member	Prant Office, Lal Darwaja, Ahmedabad	079-27560256	75670 08965
8.	Shri Tejas Chaudhri SDM & Dy. Collector and Chair Person Local Crisis Group-2 Odhav – Rakhiyal, Naroda,Sabarmati	Member	Prant Office, Daskroi,Ahmedabad	079-22970058	75670 09038
9.	Shri D.B. Tank SDM & Dy. Collector and Chair Person Local Crisis Group-3 Sanand, Bavla, Viramgam, Mandal	Member	Prant Office, Sanand,Ahmedabad	02717-223351/52	75670 08946

ANNEXURE –3

Contine…

AHMEDABAD DISTRICT CRISIS GROUP

COMPOSITION OF THE AHMEDABAD DISTRICT CRISIS GROUP

Sr. No.	Designation	Position in DCG	Office/Deptt	Phone Numbers	
				Office	Mobile/ Residence
1.	2	3	4	5	6
10.	Shri Umang Patel SDM & Dy. Collector Ahmedabad West	Member	Gota, Ahmedabad	079-27551201	9978405200
11.	Dy. Controller Civil Defence.	Member	11th Floor Bahumali bhavan Lal Darwaja, Ahmedabad	079-25507776	-
12.	Dy Information Officer	Member	Polytechnic Compound, Ahmedabad	079-26301148, 079-26305895	-
13.	Chief Medical Superintendent	Member	New Civil Hospital, Asarwa, Ahmedabad	079-22681379	99099 71649
14.	Chief District Health Officer	Member	Office of the DHO, Lal Darwaja, Ahmedabad	079-25501204	75678 80300
15.	District Agriculture Officer	Member	Office of the District Agriculture Officer, Ahmedabad	079-25506874	-
16.	Shri Amit Anandrao Dongre Chief Fire Officer	Member	Jamalpur Fire Station, Ahmedabad	079-22148466	-
17.	Dy. Chief Controller of Explosive	Member	Dy. Chief Controller of Explosive, Raopura, Vadodara	0265-2225159, 0265-2361035	-
18.	Dr Tallika Patel Regional Officer GPCB Ahmedabad	Member	Sector 10-A, Gandhinagar	-	99743 80240
19.	Dr Tallika Patel Regional Officer GPCB Vatva, Ahmedabad	Member	Vatva, Ahmedabad	-	99743 80240
20.	Shri Rahul Kanojiya Regional Officer GPCB (Gramaya) , Sanand Ahmedabad	Member	1, Deffodills Avenue, Sarkhej-Bavla Highway, NH No.8A, Moraiya-382213, Ta. Sanand, Dist. Ahmedabad.	-	75748 27444
21.	Regional Officer RTO Ahmedabad	Member	RTO Office Subhashbridge, Ahmedabad	079-27559696	-
22.	Regional Officer RTO East Ahmedabad	Member	RTO Office,Vastral Ahmedabad	079-27559695	-
23.	Mamlatdar Disaster Management Ahmedabad	Member	Collector Office, Subhas Bridge Circle, Ahmedabad	079-27561970	94261 85224

ANNEXURE –3

Contine…

AHMEDABAD DISTRICT CRISIS GROUP

COMPOSITION OF THE AHMEDABAD DISTRICT CRISIS GROUP

Sr. No.	Position in DCG	Designation	Office/Deptt	Phone Numbers	
				Office	Mobile/ Residence
1.	2	3	4	5	6
24.	Superintendent of Engg. PH (Mechanical Dept,)	Member	Jal Bhavan, Behind Townhall, Ellisbridge, Ahmedabad	079-26575465	-
25.	AGM-HR Torrent Power Ltd., Ahmedabad	Member	Torrent Power Ltd., Sabarmati, Ahmedabad	079-22551912	-
26.	General Manager, BSNL	Member	BSNL, Ahmedabad, Telecom,Gulbai tekara Ahmedabad	079-26305958	-
27.	Superintending Engineer	Member	UGVCL,Sabarmati, Ahmdabad	079-27500981, 079-27500214	-
28.	Secretary, Majoor Mahajan Sangh	Member	Majoor Mahajan Sangh, Lal Darwaja, Ahmedabad	079-25506857, 079-25506158	-
29.	Expert Person	Member	Shri Chirag Parmar-Zydus Corporate Park, Ahmedabad	-	9726162699
30.	Expert Person	Member	Shri Babu Desai-Ahmedabad	-	9909980431
31.	Expert Person	Member	Shri Bansi Patel-Bodal Chemicals Ltd, Vatva,Ahmedabad	-	9825060886
32.	Expert Person	Member	Shri Parth Rajyguru- Suzuki Motor Gujarat Private Limited,Mandal,Ahmedabad	-	9227593782
33.	Expert Person	Member	Shri Vinay Duggal -Tata Motors Ltd,Sanand,Ahmedabad	-	9794052520
34.	Expert Person	Member	Shri Mathew Joseph-Matangi Industries,Vatva,Ahmedabad	-	9898854802
35.	Expert Person	Member	Shri Sachin Patel-GSP Crop Science Pvt Ltd,Odhav,Ahmedabad	-	9879404947
36.	Expert Person	Member	Shri .K.N.Modi (Tech. Director) Parikh Enterprises, Odhav, Ahmedabad	079-22871471	9979869945
37.	Expert Person	Member	Shri Aashish Rajiv Gokhale (Deputy Manager General (O)) Indian oil Corporation Ltd Viramagam	-	9650100901

ANNEXURE – 4

AHMEDABAD DISTRICT CRISIS GROUP

LIST OF MAH UNITS (POCKET VISE)

INDUSTRIAL POCKET – AHMEDABAD-1 : VATVA –NAROL				
Sr. No	**Factory Name**	**Address**	**Major Hazardous Chemical**	**Telephone Number**
1	**2**	**3**	**4**	**5**
1.	Advance Petrochemicals Ltd.	167, Pirana Road, Piplaj-382 405 Ahmedabad	Ethylene Oxide	079-65418855
2.	Ami Organics	Plot No. 313-315, Phase 2, GIDC – Vatva, Ahmedabad	Chlorine	9099733833
3.	Associated Dyestuff Pvt. Ltd., Unit II	A-1-5, Phase –I, GIDC,Vatva, Ahmedabad	Ethylene Oxide	8980027696
4.	Bodal Chemical Ltd. Unit - III	Plot No. 2102, Phase III GIDC, Industrial Estate, Vatva Ahmedabad - 382 445	Ethylene Oxide	9909950907
5.	Crystal Quinone Pvt. Ltd., Unit - II	Plot No. A/2-20 & A/2-21, Phase – II, GIDC, Industrial Estate, Vatva, Ahmedabad – 382 445	Ethylene Oxide	9099918990
6.	Bodal Chemical Ltd. Unit-I	Plot No. 110, Phase II GIDC, Industrial Estate, Vatva Ahmedabad - 382 445	Ethylene Oxide	9909950907
7.	Indian Oil Corporation Ltd. (Marketing Division)	NH – 08, Village – Bareja, Taluka – Daskroi, Ahmedabad, 382425	Petroleum Products Class - A/B	02718 282157
8.	Jay Chemicals Industries Ltd., Unit-III	Plot No.109/ 220, Phase-II, GIDC Industrial Estate,Vatva, Ahmedabad	Ethylene Oxide	9925204426
9.	Matangi Industries LLP (UNIT-I)	Plot No. 28, Phase I, GIDC Industrial Estate, Vatva, Ahmedabad - 382 445	Ethylene Oxide	079 -40372041
10.	Matangi Industries LLP (UNIT-II)	Plot No. 5605-5614, Phase II, GIDC Industrial Estate, Vatva, Ahmedabad - 382 445	Ethylene Oxide,Styrene , Phenol	079 -40372041
11.	Mayur Dye Chem Industries	A 1/108, GIDC Industrial Estate, Phase II, Vatva, Ahmedabad – 382445	Ethylene Oxide	9327070777
12.	Megha Chem Industries	Plot No-8, GIDC Industrial Estate, Phase-II, Vatva, Ahmedabad	Chlorine	9825032614
13.	Meghmani Organics Ltd.	183, 184 GIDC Industrial Estate, Phase II, Vatva, Ahmedabad	Chlorine	079-25831210, 25834657
14.	Parshwnath Dye Chem Industries Pvt. Ltd.	A-2/495, Phase II, Gidc, Vatva, Ahmedabad	Chlorine	9328026466
15.	Saras Industries	S.No. 62, Behind Advance Petrochem, Pirana Road, Piplej, Ahmedabad	Chlorine	9825022568
16.	Sharma & Co., Piplej	S.No. 62, B/H Advance Petro Chemicals Ltd., Pirana Road, Piplej, Ahmedabad – 382405	Chlorine	9879556599

17.	A K Dye Chem	Nr.Kiran Processors, Opp Octroi Naka, Shahwadi,Narol	Chlorine	9898087849

AHMEDABAD DISTRICT CRISIS GROUP

LIST OF MAH UNITS (POCKET-VISE)

INDUSTRIAL POCKET – AHMEDABAD- 2 : ODHAV – RAKHIYAL, NARODA,SABARMATI

Sr. No	Factory Name	Address	Major Hazardous Chemical	Telephone Number
1	2	3	4	5
1)	Encore Natural Polymers Pvt. Limited	227/233, GIDC Industrial Estate, Naroda, Ahmedabad-382330	Ethylene Oxide	079-22822559, 079-22822548
2)	Parikh Enterprises Pvt. Ltd.	Plot No. 442, GIDC Industrial Estate, Odhav, Ahmedabad-382 415	Chlorine	079-22871471, 079-22871472
3)	Sagar Drugs & Pharmaceuticals Limited	Survey No. 38/3 & 46/1, Kanbha Kuawa Road, Singarwa, Dist. Ahmedabad	Ethylene Oxide	079-22910015
4)	Super Industries	Plot No. C-1/289, GIDC Industrial Estate, Naroda, Ahmedabad - 382 330	Parathion, Phorate	079-22823907

AHMEDABAD DISTRICT CRISIS GROUP

LIST OF MAH UNITS (POCKET-VISE)

INDUSTRIAL POCKET – AHMEDABAD- 3 : SANAND, BAVLA, VIRAMGAM, MANDAL

1.	Terra Tech Chemicals (India) Pvt. Ltd	Plot No.459,460 & 461 Nr. Bajaj Foods Ltd., Opp. N. N. Desai Petrol Pump, Sarkhej-Bavla Road, Changodar, Ahmedabad-382213	Chlorine	7574809477
2.	Deedy Chemical Pvt. Ltd.	263, A/2a, Akashganga Ind. Estate, Sanand, Ahmedabad	Chlorine	079-30074848
3.	Excel Formulations	Plot No. 32, Sonal Industrial Estate, Khoda Village Road, Sanand, Ahmedabad	Ethylene Oxide	9825095666
4.	Indian Oil Corporation Limited (Salaya Mathura Pipeline)	Pipelines Division, Tal. Viramgam, Ahmedabad	Petrolium Products Class – A	9724003318, 9408204000
5.	Indian Oil Corporation Ltd. (LPG Bottling Plant)-Sanand	Sanand – Viramgam Highway, Sanand, Taluka Sanand, Dist. Ahmedabad – 382 110	LPG	02717-222904
6.	Reliance Petro Marketing Ltd.	S.N. 214, At-Pimpan Taluka - Sanand, Ahmedabad	LPG	9998043041
7.	Manshi Industries	Block No. 419, Po. Chharodi, Taluka – Sanand, Ahmedabad	Chlorine	9825549414
8.	Pratiksha Chemicals Ltd.	195, Ajanta Industrial Estate, Vasna-Iyava, Taluka - Sanand, Ahmedabad	Chlorine	02717284350

9.	SHV Energy Pvt. Ltd.	Survey No. 169/3 – 169/5 Ranesar Patia, Kalyanagadh, Bavla Bagodara NH 8,Taluka Dholka, Ahmedabad	Flammable Gases	7622000571
10.	Tata Autocomp System Ltd.	Plot No. 2, Tata Motor Vendor Park, Taluka – Sanand, Dist. – Ahmedabad	LPG	7043007480
11.	Tata Motors Ltd.	Revenue Survey No.-1, Village Northkotpura, Taluka – Sanand, Dist.- Ahmedabad Gujarat – 382170	Propane	02717–668100, 02717-668143
12.	Suzuki Motor Gujarat Private Limited	Block No. 334/335, Village-Hansalpur, Nr. Becharaji,Mandal,Dist-Ahmedabad	LPG	6358997879
13.	R.R. Patel Industrial Gases Pvt Ltd.	Survey No.407, Sarkhej-Bavla Road,Vill:Pimpan	Ethylene Oxide	9722779907
14.	Macro Polymers Pvt Ltd (Unit-04)	Survey No.-382, Plot No D 01 To D 06, Gallops Industries Park-2, Chacharwadi –Vasna, Tal-Sanand , Dist-Ahmedabad	Formaldehyde, Styrene, TDI	9228010801/02

ANNEXURE – 5

AHMEDABAD DISTRICT CRISIS GROUP

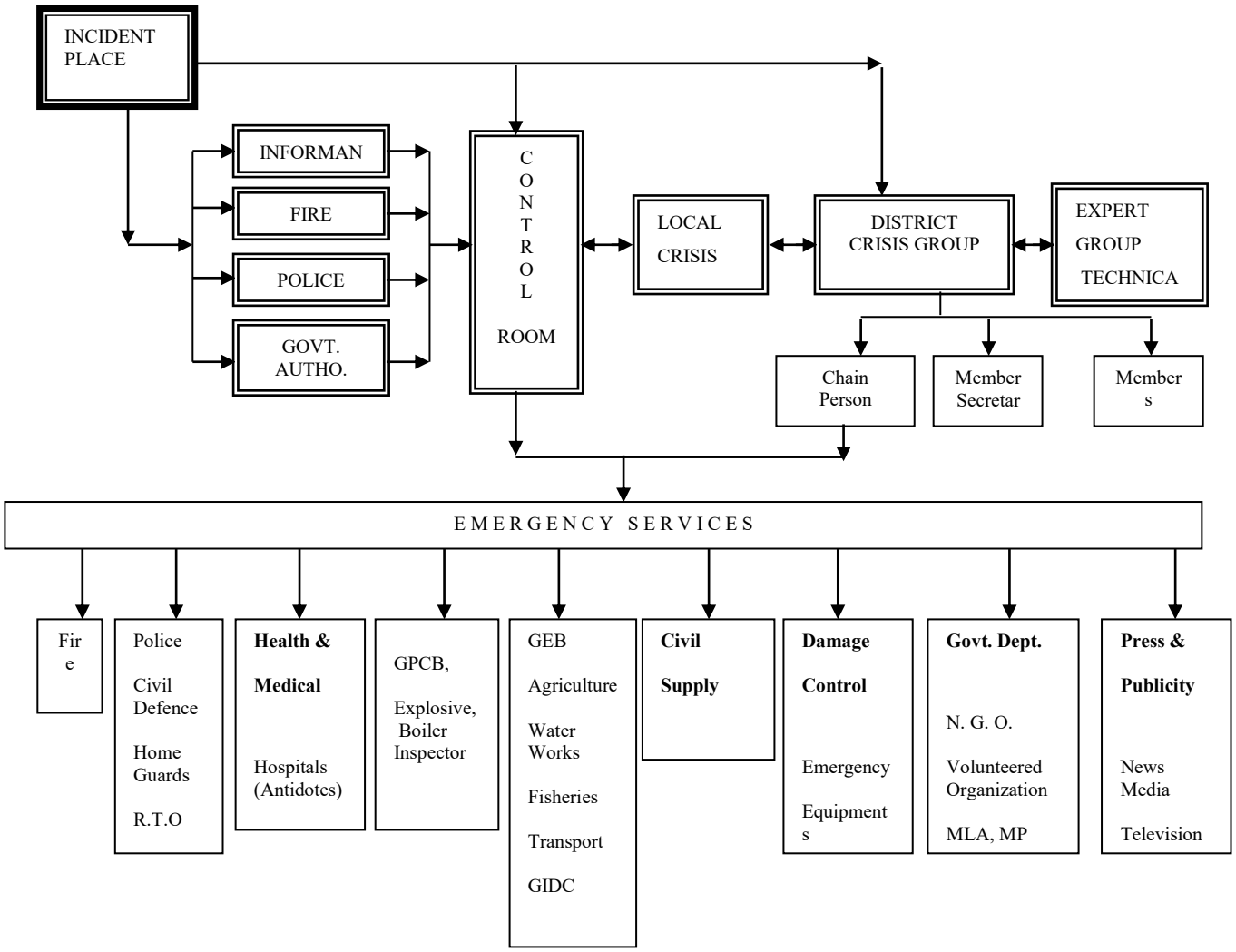
SALIENT PROPERTIES OF SOME HAZARDOUS CHEMICALS

Sr. No	Name of Chemicals	State	Colour	Odour	Sp. Gravity	Vapour Density	Melting Point ^0C	Boiling Point ^0C	Flash Point ^0C	Exposure limit		TLV ppm	Solubility in Water	Haz chem	Hazards	Hazardous Combustion Products
										LEL %	UEL %					
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1.	Acrylonitrile	Liquid	Clear Colourless liquid	Pungent	0.807	1.83	-83.6	77.3	0.55	3.1	17	2	Slightly Soluble	3 W E	F	Emits Toxic fumes of NOX & CN
2.	Acetic Acid	Liquid	Colour-less	Pungent Odour	1.05	2.07	16.7	118.1	44.44	5.4	16	10	Miscible	2 Y E	T, F	Emits highly toxic fumes of SOx
3.	Chlorine	Liquefied Gas	Greenish Yellow	Irritating	1.47	2.98	-101	-34	-	-	-	1	Slight Soluble	2 X E	T	Toxic products generated when combustible burn in Cl_2
4.	Chlorosuphonic Acid	Liquid	Light Yellow	Sharp Choking Odour	1.76	4.02	-80	151	-	-	-	-	Violent Reaction	4 W E	T	Burning in open flame can form toxic phosgene,HCl gas
5.	Ethylene Oxide	Liquified Gas	Colourless	Sweet	0.87	1.52	-111.3	10.7	-20	3	100	1	Soluble	2 P E	C,F,E	Emits acrid smoke & irritating fumes.
6.	Liquified Petroleum Gas [LPG]	Gas	Colourless	Mercaptan added for Odour Warning	.51-.58	1.5	-	-40	104.4,-60	1.9	9.5	1000	Floats	-	F & E	Emits CO, CO_2
7.	Methyl Parathion	Liquid	Yellow to Dark Brown	Mild Skunk like odour	1.234	-	2.9	156	-	-	-	0.71	Slightly Soluble	3 W	P	Emits toxic fumes of PO_x and SO_x
8.	Oleum (SO_3)	Hygroscopic Viscous Solution	Colourless to cloudy	Sharp Choking Odour	1.9-1.97	-	-	Decomposes	-	-	-	1	Highly Reactive	4 W E	C	Emits highly toxic fumes of So_x
9.	Motor Spirit [MS]	Liquid	Orange (Octane 87), Red (Octane 93)	Aromatic Ordour	Insoluble in water, Floats on water.	3-4	-45	25-215	-30	1.4	7.4	300	Insoluble in water, Floats on water.	3 Y E	F	CO / CO_2 / SO_2 / NO_X
10.	Toluene	Liquid	Colourless	Pleasant	0.817	3.14	-95 –' - 94.5	110.4	12.7	1.2	7	100	Slightly soluble	3 Y E	Fl	Emits Acrid Smoke & irritating fumes
11.	Sulphuric Acid	Liquid	Colourless	Pungent	1.84	-	10.49	315	-	-		5	Mixible	2 R E	T,C	Emits Toxic Fumes of SO2
12.	Propane Gas	Gas	Colourless	Irritant	1.5219	1.56	-	-42C	-104C	2.2	9.5	2500	Slighty Soluble	2F	F	Emit CO, CO2

F: Fire, T: Toxic, E: Explosion, CB: Combustible, C: Corrosive, P: Poisonous

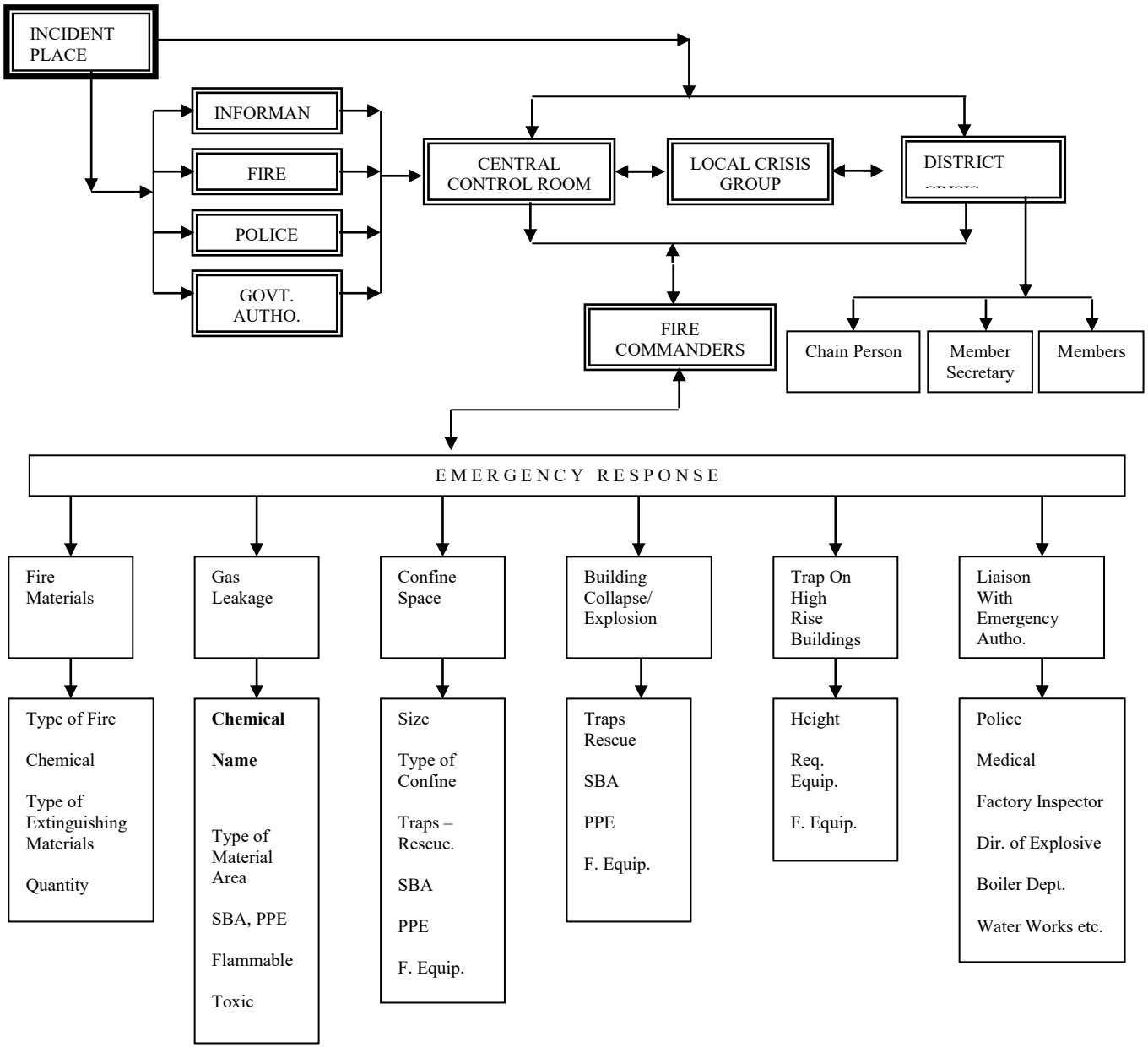
ANNEXURE – 6

COLLECTORATE COMMAND & CONTROL



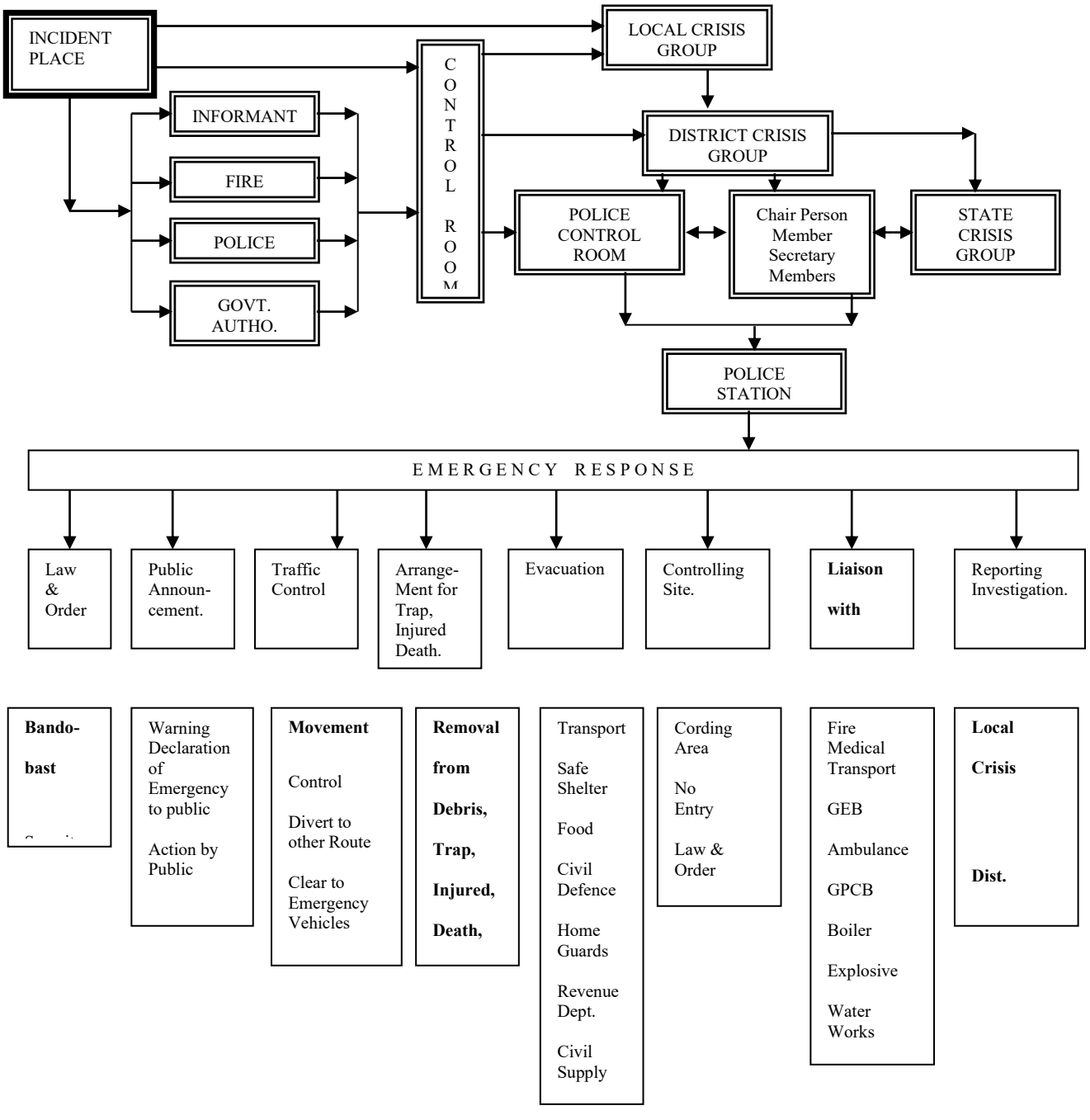
ANNEXURE – 7

FIRE – SERVICES – RESPONSE



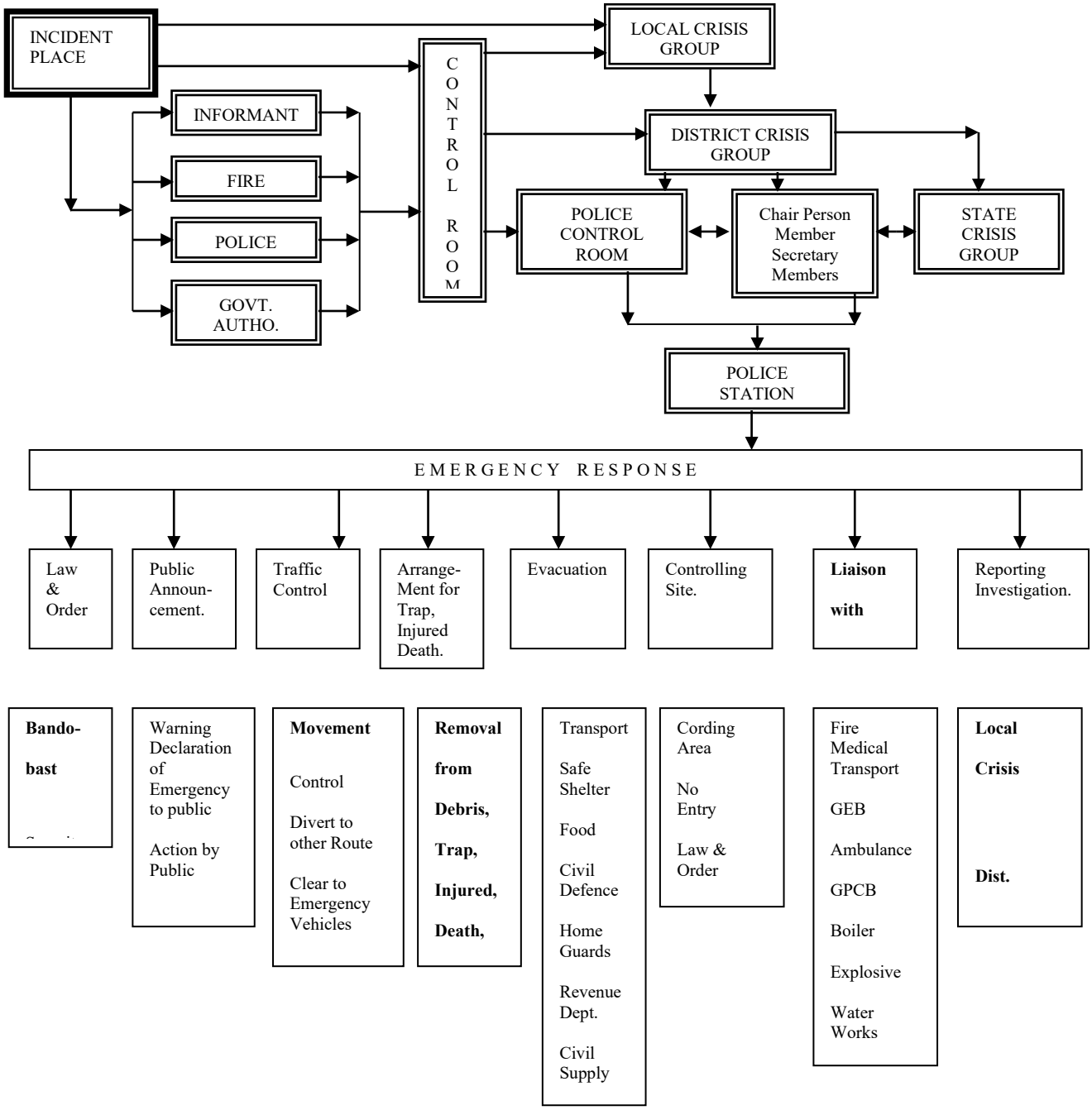
ANNEXURE – 8

POLICE DEPARTMENT (RESPONSE)



ANNEXURE – 9

HEALTH & MEDICAL RESPONSE



ANNEXURE – 10

AHMEDABAD DISTRICT CRISIS GROUP

FIRE STATIONS DETAILS-
AHMEDABAD MUNICIPAL CORPORATION

Sr. No.	Name	STD Code	Phone	Man Power	Number of Fire Tenders	Ambu-lance	Fire Suits	SCBA
A.	**ODHAV**							
1.	Odhav	**079**	22875434	40	1	1	1	3
B.	**VATVA-NAROL**							
2.	Maninagar	**079**	25470221	37	1	1	1	3
3.	Jamalpur	**079**	25397959	44	2	1	1	4
C.	**SABARMATI**							
4.	Sabarmati	**079**	27507302	38	1	1	1	3
D.	**NARODA**							
5.	Naroda	**079**	22167715	41	1	1	1	3
6.	Shahpur	**079**	25621969	40	2	1	1	4
E.	**OTHERS**							
7.	Danipith	**079**	22148465-67	56	2	4	1	5
8.	Gomtipur	**079**	22161896	35	1	1	1	1
9.	Memnagar	**079**	27417203	45	1	1	1	1
10.	Panchkuva	079	22120388	38	2	1	1	4

ANNEXURE – 11

AHMEDABAD DISTRICT CRISIS GROUP

POLICE STATIONS

A. Dy.Police Commissioner Office,-Ahmedabad City

Sr. No.	Designation	Phone No.	
		Office	Residence/ Mobile
1	Shri G S Malik Police Commissioner	079-25633636,25630200	9978406277
B.Police Stations -Ahmedabad (Rural)			
1	Supretendent of Police	079-26890440	--
2	P.A.	079-26890440	--
3	Dy.Sup.Of Police H.Q.	079-26890886	--
4	Pro.Dy.Sup.Of Police (S.C./S.T.)	079-26891162	--
5	In.P.S.I. (S.C./S.T.)	079-26891162	--
6	Office Sup.	079-26891168	--
7	Com.Inc.	079-26891158	--
8	City P.S.I.Wireless	079-26891168	--
9	R.P.S.I. H.Q.	079-22821124	--
10	Ci.Pol M.T.	079-22820777	--
11	Mounted Ghandhinagar	079-23223268	--
12	P.S.I.Control Room	079-26891168,26891115	--
13	In.S.O.G.P.I.	02717-242992	--
14	L.I.B. P.I.	079-26891172	--
15	L.I.B. P.S.I.	079-26891172	--
16	L.C.B.P.I.	079-26891002	--
17	L.C.B. P.S.I.	079-26891002	--
18	G.R.D.P.S.I.	079-26891168	--
19	Traffic P.S.I.	079-26827845	--
20	Inc.Reeder P.S.I.	079-26891168	--
C. Sarkhej Police Stations -Ahmedabad (Rural)			
1	Dy.Sup.Of Police Sarkhej	079-26820333	--
	Reeder Dy.S.P.		--
2	P.I. Sarkhej	079-26821385, 079-26827845	--
	P.S.I Sarkhej		--
	P.S.I Sarkhej		--
	P.S.I Sarkhej		--
3	Inc.P.I. Bopal	02717-293040	--
	P.S.I. Bopal		--
4	Inc.P.I. Changodar	02717-251786	--
5	C.P.I. Asalali	02718-262958	--
	P.S.I. Asalali	02718-262957	--
	Sec. P.S.I. Asalali		--
6	P.I. Sanand	02717-222333,224833	--
	P.S.I. Sanand		--
	P.S.I. Sanand		--
	P.S.I. Sanand		--
7	P.S.I. Kanabha	02718-286233	--

ANNEXURE – 11

Cont…

D. Dholka Police Stations -Ahmedabad (Rural)

1	Dy.Sup.Of Police Dholka	02714-222315	--
	Reeder Dy.S.P. Dholka		--
2	Inc. C.P.I. Dholka	02714-220770	--
3	Inc. P.I. Dholka	02714-222333,222265	--
	P.S.I Dholka		--
	P.S.I Dholka		--
	P.S.I Dholka		--
4	C.P.I. Dhandhuka	02713-222329	--
5	P.S.I. Bavla	02714-232100	--
6	P.S.I. Koth	02714-242044	--
7	P.S.I. Bagodara	02714-269230	--
8	P.S.I. Dhandhuka Senior	02713-222333	--
9	P.S.I. Ranpur	02711-238233	--
10	P.S.I. Dholera	02713-234218	--

E. Viramgam Police Stations -Ahmedabad (Rural)

1	Dy.Sup.Of Police Viramgam	02715-233627	--
2	Inc. C.P.I. Viramgam	02715-233244	--
3	P.I. Viramgam Town	02715-233237	--
	P.S.I. Viramgam Town		--
	P.S.I. Viramgam Town		--
4	P.S.I Viramgam Rural	02715-295267	--
			--
5	P.S.I. Mandal	02715-253141	--
6	P.S.I. Detroj	02715-255570	--
7	P.S.I. Vithalapur	02715-240172	--

ANNEXURE – 12

AHMEDABAD DISTRICT CRISIS GROUP

MEDICAL & HEALTH, AMBULANCE, BLOOD BANK, MEDICAL SHOPS (24 HOURS)

A. MAJOR HOSPITALS

Sr. No.	Name	Location	STD Code	Phone No.	Beds	Burn Ward	Chemical Poisoning Treatment Facility	Ambulance
A.	**ODHAV**							
1.	Smt. SLC Hospital	Saraspur	079	-	480	Yes	Yes	4
2.	Bapunagar General Hospital	Bapunagar	079	-	600	Yes	Yes	7
B.	**VATVA-NAROL**							
3.	LG Hospital	Maninagar	079	25461380	430	Yes	Yes	0
4.	Rajasthan Hospital	Maninagar	079	22866311	203	Yes	Yes	3
5.	Jivraj Mehta Hospital	Vasna Terminal	079	26639839	127	No	Yes	2
6.	Sardar Patel General Charitable Hospital	Maninagar	079	22743935	600	Yes	Yes	3
C.	**SABARMATI**							
7.	Gujarat Burns Hospital	Nava Vadaj	079	27556665	32	Yes	No	1
8.	J. J. Vora General Hospital	Income Tax, Ashram Road	-	-	48	No	No	2
9.	Mansarovar Hospital	Ashram Road	079	27557022	22	No	No	1
10.	Vadilal Sarabhai Hospital	Paldi	079	26577621	945	Yes	Yes	3
D.	**NARODA**							
11.	Vikas Hospital	Naroda	079	22823828	16	No	Yes	0
12.	Civil Hospital	Asarwa	079	22683721	1600	Yes	Yes	3
E.	**OTHERS**							
13.	Jasumatiben Surti Charitable General Hospital	Satellite Road	079	26742414	60	No	No	1
14.	Civil,Sola Hospital	Sola	079	27664359, 27664355	56	Yes	Yes	3
15.	Community Health Centre	Sarkhej	079	26826267	30	No	Yes	1
16.	Gurukrupa Hospital	Sarkhej-Dholka High way	-	-	20	Yes	Yes	0
17.	Community Health Centre	Sanand	-	-	22	No	No	2
18.	Sanand Hospital	Sanand	-	-	32	No	Yes	1
E.	**OTHERS**							
19.	Community Health Centre	Dholka	-	-	30	N	N	1

ANNEXURE –12

Continue…

AHMEDABAD DISTRICT CRISIS GROUP

B. AMBULANCE SERVICES

Sr. No.	Name	Location	Phone No.
1.	Smt. SLC Hospital	Saraspur	
2.	Bapunagar General Hospital	Bapunagar	
3.	Rajasthan Hospital	Maninagar	079-22866311
4.	Jivraj Mehta Hospital	Vasna Terminal	079-26639839
5.	Sardar Patel General Charitable Hospital	Maninagar	079-22743935
6.	Gujarat Burns Hospital	Nava Vadaj	079-27556665
7.	J. J. Vora General Hospital	Income Tax, Ashram Road	
8.	Mansarovar Hospital	Ashram Road	079-27557022
9.	Vadilal Sarabhai Hospital	Paldi	079-26577621
10.	Civil Hospital	Asarwa	079-22683721
11.	Jasumatiben Surti Charitable General Hospital	Satellite Road	079-26742414
12.	Sola Hospital	Sola	079-27474355
13.	Community Health Centre	Sarkhej	079-26633126
14.	Community Health Centre	Sanand	
15.	Sanand Hospital	Sanand	
16.	Community Health Centre	Viramgam	02715-233225
17.	Community Health Centre	Dholka	
18.	GVK EMRI (108)	NARODA	079-22814896

C. MAJOR BLOOD BANKS

Sr. No.	Name	Location	Phone No.
1	Adarsh Pathology Laboratory & Voluntary Blood Bank	Nikol Tolnaka, Bapunagar	22749146, 22746672 22744416 (R)
2	Karnavati Blood Bank	--	079-27479742 079-27415150
3	AEC Blood Bank (Amarawadi)	Amarawadi	
4	Help Blood Bank	-	079-65136744
5	AEC Blood Bank (Naranpura)	Naranpura	
6	AEC Blood Bank (Naroda)	Naroda Road	
7	AEC Blood Bank (Odhav)	Odhav	
8	AEC Blood Bank (Vasna)	Vasna	
9	AEC Blood Bank (Vatva GIDC)	Vatva GIDC	
10	Amee Pathology Laboratory & Blood Bank	Sabarmati	
11	Arjun Blood Bank & Pathology	Satellite Road	
12	Bapunagar General Hospital	Bapunagar	
13	Civil Hospital, (Asarwa)	Asarwa	079-22683949
14	Crossworld Blood Bank & Pathology Laboratory	Asarwa	
15	Green Cross Vol Blood Bank	Pardi Cross Roads, Paldi	26578824
16	Green Cross Vol Blood Bank	Opp. LG Hospital, Maninagar	25461864
18	Gujarat Blood Bank	Paldi	079 2658 6480
19	Adarsh pathology	-	079-42678234
20	Gujarat Blood Bank (Naranpura)	Naranpura	079 2745 3728
21	Gujarat Blood Bank (Paldi)	Pardi Cross Roads, Paldi	07926586080
22	Indian Red Cross Society	Himavan, Paldi	26651833 26650855
23	Indian Red Thalashamia Centre	Shefali Centre, Paldi	
24	Jivraj Mehta Hospital	Vasna	26639839, 26639840
25	L G Hospital	Kankaria, Maninagar	25461380-81
26	M P Shah Cancer Hospital	Asarwa	
27	Mamta Pathology Lab	Maninagar	
28	Max Enterprise (Mr. Tejas Shah)	Ashram Road	
29	Nagri Eye Hospital	Ellisbridge	
30	New Vishal Lab (White Cross)	Saijpur Bhoga	22815227
31	Prathama Blood Centre	Vasna	079-26611863
32	Rajasthan Hospital (Chatrabhuj Hospital)	Shahibaug	22866311, 22866312
33	Red Cross Blood Bank	Paldi	26651833
34	Red Cross Int Eye Bank	Paldi	
35	Sadvichar Parivar (Ashram Road)	Ashram Road	
36	Civil Chest Dep. (Civil Road)	Civil Hospital Campus	22680450
37	Sadvichar Parivar (Dariapur)	Dariapur	
38	Sarvoday Charitable Trust	-	079-40058958
39	Shardaben General Hospital	Saraspur	22924261 to 64
40	Shree Gujarat Pathology Laboratory	Nr. Sarkhej Police Station	26820381
41	V. S. Hospital	Ellisbridge	26577621-26

ANNEXURE – 12

Continue…

AHMEDABAD DISTRICT CRISIS GROUP

D. PRIMARY HEALTH CENTERS OF DISTRICT (P.H.C.)

PRIMARY HEALTH CENTERS OF DISTRICT (P.H.C.)				
Sr. No	**Taluka Name**	**PHC Name**	**M.O.-Name**	**Mob.No**
1	Bavla	Kavitha	Dr Vivek A Rathod	9099064078
2	Bavla	Gangad	DR ANKITA RABARI	9099064088
3	Bavla	Nanodara	DR RAJ SHAH	9099064054
4	Bavla	Shiyal	DR RUTURAJ CHAVDA	9099064084
5	Dascroi	Aslali	Dr. Rahul Valodara	9099011613
6	Dascroi	Kanbha	Dr Sangita Patani	9099064165
7	Dascroi	Kasindra	Dr Hiral S Nayak	9099064114
8	Dascroi	Kuha	Dr jaisika mathukiya	9099064110
9	Dascroi	Jetalpur	Dr. Minal R Patel	9099064163
10	Dascroi	Nandej	DR D H ZAVERI	9099064112
11	Dascroi	Vahelal	Dr brijesh c shah	9099064115
12	Detroj	Katosan road	Dr.Komal Darji	9574447499
13	Detroj	Rampura	DR Tushar panchal	9099064354
14	Detroj	Rudatal	Dr Daxesh Solanki	9099064248
15	Dhandhuka	Vagad	Dr.shweta rathod	7874199034
16	Dhandhuka	Hadala	Dr.Parth Jakhaniya (I/c)	6354702800
17	Dhandhuka	Aakru	Dr parth kumar	6354702800
18	Dholera	Dholera	Dr.Yash Bais	6355885982
19	Dholera	Pipli	Jay Rana	8780658035
20	Dholera	Bhadiyad	DR SIRAJHUSEN DESAI	9898805566
21	Dholka	Ambalyara	DR ABHISHEK PRAJAPATI (I/c)	9099064457
22	Dholka	Koth	Dr Arvind C Verma	9510138605
23	Dholka	Ganol	DR Krunal Maheriya	9099064784
24	Dholka	Chaloda	Dr Helly patel	9099064745
25	Dholka	Trasad	DR ABHISHEK PRAJAPATI	9099064457
26	Dholka	Vataman	Dr. Kaushik patel	9099064455
27	Mandal	Trent	Dr.Utsav Patel	6354341725
28	Mandal	Vithalapur	Dr Vishal Ajmera	7069029902
29	Mandal	Sitapur	Dr. Isha Mayani	9428463625

30	Sanand	Upardal	DR ANKITA PATEL	7990505742
31	Sanand	Chekhla	Dr kala H Shah	9099064400
32	Sanand	Zolapur	Dr. Krishnapriya Mohandas	8780654147
33	Sanand	Modasar	DR RAJKUMAR RAMAN	9727700265
34	Sanand	Virochanagar	Dr Rutu Ninama	7990736142
35	Sanand	Shela	Dr. S K Kapadia	7069077670
36	Sanand	Sanathal	Dr. Kaushik Vithalapara	9099064383
37	Viramgam	Karakthal	Dr. Rohan Patel	9099064235
38	Viramgam	Kumarkhan	Dr. Sandip Jadav	9099064353
39	Viramgam	Goraiya	Dr. Monali Rathi	9409354066
40	Viramgam	Vansava	Dr. Bhumi Gupta	7016136834
41	Viramgam	Manipura	Dr. R.G.Vaghela	9099064359
42	Dhandhuka	UHC	Dr.Punita Raghani (I/C)	6351282707
43	Dholka	UHC-1	Dr Rushika Mehta	9512087576
44	Dholka	UHC-2	Dr.Jeet	9106758562
45	Sanand	UHC	DR.JAY SOLANKI	8799017662
46	Viramgam	UHC	Dr. Sheray Patel	7203845478
47	Bavla	UHC	Dr. Vivek Rathod (I/c)	9099064078

Taluka Health Officers			
Sr No.	**Taluka Name**	**THO Name**	**Mobile No**
1	Bavla	Dr. Jigna Jaiswal	9726256556
2	Dascroi	Dr. Minal Patel (I/c)	9099064163
3	Detroj	Dr Sarad paliwal	7433974655
4	Dhandhuka	Dr. Mehul D. Jadav	9099064698
5	Dholera	Dr. Rakesh Mehta	9375163738
6	Dholka	Dr. Rakesh Mehta (I/c)	9375163738
7	Mandal	Dr Bhavesh Rathvi	9099064360
8	Sanand	Dr. B.K. Vaghela	9099064305 8866910300
9	Viramgam	Dr. Kaushal Patel	9726256555

ANNEXURE – 12

Continue…

AHMEDABAD DISTRICT CRISIS GROUP

E. COMMUNITY HEALTH CENTERS OF DISTRICT (C.H.C.)

SDH & CHC Superintendent List.					
SN	**District**	**Taluka**	**CHC**	**Name**	**Mobile No**
1	**2**	**3**	**4**	**5**	**6**
1	Ahmedabad	Bavla	CHC Bagodara	Dr.UDIT S.JUVALIYA	9875185891
2	Ahmedabad	Bavla	CHC Bavla	Dr.PRAVIN R.BHUVA	9825133552
3	Ahmedabad	Detroj	CHC Detroj	Dr. Bhavesh Patel	8128663685
4	Ahmedabad	Dholka	CHC Dholka	Dr. Farhin Munshi	7016751895
5	Ahmedabad	Mandal	CHC Mandal	Dr S R GOSHWAMI	9974112777
6	Ahmedabad	Sanand	CHC Sanand	Dr Bhavesh Hadiyel	9924242454
7	Ahmedabad	Dascroi	CHC Nandej	Dr. Bhakti Gor	9773127287
8	Ahmedabad	Dhandhuka	SDH Dhandhuka	Dr.Kuntal S Patel	9426385507
9	Ahmedabad	Viramgam	SDH Viramgam	Dr. Vivek Kandariya	9099023888
10	Ahmedabad	Dascroi	DH Singarva	DR.MANISH JADAV	9825328357

F. MEDICAL SHOPS (24 HOURS)

Sr. No	Name with Address	Phone No.		Sr. N	Name with Address	Phone No.
1	Krishna Medicines 11, Medicare Centre, B.h. H. M. Library ELB, Ellisbridge -380 006	26578826, 26576586		10	Paras Medical & Provision Store 4, Ghanshyam Shopping Centre, Subhash Bridge, Gurukul – 380 052	27556108
2	Stadium Chemist 7, Ambalal Avenu, Stadium Circle, Navrangpura	26460598		11	Sunrise Medicines 7, Bhaktinagar Shopping Centre, Gurukul Road, Gurukul-380 052	27482318
3	Deepak Medical & Provision Store Ishwar Complex, Opp. S. P. Stadium, Navrangpura	26401056, 26462949		12	Shreeji Medical Stores 33, Subhlaxmi CPLX, Bhuyangdev, Sola Road – 380 063	27450834
4	Radium Chemist 7, Ambalal Avenue, Stadium Circle, Navrangpura	26564598		13	Shree Akshar Medical Store 8, Agrawal Tower, Bhuyangdev, Sola Road	27456822
5	Sanjeevini Medical Stores Sanjeevini Complex, Bhimjipura, Nava Wadaj	27642929		14	Rajasthan Medical Camp Road, Near Rajasthan Hospital, Shahibaug -380 004	22868713
6	Jayveer Medicine B/5, Gold Coin Complex, Satelite-380 015, Near Jodhpur Cross Road	267407442				
7	Shreyas Medical Civil Hospital Campus, Civil Road	22683721				
8	P. V. Medicines 301, Sahjanand Trade, Opp. Apsara Cinema, Kankaria – 380 022	25351540				
9	Anil Medical India Colony, Bapunagar -380 024	22747260				

ANNEXURE – 13

LIST OF EXPERT PERSONS

AHMEDABAD DISTRICT CRISIS GROUP

Sr No	Designation	Technical Expert	Address	Phone No
1	Mr. Bansi Patel (Director)	Technical Expert-1	Bodal Chemicals Ltd., Vatva GIDC,Ahmedabad	(M) 98250 60886
2	Mr.K.N.Modi (Tech. Director)	Technical Expert-2	Parikh Enterprises, Odhav, Ahmedabad	079-22871471-2 (M) 9979869945
3	Mr. Chirga Parmar Deputy Manager-Safety & PSM	Technical Expert-3	Zydus Lifescience Ltd, Ahmedabad	(M) 97261 62699
4	Mr Babu Desai (Technical)	Technical Expert-4	Meghmani Organic Ltd Ahmedabad	(M) 99099 80413
5	Mr Parth Rajyguru Manager-Safety	Technical Expert-5	Suzuki Motor Gujarat Private Limited	(M) 9227593782
6	Mr. P.R.Patel (Director)	Technical Expert-6	Gujarat Agro Chemical MFG Co., Plot No.151-153/1 GIDC Ind Estate, Phase-2, Naroda, Ahmedabad	079- 22810029 (M) 982505592
7	Mr. Sachin Patel (Safety Manager)	Technical Expert-7	GSP Crop Science Pvt Ltd – Odhav,Ahmedabad	(M) 9879404947
8	Mr. Vikramraj Tiwari (Plant Manager)	Technical Expert-8	IOCl Bottling Plant, Sanand-Viramagam highway, Ta:Sanand	(M) 7879101024
9	Mr. Mathew Joseph (Manager)	Technical Expert-9	Matangi Industries ,Vatva,Ahmedabad	(M) 98988 54802
10	Mr. Viney Duggal (Safety Manager)	Technical Expert-10	Tata Motors Ltd., Northkotpura, Ta: Sanand	(M) 97940 52520
11	Mr Aashish Gokhale (Deputy General Manager(O))	Technical Expert-11	IOCL, Viramagam	(M) 9650100901

ANNEXURE – 14

AHMEDABAD DISTRICT CRISIS GROUP

EMERGENCY RESQUE EQUIPMENT WITH DISTRICT AUTHORITIES

No.	Muni./Taluka/ Name of Govt. or Semi Govt. Organization	Fire Fighter	Water Tanker	Tractor Trailer	Dumper / Bulldozer	Ambulance	J.C.B	Road Roller	Four Wheeler	D G Set	Boat	Rain measuring instrument
1.	Dholka Nagarpalika	1	-	4	-	-	1	1	1	-	-	-
2.	Bavla Nagarpalika	-	1	2	-	1	-	-	1	-	-	-
3.	Dhandhuka Nagarpalika	1		2	1	-	-	-	-	-	-	-
4.	Sanand Nagarpalika	-	1	2	-	1	-	-	-	-	-	-
5.	Mamlatdar, Dholka	-	-	-	-	-	-	-	-	1	3	2
6.	Mamlatdar, Bavla	-	-	-	-	-	-	-	-	1	-	1
7.	Mamlatdar,Viramgam	-	3	3 - 3	3	-	-	-	1	1	20	-
8.	Mamlatdar, Detroj-Rampura	-	-	-	-	1	-	-	-	1	-	-
9.	Mamlatdar, Mandal	-	-	-	-	-	-	-	-	1	-	-
10.	Mamlatdar, Dhandhuka	1	1	2	-	1	1	-	-	1	-	-
11.	Mamlatdar, Ranpur	-	-	-	-	-	-	-	-	1	-	-
12.	Mamlatdar, City	-	-	-	-	-	-	-	-	1	-	-
13.	Mamlatdar, Daskroi	-	-	-	-	-	-	-	-	1	-	4
14.	Mamlatdar, Sanand	-	-	-	-	2	-	-	8	1	-	2
15.	Irrigation Vibhag	-	-	-	-	-	-	-	6	-	-	-
16.	District Panchayat Ahmedabad	-	5	-	-	-	-	1	7	-	-	-

ANNEXURE – 15

AHMEDABAD DISTRICT CRISIS GROUP

EMERGENCY EQUIPMENT SUPPLIERS

A. EARTHMOVING EQUIPMENT SUPPLIERS

Sr. No.	Name	Location	Contact person	Phone	Mobile
1	2	3	4	5	6
1.	Chandra Roadlines & Crane Service	Amraiwadi	Mr. Harish C. Sharma Mr. Ramesh Tiwari	25851972	94260 11834
2.	Globe Transport Co. Pvt. Ltd.	Narol	Mr. Ramratan Agrawal Mr. Praful	25715641, 25715642, 25715643	98250 31682
3.	Gopi Crane Service	Isanpur	Mr. Gopiram Mr. Ameet	25732144,	98250 37144
4.	Iqbalkhan Engineering Contractors	Vatva	Mr. Iqbal Khan Mr. Pradipbhai	25894371, 25398014	98240 51314
5.	Jain Transport Service (Guj.)	Geeta Mandir	Mr. Arvind Garg	25465375, 25462099	98250 69471
6.	Manoj Translift	Narol	Mr. Ketan Thakkar Mr. Manoj Thakkar	-	98258 24196
7.	Nitin Transport Co.	Saijpur Bogha	Mr. Dinkar S. Gandhi Mr. Mayur Gandhi	22820942, 22820838, 22820182	98250 61025
8.	Shree Ambica Cargo Movers (Income Tax)	Income Tax	Mr. Tulsiram	27540782, 55425035	98250 14199
9.	West Coast Crane	Ashram Road	Mr. Mahesh Patel Mr. Tapan Patel	27540783, 27541785, 27913294	98240 33157
10.	Antique Construction Movers	Satellite	Mr. Ramesh K. Agarval Mr. Vandan K. Agarval	26748613, 26743314	94260 59457
11.	Arora Crane Service	Isanpur	Mr. Nawal Arora Mr. Valdi	25730980, 26850593	98240 30959
12.	Aprit Crane Service	Narol	Mr. Hirabhai	-	98253 17349
13.	Balaji Breakdown Service	Danilimda	Mr. Manubhai	-	98240 52865
14.	Chaudhary Crane Service	Odhav	Mr. Suresh Mr. Ramesh Chaudhry Mr. Natubhai	55445893, 22872364	93270 36698
15.	Jayram Fabricators / Jay Kishan Crane (Naroda GIDC)	Naroda GIDC	Mr. Vishvakarma	22809466, 55256433	9824067727
16.	Jyoti Engineering Services (Reg as A. R. Cargo Motors)	Sabarmati	Mr. Bharatkumar Mr. Attar Singh Mr. Julif	93270 03869, 27507644	98242 74711
17.	K. K. Agency	Rakhial	Mr. Khalidkhan K. Pathan	27762446, 22773843, 25359829	98250 18735
18.	Khanna Enginneers	Paldi	Mr. Ashwin G. Khanna	26587854, 26580634, 26580434	-
19.	Mahadevbhai Hiralal Marfatia	Amraiwadi	Mr. Mahadev H. Sharma Mr. Kamlesh M. Sharma	25831075	-

ANNEXURE – 15

Continue…

AHMEDABAD DISTRICT CRISIS GROUP

EMERGENCY EQUIPMENT SUPPLIERS
B. PORTABLE DG SET SUPPLIERS

Sr. No.	*Name of Vendor*	*Address*	*Contact Person*	*Phone No.*	*Mobile No.*
1	**2**	**3**	**4**	**5**	**6**
1.	*Bhagvati Power Generator*	*Naroda GIDC*	*Mr. Rajesh Sahrma Mr. Shyam*	*22819563,*	*98250 28725*
2.	*Gopi Generator*	*Ghatlodia*	*Mr. Gunvant Patel Mr. Kiran Patel*	*27464044*	*98250 62054*
3.	*Meesha Electricals*	*Naroda GIDC*	*Mr. Arvind Patel Mr. Yashwant Mr. Jitendra*	*22816475,*	*98250 30317*
4.	*Nexus Research & Sales Promotion*	*Ashram Road*	*Mr. Pradip Asar*	-	*98240 26383*
5.	*Sark Engineering Co.*	*Vatva GIDC*	*Mr. Rakesh Patel*	*25895728,*	*98240 96205*
6.	*Shakti Traders & Engineering Co.*	*Amraiwadi*	-	-	*94260 71450*
7.	*Shree Sonal Decorators*	*Ghatlodia*	-	-	*98240 11656*
8.	*Space Communication*	*Navrangpura*	*Mr. Kamlesh Shah Mr. Ashok Shah*	*26445222,*	*98250 09967*
9.	*Vink Diesel*	*Geeta Mandir Road*	*Mr. Yogendra*	*25390519, 23352312*	*98240 44199*
10.	*Ganesh Corporation (Navrangpura)*	*Navrangpura*	*Mr. J. S. Kanwar Mr. Rajiv Kanwar*	*25624528*	*98250 51110*
11.	*General Power Corporation*	*Sarkhej*	*Mr. Y. S. Ansari*	*26891816*	*98250 39887*
12.	*Gupta Traders*	*Ashram Road*	*Mr. Vijay Gupta Mr. Mahesh Gupta*	*26579116, 26579156*	*98253 15787*
13.	*K. K. Agency*	*Rakhial*	*Mr. Khalidkhan K. Pathan*	*22762446,*	*98250 18735*
14.	*Moonlight (Dariapur)*		*Mr. Rasul Mr. Salamanbhai*	*22138868,*	*98252 08840*
15.	*New Milan Music Band / Shah Light House*	*Saraspur*	*Mr. Mohmmad Sikandar Mr. S. B. Shah*	*22741495*	*99241 64786*
16.	*Progressive Engineering & Generators*	*Relief Road*	*Mr. Deval Bhatt Mr. Harish Bhatt*	*26924381*	*98259 73441*
17.	*Reliance Electricals & Generators*	*Maninagar*	*Mr. Jitendra*	*25461334*	-
18.	*S. P. Electric (Maninagar)*	*Maninagar*	*Mr. Chetan / Mr. Nimesh S. Bhavsar*	*25323003, 25328836*	*98250 06836*
19.	*Shreenath Diesels Sales & Service*	*Kankaria*	*Mr. K. K. Kotak / Mr. R. H. Singh / Mr. Jatin*	*25432694, 25382694*	*98250 62548*
20.	*Sorathia Engineers (Drive In Road)*	*Drive In Road*	*Mr. Sabir H. Sorathia / Mr. Kasam H. Sorathia*	*27910976,*	*98250 20621*
21.	*Zen Engineers / Arvind M. Soni*	*Salapas Road*	*Mr. Divyang Mistry / Mr. Arvind / Mr. Brijesh*	*25434506*	*98240 59506*
22.	*Shree Engineering Works (Naroda)*	*Naroda*	*Mr. Sanjay Patel Mr. Dharmendra Patel*	-	*98250 64168*

ANNEXURE – 16

AHMEDABAD DISTRICT CRISIS GROUP

KEY CONTACTS – NATIONAL LEVEL AUTHORITIES

Sr. No.	Agency	Contact Information	
		STD Code	Telephone Numbers
1.	National Crisis Control Room	011	24360734
2.	Joint Secretary, Ministry of Environment & Forests, Govt. of India	011	24695274
3.	Director, Hazardous Substance Management Division	011	24695337
4.	Gujarat State Disaster Management Authority	079	23259220, 23259501
5.	DG - Fasli, Mumbai	022	24060501/ 502
6.	National Safety Council, Mumbai	022	27579924/ 25/ 26
7.	Disaster Management Institute, Bhopal	0755	2466715,2461538, 2461348
8.	Asstt. Director (S), Inspectorate of Dock Safety, Near Bunder Gate, New Kandla	02836	270249, 8655775051
9.	Dy. Controller of Explosives (PESO), Raopura, Vadodara	0265	2225159, 2361035
10.	Director Manufacturing, Alembic Chemical Works Co. Ltd. Vadodara	0265	2280550
11.	Director, National Institute of Occupational Health, Ahmedabad	079	22688700, 22686351
12.	Exec. Director(Technical), KRIBHCO, Surat	0261	2862766, 2862767, 2862768, 2802073, 2862763, 2802140, 2802335, 2803081, 2803012
13.	GM, ONGC, Chandkheda Complex, Ahmedabad	079	23266521
14.	Nisarg Environmetal Protction Agency, Gandhinagar	079	22321945
15.	Director, Industrial Safety & Health, Ahmedabad	079	25502346
16.	President, Indian Association of Occupational Health, Vadodara	0265	2292505, 9978908780
17.	Director, Disaster Mitigation Institute, Ahmedabad	079	26582962

ANNEXURE – 17

AHMEDABAD DISTRICT CRISIS GROUP

LIST OF TRAINED FIRST RESPONDERS FOR SERCH, RESCUE & MEDICARE

Sr. No.	Corporation / Organisation	Name of Trainee	Designation	Team Number		Sr. No.	Corporation / Organisation	Name of Trainee	Designation	Team Number
A.	**FIREMAN /: FIRE OFFICERS**									
1.	AMC	Mr Amit Anandrao Dongre (Coordinator)	Chief Fire Officer (AMC)	I		27.	RMC	Mr. Bikhabhai Jivabhai Theba	Fireman	I
2.	AMC	Mr. Jayesh Khadiya	Additional Chief Fire Officer	I		28.	RMC	Mr. Sailesh Ramniklal Nadiyapara	Fireman	II
3.	AMC	Mr. Mithun Mistry	Additional Chief Fire Officer	I		29.	RMC	Mr. Kaji Veji Dhela	Station Officer	III
4.	AMC	Mr. Narendra B. Trivedi	Fireman	I		30.	RMC	Mr. Shardul G. Zinzhuvadia	Fireman	III
5.	AMC	Mr. Khushalchand Fulia	Fireman	I		31.	SMC	Mr. Bijan Bidyut Mitra	Sub Officer	I
6.	AMC	Mr. Ketankumar M. Shikari	Fireman	I		32.	SMC	Mr. Vijhalbhai Bhaghabhai Parmar	Sub Officer	II
7.	AMC	Mr. Rajesh Goswami	Fireman	I		33.	SMC	Mr. S. K. Acharya (Coordinator)	Dy. Chief Fire Officer	III
8.	AMC	Mr. Jayantilal N. Vavadia	Operator	I		34.	BMC	Mr. Gavariya Navisinh Bambhaniya	Fireman	I
9.	AMC	Mr. Gajendrasingh S. Chauhan	Fireman	I		35.	BMC	Mr. Bharat Dahayalal Kanada	Fireman	I
10.	AMC	Mr. Mahemudmiya Abbamiya Malek	Operator	I		**B.**	**MEDICAL SPECIALISTS (DOCTORS, HEALTH OFFICERS ETC.) :**			
11.	AMC	Mr. Pankajkumar Babulal Raval	Fireman	I		1.	L G Hospital Ahmedabad	Dr. Satasiya	MS (General Surgery)	I
12.	AMC	Mr. Ajitkumar K. Makwana	Fireman	II		2.	L G Hospital Ahmedabad	Dr. Harsha Makwana	MD (Anaesthesia)	I
13.	AMC	Mr. Dilipkumar H. Chavda	Fireman	II		3.	Rajkot Municipal Corporation,	Dr. D. M. Gheewala	Dy. Medical Officer of Health	I
14.	AMC	Mr. Hitubhai Jashubhai Gadhvi	Fireman	II		4.	Ahmedabad Municipal Corporation	Dr. Prashant Mukadam	Doctor	I
15.	AMC	Mr. Karansinh S. Nehra	Fireman	II		5.	Ahmedabad Municipal Corporation	Dr. D. R. Bhatia	Doctor	II
16.	AMC	Mr. Abdulsamad Mehbubhusain Sandhi	Fireman	II		6.	Ahmedabad Municipal Corporation	Dr. Jayeshkumar V. Parekh	Doctor	II
17.	AMC	Mr. Vikramsinh Mohansinh Rathod	Fireman	III		7.	Ahmedabad Municipal Corporation	Dr. Bindi Palkiwala	Doctor	II
18.	AMC	Mr. Vishnu Desai	Divisional Fire Officer	III		8.	Asst. Professor, Pandit Deendayal Hospital, Rajkot	Dr. K. M. Shayani	MS (Ortho)	III
19.	AMC	Mr. Mahadev K. Mangela	Fireman	III		9.	Pandit Deendayal Hospital, Rajkot	Dr. Ramesh V. Kachhadia	MS (General Surgery)	III
20.	AMC	Mr. Bachubhai S. Soldanki / Harijan	Fireman	III		10.	Civil Hospital, Sola Ahmedabad	Dr. Jagdish V. Chavda	MS (General Surgery)	III
21.	AMC	Mr. Suresh Damor	Fireman	III		11.	CHC Bardoli, Surat	Dr. Amrut R. Patel	MS (General Surgery)	III
22.	AMC	Mr. Mukesh Baria	Fireman	III		**C.**	**TRAFFIC POLICE (PSI) :**			
23.	AMC	Mr. Nalinkumar Babubhai Kahar	Fireman	III		1.	Commissionerate Traffic Ahmedabad	Mr. H. M. Kudaliya	PSI (Traffic)	I
24.	AMC	Mr. Abidali N. Balospura	Fireman	III		2.	Commissionerate Traffic Ahmedabad	Mr. M. A. Mansuri	PSI (Traffic)	II
25.	VMC	Mr. D. P. Gaujal	Station Officer (Fire)	I		3.	Commissionerate Traffic Ahmedabad	Mr. S. M. Saiyed Kazi	PSI (Traffic)	III

ANNEXURE – 18

AHMEDABAD DISTRICT CRISIS GROUP

LIST OF SAFE SHELTERS

Sr. No.	Name	Location
	Vatva – Narol Industrial Pocket	
1.	7th Day Adventist H. S. School Maninagar	Maninagar
2.	Amraiwadi Municipal Middle School	Amraiwadi
3.	Archana School – Khokhara	Khokhara
4.	Image English School	Jamalpur
5.	Vidhya Sarita Primary School Vatva	Vatva
6.	Amraiwadi Municipal High School	Amraiwadi
	Odhav- Rakhiyal-Naroda-Sabarmati Industrial Pocket	
7.	Shahpur Tutorial Girls High School	Shahpur
8.	Karmyog Vidhyalaya	Odhav
9.	Sabarmati Girls School	Sabarmati
10.	Kaligam School	Kaligam
11.	Jila Panchayat Boys School	Sabarmati
12.	Central School Shahibaug	Shahibaug
13.	National High School	Naroda
14.	H. B. Mehta Vallabh Nagar High School	Naroda
15.	Central School No.2 Cantonment	Asarwa
	Sanand- Viramgam-Bavla-Mandal Industrial Pocket	
16.	Sheteh High School, Sanand	Sanand
17.	Shree Swaminarayan Gurukul School	Sanand
18.	Swastik High School	Sanand
19.	Primary School	Bavla
20.	Shri Ramswarupdas Vidha Mandir	Viramgam
21.	Vidha Mandir High Shool, Viramgam	Viramgam

ANNEXURE – 19

AHMEDABAD DISTRICT CRISIS GROUP

METEOROLOGICAL DETAILS

Sr. No.	Month	Temperature		Rainfall Monthly Total (in mm)	Max. % R H	Wind Data				
		Max. ^{0}C	Min. ^{0}C			No. of Days for 1-19 Kmph	Wind Direction for % No. of Days* from			
							NE	SW	W	NW
1.	January	28.7	11.9	3.9	55	27	27	1	2	8
2.	February	31.0	14.5	0.3	52	24	24	2	6	16
3.	March	35.7	18.5	0.9	47	26	26	3	11	29
4.	April	39.7	23.0	1.9	49	26	26	9	20	38
5.	May	40.7	26.3	4.5	68	27	27	31	31	22
6.	June	38.0	27.4	100.0	77	28	28	43	31	7
7.	July	33.2	25.7	316.3	86	28	28	49	28	5
8.	August	31.8	24.6	213.3	84	28	28	44	32	8
9.	September	33.1	24.2	162.8	80	27	27	23	33	24
10.	October	35.6	21.2	13.1	64	24	24	2	6	15
11.	November	33.0	16.1	5.4	52	27	27	0	0	2
12.	December	29.6	12.6	0.7	56	27	27	0	0	5

Source : Indian Meteorology Department
* Calm weather prevailed during the remaining days

ANNEXURE –20/A

AHMEDABAD DISTRICT CRISIS GROUP

SURVEY OF PROBABLE TYPES OF CHEMICAL ACCIDENTS IN INDUSTRIAL POCKET
AHMEDABAD-1(VATVA-NAROL)

Sr. No.	Probable Type of Chemical Accidents	Name of Chemical Involved	Name of MAH Unit	Nomenclature
1.	Fire	MCB, E.O.,HSD, MS, ATF, SKO, Ethanol	1. IOCL 7. MDI 2. BCL-1 8. JCL 3. BCL-3 9.APL 4.CQOL 10. AO 5. MI 11. ADP 6.MOL.	1. *APL* ***: Advance Petrochemicals Ltd.*** 2. *CQPL* ***: Crystal Quinone Pvt. Ltd Unit – II*** 3. *BCL-1 :* ***Bodal Chemical Ltd. U- 1*** 4. *BCL-3 :* ***Bodal Chemical Ltd. U-3*** 5. *MI:* ***Matangi Industries LLp 1*** 6. *MI:* ***Matangi Industries LLp 2*** 7. *MDI-1:****Mayur Dyechem Intermediates Ltd. Unit-1*** 8. *MCI :* ***Megh Chem Industries*** 9. *MOL:* ***Meghmani Organics Ltd.*** 10. *JCL:****Jay Chemical Ind Ltd*** 11. *AKD :* ***A K Dyechem*** 12. *PDCI:* ***Parshvanath Dye Chem pvt ltd.*** 13. *AO:* ***Ami Organics*** 14. *ADP:* ***Associated Dye stuf pvt ltd.*** 15. *IOCL:****Idian Oil Corporation Ltd.*** 16. *SI:* ***Saras Industries*** 17. *SO:* ***Sharma & Co.***
2.	Flammable Liquid Spillage	MCB, E.O.,HSD, MS, ATF, SKO, Ethanol	1. IOCL 7. MDI 2. BCL-1 8. JCL 3. BCL-3 9.APL 4.CQOL 10. AO 5. MI 11. ADP 6.MOL.	
3.	Toxic Liquid Spillage	Acetic Acid, Chlorosulphonic Acid, Sulphuric Acid, Chlorine	1. APL, 8.MOL 2. CQPL, 9. JCL, 3.BCL-1, 10 .PDCL 4. BCL-3 11, AO, 5.CQPL 12. MCI 6. MI 13. ADP 7. SI, 14. SO 15. AKD	
4.	Flammable Gas Leakage/ Dipersion	MCB, E.O.,HSD, MS, ATF, SKO, Ethanol	1.ADPL 5.MDI 2.BCL-1 6. MOL 3.BCL-3 4. JCL	
5.	Toxic Gas Leakage/ Dispersion	Chlorine	1.SI 2.MOL 3. MCI 4. PDCI 5. AO 6. SO 7. AKD	
6.	Poisonous Substance Spreading	Pesticides	-	
7.	Explosion	Petrochemicals	1.APL, 2.ADPL 3.BCL-1 4.BCL-3 5.MI 6.IOCL	
8.	MISC		All	

ANNEXURE –20/B

AHMEDABAD DISTRICT CRISIS GROUP

SURVEY OF PROBABLE TYPES OF CHEMICAL ACCIDENTS IN INDUSTRIAL POCKET
AHMEDABAD-2(ODHAV-RAKHIAL & NARODA-SABARMATI)

Sr. No.	Probable Type of Chemical Accidents	Name of Chemical Involved	NAME OF MAH UNIT	NOMENCLATURE
1.	Fire	E.O., Ethyl Acetate, C-9, Xylene, Formaldehyde	1. SDPL 2. ENPL 3. MPL	1. *PEL:* ***Parikh Enterprises Pvt. Ltd.*** 2. *ENPL:* ***Encore Natural Polymenrs Pvt Ltd*** 3. *SDPL:* ***Sagar Drugs & Pharmaceuticals Limited.*** 4. *SI :* ***Super Industries***
2.	Flammable Liquid Spillage	E.O., Ethyl Acetate, C-9, Xylene, Formaldehyde	1. SDPL 2. ENPL	
3.	Toxic Liquid Spillage	Sulphuric Acid, Hydrochloric Acid, Caustic Lye, Chloro Sulphonic Acid, Thionyl Chloride	1.PEL	
4.	Flammable Gas Dispersion	LPG / PROPANE	1.SI	
5.	Toxic Gas Dispersion	Chlorine	2.PEL 3.SI	
6.	Poisonous Substance Spreading	Pesticides	NA	
7.	Explosion	Ethylen Oxide (E.O.)	1. SDPL 2. ENPL	
8.	MISC		All	

ANNEXURE –20/C

AHMEDABAD DISTRICT CRISIS GROUP

SURVEY OF PROBABLE TYPES OF CHEMICAL ACCIDENTS IN INDUSTRIAL POCKET
AHMEDABAD-3(SANAND, BAVLA VIRAMGAM, MANDAL)

Sr. No.	Probable Type of Chemical Accidents	Name of Chemical Involved	Name of MAH Unit	NOMENCLATURE
1.	Fire	Diesel, Petrol, LPG, Flammable Gases, Propane, E.O., Methnol, Formaldehyde, Styrene,TDI	1. TML 2. TAL 3. IOCL-B 4. SHV 5. RRPL 6. FIL 7. RRML 8. EF 9..MPL 10. SMGL	1. TTCPL : **Terra Tech Chemicals (India) Pvt. Ltd** 2. DCL : **Deedy Chemicals Pvt. Ltd.** 3. IOCL-B: **Indian Oil Corporation Ltd.(LPG Bottling Plant) - Sanand** 4. MI : **Manshi Industries** 5. *PC : **Pratiksha Chemicals*** 6. *SHV : **SHV Energy North West India Pvt. Ltd.*** 7. *TML:- **TATA Motors Ltd.*** 8. *RRPL: **R.R. Patel Industrial Gases Pvt Ltd*** 9. *EF: **Excel Formulation*** 10. *RRML: **Reliance Petro Marketing Ltd*** 11. *TAL: **Tata Autocomp System Ltd*** 12. *MPL: **Macro Polymers Pvt Ltd*** 13. *IOC (SMPL) **: Indian Oil Corporation Ltd. (Salaya Mathura Pipe Lines)*** 14. *SMGL: **Suzuki Motor Gujarat Private Ltd***
2.	Flammable Liquid Spillage	Diesel, Petrol, LPG, Propane, E.O., Methnol, Formaldehyde	1. TML 2. TAL 3. IOCL-B 4.SHV 5. RRPL 6. FIL 7. RRML 8. SLL 9. EF 10.MPL 11 SMGL	
3.	Toxic Liquid Spillage	Oleum, Phenol	1. NL 2. MI 3. TTCPL 4. PC	
4.	Flammable Gas Dispersion	Diesel, Petrol , LPG / Propane	1,IOCL-B 2 SHV 3.TML 4. FIL 5. RRML 6. TAL 7. SMGL	
5.	Toxic Gas Dispersion	Chlorine	1.CKRL, 5. MI 2. PC 3. NIR 4. DCL	
6.	Poisonous Substance Spreading	Pesticides	NA	
7.	Explosion	Isobutylene, E.O., Diesel, Petrol, LPG, Methnol, Formaldehyde	1. IOCL-B 2. TAL 3.SHV 4. RRPL 5. FIL 6. RRML 7. SMGL	
8.	MISC		All	

ANNEXURE –21

AHMEDABAD DISTRICT CRISIS GROUP

CARE FOR SAFE HANDLING OF SOME CHEMICALS

1. PRECAUTION IN FLAMMABLE AREA

Mobile vehicles without exhaust muffles (spark arrester) should not be allowed, where flammable gas / vapour is suspected. No open flame, lighter, bidi / cigar or hot substance will be permitted.

Wind direction, velocity should be ascertained sufficient water pressure with required range, hydrants, intact hose pipes with connections trained personnel and proper PPE are essential.

2. FIRE EXTINGUISHERS

Fires are classified in Five Groups. The portable fire extinguishers of various types as explained below are being installed. Sand buckets also have been installed. They are used to extinguish fires as soon as they are detected. The type of each extinguishers to be used in each class of fires have been described below Using the wrong kind of fire extinguishers could be dangerous. For example, using water on some solvents or odour can actually spread the fire or flames. Even if you have the right extinguisher, you must use it correctly to be effective.

Class of Fire	Description	Extinguishing Media	I. S. No.
A	Fires involving ordinary combustible materials like wood, paper, textiles etc. The quenching and cooling effect of water or of solutions containing larger percentage of water are of first importance in extinguishing these fires.	Water Water (Gas Pressure) Water (Constant air pressure) Water – Soda – Acid type	--- 940 6234 934
B	Fires occur in the vapour-air mixture over the surface of flammable liquids such as petrol, oil, grease, naphtha, paints, thinners, varnishes etc. They are controlled by limiting the supply of air (Oxygen), blanketing effect is essential.	Dry Chemical Powder Carbon-di-oxide Foam	2171 4308 2878 933
C	Fires involving gaseous substances under pressure, where it is necessary to dilute the burning gas at a very fast rate with an inert gas or powder.	Dry Chemical Powder Carbon-di-oxide	2178 4308 2878
D	They occur in combustible metals such as magnesium, titanium, sodium, aluminum, zinc, potassium etc. where the burning metal is reactive to water.	Dry chemical Powder special day powder for metal fire	2171 4861
E	Fires involving electrical equipments where the electrical non-conductivity of extinguishing media is of first important	Carbon-di-oxide Dry Chemical Powder	2171 4308

3. EXPLOSION HAZARDS

The following factors may lead to explosion due to presence of flammable mixtures in the atmosphere. Therefore, due care should be taken to avoid such factors, while handling flammable gas or liquid during emergency.

ANNEXURE – 21

Continue…

AHMEDABAD DISTRICT CRISIS GROUP

CARE FOR SAFE HANDLING OF SOME CHEMICALS

1. Electrical
2. Smoking
3. Friction
4. Hot surfaces
5. Welding sparks
6. Gas Cylinders
7. Spontaneous ignition
8. Static Electricity
9. Overheated materials
10. Lubricants
11. Flammable metals
12. Inflammable Solids / Liquids / Gases.
13. Lightening Strokes
14. Mobile Vehicles
15. Mobile Phone

4. PRECAUTION FOR EXPLOSION

There must be following attack in preventing an explosion.

a. Development & accumulation of explosive mixture.
b. To lower down the lower explosive limit of explosive mixture
c. To eliminate the source of ignition
d. Proper ventilation, which will prevent excessive accumulation of gases or vapour under certain conditions.
e. Changes in the temperature will also change its density
f. To provide exhaust or sucking system Care should be taken to use flameproof or explosion proof electrical equipment.
g. Use of inert gases such as Carbon-di-oxide, nitrogen, flue gas or other non-combustible gases. Their function is to keep the concentration of oxygen below the point at which it will not support the combustion.
h. Winter poses potential hazards because of colder and drier weather create more static electricity and flammable vapour concentration attains its explosive limits easily. Further hazards increases doubly when the doors and windows of the building where such flammable substances are used, are kept closed in order to conserve heat for human comfort during cold weather.

2 TOXIC HAZARD

Harmful chemical in form of gas, vapour, dirt, fumes, mists, powder etc. can exert its toxic effect only when they come in contact with body cells. Their routes of entries are inhalation, skin. Most of the harmful chemicals get entry during inhalation. The self-contained breathing apparatus, canister mask, fresh air mask like personnel protective equipment are to be used.

ANNEXURE – 21

Continue…

AHMEDABAD DISTRICT CRISIS GROUP

CARE FOR SAFE HANDLING OF SOME CHEMICALS

3 WATER REACTIVE CHEMICALS

Certain chemicals, which are highly reactive with water, therefore, do not use water during their spillages, leakages, overflowing etc. The Oleum, Chlorine, Phosphorus etc. have affinity with the water. The sand, dry earth or soda ash, lime etc. can be used, instead of water.

4 SPECIALIZED RESOURCES

These resources are those specifically designed to deal with oil and hazardous material spills. They may range from simple containment booms to elaborate trailer-mounted incinerators and unit processes to deal with hazardous material spills. A typical list follows:

a) ***Booms and Barriers:***

A wide variety of floating barriers are manufactured of different sizes, shapes and materials to contain spilled materials, divert spilled material or exclude spilled materials from sensitive areas.

b) ***Skimmers:***

A wide range of skimmers use one or more of such processes as weirs, oliaphilic drums, belts or ropes, inclined planes, vortexes or suction to remove oil or hazardous materials from the water surface for transport to receiving facilities.

c) ***Sorbents:***

Absorbent or adsorbent materials selectively absorb oil or hazardous materials for removal and disposal. These sorbets are made from a wide range of natural and manufactured materials.

d) ***Chemicals:***

Specialized chemicals are used to disburse oil and hazardous materials after surface tension and thus spreading, make and break emulsions and neutralize or alter hazardous materials.

e) ***Chemical Spreading Equipment:***

A wide range of chemical spreading equipment, ranging from hand sprayers and truck sprayers to vessel and aircraft spraying equipment, dispose the special chemicals.

f) ***Storage Facilities:***

Emergency storage facilities, range from fast erecting tanks to rubber and plastic pillows and liners for pits and reservoirs.

g) ***Special Treatment Units:***

A wide variety of special treatment units have been developed (but not widely distributed) for oil-water separation, chemical processing, incineration and the like.

ANNEXURE – 21

Continue…

h) ***Instrumentation / Safety Equipment:***

A wide range of safety equipment in the form of breathing equipment, protective clothing, protective footwear and so on, is needed, particularly for hazardous material spills. Similarly, a wide range of analysis equipment, including explosion meters, gas-measuring equipment and organic vapour analyzers is needed to measure hazard characteristics.

i) ***Unit Operations and Processes:***

The traditional and specialized resources are utilized together to achieve components of the cleanup process. The terms "unit operations" and "unit processes" are borrowed from chemical and environmental engineering to describe the collection of the individual unit operations (single activities) into unit processes (groups of activities) to achieve a purpose in the cleanup operation.

ANNEXURE – 21

Continue…

AHMEDABAD DISTRICT CRISIS GROUP

CARE FOR SAFE HANDLING OF SOME CHEMICALS

5 DEALING WITH SPILLAGES OF COMMON HAZARDOUS CHEMICALS

1. ***Aromatic Amines:***
   These are toxic and readily absorbed through skin. Washing with water effects immediate removal of spills or skin or clothing. Vapours are toxic too.

2. ***Halogenated Amines and Nitro Compounds:***
   There are toxic via inhalation or skin penetration. Remove spills with water.

3. ***Chlorosulfonic Acid:***
   In moist air HCL and H_2SO_4 are formed. Avoid breathing in fumes. In Spillage area spray lime solution instead of water.

4. ***Cyanides and Nitrides:***
   Toxic, if inhaled, swallowed or absorbed through skin. Liquid nitrides and HCN are flammable. Use CO_2 extinguishers. Clean up cyanide spills with water. Flush small amounts down the sink the copious quantities of water.

5. ***Peroxides:***
   70% H_2O_2 may spontaneously explode. Organic peroxides such as benzoyl peroxide are flammable as dry solids and may explode by shock. Use trays for storage. Use vermiculite or sand to clean up spills.

6. ***Aniline***
   Use mixture of sand and soda ash.

ANNEXURE – 21

Continue…

AHMEDABAD DISTRICT CRISIS GROUP

CARE FOR SAFE HANDLING OF SOME CHEMICALS

6 Leak Detection, Neutralisation & Disposal

Sr. No.	Leak Detection	Neutralisation & Disposal
1.	**CHLORINE** To detect the chorine leak an ammonia spray or swab is used. Chlorine gives white dense fumes of ammonium chlorine is greenish yellow gas with pungent and irritating odour.	Emergency disposal of chlorine is done by absorbing it in the solution of caustic soda, soda ash or hydrated lime slurry. Chlorine can't be vented off as it is toxic gas. Cylinder of any part of cylinder should not be immersed in the tank holding caustic or other solutions. Don't use rubber hose or polyethylene pipe connection for neutralising chorine gas. Do not pour water on the leak.
2.	**AMMONIA** Ammonia leak can be detected easily due to its specific pungent odour. The exact location of leak can be found out by hydrochloric acid swab in suspected region. This will give white vapours of ammonium chloride. Another method used in the detection of ammonia leak is by the use of sulphur dioxide gas, which also forms white fog or cloud in contact with ammonia.	As it is toxic gas it cannot be vented to atmosphere. Ammonia leakage can be absorbed in water in a suitably designed system, as its solubility in water is very high. Mild steel is used as material of construction.
3.	**SULPHUR DIOXIDE** Sulphur dioxide leak can be detected by odour as it has characteristic odour. But the exact location of the leak can be found out by ammonia vapours form a swab or squeeze bottle. Sulphur dioxide will produce dense white fumes with ammonia vapours. Leak may also be detected by applying soap solution. Soap solution in case of leakage will give bubbles.	Sulphur dioxide leak can be absorbed in caustic solution. For this purpose scrubber should be preferably fabricated of polypropylene backed by FRP. Do not use water on the leak.
4.	**BROMINE** Bromine spillage can be found out as it has intensely irritating odour. Bromine leak can be detected by using ammonia swab or spray. Bromine gives white dense fumes with ammonia solution.	As bromine is toxic, and fuming liquid, it can't be vented to atmosphere. Water should not be directly poured over the spillage with mud or earth and mop up with plenty of water.
5.	**ETHYLENE OXIDE** Ethylene oxide leak can be detected by using soap solution. Leak will produce bubble with soap solution.	As the gas is extremely flammable, all the ignition sources should be shut off. Leaking gas can be slowly vented off in a safe and open area. Put water spray to cool down, if necessary. The gas can be burnt off in a suitably designed burner.
6.	**BUTADIENE** Butadiene leak can be detected by its mild aromatic odour. Butadiene leak can also be detected by using soap solution, which will produce bubbles.	Leaking gas should be slowly vented off to air in a safe open area or can be burnt off in a suitable burnet. Put water spray for cooling, if necessary.

ANNEXURE – 21

Continue…

AHMEDABAD DISTRICT CRISIS GROUP

CARE FOR SAFE HANDLING OF SOME CHEMICALS

8. Leak Detection, Neutralisation & Disposal (Continue…)

Sr. No.	Leak Detection	Neutralisation & Disposal
7.	**BENZENE** As benzene is flammable gas, flame should not be used to detect the leak. Leak will produce bubbles with soap solution.	As the gas is highly inflammable, shut off all the sources of ignition. Apply non-flammable dispersing agent. Run the waste diluting greatly with running water. Due to non-availability of dispersant, this can be absorbed on sand. Site of spillage should be thoroughly washed with water and soap or detergent.
8.	**VINYL CHLORIDE** Vinyl chloride leak can be detected due to its characteristic odour. Leak can also be detected with soap solution, which will produce bubbles.	Leaking gas can be vented slowly to air in a safe open area or gas should be burnt off in a suitable burner.
9.	**CAUSTIC SODA** Detect the leak of caustic soda with wet litmus paper; caustic will change the colour of the paper from red to blue.	Caustic soda should be scrubbed in water scrubber made of MS or neutralize it with dilute HCl acid.
10.	**SULPHURIC ACID** Detect the leakage of oleum with its sharp penetrating odour. Leakage can also be detected by using wet blue litmus which when coming in contact turns red.	Sulphuric acid should be scrubbed in lime or caustic or water scrubber made up of MSRL or PVC/FRP. Do not put water directly on the leak. Content the leak by mixing it with earth/sand and lime sludge slowly. Neutralise by pouring water and dilute alkali.
11.	**HYDROCHLORIC ACID** Detect the leak with its sharp pungent odour. Leak can also be detected by using wet litmus paper. Hydrochloric acid will change the colour of the paper from blue to red.	Hydrochloric acid should be scrubbed in lime or caustic or water scrubber made of MSRL. Do not put water directly on the leak. Content the leak by mixing it with earth/sand and lime sludge. Slowly neutralize by pouring water and dilute alkali.
12.	**NITRIC ACID** Detect the leak of nitric acid with wet litmus paper. Nitric acid will change the colour of the paper from blue to red.	Nitric acid should be scrubbed in lime or caustic or water scrubber made of MS or SS. Do not put water on the leak. Content the leakage by mixing it with earth/sand and lime sludge. Slowly neutralize by pouring water or dilute alkali.
13.	**PHOSPHORIC ACID** Detect the leak of phosphoric acid with wet litmus paper, which will change the colour of litmus paper from blue to red.	Spread soda ash liberally over the spillage and mop up cautiously with plenty of water. Dilute the waste greatly with running water.

ANNEXURE-22

AHMEDABAD DISTRICT CRISIS GROUP

A. SPECIAL MEDICAL TREATMENTS & ANTIDOTS

Sr. No.	Name of Chemicals	Medical Treatment / Antidotes	Neutralizing /Inactivating Media	TLV Ppm	LD_{50} mg/kg	Solubility in Water
1	2	3	4	5	6	7
1.	**Acetonitryl**	Very Careful treatment of cobalt E.D.T.A. (calocynor) and if that is not effective give Nitrite / Sodium Thio Sulphate treatment	Alcoholic Sodium Hydroxide & Calcium Hypochlorate	40 20	6500 93	Miscible Poor
2.	**Ammonia**	If skin is affected then wash with plenty of water for 15 min. and then wash with dilute lactic acid and apply soframycin cream. If eye is affected then wash by eye fountain with plenty of water for 15 min. Put one drop of 0.4% Benzocaine (Novocaine) solution in eye. Boric or lactic acid solution eye drops can also be given. If entered in throat then give smell through cotton dipped in ethanol or ether through nose. Administer oxygen in case of breathing difficulty.	Hydrochloric Acid	50	350 mg/kg	Good
3.	**Aniline**	Methylene Blue (1% solution), Ascorbic Acid (5% solution) Administer Oxygen in case of breathing difficulty.	Mixture of Sand and Soda Ash	5	450	Poor
4.	**Benzene**	Skin is affected then wash with plenty of water. Administer Oxygen or shift to fresh air. Diazepam 0.1 mg/kg.(iv), bed rest.	Incineration	10	3400	Poor
5.	**Bromine**	Skin is affected then wash with plenty of water. Apply sodium bicarbonate and again wash with water. Eye is affected then flush eye in eye fountain. Put 2-3 drops in eye of Pontocaine 0.5% solution or Benzocaine (Novocain) 0.4% solution. If inhaled then give smell through ethanol or ether dipped cotton. Give milk, buttermilk or lemon water. Give O2 in case of breathing difficulty.	Sodium Thiosulphate, Soda Ash	0.1	-	Poor
6.	**Carbon Tetra Chloride**	N-acetyl-L-cysteine		5	2800	Not Soluble
7.	**Chlorine**	Skin is affected then wash with plenty of water. Apply sodium bicarbonate and again wash with water. Eye is affected then flush eye in eye fountain. Put 2-3 drops in eye of Pontocaine 0.5% solution or Benzocaine (Novocain) 0.4% solution. If inhaled then give smell through ethanol or ether dipped cotton. Give milk, buttermilk or lemon water. Give O2 in case of breathing difficulty.		1	-	Poor
8.	**Dimethyl Sulphate**	Skin is affected then apply Magnesium Oxide paste and give injection of Corticosteroid. In case of breathing difficulty administer Oxygen.	Alcoholic Sodium Hydroxide & Calcium Hypochlorate	1	440	Poor
9.	**Dichloro Methane**	Hydro cortisone (200 mg every 4 hours). In case of aspiration pneumonia give antibiotics.	Hydrochloric Acid	-	-	-
10.	**Ethyl Alcohol**	2 gm of Sodium bicarbonate in 250 ml water, Diazepam 10 mg by intravenous. Skin or eye is affected then wash with plenty of water.		1000	7060	Soluble
11.	**Ethylene Oxide**	Artificial respiration. Treatment by physician.	Dissolve in Solvent	50	270	Good
12.	**Ethylene Dichloride**			10	-	Not Soluble
13.	**Formaldehyde**	Milk, activated charcoal or Water.		3	300	Soluble
14.	**Hydrogen Cyanide**	Give inhalation of 0.2 ml amyl nitrite dipped cotton. Sodium nitrite (1% solution), Sodium thiosulphate (30% solution), Cromosmon (1% methylene blue in 25 % glucose solution)		4.7	-	Miscible
15.	**Iodine and Compositions**	Milk, Fine starch Solution, 100 ml of 1% Sodium Thiosulphate by mouth.				Insoluble
16.	**Lead Compounds**	CaNa2EDTA, D-Penicilliamine (oral), BAL (with CaEDTA), Induce vomiting, then give Magnesium sulphate in water.				
17.	**LPG**	Wash with water Remove affected person to fresh air.	Prevent source of ignition	1000	-	Floats
18.	**Methyl Alcohol**	Ethanol (30% solution from inside, 5% solution from out side i.e. by intravenous injection), Epicake Syrup. In case of acidosis give Sodium bicarbonate. In case of delirium give Diazepam 10 mg. by intravenous injection. Folinic acid (Leucovorin), 1 mg/kg, iv, 4 hourly.	200	4100	Good	

ANNEXURE-22

Continue…

AHMEDABAD DISTRICT CRISIS GROUP

A. SPECIAL MEDICAL TREATMENTS & ANTIDOTS

Sr. No.	Name of Chemicals	Medical Treatment / Antidotes	Neutralizing /Inactivating Media	TLV Ppm	LD_{50} mg/kg	Solubility in Water
1	2	3	4	5	6	7
19	**Mercury**	Give white of egg in water. Later give milk, then incude vomiting. BAL, D-Penicillamine, n-Acetycysteine, Dimercaptopropane-1 sulfonate (DMPS)		0.1 mg/m3		Insoluble
20.	**Nitrobenzene**	Methylene blue, 1-2 mg/kg, iv, over 5 min.				
21.	**Nitrogen Oxides (NOx)**	Prednisone or Prednisolone 5 mg. every 6 hrs interval.				
22.	**Nitric Acid**	Administer oxygen, morphine injection for severe aches.	Sodium Carbonate or Soda Ash or Slacked Lime	2	-	Good
23.	**Oleum**	Wash contaminated area with water and soap. 5% soln of sodium bicarbonate. Artificial respiration	Dry Sand, Earth	1	-	Highly Reactive
24.	**Oxalic Acid**	Milk, lemon Water, chalk or calcium lactate, calcium chloride or calsium gluconate with liquid. 10% calcium gluconate or chloride 10 ml. by intravenous injection.		1mg/m3	1000	Soluble
25.	**Phenol & Derivatives**	Shift in fresh air, activated charcoal and 240 ml. milk. If skin or eye is affected then wash with plenty of water for 15 min. if skin is affected then wash with Polyethylene glycol (PEG).		5	414	Soluble
26.	**Phosgene**	Cortisone acetate 1 mg/kg by mouth – thrice a day. In case of breathing difficulty administer Oxygen.		0.1	-	Hydrolyzed
27.	**Phosphorus**	10 ml calcium gluconate (10%) by intravenous injection, 5% glucose in water. Travert (10% invert sugar) by intravenous injection.		0.1	3030	Insoluble
28.	**Organics Phosphorous Insecticides (e.g. Malathion, Parathion, Monocrotophos, Phorate)**	Atropine injection, Atropine (0.1% solution), Nalorphine hydrochloride (0.5 %solution), Trimedoxim bromide (15%solution), Pyridine Aldoxy Methyodate, Diperoxim, Biodexim and Isonitrocin (40%solution), Pralidoxi, PAM, TOXOGONIN.				
29.	**Sulphur Dioxide**	Treat burns as usual. Oxygen with intermittent positive pressure breathing apparatus.	Cover with ash or sodium bicarbonate and Calcium Hydrochlorite	2	-	Sinks & Boils
30.	**Sulphuric Acid**	Wash thoroughly with water followed by 5% soln of sodium bicarbonate.	Cover with Sodium Carbonate or Soda Ash or Slacked Line	1 mg/m^3	2140	Reactive
31.	**Toluene**	Wash Completely with. Remove exposed Person to Fresh Air, Artificial Respiration.		100	1640	Poor
32.	**Thionyl Chloride**	Administer oxygen. 5% soln of sodium bicarbonate may be used.	Cover with sodium bicarbonate	5	-	Decomposes (Hydrolyses)
33.	**Vinyl Chloride**	Skin is affected, wash with plenty of water. Eye is affected then keep eye open and allow material to vaporise. Don't apply any eye drops. In case of breathing difficulty, administer oxygen. If injected then include vomiting. Give one spoon mineral oil and after that give sodium /magnesium sulphate (one Spoon) in a glass of water. Give strong tea or coffee of feeling exhausted.		1	500	Slightly Soluble
34.	**Xylene**	Skin is affected then wash with plenty of water. Administer Oxygen or shift to fresh air. Diazepam 0.1 mg/kg.(iv), bed rest.		100	4300	Not Soluble
35	**Propane**	Wash with water Remove affected person to fresh air	Prevent sources of ignition	2500	-	Slighty Soluble

ANNEXURE-22

Continue…

AHMEDABAD DISTRICT CRISIS GROUP

B. DETAILS ON BURNS AND THEIR TREATMENT

1. CAUSES OF BURNS

Under the category of burns, several environmental injuries are included. They are: thermal burns, burns from electrical current, chemical burns, burns resulting from radiant energy and systemic reactions to heat.

2. SEVERITY OF THERMAL BURNS

The seriousness of the thermal burns depends upon the degree of the burn (depth of the skin Injured) and the amount of body surface involved.

2.1 Degree of Burns:

Burns can be classified in degrees from one through six. A first-degree burn is limited to the most superficial layer of the epidermis and results only in erythema (reddening) of the skin. A second-degree burn causes damage into but not through the dermis and characteristically results in the appearance of vesicles (blisters) in the skin. A third degree burn is one in which the full thickness of the skin is destroyed down to the subcutaneous fat. In this burn the skin may appear pale, dry and white; it may even be brown or charred. Clotted blood vessels may be seen through the skin as though one were looking at them through parchment. A fourth degree burn Involves destruction of the skin and the subcutaneous fat. A fifth degree burn involves destruction of the skin, the fat and the underlying muscle. A sixth degree burn Involves destruction through all the structures, including the supporting bone.

With bums more serious than second degree, there is destruction of the sensory nerve endings of the skin. The burned area is consequently insensitive. However, the area surrounding the burn will not have all nerve endings destroyed and may frequently be extremely painful.

2.2 Body Surface Involved:

The amount of body surface that is burned is very important in determining the seriousness of the Injury. A very rough but reasonably accurate estimate of the amount of body surface burned is determined by the rule of nine. This rule, which applies specifically in adults and older children, divides the body into sections, each of which constitutes approximately 9 % of the total area. The body sections and the respective percentage assigned to them are:

Head, Face, I.e. area involving neck and above	9%
Each arm	9%
Front torso	18%
Each leg	18%
Back	18%
Genitals	1%

By knowing the degree of burn, the approximate percentage of the body that has been burn, accompanying complications, and the age of the patient, one can classify the severity of thermal burns as critical, moderate, or minor. Such classification is essential In a disaster where

many injured patients are involved and where the triage separates the patients into emergency cases and cases for whom treatment may be delayed. A summary of the three classes follows.

2.3 ***Critical (Severe) Burns:***

This category includes:

- ❖ All burn of whatever degree and extent if they are complicated by respiratory tract Injury and other major injuries or fractures
- ❖ Third degree burns Involving critical areas such as face hands or feet
- ❖ Third degree burns which Involve more than 10% of the body surface
- ❖ Second degree burns which Involve more than 30% of the body surface

2.4 ***Moderate Burns:***

This category includes:

- ❖ Third degree burns of 2 to 10 percent of the body surface which do not involve the face, hands or feet
- ❖ Second degree burns which involve 15 to 30 percent of the body surface
- ❖ First degree burns Involving 50 to 75 percent of the body surface

2.5 ***Minor Burns:***

This category includes:

- ❖ Third degree burns of less than 2 percent of the body surface if no critical areas are involved
- ❖ Second degree burns involving less than 15 percent of the body surface
- ❖ First degree burns of less than 20 percent of the body surface

In evaluating a patient who has sustained a burn, age and general condition must also be considered. A moderate burn In an aged patient who is chronically ill should be classified as critical in terms of the immediate treatment required because of the patient's general condition apart from the burns.

3. THE CARE OF THERMAL BURNS

The care of thermal burns depends on the percentage of burned body surface involved. In no instance should grease (butter, lard, Vaseline, mineral oil or other ointments) be applied to a burn. For the first or second-degree burns, the emergency medical treatment should be to:

- ❖ Remove any burning/smoldering clothing as necessary
- ❖ Immerse the burned part in ice water for five to ten minutes and periodically continue to add ice to keep the temperature low. If area cannot be immersed, cover with clean, porous cloth of nay kind and keep continuously wet with ice water (or the coldest water available)
- ❖ Use cool wet applications for relief of pain.
- ❖ Transport the patient to the emergency department, continuing cool applications en- route.

For extensive first or second degree burns and for all third degree burns the procedure set forth below should be followed.

- ❖ Examine for and relieve any respiratory distress. Always

anticipate respiratory difficulty when there are burns around the face and neck or when the patient has been exposed to hot gases or smoke.

- ❖ Clothing that adheres to the skin should be cut around and left in place.
- ❖ Cover the burned area with a sterile dressing or a clean sheet. Use cool wet applications for pain relief.
- ❖ Treat the patient for shock if it is apparent.
- ❖ Transport the patient to the emergency department, continuing cool applications en- route.

Severe pain, which may accompany first or second degree burns or may exist at the edges of third degree bums, is best relieved by injected analgesic medication. These drugs must be given by a qualified person or on doctor's order.

Local treatment with cool compress remains the best emergency treatment for burn pain. Third degree bums, which destroy nerve endings, are often not painful enough to require such treatment before the patient reaches the hospital. In burns of this degree and increasing severity, initial efforts are best directed at general support and resuscitation of the patient.

ANNEXURE-23

AHMEDABAD DISTRICT CRISIS GROUP

GENERAL RESPONSE ACTIONS IN CASE OF CHLORINE LEAKAGE/ DISPERSION

1. **Symptoms:**

Being Irritant cause's conjunctivitis and damage to cornea. Asyphxia. Affection of respiratory tract, may lead to Bronchitis, Bronchospasm, Pulmonary Oedema.

2. **First Aid:**

Prompt treatment is essential. Remove the patient to the area where fresh air is available. DO NOT give anything to an unconscious patient by mouth, It may choke him.

a. If chlorine gas inhalation is mild and the patient is only coughing, the following line of treatment may be given:
   - Loosen the clothes and remove the shoes. Give ammonia by Inhalation.
   - Place the patient on his back with head and back elevated. Keep the patient warm with blanket to avoid chilling.
   - Rest Is a must.
   - Milk, buttermilk, coffee can be given for relief from throat irritation.
   - Cough syrups like Hitadrine, Coughrol, Linctus, Codeine, etc., and common throat lozenges such as Vox, Vicks tablets, Halls, etc., can also be given to soothen the throat Irritation.
   - If gas inhalation Is severe but breathing has not ceased start oxygen immediately. Phlebotomy (500 - 700 ml), Caffeine and Sodium Benzoate 0.5 - 1.0 gm/mm. may also be given.
   - In case breathing has ceased start artificial respiration.

b. If Gaseous or Liquid Chlorine has come in contact with eyes:
   - Flush eyes immediately with running water or normal saline water for about 15 minutes.
   - Hold eyelids apart to ensure complete neutralization with water.
   - Do not try to neutralize with chemicals.
   - Administer 2 - 3 drops of 0.5 % solution of Pontocaine or other effective topical anesthetic in the eyes.
   - Do not use oils or oily ointments in the eyes.

c. If Gaseous or Liquid Chlorine has come into contact with the skin:
   - Remove contaminated clothes.
   - Flush the affected portion with copious amount of running water. a Wash skin with copious amount of soap and water.
   - Do not apply greases.

d. If liquid chlorine is by chance swallowed:
   Swallowing of liquid chlorine is extremely unlikely. If swallowed and the patient is conscious:
   - Ask the patient to drink copious quantity of limewater, ammonia water (1 ml in 60 ml of water), milk of magnesia or fresh water.
   - No attempt should be made to induce vomiting.
   - Keep the patient under observation and call for immediate medical help.

3. **Treatment**

a. Pulmonary Oedema

- Administer 60 to 100 % oxygen at 6 Lit/mm.
- Intermittent positive pressure breathing apparatus, set to deliver positive pressures of 5 - 15 cm of water in the inspiratory cycle, is valuable In reducing the formation of edema
- Symptomatic treatment. Lasyx is suggestive.
- Administer Aminophylene intravenously.

b. Bronchospasm

- There is no known antidote for acute chlorine exposures. The exposure is associated with acute symptomatology requiring supportive therapy only.
- Early treatment is the most effective.
- Broncho dialators nebuilzed into the intermittent positive pressure gas stream are often beneficial.

ANNEXURE –24

AHMEDABAD DISTRICT CRISIS GROUP

COLOUR CODE SYSTEM FOR PIPE LINES

COLOUR CODE FOR GENERAL SERVICES (UTILITY)

Table – 2 [IS 2379 : 1990 (Clauses 7.5 and 9.1)]

Sr. No.	Contents	Ground Colour	First Colour Band	Second Colour Band
WATER :				
1.	Boiler Feed Water	Sea Green	Gulf Red	-
2.	Central Heating Below 60ºC	Sea Green	Canary Yellow	-
3.	Central Heating 60ºC To 100ºC	Sea Green	Dark Violet	-
4.	Central Heating Above 100ºC	Sea Green	Dark Violet	Signal Red
5.	Chilled Water	Sea Green	Black	Canary Yellow
6.	Condensate	Sea Green	Light Brown	-
7.	Cooling	Sea Green	French Brown	-
8.	Filtered Water	Sea Green	Light Brown	-
9.	Fire water	Fire Red	Crimson Red	-
10.	Hydraulic Power	Sea Green	Black	-
11.	Treated	Sea Green	Light Orange	-
12.	Waste Water	Sea Green	Canary Yellow	Signal Red
AIR :				
13.	Compressed Up to and including 15 kg/cm^2	Sky Blue	-	-
14.	Compressed to over 15 kg/cm^2	Sky Blue	Signal Red	-
15.	Dry Vacuum	White	-	-
16.	High Pressure Steam	Aluminium to IS 2339	French Blue	-
17.	Medium Pressure Steam	Aluminium To IS 2339	Gulf Red	-
18.	Low Pressure Steam	Aluminium To IS 2339	Canary Yellow	-
19.	Instrument Air	Sky Blue	French Blue	-
20.	Drainage	Black	-	-
OILS :				
1.	Furnace Oil	Light Brown	French Blue	-
2.	High Speed Diesel Fuel	Light Brown	-	-
3.	Hydraulic Power	Light Brown	Dark Violet	-
4.	Light Diesel Fuel	Light Brown	Brilliant Green	-
5.	Lubricating Oil	Light Brown	Light Grey	-

INDUSTRIAL GASES (For Pipelines)

Sr. No.	Contents	Ground Colour	First Colour Band	Second Colour Band
1.	Acetylene	Canary Yellow	Service Brown	-
2.	Ammonia	Canary Yellow	Dark Violet	-
3.	Butane	Canary Yellow	Signal Red	-
4.	Chlorine	Canary Yellow	Dark Violet	Light Orange
5.	Ethylene Oxide	Canary Yellow	Dark Violet	Brilliant Green
6.	Hydrogen	Canary Yellow	Signal Red	French Blue
7.	Hydrogen Sulphide	Canary Yellow	Gulf Red	-
8.	Methane	Canary Yellow	Signal Red	Light Brown
9.	Methyl bromide	Canary Yellow	Fresh Blue	Black
10.	Nitrogen	Canary Yellow	Black	-
11.	Oxygen	Canary Yellow	White	-
12.	Phenol	Canary Yellow	Dark Violet	Smoke Grey
13.	Phosgene	Canary Yellow	Black	White
14.	Propane	Canary Yellow	Signal Red	Black
15.	Sulphur Dioxide	Canary Yellow	Dark Violet	Golden Brown

HYDROCARBON AND NAPHTHA (PETROLEUM PRODUCTS

Sr. No.	Contents	Ground Colour	First Colour Band	Second Colour Band
1.	Acetone	Dark Admirality Grey	Black	Canary Yellow
2.	Benzene	Dark Admirality Grey	Canary Yellow	-
3.	Butadiene	Dark Admirality Grey	Black	-
4.	Ethylene Di-Chloride	Dark Admirality Grey	Gulf Red	-
5.	Methanol	Dark Admirality Grey	Deep Bull	-
6.	Naphtha	Dark Admirality Grey	Light Brown	Black
	ACIDS :			
1.	Hydrochloric Acid	Dark Violet	Silver Grey	-
2.	Hydrofluoric Acid	Dark Violet	Signal Red	French Blue
3.	Nitric Acid	Dark Violet	French Blue	Light Orange
4.	Phosphoric Acid	Dark Violet	Silver Grey	-
5.	Sulphuric Acid	Dark Violet	Brilliant Green	Light Orange
	CHEMICAL & ALLIED PRODUCTS			
1.	Brine	Black	White	-
2.	Carbon Disulphide	Black	Light Orange	-
3.	Caustic Solution	Smoke Grey	Light Orange	-
4.	Lime	Smoke Grey	White	Canary Yellow
5.	Sodium Sulfide	Black	Brilliant Green	Canary Yellow

ANNEXURE –25

AHMEDABAD DISTRICT CRISIS GROUP

A PROPOSED SCALE FOR GRADING OF CHEMICAL DISASTERS

Grades	*Qualitative Severity Consequences Criteria*
1	▪ ***Injuries requiring first –aid only*** ▪ ***Contained release with local environmental effect and pollution problem***
2	▪ ***Injuries requiring a physician's care*** ▪ ***Uncontained release with potential for minor environment effects*** ▪ ***Chances of fire and Explosion***
3	▪ ***Severe injuries or potential for a fatality*** ▪ ***Uncontained release with potential for moderate environment effects***
4	▪ ***Multiple life threatening injuries and /or fatality*** ▪ ***Uncontained release with potential for major environment effects***

ANNEXURE – 26

AHMEDABAD DISTRICT CRISIS GROUP

PROPOSE REGISTER FOR CHEMICAL ACCIDENT OCCURRED IN THE INDUSTRIAL POCKET

Sr. No.	Place of Chemical Accident	Type of Chemical Accident (like fire, Explosion, Gas Dispersion etc.)	Date & Time of Accident	Chemical Involved	Duration	Accident Effect					Reported/ non Reported	Informant with date	Remarks
						Nos. of Affected Person	Nos. of Injured Person	Nos. of Death	Properties Damage	Environmental Damage			
1	2	3	4	5	6	7	8	9	10	11	12	13	14
1.													
2.													
3.													
4.													
5.													
6.													
7.													
8.													
9.													
10.													

ANNEXURE – 27

AHMEDABAD DISTRICT CRISIS GROUP

LIST OF RELEVANT STATUTE ON HAZARDOUS SUBSTANCES

Sr. No.	*Statute*	
1.	***The Factories Act, 1948(1987) and The Gujarat Factories Rules 1963(2004)***	
2.	***The Petroleum Act, 1934***	
3.	***The Explosive Act, 1984(1983)***	
4.	***The Motor Vehicles Act 1988(2001)***	
5.	***The Gas Cylinder Rules 2004***	
6.	***The Static & Mobile Pressure Vessels (Unfired) Rules 1981***	
7.	***The Indian Boilers Act 1923 & Rules 1961, Gujarat Boiler Rules 1966***	
8.	***The Mines Act 1952 & Rules 1955***	
9.	***The Insecticide Act, 1968(2000)***	
10.	***The Disaster Management Act -2005 & Rules 2006***	
11.	***National Disaster Management guide lines – Chemical Disaster (NDMG-CD)***	
12.	***The Gujarat State Disaster Management Act -2005 & Rules 2006***	
13.	***The Environment (Protection) Act, 1986(1991) and following Rules there under***	
	13.1	***The Environment (Protection) Rules, 1986 (2004)***
	13.2	***The Manufacture, Storage and Import of Hazardous Chemicals Rules, 1989 (1994, 2000)***
	13.3	***The Chemical Accidents (Emergency Planning, Preparedness and Response) Rules, 1996***
	13.4	***The Hazardous Wastes (Management and Handling) Rules, 1989 (2003)***
	13.5	***Environment Impact Assessment Notification 1994***
	13.6	***Bio-Medical Wastes (Management & Handling) Rules, 1989***
	13.7	***The national Environment Tribunal Act, 1995***
14.	***Weapons of mass Destruction and their Delivery Systems (Prohibition of Unlawful Activities) Act, 2005***	
15.	***The Public liability insurance act, 1991(1992)***	
16.	***The Workman's Compensation Act 1923 & Rules 1924***	
17.	***Employees state Insurance Act 1948 & Rules 1950***	

ANNEXURE – 28

AHMEDABAD DISTRICT CRISIS GROUP
FORMAT FOR EXERCISE / MOCK DRILL / REHEARSAL

1	AIM / PURPOSE	:	
2	AUTHORIZED BY	:	
3	PARTICIPANTS	:	1. ☐ Original Industry 2. ☐ Surrounding Factories 3. ☐ Mutual Aiders 4. ☐ Emergency Services 5. ☐ Government Departments 6. ☐ Experts / Observers / Umpires / Invitees 7. ☐ Surrounding Public 8. ☐ N. G. O. / Volunteer Organizations 9. ☐ Other Essential Persons / Teams
4	CODE NAME	:	
5	NATURE	:	1. ☐ Origin 2. ☐ Date & Time of Commencement 3. ☐ Locations / Site.
6	DATE, TIME AND DURATION OF EXERCISE	:	
7	CO-ORDINATION COMMITTEE (APEX CRISIS GROUP)	:	1. ☐ Chair Person – Collector & D. M. 2. ☐ Member Secretary – Factory Inspector 3. ☐ Member Fire Fighting Commandant 4. ☐ Member Police Commandant 5. ☐ Member Medical & Health Commandment 6. ☐ Member Expert Panel 7. ☐ Member Representation from Industries 8. ☐ Member I/C Off site Control Room
8	WORKING COMMITTEE	:	1. ☐ Chair Person District Development Officer (District Panchayat) 2. ☐ Member : Fire Brigade Services 3. ☐ Member : Police Force, Civil Defence + Home Guard 4. ☐ Member : Medical Services, Health Department, Hospitals, Private Doctors 5. ☐ Member : Incident Controllers from MAH Units Safety Officers 6. ☐ Member : Safe Shelters – Activities, Govt. Officials, N.G.O., Volunteer Organisations, Public Relations 7. ☐ Members : Transport Activities : RTO, S. T. Services, Emergency Equipment Suppliers, Private Transporters, Telephone Departments, GIDC Authorities

ANNEXURE – 28

Contd...

AHMEDABAD DISTRICT CRISIS GROUP

FORMAT FOR EXERCISE / MOCK DRILL / REHEARSAL

8	WORKING COMMITTEE		8. ☐ Members : Monitoring Services: GPCB Authorities, Explosive Authorities, Boiler Inspectorate, Technical Persons 9. ☐ Members : Observers / Reporters
9.	AFFECTED ZONES	:	1. ☐ Critical Zone (Max. Damage Area) 2. ☐ Semi-Critical Zone (Moderately Affected Area) 3. ☐ Alert Zone (Warn Area)
10.	CONTROL ROOM	:	1. ☐ Off Site Control Room 2. ☐ Shadow Control Room 3. ☐ Emergency Control Centre
11.	SEQUENTIAL ACTIONS	:	1. ☐ Meeting of Apex Crisis Group 2. ☐ Meeting of Working Group / Industries 3. ☐ Public Education 4. ☐ Table – Exercise 5. ☐ Preparation Stage 6. ☐ Actual Exercise / Stimulation 7. ☐ De-brief Meeting 8. ☐ Conclusion Report
12.	FACILITIES	:	1. ☐ Communication System and Arrangements. 2. ☐ Transport Arrangement / Vehicles. 3. ☐ Identification Badges / Passes / Uniforms. 4. ☐ Mass-Education Arrangements. 5. ☐ Selection of Event / Place & Training 6. ☐ Training / Preparedness to all participants 7. ☐ Maps / Charts / Stationary / Banners 8. ☐ Arrangement of Various Meetings 9. ☐ Photographs / Video 10. ☐ Arrangement for Tea, Refreshment, Lunch etc. 11. ☐ Manpower / Vehicles / Telephones / Equipments 12. ☐ Off-Site Emergency Action Plan / On-Site Emergency Action Plan / Technical Details / M.S.D.S., etc.
			13. ☐ Pen, Pencils, Papers, Folders, Files, Pins, etc. Stationeries.
			14. ☐ Tables, Chairs etc. furniture
13.	RECOMMENDATIONS	:	

ANNEXURE – 29

Ahmedabad DISTRICT CRISIS GROUP

DETAILS OF CONDUCTED MOCK DRILL

Sr. No	Dt. of Mock Drill	Chemical Involved	Scenario	Place
1.	2012	Petrol, Diesel	Flammable Liquid Leakage	IOCL, Viramgam
2.	2013	LPG	Flammable Gas Dispersion	IOCL, Sanand
3.	2014	LPG	Flammable Gas Dispersion	SHV Energy Pvt. Ltd.
4.	2015	Chlorine	Toxic Gas Leakage	Meghmani Organics Ltd.
5.	2016	Ethylene Oxide	Flammable Liquid Leakage	Bodal Chemicals Ltd Vatva
6.	2017	LPG	Flammable Gas Dispersion	IOCL, Sanand
7.	2019	Petrol, Diesel	Flammable Liquid Leakage	IOCL, BAREJA
8.	2021	Ethylene Oxide	Flammable Liquid Leakage	Bodal Chemicals Ltd Vatva
9	2021	Petrol, Diesel	Flammable Liquid Leakage	IOCL, Viramgam
9	2022	Chlorine	Toxic Gas Leakage	Parikh Enteprise
10	2023	Petrol, Diesel	Flammable Liquid Leakage	IOCL, BAREJA
11	2024	Petrol, Diesel	Flammable Liquid Leakage	IOCL, Viramgam

ANNEXURE – 30

AHMEDABAD DISTRICT CRISIS GROUP
GLOSSARY OF TERMS AND DEFINITIONS

1. **ACCIDENT**
An accident may be defined as "an undesirable and unplanned event with or without or major or minor damage consequence to life and/or property."

2. **ACGIH**
American conference of governmental Industrial Hygienists

3. **ACUTE**
SEVERE but of the short duration. ACUTE health effects are those that occur immediately after exposure to hazardous chemical.

4. **AEROSOL**
Particles (Solid or Liquid) that remain suspended in air for a period of time. (Mists, Smokes, Fumes, Dusts etc.)

5. **AIRBORNE RELEASE**
Release off any chemical into the air.

6. **AMBIENT**
Ambient temperature is temperature of the surrounding area.

7. **AMORPHOUS**
Non-crystalline, having no definite form or shape.

8. **AN INCIDENT**
An incident is emergent situation of any critical deviation in the process control or otherwise that may lead to a major accident / potential emergency and disaster.

9. **ANEMOMETER**
A device used to measure speed of wind or any other moving gas.

10. **ANSI**
American National Standards Institute

11. **ATMOSPHERIC STABILITY**
Atmospheric Stability is defined in terms of vertical temperature gradient in the atmosphere. It is usually described using the system of categories developed by Pasquill. The categories of stability class are identified by the letter A to F (or sometimes A-G)

Neutral stability occurs typically, when there is total cloud cover and is designed by category D (The temperature gradient = adiabatic lapse rate) Unstable conditions occur when the sun is shinning. The unstable conditions are designated by the letters A-C with A is the least stable condition stable conditions occur on clear, calm nights, when the air near the ground is stratified and free from turbulence and are designated by the letter E & f.

Some times an additional category G is used for exceptionally stable conditions. Neutral conditions correspond to a rate of decrease in temperature with height of about 1 Deg C per meters, vertically. For the dispersion study D & C stability class has been considered.

12. BLEVE (BOILING LIQUID EXPANDING VAPOUR CLOUD EXPLOSION)

The event may have two folds, one; flammable liquid under pressure rapidly spread in to the open area in form of vapour cloud, two; if this spreading vapour cloud gets any source of ignition, then violently explosion took place produce missiles effect with secondary fires and create heavy damages to the surrounding area. The phenomena are called as BLEVE.

13. BUND/DYKE

Raised ground or a wall built around a tank or tank farm, to retain spills and prevent their spread, thus reducing hazards.

14. BURNING RATE

The value is the rate (in millimetres per minute) at which the depth of a pool of liquid decreases as the liquid burns.

15. CAS (CHEMICAL ABSTRACT SERVICE REGISTRY NUMBER):

The unique identification number assigned each compound/chemicals registered with the Chemical Abstract Service (CAS) is listed to aid in quick identification of the compound.

16. CARCINOGEN

A substance capable of producing cancer (carcinoma).

17. CHRONIC

Of long duration or having frequent recurrence. Chronic health effects are those that become apparent or continue for some time after exposure to hazardous chemicals.

18. COMBUSTION PRODUCT

Material produced or; generated during the burning or oxidation of a material.

19. CONTAMINANT

A harmful, irritating or moisture material that is foreign to the normal atmosphere.

20. DANGEROUS OCCURRENCE

Dangerous Occurrences include bursting of vessel collapse of crane, derrick, hoist, explosion, fire, leakage, escape of any molten metal / hot liquid, explosion of receiver /container, collapse of building/ structure, as specified under schedule of Rule 103 of GFR 1995 and provision under section 88-A of the Factories Act 1948, where in a factory any dangerous occurrence as specified occurs weather causing any bodily injury or disability or not.

21. DENSITY

The mass of Unit Volume of a substance e.g. kg/M^3

22. DISASTER

A disaster is catastrophic consequence of a major emergency / accident that leads to, not only extensive damage to life and property but also disrupts all normal human activity for a pretty long time and requires a major national and international effort for rescue and rehabilitation of those affected.

23. DISTRICT CRISIS GROUP(DCG)

"District Crisis Group" means

a. The District Crisis Group is the apex body in the district to deal with major chemical accidents and to provide expert guidance for handling chemical accidents.

   Ref; Schedule 7 of Rule 8 of Chemical Accidents (Emergency Planning, Preparedness & Response) Rule, 1996.

24. DOMINO EFFECT

An effect by which a small hazardous incidence in a unit can escalate to surrounding area causing heavy damages to man, properties &environment.

25. DOW Index

Dow index is system of indexing fire, explosion & toxicity level so as to categorized plant/ section into different hazard zones involving fire, explosion & toxicity hazards.

26. EMERGENCY

Emergency means a situation leading to a circumstance or set of circumstances in which there is danger to the life or health of persons or which could result in big fire or explosion or pollution to the work and outside environment, affecting the workers or neighbourhood in a serious manner, demanding immediate action. (Ref. Para 2(j) of Part I of Schedule XIX of Gujarat Factories Rules 1963(1995).

27. EMERGENCY INFORMATION PANEL

Every Goods carriage used for transporting any dangerous or hazardous goods shall be legibly and conspicuously marked with an emergency information panel in each of three places of the carriage.

28. ENDOTHERMIC PROCESS

A process accompanied by the absorption of heat.

29. EVACUATION

Removal of residents and other persons from an area of danger.

30. EXOTHERMIC PROCESS

A process, in which energy in the form of heat is released.

31. FIRE BALL

The burning of a flammable gas cloud, the bulk of which is initially over-rich i.e. (U.F.L.). The whole cloud appears to be on fire as combustion is taking place at eddy boundaries, when air is entrained.

32. FLAMMABILITY LIMITS (UFL- LFL)

In fuel-air system a range of composition exists outside which a flame will not propagate a substantial distance from a ignition source. The limiting fuel concentration are termed the upper flammable limit (UFL) and lower Flammable Limit (LFL)

33. FLASH FIRE

A burning of a flammable vapour cloud at very low flame propagation speed.

34. FLASH POINT

This is defined as the lowest temperature at which vapours above a combustible substance will ignite in air when exposed to a flame.

Depending on the test method used, the values given are either Tag closed cup (C. C.) or Cleveland open cup (O, C.) The values, along with those in 6.2 and 6.5 give an indication of the relative flammability of the chemical. In general, the open cup value is about 10o to 15oF higher than the closed cup value.

35. HAZARD

Hazard may be defined as "the potential of an accident." Hazard exists in man and the system of materials and machines.

36. HAZARDOUS CHEMICALS

Any substance or material in a quantity or form which may be harmful to humans, animals, crops, water systems, or other elements of the environment if accidentally released. Hazardous chemicals include, explosives, gases (compressed, liquefied or dissolved), flammable or combustible liquids, flammable solids substance, toxic, corrosives,

oxidizing substance, poisonous and insecticides substances.

"Hazardous Chemicals" means

a. Any Chemical, which satisfies any of the criteria, laid down in Part I of Schedule I and is listed in column 2 of Part II of the schedule.
b. Any Chemical listed in Column 2 of Schedule 2.
c. Any Chemical listed in Column 2 of Schedule 3,. as per provisions given below;

- Rule 68J 1 (a) of GUJARAT FACTORIES RULES 1963 (Amended-1995)

- Rule 2(e) of MANUFACTURE, STORAGE AND IMPORT OF HAZARDOUS CHEMICAL RULES, 1989.

- Rule 2(b) of Chemical Accidents (Emergency Planning, Preparedness & Response) Rule, 1996.

37. HAZARDOUS PROCESS

Any process or activity in relation to an industry specified in the First Schedule under the Section 2(cb) of the Factories Act 1948 (1987).

38. HAZCHEM CODES

The HAZCHEM code system was developed by the British Fire Service for use on vehicles transporting dangerous substances. It consists or either two or three characters. The first characters is a numeral in the range of 1 to 4.
1 – Jets, 2 – Fog, 3 – Foam, 4 - Dry Agent

The second character is a letter selected from the range P, R. S, T, W, X, Y, Z. Personal Protection – 1. The letter P, R, W or X indicate that a full chemical suit and breathing apparatus should be warn. 2. The letters S, T, Y & Z indicate that breathing apparatus need only be warn if the substances are involved in a fire.
Contain or Dilute – The letters P, R, S, & T indicate dilution while W X Y & Z indicate containment.

The third character when appearing is E indicates that evacuation of persons in the neighbouring areas must be taken into consideration.

39. IC (INCIDENT CONTROLLER)

He has to tackle the situation of operations on
Process/storage/event/occurrence by taking technical decisions to control the emergency by responding the requisite experienced persons.

40. INDUSTRIAL ACTIVITY

"Industrial Activity" means

i. An operation of process carried out in an industrial installation referred to in Schedule 4 involving or likely to involve one or more hazardous chemicals and includes on-site storage or on-site transport which is associated with that operation or process, as the case may be, or
ii. Isolated Storage, or
iii. Pipeline.

ANNEXURE – 30

Continue…

GLOSSARY OF TERMS AND DEFINITIONS

Industrial activities are given in following;

a. Rule 68(J)(1)(b) of GUJARAT FACTORIES RULES 1963 (Amended-1995)
b. Rule 2(h) of MANUFACTURE, STORAGE AND IMPORT OF HAZARDOUS CHEMICAL RULES, 1989.
c. Rule 2(c) of Chemical Accidents (Emergency Planning, Preparedness & Response) Rule, 1996.

41. IDLH (IMMEDIATELY DANGEROUS TO LIFE AND HEALTH)

The level of concentration immediately dangerous to life or health from which a worker could escape without any impairing symptoms or any irreversible health effect (NIOSH/OSHA). The concentrations are reported either parts per million (ppm) or milligrams per cubic meter (mg/m^3).

42. IGNITION TEMPERATURE

This is the minimum temperature at which the material will ignite without a spark or flame being present. Along with the values in 6.1 and 6.2 above, it gives an indication of the relative flammability of the chemical. It is sometimes called "auto ignition temperature".

43. LC_{50} (LETHAL CONCENTRATION)

Lethal Concentration level for air Bourne toxic substance.

44. LD_{50} (LETHAL DOSE)

The term LD_{50} signifies that about 50% of the animals given the specified dose by mouth will die. Thus for a grade 4 chemical (below 50 mg/kg) the toxic dose for 50% of animals weighting 70 kgs (150 lb) is 70 50 = 3, 500 mg=3.5 gr or less than 1 tea spoonful, it might be as little as a few drops. For a Grade 1 chemical (5 to 15 g/kg) the LD50 would be between a pint and a quart for a 150 lb man.

45. LOCAL CRISIS GROUP (LCG)

"Local Crisis Group" means

a. It is body constituted by Government, in the industrial pocked to deal with chemical accidents and co-ordinate efforts in planning, preparedness and mitigation of chemical accidents.

Ref:. Schedule 8 of Rule 8 of Chemical Accidents (Emergency Planning, Preparedness & Response) Rule1996.

46. MAJOR ACCIDENT

Major Accident means an incident involving loss of the life inside or outside the site or ten or more injuries inside and/or one or more injuries outside or release of toxic chemical or explosion or fire of spillage of hazardous chemical result in 'On Site' or 'Off Site' emergencies or damage too equipments leading to stoppage of process or adverse effects to the environment. (Ref. 1. Rule 68(J)(1)(d) of Gujarat Factories Rules 1963(2004), 2. Rule 2(j) of Manufacture, Storage and Import of Hazardous Chemical Rules, 1989. 3. Rule 2(f) of Chemical Accidents (Emergency Planning, Preparedness & Response) Rule, 1996).

47. MAJOR ACCIDENT HAZARDOUS (MAH) INSTALLION

"MAH installation" means

a. Isolated storage and industrial activity at a site, handling (including transport through carrier or pipeline) of hazardous chemicals equal to or in excess of the threshold quantities specified in column 3 of Schedule 2 and 3 respectively.

Ref: Rule 2(g) of Chemical Accidents (Emergency Planning, Preparedness & Response) Rule1996.

48. MANOMETER

An instrument that measures gaseous pressure, especially, it is a U-tube partially filled with water / mercury / light oil. The difference in level of the liquid between two sides of tubes indicates the pressure.

49. MORBIDITY

Ability to cause illness of diseases.

50. NFPA

National Fire Protection Association-USA

51. NGO (NON GOVERNMENT ORGANIZATIONS):

Voluntary and social services agencies such as Salvation Army, Red Cross society, Social worker groups, Church Group etc., who provide community support services particularly during emergencies and natural calamities.

52. NIOSH

National Institute for Occupational Safety & Health-USA

53. ODOUR THRESHOLD

The lowest concentration of an air contaminant that can be detected by smell.

54. OFF-SITE EMERGENCY PLAN

The objective of an Off Site Emergency Plan is to protect the life and property of the neighbourhood areas of the industrial unit . Off Site Emergency Plan shall be prepared by Government Authorities as per Rule 14 of MSIHC Rules 1989 and follow the instruction under provision of CA (EPPR) Rules 1996.

55. ON SITE EMERGENCY PLAN

On Site Emergency Plan is to be prepared by occupier of industrial Units as per Schedule 8A under Rule 68(J)(12) of Gujarat Factories Rules 1963(2004). Ref: Section 41(B)(4) of The Factories Act 1948 , Schedule XI under Rule 13 of MSHIC Rules 1989, and Rule 5,7, & 9 of CA(EPPR) Rules 1996.

56. OSHA
Occupational Safety and Health Administration – U. S. Federal Agency

57. OVER PRESSURE
Maximum pressure above atmosphere pressure experienced during the pressure of a blast wave from an explosion.

58. PLUME
Hazardous gas / vapour / cloud resulting from a continuous source release.

59. PUFF
Plum is instantaneous release of a gas / vapour from the source.

60. POLYMERIZATION
A few chemicals can undergo rapid polymerization to form sticky, resinous materials, with the liberation of much heat. The containers may explode.

61. POOL FIRE
A pool of flammable liquid burning with a stationary diffusion flame.

62. PPM (PARTS PER MILLION)

63. PYROLYSIS
Chemical decomposition by the action of heat.

64. QRA (QUANTITATIVE RISK ASSESSMENT)
QRA is identifying, quantifying & computer modelling of all the potential emergency scenarios.

65. RESPONSE
The efforts to minimize the risks created in an emergency by protecting the people, the environment and the property, and the efforts to return the scene to normal pre-emergency conditions. Persons who perform the various response functions are termed “RESPONDERS”.

66. RISK
Risk of an accident may be defined as “the chance or probability or likelihood of an accident being caused in a given man-material-machine system.

67. SENSITIVE POPULATIONS
Groups of people that may be more susceptible than the general population to the toxic effects of the release due to pre-existing health condition (patients in hospitals, pregnant women etc.) or age (elderly people infants, handicaps).

68. SPILL
Spill is large liquid releases from a bulk storage tank/process vessel.

69. SEVERITY RATING

1. The Severity rating of 1 would be termed as most sever which would call for complete evacuation of public at large and would hold potential for sever damage both to life as well as property.
2. The severity rating of 2 would be terms as grave for it would have potential to cause damage to life and a portion of property.
3. The severity rating of 3, would be termed as high i.e. it has potential effect on life and extensive damage in terms of property.
4. The severity rating of 4, would be terms as moderate i.e. would call for partial evacuation as well as activation of material aid.
5. The severity rating of 5 would be terms as low. This would have both localized effect mostly in terms of property damage and would call for declaration of local emergency.

70. SMC : SITE MAN CONTROLLER

He is overall responsible for directing operations & decides the actions, consulting with incident controller &seniors, and handle &control the emergency.

71. SHORT – TERM INHALATION LIMIT (STEL)

The parts of vapour (gas) per million parts of contaminated air by volume at 25oC (77oF) and at one atmosphere of pressure is given. The limits are given in milligrams per cubic meter for chemical that form a fine mist or dust. The values given are the maximum permissible average exposures for the time periods specified.

72. SPECIFIC GRAVITY

The specific Gravity of a chemicals is the ratio of the weight of the solid or liquid to the weight of an equal volume of water at 4oC (or at some other specified temperature) If the specific gravity is less than 1.0 (or less than 1.03 in sea water) the chemical will float, if higher it will sink.

ANNEXURE – 30

Continue…

GLOSSARY OF TERMS AND DEFINITIONS

73. TLV (THRESHOLD LIMIT VALUE)

TLV refer to airborne concentration of substances. There are three categories of TLV.
TLV – TWA - Time Weighted Average.
TLV - STEL – Short term Exposure limit
TLV - for gases and vapour is usually expressed in PPM. (Part of the gas/vapour/million parts of air) mg/m3: milligram/cubic meter.

74. Toxic Cloud

Air borne mass of gases, vapours, fumes, dust or aerosols of toxic materials.

75. Toxicity

The ability of a substance to cause damage to living tissue, impairment of the central nervous system, serve illness or death when ingested, inhaled or absorbed by the skin.

76. VAPOUR CLOUD

Air borne dispersing hazardous vapours, which may or may not be visible as a "Cloud"

77. VULNERABILITY

It can be defined as "the zone of influence of an emergency in and around the facility concerned.

78. WATER FOG

A finely divided mist produced by either a high or low velocity fog nozzle. It is used for knocking down flames and cooling hot surfaces.

ANNEXURE-31

AHMEDABAD DISTRICT CRISIS GROUP

CHEMICAL ACCIDENTS (EPPR) RULES-1996

THE GAZETTE OF INDIA EXTRA ORDINARY
PART – II SECTION – 3(1)

Ministry of Environment & Forests
Notification
New Delhi, the 01st August, 1996

Rules on Emergency planning,
Preparedness and Response for
Chemical Accidents

G.S.R. 347 (E). – In exercise of the powers conferred by Sections 6,8 and 25 of the Environment (Protection) Act, 1986 (29 of 1986), the Central Government hereby makes the following rules, namely :-

1. **Short Title and Commencement**.--
   a. These rules may be called the Chemical Accidents (Emergency Planning, Preparedness and Response) Rules, 1996.
   b. They shall come into force on the date of their publication in the Official Gazette.
2. **Definitions: -** In these rules unless the context otherwise requires, -

   a. "Chemical accident" means an accident involving a fortuitous or sudden or unintended occurrence while handling any hazardous chemicals resulting in continuous, intermittent or repeated exposure to death, or injury to, any person or damage to any property but does not include an accident by reason only of war or radio-activity.
   b. "Hazardous chemical" means, -
      1. any chemical which satisfies any of the criteria laid down in Part 1 of Schedule 1 or is listed in Part 2 of the said schedule;
      2. Any chemical listed in Column 2 or Schedule 2;
      3. Any chemical listed in Column 2 of Schedule 3.
   c. "Industrial activity" includes an operation or process,-
      1. carried out in an industrial installation referred to in Schedule – 4 involving or likely to involve one or more hazardous chemicals;
      2. On-site storage or on-site transport, which is associated with that operation or process as the case may be;
      3. Isolated storage;
      4. Pipeline.

   d. "Industrial pocket" means any industrial zone earmarked by the Industrial Development Corporation of the State Government of by the State Government.

ANNEXURE – 31

Continue…

e. "Isolated storage" means – storage of a hazardous chemical other than storage associated with an installation on the same site specified in Schedule – 4 where that storage involves at least the quantities of that chemical set out in Schedule-2;

f. "Major chemical accident" means, -- an occurrence including any particular major emission, fire or explosion involving one or more hazardous chemicals and resulting from uncontrolled developments in the course of industrial activity or transportation or due to natural events leading to serious effects both immediate of delays, inside or outside the installation likely to cause substantial loss of life and property including adverse effects on the environment;

f. "Major Accident Hazards (MAH) Installations", -- means, isolated storage and industrial activity at a site, handling (including transport through carrier or pipeline) of hazardous chemicals equal to or, in excess of the threshold quantities specified in column 3 of Schedules 2 and 3 respectively;

h. "Manufacture, Storage and Import of Hazardous Chemicals Rules" means – the Manufacture, Storage and import of Hazardous Chemicals Rules, 1989, published in the notification of Government of India in the Ministry of Environment & Forests No. S.O.966 (E) dated 27th November, 1989.

i. "Off-site emergency plan" means, - the off-site emergency plan prepared under rule 14 of the Manufacture, Storage and Import of Hazardous Chemicals Rules;

j. "Pipeline" means, -- a pipe (together with any apparatus and works associated therewith) or system of pipes (together with any apparatus and works associated therewith) for the conveyance of a hazardous chemical other than a flammable gas as set out in column 2 of Part II of Schedule 1, at a pressure of less than 8 bars absolute;

k. "Site" means, -- any location where hazardous chemicals are manufactured or processed, stored, handled, used, disposed of and includes the whole of an area under the control of an occupier and includes pier, jetty or similar structure whether floating or not;

i. "Transport" means, -- movement of hazardous chemicals by any means over land, water of air.

3. <u>Constitution of Central Crisis Group</u>:

a. The Central Government shall constitute a Central Crisis Group for management of Chemical accidents and set up a Crisis Alert system in accordance with the provisions of Rule-4 within thirty days from the date of commencement of these rules.

ANNEXURE – 31

Continue…

b. The composition of the Central Crisis Group shall be as specified in Schedule-5.
c. The Central Crisis Group shall meet at least once in six months and follow such procedure of transaction of business as it deems fit.
d. Notwithstanding anything contained in sub-rule (2) the Central Crisis Group may co-opt any person whose assistance or advice is considered useful in performing any of its functions to participate in the deliberations of any of its meetings.

4. Constitution of Crisis Alert System, - the Central Government shall,
a. set up a functional control room at such place as it deems fit.
b. set up an information net working system with the state and district control rooms.
c. appoint adequate staff and experts to man the functional control room.
d. publish a list of Major Accident Hazardous installations;
e. publish a list of major chemical accidents in chronological order;
f. publish a list of members of the Central State and District Crisis Groups;
g. take measures to create awareness amongst the public with a view to preventing chemical accidents.

5. Functions of the Central Crisis Group, -

a. The Central Crisis Group shall be the apex body to deal with major chemical accidents and to provide expert guidance for handling major chemical accidents.

b. Without prejudice to the functions specified under sub-rule(1), the Central Crisis Group shall –

1. continuously monitor the post-accident situation arising out of a major chemical accident and suggest measures for prevention and to check recurrence of such accidents;
2. conduct post-accident analysis of such major chemical accidents and evaluate responses;
3. review district off-site emergency plans with a view to examine its adequacy in accordance with the manufacture, storage, and import of hazardous chemicals, rules and suggest measures to reduce risks in the Industrial pockets;
4. Review the progress reports submitted by the State Crisis Groups;
5. Respond to queries addressed to it by the State Crisis Groups and the District Crisis Groups;
6. Publish a state-wise list of experts and officials who are concerned with the handling of chemical accidents;
7. Render, in the event of a chemical accident in a State all functional and infrastructural help as may be necessary.

ANNEXURE – 31

Continue…

6. Constitution of State Crisis Group, --

a. The State Government shall constitute a State Crisis Group for management of chemical accidents within thirty days from the date of commencement of these rules.
b. The composition of the State Crisis Group shall be as specified in Schedule 6.
c. The State Crisis Group shall meet at least once in three months and follow such procedure for transaction of business as it deems fit.
d. Notwithstanding anything contained in sub-rule(2) the State Crisis Group may co-opt any person whose assistance or advice is considered useful in performing any of its functions, to participate in the deliberation of any of its meetings.

7. Functions of the State Crisis Group, --

a. The State Crisis Group shall be the apex body in the State to deal with major chemical accidents and to provide expert guidance for handling major chemical accidents.
b. Without prejudice to the functions specified under sub-rule (1), the State Crises Group shall, --
c. Review all district off-site emergency plans in the State with a view to examine its adequacy in accordance with the manufacture, storage and import of Hazardous chemicals, Rules and forward a report to the Central Crisis Group once in three months.
d. Assist the State Government in managing chemical accidents at a site.
e. Assist the State Government in the planning, preparedness and mitigation of major chemical accidents at a site in the State;
f. Continuously monitor the post accident situation arising out of a major chemical accident in the State and forward a report to the Central Crisis Group;
g. Review the progress report submitted by the District Crisis Groups;
h. Respond to queries addressed to it by the District Crisis Groups;
i. Publish a list of experts and officials in the State who are concerned with the management of chemical accidents.

8. Constitution of the District and Local Crisis Group, --

a. The state Government shall cause to be constituted within thirty days from the date of commencement of these rules, --
   1. District Crisis Group,
   2. Local Crisis Group,

b. The composition of the District Crisis Group and the Local Crisis Groups shall be as specified in Schedules 7 & 8 respectively.

c. The District Crises Group shall meet every forty five days and send a report to the State Crisis Group.

d. The local Crisis Group shall meet every month and forward a copy of the proceedings to the District Crisis Group.

ANNEXURE – 31

Continue…

9. Functions of the District Crisis Group, --

a. The District Crisis Group shall be the apex body in the district to deal with major chemical accidents and to provide expert guidance for handling chemical accidents;

b. Without prejudice to the functions specified under rule (1) the District Crisis Group shall, --

c. Assist in the preparation of the district off-site emergency plan.

d. Review all the on-site emergency plans prepared by the occupier of Major Accident Hazards installation for the preparation of the district off-site emergency plan;

e. Assist the district administration in the management of chemical accidents at a site lying within the district.

f. Continuously monitor every chemical accident;

g. Ensure continuous information flow from the district to the Center and State Crisis Group,

h. Forward a report of the chemical accident within fifteen days to the state crisis group;

i. Conduct at least one full scale mock-drill of a chemical accident at a site each year and forward a report of the strength and the weakness of the plan to the State Crisis Group.

10 **Functions of the Local Crisis Group**, --

The Local Crisis Group shall be the body in the industrial pocket to deal with chemical accidents and co-ordinate efforts in planning, preparedness and mitigation of a chemical accident;

a. Without prejudice to the functions specified under sub-rule (1) the Local Crisis Group shall, --
   1. Prepare local emergency plan for the industrial pocket.
   2. Ensure dovetailing of the local emergency plan with the district off-site emergency plan;
   3. Train personnel involved in chemical accident management;
   4. Educate the population likely to be affected in a chemical accident about the remedies and existing preparedness in the area;

ANNEXURE – 31

Continue..

5. Conduct at least one full scale mock-drill of a chemical accident at a site every six months and forward a report to the District Crisis Group;

6. Respond to all public inquiries on the subject

11 **Powers of the Members of the Central, State and District Crisis Groups**, --

The Members of the Central Crisis Group, State Crisis Groups and District Crisis Groups shall be deemed to be persons empowered by the Central Government in this behalf under sub-section (1) of section 10 of the Environment (Protection) Act, 1986.

12 **Aid and assistance for the functioning of the District and Local Crisis Groups**, --

a. The Major accident Hazard installations in the industrial pockets in the district shall aid, assist and facilitate functioning of the District Crisis Group,

b. The Major Accident Hazard installations in the industrial pockets shall also aid, assist and facilities the functioning of the Local Crisis Group.

13. Information in the public, --

a. The Central Crisis Group shall provide information on request regarding chemical accident prevention, preparedness and mitigation in the country.

b. The State Crisis Group shall provide information on request regarding chemical accident prevention, preparedness and mitigation to the public in the State.

c. The Local Crisis Group shall provide information regarding possible chemical accident at a site in the industrial pocket and related information to the public on request;

d. The Local Crisis Group shall assist the Major Accident Hazard installations in the industrial pocket in taking appropriate steps to inform persons likely to be affected by a chemical accident

Schedule – I

[See rule 3(b) & 2(j)]

Part – I

a. Toxic Chemicals: Chemicals having the following values of acute toxicity and which owing to their physical and chemical properties are capable of producing major accident hazards:

Sr. no.	Degree of toxicity	Oral toxicity LD50(mg/kg)	Dermal toxicity (Dermal LD50) (mg/kg)	Inhalation toxicity by dust & mists (mg/l)
1.	Extremely toxic	<5	<40	<0.5
2.	Highly toxic	>5 – 50	>4 – 200	>0.5 – 2.0
3.	Toxic	>50 – 200	>200 - 1000	>2 – 10

b. Flammable Chemicals:-

1. Flammable gases chemicals which in the gaseous state at normal pressure and mixed with air become flammable and the boiling point of which at normal pressure is 20ºC or below.

2. Highly flammable liquids chemicals which have a flash point lower than 23ºC and the boiling point of which at normal pressure is above 20ºC.

3. Flammable liquids chemicals which have a flash point lower than 65ºC and which remain liquids under pressure, where particular processing conditions, such as high pressure and high temperature, may create major accident hazards.

c. Explosion Chemicals which may explode under the effect of flame, heat or petro-chemical conditions or which are more sensitive to shocks or friction than dinitro-benzene.

Part – II

List of Hazardous and Toxic Chemicals

Sr.no	Name of the Chemical
1	Acetaldehyde
2	Acetic Acid
4	Acetone
12	Acrylonitrile
31	Ammonia
37	Aniline
56	Benzene
84	Bromine
88	Butadiene
109	Carbon Tetrachloride
110	Carbon Di-sulphide
119	Chloride
161	Cyclohexane
248	Ethyl Alcohol
261	Ethylene
285	Formaldehyde
306	Hexane
314	Hydrogen
315	Hydrogen Bromide
323	Iodine
334	Isopropyl Alcohol
347	Liquified Petroleum Gas.
368	Methane
377	Methyl Alcohol
423	Nitric Acid
425	Nitro Benzene
429	Nitrogen
444	Oleum
428	Oxygen
462	Parafin
481	Phenol
583	Styrene
591	Sulphuric Acid
628	Toluene
666	Turpentine
684	Zirconium & Compounds

* As per MSIHC Rules - 2000

Schedule – II & III

List of Chemicals with Threshold Quantity under rule 2(b), 2(c), 2(g).

Schedule – IV

List of Installation includes an operation or processes under rule 2(c), 2(e).

Schedule – V

[See rule 3(2)]

Composition of Central Crisis Group

1.	Secretary Govt. of India Ministry of Environment & Forests	Chair Person
2.	Joint Secretary Adviser (Environment & Forests)	Member Secretary
3.	Joint Secretary (Labour)	Member
4.	Joint Secretary / Advisor (Chemicals & Petrochemicals)	Member
5.	Director General, Civil Defence	Member
6.	Fire Advisor, Directorate General, Civil Defence	Member
7.	Chief Controller of Explosives	Member
8.	Joint Secretary (Dept. of Industries)	Member
9.	Direct General, Indian Council of Medical Research	Member
10.	Joint Secretary (Health)	Member
11.	Chairman, Central Pollution Control Board	Member
12.	Director General, Indian Council of Agriculture Research	Member
13.	Director General, Council of Scientific & Industrial Research	Member
14.	4 Experts (Industrial Safety and Health)	Member
15.	Joint Secretary (Fertilizers)	Member
16.	Director General (Telecom)	Member
17.	2 Representatives of Industries to be nominated by the Central Govt.	Member
18.	Joint Secretary (surface transport0	Member
19.	General Manager (Rail Safety)	Member
20.	Advisor, Centre for environment and explosive safety	Member
21.	One Representative of Indian Chemical Manufacturers Association to be nominated by the Central Govt.	Member

Schedule – VI

[See rule 6(2)]

Composition of the State Crisis Group

1.	Chief Secretary	Chair Person
2.	Secretary (Labour)	Member Secretary
3.	Secretary (Environment)	Member
4.	Secretary (Health)	Member
5.	Secretary (Industries)	Member
6.	Secretary (Public Health Engg.)	Member
7.	Chairman, State Pollution Control Board	Member
8.	4 Experts (Industrial Safety & Health) to be nominated by the State Govt.	Member
9.	Secretary / Commissioner (Transport)	Member
10.	Director (Industrial Safety / Chief Inspector of Factories)	Member
11.	Fire Chief	Member
12.	Commissioner of Police	Member
13.	One Representative from the industry to be nominated by the State Govt.	Member

Schedule – VII

[See rule 8]

Composition of the District Crisis Group

1.	District Collector	Chair person
2.	Inspector of Factories	Member secretary
3.	District Energy Officer	Member
4.	Chief Fire Officer	Member
5.	District information Officer	Member
6.	Controller of Explosives	Member
7.	Chief Civil Defence	Member
8.	One Rep. Of Trade Unions to be nominated by the Dist. Collector	Member
9.	Deputy Sup. Of Police	Member
10.	District Health Officer / Chief Medical Officer	Member
11.	Commissioner, Municipal Corporation	Member
12.	Rep. Of the Dept. of Public Health Engg.	Member
13.	Rep. Of Pollution Control Board	Member
14.	District Agricultural Officer	Member
15.	4 Experts (Industrial Safety & Health) to be nominated by the Dist. Collector	Member
16.	Commissioner (Transport)	Member
17.	One rep. Of Industry to be nominated by the Dist. Collector	Member
18.	Chair persons member secretary of Local Crisis Group	Member

ANNEXURE – 31

Continue...

Schedule – VIII

[See rule 8]

Composition of the Local Crisis Group

1.	Sub-divisional Magistrate / District Emergency Authority	Chair person
2.	Inspector of Factories	Member Secretary
3.	Industries in the District Industrial area / Industrial Pocket	Member
4.	Transporters of Hazardous Chemicals (2 nos.)	Member
5.	Fire Officer	Member
6.	Station House Officer (Police)	Member
7.	Block Development Officer	Member
8.	One rep. Of Civil Defence	Member
9.	Primary Health Officer	Member
10.	Editor of Local News Paper	Member
11.	Community leader / sarpanch / village pradhan nominated by Chair Person	Member
12.	One rep. Of non-government organization to be nominated by the Chair person	Member
13.	Two Doctors eminent in the Local area to be nominated by Chair person	Member
14.	Two social workers to be nominated by the chair person	Member

OFF - SITE EMERGENCY PLAN

AHMEDABAD DISTRICT

DESCRIPTION

SECTION

PART: 2

REVISED BY

DISTRICT CRISIS GROUP

AHMEDABAD

JANUARY – 2026

PROFILE OF MAH UNITS

CHAPTER - 10

10.1 INDUSTRIAL PROFILE

Ahmedabad, the unofficial State capital, is the largest city of Gujarat. Once called the Manchester of India due to large numbers of textile mills. Then after, the industrial estates developed by GIDC on the periphery of the city and also in other parts of the District are booming with industrial activity, ranging from engineering, garment processing and exports, chemicals, pharmaceuticals, etc. The District is subdivided into 09 Talukas viz. City, Bavla, Rampura, Mandal, Ranpur, Daskroi, Dholka, Dhandhuka, Sanand and Viramgam.

The Three industrial pockets are identified in various Talukas viz. City, Daskroi, Bavla, Sanand and Viramgam in Ahmedabad District. The maps of industrial pockets are given at **Annexure 2, 2A & 2B**.

The total numbers of Major Accident Hazards (MAH) units are 35 as identified in above industrial pockets. All M.A.H. Units have prepared their On-site Emergency Plan, and they have submitted the details/information in the format as asked. The list of MAH units located in the district is given at **Annexure – 4.**

10.2 INDUSTRIAL POCKETS

The industrial pockets are identified in the district based on MAH Units located in the area.

Sr. No.	Industrial Pocket	Area	M.A.H. Units
1.	Vatva - Narol	Industries located in Vatva & Narol Area	17
2.	Odhav – Rakhiyal, Naroda - Sabarmati	Industries located in Odhav & Rakhiyal Area	04
3.	Sanand, Bavla, Viramgam, Mandal	Industries located in Sanand, Bavla, Viramgam, Mandal Area	14
		TOTAL	**35**

The Industrial pockets are shown in the MAP at **Annexure—2A to 2B**.

10.3 LIST of MAH UNITS - Industrial Pocket wise

TABLE-1 (AHMEDABAD-1)

INDUSTRIAL POCKET – AHMEDABAD-1 : VATVA –NAROL				
Sr. No	**Factory Name**	**Address**	**Major Hazardous Chemical**	**Telephone Number**
1	**2**	**3**	**4**	**5**
1.	ASSOCIATE INTERMEDIATES PVT LTD.	A-1/5, PHASE-1,VATVA,AHMEDABAD	ETHYLENE OXIDE	079-25833770
2.	ADVANCE PETROCHEMICALS LTD	166/167, PIRANA ROAD, PIPLEJ	ETHYLENE OXIDE, METHANOL	079-25715196
3.	A K DYECHEM	174/2/1, OPP. SHAHWADI RAMPINJ STATION, SHAHWADI, NAROL, AHMEDABAD	CHLORINE, CAUSTIC SODA LYE	9825428887
4.	AMI ORGANICS	PLOT NO 313-315, PHASE-2, GIDC IND. ESTATE, VATVA	CHLORINE, MONO CHLORO BENZENE	09879742021
5.	BODAL CHEMICAL LTD UNIT-1	PLOT NO, 110, PHASE-2, GIDC IND. ESTATE, VATVA	ETHYLENE OXIDE, CHLOROSULPHONIC ACID	079-25831684
6.	BODAL CHEMICAL LTD UNIT-3	PLOT NO, 2102, PHASE-3, GIDC IND. ESTATE, VATVA	ETHYLENE OXIDE, CHLOROSULPHONIC ACID	99099 50811
7.	CRYSTAL QUINON E PVT LTD (UNIT-2)	PLOT NO. A/2-20 & A/2-21, PHASE-2, GIDC IND. ESTATE, VATVA	ETHYLENE OXIDE, CHLOROSULPHONIC ACID	079-65414800 TO 07
8.	INDIAN OIL CORP. LTD	MARKETING DIVISION, NH-08, VILL- BAREJA, TALUKA-DASKROI, AHMEDABAD.	PETROLEUM PRODUCTS CLASS -A/B	99043 58500
9.	JAY CHEMICALS IND LTD UNIT-3	PLOT NO, 109/220, PHASE-2, GIDC IND. ESTATE, VATVA	ETHYLENE OXIDE, CHLOROSULPHONIC ACID	079-25830812
10.	MATANGI INDUSTRIES LLP (UNIT-01)	28, PHASE-1, GIDC IND. ESTATE, VATVA	ETHYLENE OXIDE, CHLOROSULPHONIC ACID	079-25890302
11.	MATANGI INDUSTRIES LLP (UNIT-02)	Plot No.C-/5605, C1/5606, C1/5607,C1/5608, C1/5609, C1/5610, C1/5611, C1/5612, C1/5613,C1/5614, Phase-2, G.I.D.C, Vatva	ETHYLENE OXIDE, PROPYLENE OXIDE, CHLOROSULPHONIC ACID	079-25890302
12.	MAYUR DYECHEM INTERMEDIATES LTD (UNIT-1)	A1/108, PHASE-2, GIDC IND. ESTATE, VATVA	ETHYLENE OXIDE, CHLOROSULPHONIC ACID	079-25831476, 25833445
13.	MEGHACHEM INDUSTRIES	PLOT 8, PHASE-2, GIDC IND. ESTATE, VATVA	CHLORINE, AMMONIA	079-29295120, 64503487
14.	MEGHMANI ORGANICS LTD	183,184,190 , PHASE-2, GIDC IND. ESTATE, VATVA	CHLORINE MONO CHLORO BENZENE	079-25831210, 25834657
15.	PARSHWNATH DYE CHEM INDUSTRIES PVT LTD	PLOT A-2,495, PHASE-2, GIDC IND. ESTATE, VATVA	CHLORINE	079-32921167
16.	SARAS INDUSTRIES	S. NO.-62, BEHIND ADVANCE PETROCHEM, PIRANA ROAD, PIPLEJ, AHMEDABAD.	CHLORINE	98250 22568
17.	SHARMA & CO.	S. NO.-62, BEHIND ADVANCE PETROCHEM, PIRANA ROAD, PIPLEJ, AHMEDABAD.	CHLORINE	99747 45900

TABLE-2 (AHMEDABAD-2)

INDUSTRIAL POCKET – AHMEDABAD- 2 : ODHAV – RAKHIYAL, NARODA-SABARMATI				
Sr. No	**Factory Name**	**Address**	**Major Hazardous Chemical**	**Telephone Number**
1	**2**	**3**	**4**	**5**
1.	Encore Natural Polymers Pvt. Limited	227/233, GIDC Industrial Estate, Naroda, Ahmedabad-382330	Ethylene Oxide	079-22822559, 079-22822548
2.	Parikh Enterprises Pvt. Ltd.	Plot No. 442, GIDC Industrial Estate, Odhav, Ahmedabad-382 415	Chlorine	079-22871471, 079-22871472
3.	Sagar Drugs & Pharmaceuticals Limited	Survey No. 38/3 & 46/1, Kanbha Kuawa Road, Singarwa, Dist. Ahmedabad	Ethylene Oxide	079-22910015
4.	Super Industries	Plot No. C-1/289, GIDC Industrial Estate, Naroda, Ahmedabad - 382 330	Parathion, Phorate	079-22823907

TABLE-3(AHMEDABAD-3)

INDUSTRIAL POCKET – AHMEDABAD- 3 : INDUSTRIAL POCKET : SANAND, BAVLA, VIRAMGAM, MANDAL				
Sr. No	**Factory Name**	**Address**	**Major Hazardous Chemical**	**Telephone Number**
1	**2**	**3**	**4**	**5**
1.	Terra Tech Chemicals (India) Pvt. Ltd	Plot No.459,460 & 461 Nr. Bajaj Foods Ltd., Opp. N. N. Desai Petrol Pump, Sarkhej-Bavla Road, Changodar, Ahmedabad-382213	Chlorine	7574809477
2.	Deedy Chemical Pvt. Ltd.	263, A/2A, Akashganga Ind. Estate, Sanand, Ahmedabad	Chlorine	079-30074848
3.	R.R. Patel Industrial Gases Pvt Ltd.	Survey No.407, sarkhej-bavla Road,vill:pimpan	Ethylene Oxide	9722779907
4.	Excel Formulations	Plot No. 32, Sonal Industrial Estate, Khoda Village Road, Sanand, Ahmedabad	Ethylene Oxide	9825095666
5.	Indian Oil Corporation Limited (Salaya Mathura Pipeline)	Pipelines Division, Tal. Viramgam, Ahmedabad	Petrolium Products Class – A	9724003318, 9408204000
6.	Indian Oil Corporation Ltd. (LPG Bottling Plant)- Sanand	Sanand – Viramgam Highway, Sanand, Taluka Sanand, Dist. Ahmedabad – 382 110	LPG	02717-222904
7.	Reliance petro marketing Ltd.	S.N. 214, At-Pimpan Taluka - Sanand, Ahmedabad	LPG	9998043041
8.	Mansi Industries	Block No. 419, Po. Chharodi, Taluka – Sanand, Ahmedabad	Chlorine	9825549414
9.	Suzuki Motor Gujarat Private Limited	Block No. 334/335, Village-Hansalpur, Nr. Becharaji,	LPG	6358997879

10.	Pratiksha Chemicals Ltd.	195, Ajanta Industrial Estate, Vasna-Iyava, Taluka - Sanand, Ahmedabad	Chlorine	02717284350
11.	SHV Energy Pvt. Ltd.	Survey No. 169/3 – 169/5 Ranesar Patia, Kalyanagadh, Bavla Bagodara NH 8A… Taluka Dholka, Ahmedabad	Flammable Gases	7622000571
12.	Tata Autocomp System Ltd.	Plot No. 2, Tata Motor Vendor Park, Taluka – Sanand, Dist. – Ahmedabad	LPG	7043007480
13.	TATA Motors Ltd.	Revenue Survey No.-1, Village Northkotpura, Taluka – Sanand, Dist.- Ahmedabad Gujarat – 382170	Propane	02717–668100, 02717-668143
14.	Macro Polymers Pvt Ltd	Survey No.-382, Plot No D 01 To D 06, Gsllops Industries Park-2, Chacharwadi – Vasna, Tal-Sanand , Dist-Ahmedbad	Formaldehyde, Styrene, TDI	9228010801/02

10.4

FACT SHEETS

The details in respect of name, address, products, storage of major hazardous chemicals, work force, emergency contact persons' Name, Telephone Numbers, etc. of each MAH units are given in form of FACT SHEET, as follows.

10.4.1. FACT SHEET OF ASSOCIATED INTERMEDIATES PVT LTD.

AHMEDABAD-1: VATVA-NAROL | *MAH-UNIT-1*

1.	Name of the Factory Address Phone NO. FAX NO. E-MAIL	: : : : : :	M/s. Associated Intermediates & Chemicals Plot No. A-1-5, Phase-I, G.I.D.C. Industrial Estate, Vatva, Ahmedabad-382 445. finance@aicdyes.com
2.	Occupier	:	Viral Bhai Shah (M)- 98250 07107
3.	Manager	:	Ashutosh bhai Plot No. A-1-5, Phase-I, G.I.D.C. Industrial Estate, Vatva, Ahmedabad-382 445.

4. *Contact Person* :

Sr. No.	*Name*	*Designation*	*Telephone Number*		
			Factory/ Office	*Resident*	*Mobile*
1.	Viral Bhai Shah	Occupier	-	-	98250 07107
2.	Ashutosh Bhai	Manager	-	-	-

5. *Products* : Chemicals

6. *Man Power & Timing*

Shift	*Time*	*Direct Employee*		*Contractor's Person*		*Security/ Watchman*		*Total*		
		M	*F*	*M*	*F*	*M*	*F*	*F*	*M*	*Final*
General	10:00 to 18:00	-	-	-	-	-	-	-	-	-
1st	08:00 to 16:00	-	-	-	-	-	-	-	-	-
2nd	16:00 to 24:00	-	-	-	-	-	-	-	-	-
3rd	24:00 to 08:00	-	-	-	-	-	-	-	-	-
	TOTAL	-	-	-	-	-	-	-	-	-

7. *Major Hazardous Chemicals*

Sr. No.	*Name*	*Type of Storage/ Container*	*Capacity of each Container MT or KL*	*No. of Container /Vessels*	*Maximum Storage Capacity MT*	*Parameters*	
						Pressure	*Temperature*
1.	Ethylene Oxide	Tank	07	1	07	3 Kg/Cm^2	10 ^0C
2.	Caustic Soda	Tank	25 Ton	-	-	Atm	Amb
3.	Sulphuric Acid	Tank	20 Ton	-	-	Atm	Amb
4.	Chlorosulphonic Acid	Tank	90 Ton	-	-	Atm	Amb

10.4.2 FACT SHEET OF ADVANCE PETROCHEMICALS LTD

AHMEDABAD-1: VATVA-NAROL | *MAH-UNIT-2*

1.	*Name of the Factory*	:	M/s. ADVANCE PETROCHEMICALS LTD.
	Address	:	166/167, Pirana Road, PIPLEJ, Ahmedabad-342405
	Phone NO.	:	29708156, (M)-9081998855
	FAX NO.	:	
	E-MAIL	:	info@advancepetro.com, advance93@hotmail.com
2.	*Occupier*	:	Mr. Pulkit Goenka (M)- 98250 84848
3.	*Manager*	:	Mr. Ripa Solanki 10 ShriNand Nagar,New Maninagar Ahmedabad (M)- 7600832400

4. *Contact Person* :

Sr. No.	*Name*	*Designation*	*Telephone Number*		
			Factory/ Office	*Resident*	*Mobile*
1.	Mr. Pulkit Goenka	Occupier	079-25715196	-	98250 84848
2	Mr Rashmi	Safety	-	-	6354247275

5.	*Products*	:	Petrochemical Products (Glycol Ether)

6. *Man Power & Timing*

Shift	*Time*	*Direct Employee*		*Contractor's Person*		*Security/ Watchman*		*Total*		
		M	*F*	*M*	*F*	*M*	*F*	*F*	*M*	*Final*
General	10:00 to 18:00	10	-	-	-	-	-	-	-	10
1st	08:00 to 16:00	8	-	-	-	-	-	-	-	8
2nd	16:00 to 24:00	9	-	-	-	-	-	-	-	9
3rd	24:00 to 08:00	9	-	-	-	-	-	-	-	9
	TOTAL	34	-	-	-	-	-	-	-	34

7. *Major Hazardous Chemicals*

Sr. No.	*Name*	*Type of Storage/ Container*	*Capacity of each Container MT or KL*	*No. of Container /Vessels*	*Maximum Storage Capacity MT*	*Parameters*	
						Pressure	*Temperature*
1.	Ethylene Oxide	Tank	14	1	20	3 Kg/Cm^2	10 ^0C
2.	Methanol	Tank U/G	18	1	20	Atm	Amb

10.4.3 FACT SHEET OF A K DYECHEM

AHMEDABAD-1: VATVA-NAROL	*MAH-UNIT-3*

1.	*Name of the Factory* *Address* *Phone NO.* *FAX NO.* *E-MAIL*	: : : : :	M/s. A k Dyechem 174/2/1, Opp Shahwadi Rampinj Station, Shahwadi, Narol Ahmedabad. Agarwal.jiggie@gmail.com
2.	*Occupier*	:	Mr. Kiran Agarwal Sector-F, Bunglow no. 5, Sterling City, Bopal, Ahmedabad (M)-9898087849
3.	*Manager*	:	Mr. Jignesh Agarwal Sector-F, Bunglow no. 5, Sterling City, Bopal, Ahmedabad (M)-9825428887

4. *Contact Person* :

Sr. No.	*Name*	*Designation*	*Telephone Number*		
			Factory/ Office	*Resident*	*Mobile*
1.	Kiran Agarwal	Occupier	-	-	9898087849
2.	Jignesh Agarwa	Manager	-	-	9825428887
3.	Sanjay Bhadodariya	Officer	-	-	7878911224

5. *Products* : Textile

6. *Man Power & Timing*

Shift	*Time*	*Direct Employee*		*Contractor's Person*		*Security/ Watchman*		*Total*		
		M	*F*	*M*	*F*	*M*	*F*	*F*	*M*	*Final*
General	09:30 to 17:30	1	-	1	-	1	-	-	03	03
1st	07:00 to 15:00	-	-	-	-	-	-	-	-	-
2nd	15:00 to 23:00	-	-	-	-	-	-	-	-	-
3rd	23:00 to 07:00	-	-	-	-	-	-	-	-	-
	TOTAL	1	-	1	-	1	-	-	03	03

7. *Major Hazardous Chemicals*

Sr. No.	*Name*	*Type of Storage/ Container*	*Capacity of each Container MT or KL*	*No. of Container /Vessels*	*Maximum Storage Capacity MT*	*Parameters*	
						Pressure	*Temperature*
1.	Chlorine	Tonner	0.9 KL	16	14.40 KL	7 Kg/Cm^2	10 ^0C
2.	Caustic Soda Lye	Tank	10 MT	2	10 MT	Atm	Amb

10.4.4 FACT SHEET OF AMI ORGANICS.

AHMEDABAD-1: VATVA-NAROL | *MAH-UNIT-4*

1.	*Name of the Factory* *Address* *Phone NO.* *FAX NO.* *E-MAIL*	: : : : : 	M/s. Ami Organics Plot No. 313-315, Phase-II, G.I.D.C. Industrial Estate, Vatva, Ahmedabad-382 445. 079-29703454 Amiorganics11@gmail.com
2.	*Occupier*	:	Parimalbhai B Patel 6, Sapt Villa, Sindhu Bhavan,Thaltej Ahmedabad. (M)- 9099733833
3.	*Manager*	:	Rakesh R valand D-40, Amar Tenament, Vatva, Ahmedabad. (M)-9727762456

4. *Contact Person* :

Sr. No.	*Name*	*Designation*	*Telephone Number*		
			Factory/ Office	*Resident*	*Mobile*
1.	Parimalbhai B Patel	Occupier	079-29703454	-	9099733833
2.	Rakesh R Valand	Manager	079-29703454	-	9727762456

5.	*Products*	:	Chemicals

6. *Man Power & Timing*

Shift	*Time*	*Direct Employee*		*Contractor's Person*		*Security/ Watchman*		*Total*		
		M	*F*	*M*	*F*	*M*	*F*	*F*	*M*	*Final*
General	10:00 to 18:00	14	01	-	-	-	-	01	14	14
1st	08:00 to 16:00	07	-	08	-	-	-	-	15	15
2nd	16:00 to 24:00	05	-	05	-	-	-	-	10	10
3rd	24:00 to 08:00	05	-	05	-	-	-	-	10	10
	TOTAL	31	01	18	-	-	-	01	50	50

7. *Major Hazardous Chemicals*

Sr. No.	*Name*	*Type of Storage/ Container*	*Capacity of each Container MT or KL*	*No. of Container /Vessels*	*Maximum Storage Capacity MT*	*Parameters*	
						Pressure	*Temperature*
1.	Chlorine	Tonner	0.9 KL	23 Tonner	20.7 KL	7 Kg/Cm^2	10 ^0C
2.	Mono Chloro Benzene	Drum	20 KL	200 Lit each Drum	20 KL	Atm	Amb
3.	Caustic Soda Lye	Tank	10 KL	01	10 KL	Atm	Amb

10.4.5 FACT SHEET OF BODAL CHEMICALS LTD (UNIT-01)

AHMEDABAD-1: VATVA-NAROL | *MAH-UNIT-5*

1.	*Name of the Factory*	:	M/s. BODAL CHEMICALS LTD.(Unit-01)
	Address	:	Plot No. 110, Phase-II, G.I.D.C. Industrial Estate, Vatva, Ahmedabad-382445.
	Phone NO.	:	079-25831684
	FAX NO.	:	079-25836052
	E-MAIL	:	hr@bodal.com
2.	*Occupier*	:	Mr. Rajarshi Ghosh R.C Technical Road, Chanakyapuri, Ghatlodia, Ahmedabad-380061 (M)- 9909950907
3.	*Manager*	:	Mr. Rameshbhai Patel A/9, Shrinathji Opp, Nirmal Bunglow, C.T.M, Ahmedabad (M)- 90999 75974

4. *Contact Person* :

Sr. No.	*Name*	*Designation*	*Telephone Number*		
			Factory/ Office	*Resident*	*Mobile*
1.	Mr. Rameshbhai Patel	Factory Manager	99099 50820	-	90999 75974
2.	Mr. Ashvinbhai Jadav	Plant In charge	99099 50820	-	99099 50851
3.	Mr. Chirag Parmar	Safety Officer	99099 50820	-	97261 62699

5. *Products* : Dye Intermediates

6. *Man Power & Timing*

Shift	*Time*	*Direct Employee*		*Contractor's Person*		*Security/ Watchman*		*Total*		
		M	*F*	*M*	*F*	*M*	*F*	*F*	*M*	*Final*
General	10:00 to 18:00	05	-	10	-	04	-	-	19	19
1st	08:00 to 16:00	22	-	57	-	-	-	-	79	79
2nd	16:00 to 24:00	23	-	52	-	-	-	-	75	75
3rd	24:00 to 08:00	25	-	42	-	-	-	-	67	67
	TOTAL	**75**	**-**	**161**	**-**	**04**	**-**	**-**	**240**	**240**

7. *Major Hazardous Chemicals*

Sr. No.	*Name*	*Type of Storage/ Container*	*Capacity of each Container MT or KL*	*No. of Container/ Vessels*	*Maximum Storage Capacity MT*	*Parameters*	
						Pressure	*Temperature*
1.	Ethylene Oxide	Tank	0 MT	2	14 MT	3 Kg/Cm^2	10 ^0C
2.	Caustic Soda	Tank	0 KL	1	25 KL	Atm	Amb
3.	Sulphuric Acid	Tank	0 KL	2	50 KL	Atm	Amb
4.	Chlorosulphonic Acid	Tank	0 KL	2	50 KL	Atm	Amb
5.	Oleum	Tank	0 KL	2	50 KL	Atm	Amb

Note: Plant Operation is closed, So Capacity of each Container is ZERO

10.4.6 FACT SHEET OF BODAL CHEMICALS LTD (UNIT-03)

AHMEDABAD-1: VATVA-NAROL | *MAH-UNIT-6*

1.	*Name of the Factory* *Address* *Phone NO.* *FAX NO.* *E-MAIL*	: : : : :	M/s. BODAL CHEMICALS LTD. (Unit-03) Plot No. 2102, Phase-III, G.I.D.C. Industrial Estate, Vatva, Ahmedabad-382 445. 079-25831684 079-25836052 hr@bodal.com
2.	*Occupier*	:	Mr. Rajarshi Ghosh R.C Technical Road, Chanakyapuri, Ghatlodia, Ahmedabad-380061 (M)- 9909950907
3.	*Manager*	:	Mr. Chetan Patel Chitralekha Society, Ajay Tenament, Vastral Road, Odhav, Ahmadabad. (M)- 95120 47124

4. *Contact Person* :

Sr. No.	*Name*	*Designation*	*Telephone Number*		
			Factory/ Office	*Resident*	*Mobile*
1.	Mr. Chetan Patel	Factory Manager	99099 50811	-	95120 47124
2.	Mr. Chirag Parmar	Safety Officer	99099 50820	-	97261 62699

5. *Products* : Dye Intermediates

6. *Man Power & Timing*

Shift	*Time*	*Direct Employee*		*Contractor's Person*		*Security/ Watchman*		*Total*		
		M	*F*	*M*	*F*	*M*	*F*	*F*	*M*	*Final*
General	10:00 to 18:00	03	-	02	-	02	-	-	05	07
1st	08:00 to 16:00	05	-	05	-	-	-	-	10	10
2nd	16:00 to 24:00	07	-	06	-	-	-	-	13	13
3rd	24:00 to 08:00	05	-	07	-	-	-	-	12	12
	TOTAL	**20**	**-**	**20**	**-**	**02**	**-**	**-**	**40**	**42**

7. *Major Hazardous Chemicals*

Sr. No.	*Name*	*Type of Storage/ Container*	*Capacity of each Container MT or KL*	*No. of Container/ Vessels*	*Maximum Storage Capacity MT*	*Parameters*	
						Pressure	*Temperature*
1.	Ethylene Oxide	Tank	0 MT	1	07 MT	3 Kg/Cm^2	10 ^0C
2.	Caustic Soda	Tank	0 KL	1	25 KL	Atm	Amb
3.	Sulphuric Acid	Tank	0 KL	1	50 KL	Atm	Amb
4.	Chlorosulphonic Acid	Tank	0 KL	1	50 KL	Atm	Amb

Note: Plant Operation is closed, So Capacity of each Container is ZERO

10.4.7 FACT SHEET OF Crystal Quinone Pvt LTD. (Unit-II)

AHMEDABAD-1: VATVA-NAROL | *MAH-UNIT-7*

1.	*Name of the Factory* *Address* *Phone NO.* *FAX NO.* *E-MAIL*	: : : : :	M/s. Crystal Quinone Pvt LTD. (Unit-II) Plot No. A/2-20 & A/2-21, Phase-II, GIDC Industrial Estate, Vatva, Ahmedabad-382 445. 079-65414800 to 07 079-40083390 Finance@crystalquinone.com
2.	*Occupier*	:	Mr. Aniket A Shah, 1, Friend Colony, Ambawadi, Ahmedabad Phone-079 65414600 , (M)- 9913608080
3.	*Manager*	:	Mr.Mahesh B Menon. D -3 Rajdeep Appartment,near Bajkhedavad Society.opp;Munisipal library. Maninagr East.Ahmedabad. (M)-9978954113

4. *Contact Person* :

Sr. No.	*Name*	*Designation*	*Telephone Number*		
			Factory/ Office	*Resident*	*Mobile*
1.	Mr. Aniket A Shah	Occupier	079 49069000	-	9913608080
2.	Mr. Mahesh B Menon	Factory Manager	9978954115	-	9978954113

5. *Products* : Dye Intermediates

6. *Man Power & Timing*

Shift	*Time*	*Direct Employee*		*Contractor's Person*		*Security/ Watchman*		*Total*		
		M	*F*	*M*	*F*	*M*	*F*	*F*	*M*	*Final*
General	10:00 to 18:00	5	0	0	0	0	0	0	5	5
1st	08:00 to 16:00	9	0	5	0	1	0	0	15	15
2nd	16:00 to 24:00	9	0	5	0	1	0	0	15	15
3rd	24:00 to 08:00	9	0	4	0	1	0	0	14	14
	TOTAL	32	0	14	0	3	0	0	49	49

7. *Major Hazardous Chemicals*

Sr. No.	*Name*	*Type of Storage/ Container*	*Capacity of each Container MT or KL*	*No. of Container/ Vessels*	*Maximum Storage Capacity MT*	*Parameters*	
						Pressure	*Temperature*
1.	Ethylene Oxide	Tank	7 MT	2	14 MT	4 Kg/Cm^2	10 ^{0}C
2	Sulphuric Acid	Tank	25 KL	1	25 KL	Atm	Amb
3.	Caustic Soda Lye	Tank	23 KL	1	23 KL	Atm	Amb
4	Acetic Anhydride	Tank	25 KL	1	25 KL	Atm	Amb
5	Chlorosulphonic Acid	Tank	25 KL	4	100 KL	Atm	Amb
6	2:5 Dimethoxy Aniline	BAG	200 bags	1	5000 Kgs	Atm	Amb
7	Para Cresidine	BAG	200 bags	1	5000 Kgs	Atm	Amb

10.4.8 FACT SHEET OF SHARMA & CO.

AHMEDABAD-1: VATVA-NAROL	MAH-UNIT-8

1.	*Name of the Factory* *Address* *Phone NO.* *FAX NO.* *E-MAIL*	: : : : :	M/s. Sharma & Co. S. No.-62, Behind Advance Petrochem, Pirana Road, Piplej, Ahmedabad. 9879556599, 9974745900 Ajay.sharma8885@gmail.com
2.	*Occupier*	:	Mr.Vasudev R Sharma 9, Sukruti Apartments, L.G. Corner, Maninagar, Ahmedabad. (M)- 9879556599
3.	*Manager*	:	Mr. Ajay Sharma 9, Sukruti Apartment, L.G. Corner, Maninagar, Ahmedabad (M)- 9974745900

4. *Contact Person* :

Sr. No.	*Name*	*Designation*	*Telephone Number*		
			Factory/ Office	*Resident*	*Mobile*
1.	Vasudev R Sharma	Occupier	-	-	9879556599
2.	Ajay V Sharma	Manager	-	-	9974745900

5. *Products* : Chemicals

6. *Man Power & Timing*

Shift	*Time*	*Direct Employee*		*Contractor's Person*		*Security/ Watchman*		*Total*		
		M	*F*	*M*	*F*	*M*	*F*	*F*	*M*	*Final*
General	10:00 to 18:00	4	-	-	-	1	-	-	5	5
1st	08:00 to 16:00	-	-	-	-	-	-	-	-	-
2nd	16:00 to 24:00	-	-	-	-	-	-	-	-	-
3rd	24:00 to 08:00	-	-	-	-	-	-	-	-	-
	TOTAL	4	-	-	-	1	-	-	-	5

7. *Major Hazardous Chemicals*

Sr. No.	*Name*	*Type of Storage/ Container*	*Capacity of each Container MT or KL*	*No. of Container/ Vessels*	*Maximum Storage Capacity MT*	*Parameters*	
						Pressure	*Temperature*
1.	Chlorine	Tonner	0.9 KL	15	18 KL	7 Kg/Cm^2	10 ^0C
2.	Caustic Soda Lye	Tank	10MT	5	50 MT	Atm	Amb

10.4.9 FACT SHEET OF INDIAN OIL CORP. LTD

AHMEDABAD-1: VATVA-NAROL | *MAH-UNIT-9*

1.	*Name of the Factory* *Address* *Phone NO.* *FAX NO.* *E-MAIL*	: : : : :	M/s. Indian Oil Corp. Ltd Marketing Division, NH-08, Vill- Bareja, Taluka- Daskroi, Ahmedabad. 9712770087 Ishrivastava@indianoil.in
2.	*Occupier*	:	Mr Love Shrivastava(DGM) Ahmedabad (M)- 8336084343
3.	*Manager*	:	Mr Love Shrivastava(DGM) Ahmedabad (M)- 8336084343

4. *Contact Person* :

Sr. No.	*Name*	*Designation*	*Telephone Number*		
			Factory/ Office	*Resident*	*Mobile*
1.	Mr Love Shrivastava	Occupier	9712770087(201)	-	8336084343
2.	Mr Love Shrivastava	Manager	9712770087(203)	-	8336084343
3.	Mr Tanmay Shrivastav	Safety Officer	9712770087(206)	-	9265316975

5. *Products* : Petroleum Products Class -A/B(MS,HSD,SKO, ATF and Ethanol)

6. *Man Power & Timing*

Shift	*Time*	*Direct Employee*		*Contractor's Person*		*Security/ Watchman*		*Total*		
		M	*F*	*M*	*F*	*M*	*F*	*F*	*M*	*Final*
General	08:30 to 17:00	12	1	23	4	4	1	6	39	90
1st	06:00 to 14:00	3	-	2	-	9	-	-	14	28
2nd	14:00 to 22:00	3	-	2	-	9	-	-	14	28
3rd	22:00 to 06:00	3	-	2	-	6	-	-	11	22
	TOTAL	21	1	29	4	29	1	6	78	168

7. *Major Hazardous Chemicals*

Sr. No.	*Name*	*Type of Storage/ Container*	*Capacity of each Container MT or KL*	*No. of Container/ Vessels*	*Maximum Storage Capacity MT*	*Parameters*	
						Pressure	*Temperature*
1.	HSD	VERTICAL ABOVE GROUND TANK	11329.00	4	45316	Atm	Abm
2.	MS	FLOATING ROOF ABOVE GROUND TANK	8352.00	3	25056	Atm	Amb
3.	ATF	TANK	6492	2	12984	Atm	Amb
4.	SKO	VERTICAL ABOVE GROUND TANK	3638	1	3638	Atm	Amb
5.	Ethanol	VERTICAL ABOVE GROUND TANK	3635	1	3635	Atm	Amb
6.	Ethanol	UNDER GROUND	69.00	1	69	Atm	Amb

10.4.10 FACT SHEET OF JAY CHEMICAL LTD. (Unit-III)

AHMEDABAD-1: VATVA-NAROL	*MAH-UNIT-10*

1.	*Name of the Factory* *Address* *Phone NO.* *FAX NO.* *E-MAIL*	: : : : :	M/s. JAY CHEMICAL LTD. (Unit-III) Plot No. 109/220, Phase-II, GIDC Industrial Estate, Vatva, Ahmedabad-382 445. 079-25830812 Jhk1@jaychemical.com
2.	*Occupier*	:	Mr. Greevan J. Kharawala, 2, Spring Valley, B/H Karnavati Club, S.G.Highway, Ahmedabad Phone-079 25830812 (M)- 99255 55333, 99252 04429
3.	*Manager*	:	Mr. Dipak Vyas (M)- 99252 04421

4. *Contact Person* :

Sr. No.	*Name*	*Designation*	*Telephone Number*		
			Factory/ Office	*Resident*	*Mobile*
1.	Mr. Dipak Vyas	Manager	079-25830812	-	99252 04421
2.	Mr. Suketu Vyas	Admin Manager	079-25830812	-	94261 72988
3.	Mr. Alpesh Pavwar	Safety Officer	079-25830812	-	90990 46586

5. *Products* : Dye Intermediates

6. *Man Power & Timing*

Shift	*Time*	*Direct Employee*		*Contractor's Person*		*Security/ Watchman*		*Total*		
		M	*F*	*M*	*F*	*M*	*F*	*F*	*M*	*Final*
General	09:00 to 05:00	45	-	14	-	-	-	-	59	59
1st	08:00 to 16:00	10	-	8	-	-	-	-	18	18
2nd	16:00 to 23:00	10	-	8	-	-	-	-	18	18
3rd	23:00 to 08:00	10	-	6	-	-	-	-	16	16
	TOTAL	75	-	36	-	-	-	-	111	111

7. *Major Hazardous Chemicals*

Sr. No.	*Name*	*Type of Storage/ Container*	*Capacity of each Container MT or KL*	*No. of Container/ Vessels*	*Maximum Storage Capacity MT*	*Parameters*	
						Pressure	*Temperature*
1.	Ethylene Oxide	Tank	7 MT	2	14 MT	4 Kg/Cm^2	10 ^0C
2.	Chlorosulphonic Acid	Tank	20 KL	3	75 KL	Atm	Amb
3.	Thionyl Chloride	Tank	20 KL	2	30 KL	Atm	Amb
4.	Sulphuric Acid	Tank	25 KL	1	30 KL	Atm	Amb
5.	Caustic Soda Lye	Tank	25 KL	2	60 KL	Atm	Amb

10.4.11 FACT SHEET OF MATANGI INDUSTRIES.

AHMEDABAD-1: VATVA-NAROL | *MAH-UNIT-11*

1.	*Name of the Factory*	:	M/s. Matangi Industries LLP (Unit-01)
	Address	:	Plot No. 28, Phase-I, GIDC Industrial Estate, Vatva, Ahmedabad-382 445.
	Phone NO.	:	079-25890302
	FAX NO.	:	079-25891337
	E-MAIL	:	info@matangiindustries.com
2.	*Occupier*	:	Mr. Ruchit Suryakant Jani 6, Maniratnam bangle , Rajpath Club Road, Near Kantham Party Plot, Bopal, Ahmedabad. (M):9825042634
3.	*Manager*	:	Mr. Kapil Birla Q-1103, Safal parishkar-2, khokhra circle, khokhra, Ahmedabad. (M): 9099042301

4. *Contact Person* :

Sr. No.	*Name*	*Designation*	*Telephone Number*		
			Factory/ Office	*Resident*	*Mobile*
1.	Mr. Ruchit Suryakant Jani	Occupier	-	-	98250 42634
2.	Mr. Kapil Birla	Factory Manager	-	-	90990 42301

5. *Products* : Dyes Intermediate and Performance Chemical

6. *Man Power & Timing*

Shift	*Time*	*Direct Employee*		*Contractor's Person*		*Security/ Watchman*		*Total*		
		M	*F*	*M*	*F*	*M*	*F*	*F*	*M*	*Final*
General	10:00 to 18:00	42	09	-	-	-	-	09	42	51
1st	08:00 to 16:00	16	-	13	-	02	-	0	31	31
2nd	16:00 to 24:00	18	-	-	-	-	-	0	18	18
3rd	24:00 to 08:00	16	-	13	-	01	-	0	30	30
	TOTAL	92	09	26	-	03	-	09	121	130

7. *Major Hazardous Chemicals*

Sr. No.	*Name*	*Type of Storage/ Container*	*Capacity of each Container MT or KL*	*No. of Container/ Vessels*	*Maximum Storage Capacity MT*	*Parameters*	
						Pressure	*Temperature*
1.	Ethylene Oxide	Tank	7 MT	1	7 MT	3 Kg/Cm^2	10 ^{0}C
2.	Propylene Oxide	Tank	7 MT	1	7 MT	Atm.	10 ^{0}C
2.	Chlorosulphonic Acid	Tank	25 KL	2	60 KL	Atm.	Amb
3.	Sulphuric Acid	Tank	25 KL	1	30 KL	Atm.	Amb
4.	Caustic Soda Lye	Tank	25 KL	2	60 KL	Atm.	Amb

10.4.12 FACT SHEET OF MATANGI INDUSTRIES.

AHMEDABAD-1: VATVA-NAROL | *MAH-UNIT-12*

1.	*Name of the Factory* *Address* *Phone NO.* *FAX NO.* *E-MAIL*	: : : : :	M/s. Matangi Industries LLP (Unit-02) Plot No.C-/5605, C1/5606, C1/5607,C1/5608, C1/5609, C1/5610, C1/5611, C1/5612, C1/5613,C1/5614, Phase-2, G.I.D.C, Vatva 079-25890302 079-25891337 info@matangiindustries.com
2.	*Occupier*	:	Mr. Ruchit Suryakant Jani 6, Maniratnam bangle , Rajpath Club Road, Near Kantham Party Plot, Bopal, Ahmedabad. (M):9825042634
3.	*Manager*	:	Mr. Mathew Joseph (M): 98988 54802

4. *Contact Person* :

Sr. No.	*Name*	*Designation*	*Telephone Number*		
			Factory/ Office	*Resident*	*Mobile*
1.	Mr. Ruchit Suryakant Jani	Occupier	-	-	98250 42634
2.	Mr. Mathew Joseph	Factory Manager	-	-	98988 54802

5. *Products* : Dyes Intermediate and Performance Chemical

6. *Man Power & Timing*

Shift	*Time*	*Direct Employee*		*Contractor's Person*		*Security/ Watchman*		*Total*		
		M	*F*	*M*	*F*	*M*	*F*	*F*	*M*	*Final*
General	10:00 to 18:00	42	09	-	-	-	-	09	42	51
1st	08:00 to 16:00	16	-	13	-	02	-	0	31	31
2nd	16:00 to 24:00	18	-	-	-	-	-	0	18	18
3rd	24:00 to 08:00	16	-	13	-	01	-	0	30	30
	TOTAL	92	09	26	-	03	-	09	121	130

7. *Major Hazardous Chemicals*

Sr. No.	*Name*	*Type of Storage/ Container*	*Capacity of each Container MT or KL*	*No. of Container/ Vessels*	*Maximum Storage Capacity MT*	*Parameters*	
						Pressure	*Temperature*
1.	Ethylene Oxide	Tank	7 MT	1	7 MT	3 Kg/Cm^2	10 ^{0}C
2.	Propylene Oxide	Tank	7 MT	1	7 MT	Atm.	10 ^{0}C
2.	Chlorosulphonic Acid	Tank	25 KL	2	60 KL	Atm.	Amb
3.	Sulphuric Acid	Tank	25 KL	1	30 KL	Atm.	Amb
4.	Caustic Soda Lye	Tank	25 KL	2	60 KL	Atm.	Amb

10.4.13 FACT SHEET OF MAYUR DYECHEM INTERMEDIATES LTD.(Unit-01)

AHMEDABAD-1: VATVA-NAROL | *MAH-UNIT-13*

1.	*Name of the Factory* *Address* *Phone NO.* *FAX NO.* *E-MAIL*	: : : : :	M/s. Mayur Dyechem Intermediates LTD.(Unit-01) Plot No. A 1/108, Phase-II, G.I.D.C. Industrial Estate, Vatva, Ahmedabad-382 445. 079-25831476, 079-25833445 25892264 mayurdye@sify.com
2.	*Occupier*	:	Mr. Mayurbhai B. Patel, 43, Tulip Bunglow, Drive In Road, Ahmedabad
3.	*Manager*	:	Mr. Bharatbhai Patel B-37, Ramkrishna Society, Canal Road, Uttam Nagar , Maninagar (M)- 99250 19812

4. *Contact Person* :

Sr. No.	*Name*	*Designation*	*Telephone Number*		
			Factory/ Office	*Resident*	*Mobile*
1.	Mr. Mayurbhai B. Patel,	Occupier	079 25831476	-	
2.	Mr. Bharatbhai Patel	Manager	079 25831476	-	99250 19812

5. *Products* : Dyes Intermediates

6. *Man Power & Timing*

Shift	*Time*	*Direct Employee*		*Contractor's Person*		*Security/ Watchman*		*Total*		
		M	*F*	*M*	*F*	*M*	*F*	*F*	*M*	*Final*
General	10:00 to 18:00	20	4	-	-	-	-	4	20	24
1st	08:00 to 16:00	20	-	4	-	1	-	-	25	25
2nd	16:00 to 24:00	14	-	4	-	1	-	-	19	19
3rd	24:00 to 08:00	11	-	4	-	1	-	-	16	16
	TOTAL	65	4	12	-	3	-	4	80	84

7. *Major Hazardous Chemicals*

Sr. No.	*Name*	*Type of Storage/ Container*	*Capacity of each Container MT or KL*	*No. of Container/ Vessels*	*Maximum Storage Capacity MT*	*Parameters*	
						Pressure	*Temperature*
1.	Ethylene Oxide	Tank	7 MT	2	14 MT	3 Kg/Cm^2	10 ^0C
2.	Caustic Soda	Tank	16 KL	1	16 KL	Atm	Amb
3.	Sulphuric Acid	Tank	20 KL	1	25 KL	Atm	Amb
4.	Chlorosulphonic Acid	Tank	28 KL	2	56 KL	Atm	Amb
5.	Thionyl Chloride	Tank	15 KL	1	15 KL	Atm	Amb
6.	Acetanilide	Bag	25	-	25 Bag	Atm	Amb

10.4.14 FACT SHEET OF MEGHA CHEM INDUSTRIES

AHMEDABAD-1: VATVA-NAROL | *MAH-UNIT-14*

1.	*Name of the Factory*	:	M/s. Megha Chem Industries
	Address	:	Plot No. 8, Phase-II, G.I.D.C. Industrial Estate, Vatva, Ahmedabad-382 445.
	Phone NO.	:	079-29295120, 64503487
	FAX NO.	:	
	E-MAIL	:	meghachem2000@yahoo.co.in
2.	*Occupier*	:	Mr. Amrutbhai S. Patel, 6, Kaushlya Bunglow, Ramdev nagar, Setelite Ahmedabad (M)- 98792 29219
3.	*Manager*	:	Mr. Harshad Shah (M)- 9426727430

4. *Contact Person* :

Sr. No.	*Name*	*Designation*	*Telephone Number*		
			Factory/ Office	*Resident*	*Mobile*
1.	Mr. Amrutbhai S. Patel	Occupier	079 29295120	-	98792 29219
2.	Mr. Harshad Shah	Plant Head	079 29295120	-	9426727430

5.	*Products*	:	Chemicals

6. *Man Power & Timing*

Shift	*Time*	*Direct Employee*		*Contractor's Person*		*Security/ Watchman*		*Total*		
		M	*F*	*M*	*F*	*M*	*F*	*F*	*M*	*Final*
General	10:00 to 18:00	8	-	-	-	-	-	-	8	8
1st	08:00 to 16:00	8	-	-	-	1	-	-	9	9
2nd	16:00 to 24:00	6	-	-	-	1	-	-	7	7
3rd	24:00 to 08:00	5	-	-	-	1	-	-	6	6
	TOTAL	27	-	-	-	3	-	-	30	30

7. *Major Hazardous Chemicals*

Sr. No.	*Name*	*Type of Storage/ Container*	*Capacity of each Container MT or KL*	*No. of Container/ Vessels*	*Maximum Storage Capacity MT*	*Parameters*	
						Pressure	*Temperature*
1.	Chlorine	Tonner	0.9 KL	24	21 KL	7 Kg/Cm^2	10 ^0C
2.	Ammonia Gas	Cylinder	50 KL	10	10 Cylinder	10 Kg/Cm^2	Amb

10.4.15 FACT SHEET OF MEGHMANI ORGANICS LTD

AHMEDABAD-1: VATVA-NAROL | *MAH-UNIT-15*

1.	*Name of the Factory* *Address* *Phone NO.* *FAX NO.* *E-MAIL*	: : : : :	M/s. Meghmani Organics Ltd Plot No. 180,181,183,184,168,189,190, Phase-II, G.I.D.C. Industrial Estate, Vatva, Ahmedabad-382 445. 079-25831210, 25834657 25833403 Satish.shukla@meghmani.com,
2.	*Occupier*	:	Mr. DARSHAN ANANDKUMAR PATEL Bunglow No: 6, Shivalik Green Bunglow, Near Dev Kutir - 3, Behind Santur Bunglow, Ambli Bopal, (M)- 98250 06830
3.	*Manager*	:	Mr. Satish M Shukla 18, Punit Complex, B/H Bal vatika, Maninagar, Ahmedabad. (M)- 99798 82201

4. *Contact Person* :

Sr. No.	*Name*	*Designation*	*Telephone Number*		
			Factory/ Office	*Resident*	*Mobile*
1.	Mr. Darshan A Patel	Occupier	079 25831210	-	98250 06830
2.	Mr. Palak Shah	Factory Manager	079 25831210	-	99798 82201
3.	Mr. Hasmukh Adhanja	AGM	079 25831210	-	63576 81621

5. *Products* : Chemicals

6. *Man Power & Timing*

Shift	*Time*	*Direct Employee*		*Contractor's Person*		*Security/ Watchman*		*Total*		
		M	*F*	*M*	*F*	*M*	*F*	*F*	*M*	*Final*
General	10:00 to 18:00	47	2	0	-	2	-	2	49	49
1st	08:00 to 16:00	27	-	20	-	2	-	-	49	49
2nd	16:00 to 24:00	26	-	20	-	2	-	-	48	48
3rd	24:00 to 08:00	26	-	18	-	3	-	-	47	47
	TOTAL	126	2	58	-	9	-	2	193	195

7. *Major Hazardous Chemicals*

Sr. No.	*Name*	*Type of Storage/ Container*	*Capacity of each Container MT or KL*	*No. of Container/ Vessels*	*Maximum Storage Capacity MT*	*Parameters*	
						Pressure	*Temperature*
1.	Chlorine	Tonner	0.9	6 Tonner	5.4	7 Kg/Cm^2	10 ^0C
2.	Aluminum Chloride	Drum	0.05	200	10	Atm	Amb
3.	Mono Chloro Benzene	Tank	12 KL	1	12 KL	Atm	Amb
4.	Caustic Soda Lye	Tank	10	2	20	Atm	Amb

10.4.16 FACT SHEET OF PARSHWNATH DYE CHEM IND. PVT LTD

AHMEDABAD-1: VATVA-NAROL | *MAH-UNIT-16*

1.	*Name of the Factory* *Address* *Phone NO.* *FAX NO.* *E-MAIL*	: : : : :	M/s. Parshwnath Dye Chem Ind. Pvt Ltd Plot No. A-2/495, Phase-II, G.I.D.C. Industrial Estate, Vatva, Ahmedabad-382 445. 9099071075 factory@parshwnath.com
2.	*Occupier*	:	Mr. RAJESH D. JOBALIYA Lane No-18/362 Satyagrah Chhawni,Satellite Road,Ahmedabad-380015 (M)- 9824026477
3.	*Manager*	:	Mr. PALAK SHAH (M)-90990 10794

4. *Contact Person* :

Sr. No.	*Name*	*Designation*	*Telephone Number*		
			Factory/ Office	*Resident*	*Mobile*
1.	MR.RAJESH D.JOBALIYA	Occupier	079-29700722	-	98240 26477
2.	MR.PALAK SHAH	Manager	079-29700722	-	90990 10794
3.	MR. HARSHAD PATEL	Incharge	079-29700722	-	93273 21415

5. *Products* : Chemicals

6. *Man Power & Timing*

Shift	*Time*	*Direct Employee*		*Contractor's Person*		*Security/ Watchman*		*Total*		
		M	*F*	*M*	*F*	*M*	*F*	*F*	*M*	*Final*
General	10:00 to 18:00	5	-	-	-	-	-	-	5	5
1st	08:00 to 16:00	15	-	30	-	3	-	-	48	48
2nd	16:00 to 24:00	15	-	15	-	-	-	-	30	30
3rd	24:00 to 08:00	13	-	15	-	3	-	-	31	31
	TOTAL	48	-	60	-	6	-	-	114	114

7. *Major Hazardous Chemicals*

Sr. No.	*Name*	*Type of Storage/ Container*	*Capacity of each Container MT or KL*	*No. of Container/ Vessels*	*Maximum Storage Capacity MT*	*Parameters*	
						Pressure	*Temperature*
1.	Chlorine	Tonner	0.9 KL	6 Tonner	5.4 KL	7 Kg/Cm^2	10 ^0C
2.	Mono Chloro Benzene	Drum	200 Lit	14	2800 Lit	Atm	Amb

10.4.17 FACT SHEET OF SARAS INDUSTRIES

AHMEDABAD-1: VATVA-NAROL	*MAH-UNIT-17*

1.	*Name of the Factory* *Address* *Phone NO.* *FAX NO.* *E-MAIL*	: : : : :	M/s. Saras Industries S. No.-62, Behind Advance Petrochem, Pirana Road, Piplej, Ahmedabad. 9825022568 - acroza_pawan@yahoo.co.in
2.	*Occupier*	:	Mr. Pawan Sakhigopal Agrawal 3B Samarth apartment, vallabhwadi, maninagar, Ahmedabad (M)- 9825022568
3.	*Manager*	:	Mr. Pawan Sakhigopal Agrawal 3B Samarth apartment, vallabhwadi, maninagar, Ahmedabad (M)- 9825022568

4. *Contact Person* :

Sr. No.	*Name*	*Designation*	*Telephone Number*		
			Factory/ Office	*Resident*	*Mobile*
1.	Pavan Kumar	Occupier	-	-	98250 22568
2.	Abhishek Yadav	Safety Officer	-	-	70849 03615

5. *Products* : Chemicals (Bleach)

6. *Man Power & Timing*

Shift	*Time*	*Direct Employee*		*Contractor's Person*		*Security/ Watchman*		*Total*		
		M	*F*	*M*	*F*	*M*	*F*	*F*	*M*	*Final*
General	10:00 to 18:00	5		-	-	-	-	-	5	5
1st	08:00 to 16:00	-	-	-	-	-	-	-	-	-
2nd	16:00 to 24:00	-	-	-	-	-	-	-	-	-
3rd	24:00 to 08:00	-	-	-	-	-	-	-	-	-
	TOTAL	5	-	-	-	-	-	-	5	5

7. *Major Hazardous Chemicals*

Sr. No.	*Name*	*Type of Storage/ Container*	*Capacity of each Container MT or KL*	*No. of Container/ Vessels*	*Maximum Storage Capacity MT*	*Parameters*	
						Pressure	*Temperature*
1.	Chlorine	Tonner	0.9	15	18 KL	7 Kg/Cm^2	10 ^0C
2.	Caustic Soda Lye	Tank	10MT	5	50 MT	Atm	Amb

10.4.18 FACT SHEET of Parikh Enterprises Pvt. Ltd.

AHMEDABAD-2: ODHAV RAKHIAL, NARODA, SABARMATI | *MAH-UNIT-18*

1.	Name of the Factory	:	M/s. Parikh Enterprises Pvt. Ltd.
	Address	:	Plot No. 442, GIDC Industrial Estate, Odhav, Ahmedabad-382 415
	Phone no. Fax no. E-mail	: : :	079-22871471, 22871472 079-22872797 parikh81@yahoo.co.in
2.	Occupier	:	Mr. H. B. Patel, Technical Director B-4, Tejendra Park Society, Nirat Cross Road, Vastral Road, Ahmedabad – 382418 (M) – 99798 69946
3.	Manager	:	Mr. D. B. Patel, Factory Manager A / 102 Shree Vinayak Residency, Nikol, Ahmedabad – 382415 (M) – 99798 69947
4.	Contact Person	:	

Sr. No.	Name	Designation	Telephone Number		
			Factory / Office	Resident	Mobile
1.	Mr. H. B. Patel	Technical Director	079-22871471, 22871472	-	99798 69946
2.	Mr. D. B. Patel	Factory Manager	079-22871471, 22871472	-	99798 69947
3.	Mr. A. N. Patel	Safety Officer	079-22871471, 22871472	-	76005 33623

5.	Products	:	Copper Chemicals

6. Man Power & Timing

Shift	Time	Direct Employee		Contractor's Person		Security / Watchman		Total	
		M	F	M	F	M	F	M	F
General	08.30 to 17.00	53	-	88	-	2	-	143	-
1st	07.00 to 15.30	06	-	03	-	1	-	10	-
2nd	15.30 to 24.00	08	-	19	-	2	-	29	-
3rd	24.00 to 07.00	06	-	14	-	2	-	22	-
	Total	73	-	124	-	07	-	204	-

7. Major Hazardous Chemicals

Sr. No.	Name	Type of Storage / Container	Capacity of each Container MT	No. of Container / Vessels	Maximum Storage Capacity MT	Parameters	
						Pressure	Temperature
1.	Sulphuric Acid	Tank	30	1	30	Atm.	Amb.
2.	Hydrochloric Acid	Tank	16	3	48	Atm.	Amb.
3.	Chlorine	Tonner	0.9	41	41 Tonners	7 kg/cm^2	Amb

10.4.19 FACT SHEET of Sagar Drugs & Pharmaceuticals Pvt. Ltd.

AHMEDABAD-2: ODHAV RAKHIAL, NARODA, SABARMATI | *MAH-UNIT-19*

1.	Name of the Factory	:	M/s. Sagar Drugs & Pharmaceuticals Pvt. Ltd
	Address	:	Survey No. 38/3, 46/1, Kanbha-kuha Road, Singarwa, Dist. Ahmedabad
	Phone no. Fax no. E-mail	: : :	079-22901856 079 – 26300867 info@sagardrugs.com/factory@sagardrugs.com
2.	Occupier	:	Mr. Ankur R. Patel D-2, Bharat Ashram, Rajhansh Society, Ellisbridge, Ahmedabad 079 – 26303982
3.	Manager	:	Mr. Pravinvbhai B. Patel, Factory Manager D-1, Bharat Ashram, Rajhansh Society, Ellisbridge
4.	Contact Person	:	

Sr. No.	Name	Designation	Telephone Number		
			Factory / Office	Resident	Mobile
1.	Mr. Ankur R. Patel	Occupier	079-26308930	-	-
2.	Mr. Pravinvbhai B. Patel	Factory Manager	079-26308930	-	98257 73767
3.	Mr. Saurabh Bhatiya	Production Incharge	079-26308930	-	99798 53697

5.	Products	: Chemicals
6.	Man Power & Timing	

Shift	Time	Direct Employee		Contractor's Person		Security / Watchman		Total	
		M	F	M	F	M	F	M	F
General	09.00 to 18.00	05	-	10	5	-	-	15	5
1st	08.00 to 16.00	03	-	08	-	04	-	15	-
2nd	16.00 to 24.00	06	-	20	-	04	-	30	-
3rd	24.00 to 08.00	04	-	16	-	04	-	24	-
	Total	18	-	54	5	12	-	89	

7. Major Hazardous Chemicals

Sr. No.	Name	Type of Storage / Container	Capacity of each Container MT	No. of Container / Vessels	Maximum Storage Capacity MT	Parameters	
						Pressure	Temperature
1.	Ethylene Oxide	Tank	07	03	21	3 Kg /cm^2	<12^{0}C
2.	Chloro Sulphonic Acid	Tank	50	04	180	Atm	Amb
3.	Sulphuric Acid	Tank	50	02	70	Atm	Amb
4.	Thionyl Chloride	Tank	08	02	50	Atm	Amb

10.4.20 FACT SHEET of Encore Natural Polymers Pvt. Ltd.

AHMEDABAD-2: ODHAV RAKHIAL, NARODA, SABARMATI | *MAH-UNIT-20*

1.	Name of the Factory	:	Encore Natural Polymers Pvt Ltd.
	Address	:	227-233, GIDC Industrial estate, Naroda, Ahmedabad-382330, Gujarat, India
	Phone no. Fax no. E-mail	: : :	+91(0)79 2282-2548/2559 +91(0)79 2282-2393 sbhadauria@encorenaturalpolymers.com
2.	Occupier	:	Mr. Sudhir A. Merchant
3.	Manager	:	Mr. Arpit Brahmbhatt
4.	Contact Person	:	

Sr. No.	Name	Designation	Telephone Number		
			Factory / Office	Resident	Mobile
1.	Mr. Arpit Brahmbhatt	Ass. Manager	227-233, GIDC Industrial Estate, Naroda, Ahmedabad-382330, Gujarat, India	-	7574807696
2	Mr. Nishant Suthar	Sr Engg Maintenance	227-233, GIDC Industrial estate, Naroda, Ahmedabad-382330, Gujarat, India	-	9974079502

5.	Products	:	Guar & Tamarind and various thicker applications

6. Man Power & Timing

Shift	Time	Direct Employee		Contractor's Person		Security / Watchman		Total	
		M	F	M	F	M	F	M	F
General	9:30-18:00	10	8	-	-	-	-	12	8
1st	07:00-15:00 hours	8	-	14	-	2	-	16	
2nd	15:00-23:00 hours	4	-	13	-	2	-	11	
3rd	23:00-7:00 hours	3	-	3	-	2	-	8	
	TOTAL	25	8	30	-	6	-	61	8

7. Major Hazardous Chemicals-

Sr. No.	Name	Typ-e of Stora-ge / Container	Capacity of each Container MT	No. of Container / Vessels	Maximum Storage Capacity MT	Parameters	
						Pressure	Temperature
1	Ethylene Oxide	Storage Tank	12242kg	1	16.23	2.5kg @ 7.C	
2	Propylene Oxide	Storage Tank	22	1	11	2.5kg@ 9.C	
3	Acetic Acid	50 kg Carboys	50kg karboys	-	3	-	
4	Formaldehyde	30 liter Carboys	30kg karboys	-	1	-	
5	Hydrogen Peroxide	42 liter Carboys	42kg karboys	-	3	-	
6	Methanol	215 liter Drum	10000litre	-	1	-	
7	Phosphoric Acid	30 liter Carboys	30litre	-	6	-	
8	Sodium Hydroxide	Storage Tank	storage tank	1	15	-	

10.4.21. FACT SHEET of Super Industries

AHMEDABAD-2: ODHAV RAKHIAL, NARODA, SABARMATI

MAH-UNIT-21

1.	Name of the Factory	:	M/s Super Industries
	Address	:	Plot No. C-1/289, GIDC Industrial Estate, Phase –I, Naroda, Ahmedabad -382 330
	Phone no. Fax no. E-mail	: : :	079-22823907 079-22823907, 22686360 super_crop_safe@yahoo.com
2.	Occupier	:	Shri Ishwarbhai B Patel 4-B, Navinchandra Park, Civil Camp Road, Shahibaug, AHMEDABAD – 4 Ph. 079 22682453
3.	Manager	:	Shri Satish I Patel, Factory Manager 4-B, Navinchandra Park, Civil Camp Road, Shahibaug, Ahmedabad
4.	Contact Person	:	

Sr. No.	Name	Designation	Telephone Number		
			Factory / Office	Resident	Mobile
1.	Shri Ishwarbhai B Patel	Occupier	079 22823907	079 22682453	98241 69514
2.	Shri Satish I Patel	Mamager	079 22823907	-	97122 77766

5.	Products	:	Pesticides
6.	Man Power & Timing		

Shift	Time	Direct Employee		Contractor's Person		Security / Watchman		Total	
		M	F	M	F	M	F	M	F
General	08:00 to 18:00	12	--	--	--	--	-	12	--
1st		--	--	--	--	--	-	--	--
2nd		--	--	--	--	--	-	--	--
3rd		--	--	--	--	--	-	--	--
	TOTAL	12	-	--	--	--	-	12	-

7.	Major Hazardous Chemicals							

Sr. No.	Name	Type of Storage / Container	Capacity of each Container MT	No. of Container / Vessels	Maximum Storage Capacity MT	Parameters	
						Pressure	Temperature
1.	Phorate Technical	Drum	200 Kgs	10	2000 Kgs	Atm.	Amb

10.4.22 FACT SHEET of Terra Tech Chemicals (India) Pvt. Ltd

AHMEDABAD-2: ODHAV RAKHIAL, NARODA, SABARMATI | *MAH-UNIT-22*

1.	Name of the Factory	:	M/s. Terra Tech Chemicals (India) Pvt. Ltd
	Address	:	Plot No.459-470, Nr. Bajaj Foods Ltd., Opp. N. N. Desai Petrol Pump, Sarkhej-Bavla Road, Changodar, Ahmedabbad-332213
	Phone no. Fax no. E-mail	: : :	7574809476 +91-2717-251011/12 Hiren.nayak@cabb-chemicals.in
2.	Occupier	:	Shri PV Chaitanya Prasad 1700, lodha bellezza, RTO office, 5th Phase kukatpally, KPHB colony, Trimlagiri, Hydrabad, Telangana-500072 (M): 7774809438
3.	Manager	:	Mr. Madhav K Raikar 602, G-1, Aakash Residency, Shella, Club 07 Road, Ahmedabad, Gujarat-380058 (M)- +91-7574809474
4.	Contact Person	:	

Sr. No.	Name	Designation	Telephone Number		
			Factory / Office	Resident	Mobile
1.	Mr Madhav K Raikar	FactoryManager	7574809474	-	7574809474
2.	Mr. Bhavesh Rathwa	Sr.Safety Officer	7574809476	-	9978105272

5.	Products :	Chemicals – MCA & SMCA
6.	Man Power & Timing	

Shift	Time	Direct Employee		Contractor's Person		Security / Watchman		Total	
		M	F	M	F	M	F	M	F
General	09.00 to 18.00	18	0	0	-	1	-	19	0
1st	07.00 to 15.00	21	-	30	-	2	-	53	-
2nd	15.00 to 23.00	21	-	30	-	1	-	52	-
3rd	23.00 to 07.00	21	-	30	-	2	-	53	-
	TOTAL	80	0	90	-	6		177	0

7. Major Hazardous Chemicals

Sr. No.	Name	Type of Storage / Container	Capacity of each Container MT	No. of Container / Vessels	Maximum Storage Capacity MT	Parameters	
						Pressure	Temperature
1.	Acetic Acid	Tank	15	10	150	Atm.	Amb
2.	Chlorine	Tonners	900 Kgs	100	192 Tonners	7 Kg/ Cm2	Amb
3.	Acetic Anhydride	Tank	22	2	50	Atm.	Amb
4.	Light Soda Ash	Bag	50 Kgs	1000	50	Atm.	Amb

10.4.23 FACT SHEET of Deedy Chemicals Pvt. Ltd.

AHMEDABAD-3: SANAND, BAVLA,VIRAMGAM,MANDAL

MAH-UNIT-23

1.	Name of the Factory	:	M/s. Deedy Chemicals Pvt. Ltd.
	Address	:	263, A/2A, Akashganga Ind. Estate, Sanand, Ahmedabad
	Phone no. Fax no. E-mail	: : :	02717-284313/ 284366
2.	Occupier	:	MR. VIPUL V. PATEL B-801, SHAPATH-IV, OPP. KARNAVATI CLUB, S.G.ROAD, AHMEDABAD-380015 (M)- 98240 14373
3.	Manager	:	MR. NUPUR DAVE KALPANA SOCIETY, VASAD, ANAND -388306. (M)- 94276 73686
4.	Contact Person	:	

Sr. No.	Name	Designation	Telephone Number		
			Factory / Office	Resident	Mobile
1.	Mr. Henal Sheth	Director	02719-284313 / 284366	079-30074848	98240 44994
2.	Mr. Vipul Patel	Director	02719-284313 / 284366	02717-294408	98240 14373
3.	Mr. Nupur Dave	Manager	02717-284313	-	94276 73686

5.	Products	:	Chemicals

6. Man Power & Timing

Shift	Time	Direct Employee		Contractor's Person		Security / Watchman		Total	
		M	F	M	F	M	F	M	F
1st	08.00 to 16.00	08	-	15	-	-	-	23	-
2nd	16.00 to 24.00	05	-	10	--	-	-	15	-
3rd	24.00 to 08.00	05	-	10	-	-	-	15	-
	TOTAL	18	-	35	-	-	-	53	-

7. Major Hazardous Chemicals

Sr. No.	Name	Type of Storage / Container	Capacity of each Container MT	No. of Container / Vessels	Maximum Storage Capacity MT	Parameters	
						Pressure	Temperature
1.	Chlorine	Tonner	900 Kg	30	30 Tonners	7 Kg/Cm2	Amb
2.	M.C.A.	Tank	60	1	60	Atm	Amb
3.	Acetic Acid	Tank	30	1	30	Atm	Amb

10.4.24 FACT SHEET of Excel Formulations

AHMEDABAD-3: SANAND, BAVLA,VIRAMGAM,MANDAL | *MAH-UNIT-24*

1.	Name of the Factory	:	EXCEL FORMULATIONS
	Address	:	Plot.32, Sonal ind estate, Khoda village road, Sanand
	Phone no. Fax no. E-mail	: : :	92280 08275 079 40067245 info@excelformulations.com
2.	Occupier	:	Mr. DIPESH PATEL 401, SANIDHYA – A, PRAHLADNAGAR ROAD, SATELLITE, AHMEDABAD
3.	Manager	:	MR. DIPESH PATEL
4.	Contact Person	:	

Sr. No.	Name	Designation	Telephone Number		
			Factory / Office	Resident	Mobile
1.	Mithil Parmar	Manager	Factory	Jivrajpark	97253 28751
2.	Dinesh Solanki	Clerk	Factory	Dholka	96623 95336

5.	Products	: Chemicals
6.	Man Power & Timing	

Shift	Time	Direct Employee		Contractor's Person		Security / Watchman		Total	
		M	F	M	F	M	F	M	F
General	8.00 TO 17.00	-	-	-	-	2	-	2	-
1st	8.00 TO 16.00	10	-	-	-	-	-	10	-
2nd	16.00 TO 12.00	-	-	-	-	4	-	4	-
3rd	12.00 TO 8.00	-	-	-	-	-	-	-	-
	TOTAL	10	-	-	-	6	-	16	-

7. Major Hazardous Chemicals

Sr. No.	Name	Type of Storage / Container	Capacity of each Container MT	No. of Container / Vessels	Maximum Storage Capacity MT	Parameters	
						Pressure	Temperature
1.	Ethyline Oxide	VESSEL	7+4	2	11	5 Kg	10.5 Degree
2.	Carbon Diaoxide	VESSEL	18.4	1	18.4	21 Kg	-10 Degree

10.4.25 FACT SHEET Indian Oil Corporation Ltd. (LPG Bottling Plant, Sanand)

AHMEDABAD-3: SANAND, BAVLA,VIRAMGAM,MANDAL | *MAH-UNIT-25*

1.	Name of the Factory	:	M/s. Indian Oil Corporation Ltd. (LPG Bottling Plant)
	Address	:	Sanand-Viramgam High Way, Near VadnagarBus Stop, Sanand-380006
	Phone no. Fax no. E-mail	: : :	02717-294381 02717-294259 majim@indianoil.in
2.	Occupier	:	Shri Mrinoy Maji, Flat no A-1102, Serenity Sky, South Bopal, Ahmedabad (M)- 8134996701
3.	Manager	:	Shri B H Bharti 41,Kamal Nayan Bunglow, South bopal, Ahmedabad (M)- 96620 40906
4.	Contact Person	:	

Sr. No.	Name	Designation	Telephone Number		
			Factory / Office	Resident	Mobile
1.	Shri Mrinoy Maji	DGM(P)	02717-294381	-	8134996701
2.	Shri B H Bharti	Sr. Manager(S)	02717-294341	-	96620 40906
3.	Shri Vikramraj Tiwari	Safety	-	-	7879101024

5.	Products	:	Petroleum Product-LPG

6. Man Power & Timing

Shift	Time	Direct Employee		Contractor's Person		Security / Watchman		Total	
		M	F	M	F	M	F	M	F
General	09.00 to 17.30	07	00	10	00	01	-	18	00
1st	06.00 to 14.00	10	-	96	-	08	-	114	-
2nd	14.00 to 22.00	12	-	97	-	08	-	117	-
3rd	22.00 to 06.00	-	-	7	-	06	-	13	-
	TOTAL	29	00	210	00	23		262	00

7. Major Hazardous Chemicals

Sr. No.	Name	Type of Storage / Container	Capacity of each Container MT	No. of Container / Vessels	Maximum Storage Capacity MT	Parameters	
						Pressure	Temperature
1.	LPG	Horton sphere	1400	01	1400	Atm	Amb
2.	LPG	Tank A/ G	150	04	600	Atm	Amb
3.	LPG	Horton sphere	1200	02	2400	Atm	Amb

10.4.26 FACT SHEET of (Reliance Petro Marketing Ltd.) Sanand

AHMEDABAD-3: SANAND, BAVLA, VIRAMGAM, MANDAL | *MAH-UNIT-26*

1.	Name of the Factory	:	Reliance Petro Marketing Ltd
	Address	:	Plot No:167/1, 214/3&4, Vll.:- Pimpan, Sanand – Bavla Road, Ta.:- Sanand, Dist:- Ahmedabad-382110
	Phone no. Fax no. E-mail	: : :	02717-294254 9998043041/9974045667 Lpgbottlingplant.sanand@ril.com
2.	Occupier	:	Mr Vishal Sood Reliance Corporate IT park, Ghansoli, New Mumbai (M)-8369354929
3.	Manager	:	Mr Satvirsingh Dhakre
4.	Contact Person	:	

Sr. No.	Name	Designation	Telephone Number		
			Factory / Office	Resident	Mobile
1.	Mr Vishal Sood	Director	02279670169	-	8369354929
2.	Satvirsingh Dhakre	Plant Manager	02717294254	-	9724390621
3.	Vikas Shukla	Safety	02717294254	-	9662980142

5.	Products	:	LPG

6. Man Power & Timing

Shift	Time	Direct Employee		Contractor's Person		Security / Watchman		Total	
		M	F	M	F	M	F	M	F
General	9:00 to 6:00	02	0	30	0	6	0	38	0
	TOTAL	02	0	30	0	6	0	38	0

7. Major Hazardous Chemicals

Sr. No.	Name	Type of Storage / Container	Capacity of each Container MT	No. of Container / Vessels	Maximum Storage Capacity MT	Parameters	
						Pressure	Temperature
1.	LPG	Bullet	32.7	03	98.1	5-7 kg/cm^2	25-32 Deg C.

10.4. 27 FACT SHEET of Mansi Industries

AHMEDABAD-3: SANAND, BAVLA,VIRAMGAM,MANDAL | *MAH-UNIT-27*

1.	Name of the Factory	:	M/s. Mansi Industries
	Address	:	Block No. 419, PO.-Chharodi, Taluka- Sanand, Ahmedabad.
	Phone no. Fax no. E-mail	: : :	02717-273020 02717-273020 info@mansi industries.com
2.	Occupier	:	Mr. Darshan C., Jambusaria. Anant, 6/B, Seema Society, Navrangpura, AHMEDABAD-09. Ph. 079-27912158. M. 98250 16080
3.	Manager	:	Mr. Dharmendra J. Shihora (Patel) Village-TRENT, Tal.-Mandal Dist:Ahmedabad (M)- 98255 49414
4.	Contact Person	:	

Sr. No.	Name	Designation	Telephone Number		
			Factory / Office	Resident	Mobile
1.	Mr. DarshanJambusaria	Occupier	98255 49414	079-27912158	98250 16080
2.	Mr. DharmendraShihora	Manager	98255 49414	02715-251735	98255 49414

5.	Products	:	Aluminium Chloride
6.	Man Power & Timing		

Shift	Time	Direct Employee		Contractor's Person		Security / Watchman		Total	
		M	F	M	F	M	F	M	F
General	09.00 to 17.00	02	-	-	-	-	-	02	-
1st	08.00 to 16.00	16	-	-	-	1	-	16	-
2nd	16.00 to 24.00	15	-	-	-	1	-	15	-
3rd	00.00 to 08.00	12	-	-	-	1	-	12	-
	TOTAL	48	-	-	-	3	-	48	-

7. Major Hazardous Chemicals

Sr. No.	Name	Type of Storage / Container	Capacity of each Container MT	No. of Container / Vessels	Maximum Storage Capacity MT	Parameters	
						Pressure	Temperature
1.	CHLORINE	Tonner	900 Kg	100	100 Tonners	7 Kg/Cm2	Amb

10.4.28 FACT SHEET of Pratiksha Chemicals Ltd.

AHMEDABAD-3: SANAND, BAVLA,VIRAMGAM,MANDAL | *MAH-UNIT-28*

1.	Name of the Factory	:	M/s. Pratiksha Chemicals Ltd
	Address	:	195/2, Near Ajanta Ind-Estate, Vasna Lyava, Taluka Sanand, Dist Ahmedabad
	Phone no. Fax no. E-mail	: : :	 -- exports@dharapratiksha.com
2.	Occupier	:	Mr.Jayesh Patel, 21, Surdhara Bunglow-2, Nr Prahladnagar Garden, Ahmedabad. (M)-93761 06071
3.	Manager	:	Mr. Nilesh Patel 8, Vrundavan, Park Society, Bavla Road, Sanand (M)-90999 77208
4.	Contact Person	:	

Sr. No.	Name	Designation	Telephone Number		
			Factory / Office	Resident	Mobile
1.	Mr. Jayesh K. Patel	Director	02717-284350	-	93761 06071
2.	Mr .Nilesh Patel	Manager	02717-284350	-	90999 77208
3.	Mr. Managla Damor	Key Person	02717-284350	-	99748 12933

5.	Products	: Chemicals
6.	Man Power & Timing	

Shift	Time	Direct Employee		Contractor's Person		Security / Watchman		Total	
		M	F	M	F	M	F	M	F
General	08.00 to 17.00	04	-	-	-	-	-	04	-
1st	07.00 to 15.30	12	-		-	1	-	12	-
2nd	15.30 to 21.30	07	-		-	1	-	07	-
3rd	21.30 to 07.00	07	-		-	1	-	07	-
	TOTAL	30	-		-	3	-	33	-

7. Major Hazardous Chemicals

Sr. No.	Name	Type of Storage / Container	Capacity of each Container MT	No. of Container / Vessels	Maximum Storage Capacity MT	Parameters	
						Pressure	Temperature
1.	Chlorine	Tonner	900 Kg	25	20	7 Kg/Cm2	Amb
2.	MCB	Drum	200 Kg	-	4	Atm	Amb
3	Aluminium Chloride	Drum+Bag	250 Kg/ 35 Kg	-	25	Atm	Amb
4	Cupric Chloride	Drum	200	-	2	Atm	Amb
5	Caustic Flakes	Bag	35 Kg	-	3	Atm	Amb

10.4.29 FACT SHEET of SHV Energy Pvt. Ltd.

AHMEDABAD-3: SANAND, BAVLA,VIRAMGAM,MANDAL | *MAH-UNIT-29*

1.	Name of the Factory	:	M/s. SHV Energy Pvt. Ltd.
	Address	:	Survey No. 169/3 – 169/5, RanesarPatia, Kalyanagadh, Bavla-Bagodara-NH 8A, Taluka- Bavla, Dist-Ahmedabad, 382 240
	Phone no. Fax no. E-mail	: : :	7278504736/9054400226 -- Shv-bavla@supargas.com
2.	Occupier	:	Mr. Miguel Bastos Barros Flat no-03, Temple Square Appartmens, Sreebagh Colony, Kothaguda, Telengana, Hyderabad-500084 (M)- 8977902383
3.	Manager	:	Mr. Sudip Bhattacherjee(Factroy Manager) Flat no-O-107,Swareet Apratment, Sonal Road, Vejalpur, Ahmedabad-382220
4.	Contact Person	:	

Sr. No.	Name	Designation	Telephone Number		
			Factory / Office	Resident	Mobile
1.	Mr. Sudip Bhattacherjee	Factory Manager	-	-	9848098672
2.	Mr Shivam Kumar	Senior Manager-(O)	-	-	8098388471
3.	Mr Dhruvit Chavada	Safety Officer	-	-	9586361895

5.	Products	: LPG-Bottles- Filling (Super Gas)
6.	Man Power & Timing	

Shift	Time	Direct Employee		Contractor's Person		Security / Watchman		Total	
		M	F	M	F	M	F	M	F
General	09.30 to 18.00	14	-	08	-	01	-	23	-
1st	06.00 to 14.00	06	-	04	-	02	-	12	-
2nd	14.00 to 22.00	06	-	04	-	02	-	12	-
3rd	22.00 to 06.00	-	-	-	-	02	-	02	-
	TOTAL	26	-	16	-	7	-	49	-

7. Major Hazardous Chemicals

Sr. No.	Name	Type of Storage / Container	Capacity of each Container MT	No. of Container / Vessels	Maximum Storage Capacity MT	Parameters	
						Pressure	Temperature
1.	LPG	Pressure Vessel	150	1	141.5	7-12 Bar	Amb
2.	LPG	Pressure Vessel	150	1	141.5	7-12 Bar	Amb
3.	LPG	Pressure Vessel	28	1	25.4	7-15 Bar	Amb

10.4.30 FACT SHEET of Tata Autocomp System Ltd.

AHMEDABAD-3: SANAND, BAVLA,VIRAMGAM,MANDAL | *MAH-UNIT-30*

1.	Name of the Factory	:	M/s. TATA AUTOCOMP SYSTEMS LTD
	Address	:	Plot No:A-2, Survey No-1, Tata Motors Vendor Park, North Kotpura, Sanand, P.O. Viroch Nagar, Ahmedabad-382170
	Phone no. Fax no. E-mail	: : :	02717662037 ----- vishalkumar.patel@tataautocomp.com
2.	Occupier	:	Mr. Arvind Goel Plot No: A-2,Survey No-1, TATA Motors Vendor Park, North Kotpura, P.O.: Viroch Nagar, Ta. Sanand, Dist.: Ahmedabad, Gujarat. (M)- 7043007489
3.	Manager		Mr. Rajesh Ramchandani Plot No: A-2,Survey No-1, TATA Motors Vendor Park, North Kotpura, P.O.: Viroch Nagar, Ta. Sanand, Dist.: Ahmedabad, Gujarat.
4	Contact Person	:	

Sr. No.	Name	Designation	Telephone Number		
			Factory / Office	Resident	Mobile
1.	Akshay Chauhan	Sr Executive Safety	7043007480	--------	7043007480
2.	Mr. Rajesh Ramchandani	Manager	7043007488	-------	7043007489

5.	Products	: Plastic Parts (Interior & Exterior)
6.	Man Power & Timing	

Shift	Time	Direct Employee		Contractor's Person		Security / Watchman	Total		
		M	F	M	F	M	F	M	F
General	9:00 Am to 5:30 Pm	32	0	7	0	8	0	47	0
1st	6:30 Am to 3:30 Pm	89	0	106	0	4	0	195	0
2nd	3:30 Pm to 11:30 Pm	78	0	32	0	4	0	114	0
3rd	11:00 Pm to 6:30 Am	17	0	16	0	4	0	37	0
	Total	216	0	161	0	20	0	397	0

7. Major Hazardous Chemicals

Sr. No.	Name	Type of Storage / Container	Capacity of each Container	No. of Container / Vessels	Maximum Storage Capacity	Parameters	
						Pressure	Temperature
1.	Propane	20 ton	10 ton	2	17 Ton	8 kg	40
2.	Isopropyl Alcohol	600 ltr	200 ltr	3	1000 ltr	0	0
3.	Paints	2000 ltr	20 ltr	100	2500 ltr	0	0
4.	LPG	10 Ton	10 Ton	-	-	450°C	756.56kPa

10.4.31 FACT SHEET of TATA Motors Ltd.

AHMEDABAD-3: SANAND, BAVLA,VIRAMGAM,MANDAL | *MAH-UNIT-31*

1.	Name of the Factory	:	M/s. TATA Motors Limited
	Address	:	Revenue Survey No.-1, Village – Northkotpura, Taluka :- Sanand, Dist.:- Ahmedabad Pin- 382170
	Phone no. Fax no. E-mail	: : :	02717 – 668143 -- --
2.	Occupier	:	Mr. Shailesh Chandra
			TATA Motors Limited, "Bombay House" , 24, Homi ModyStreet, Mumbai – 400 001
3.	Manager		Mr. Sandeep Kumar
			Survey No.-1, Village Northkotpura, Ta. – Sanand, Di. – Ahmedabad, 382170. Gujarat, India
4	Contact Person	:	

Sr. No.	Name	Designation	Telephone Number		
			Factory / Office	Resident	Mobile
1.	Mr. Sandeep Kumar	Factory Manager	02717 – 668125	-	8238096744
2.	Mr. Viney Duggal	Safety Manger	02717 – 668120	-	9794052520
3	Mr. Ajay Tripathi	Legal Manger	02717 – 668531	-	9033038902
4	Mr. Hasmukh Ranva	Welfare Manager	02717 – 668205	-	8866078013

5.	Products :	Passenger Car
6.	Man Power & Timing	

Shift	Time	Direct Employee		Contractor's Person		Security / Watchman		Total	
		M	F	M	F	M	F	M	F
General	8:30 to 17:00	231	21	50	31	2	4	283	56
1st	6:30 to 15:00	1689	109	1799	125	45	3	3533	237
2nd	15:00 to 23:30	818	0	175	0	52	0	1045	00
3rd	11:30 to 6:30	209	0	65	0	46	0	320	00
	Total	2947	130	2089	156	145	7	5181	293

7. Major Hazardous Chemicals

Sr. No.	Name	Type of Storage / Container	Capacity of each Container MT	No. of Container / Vessels	Maximum Storage Capacity MT	Parameters	
						Pressure	Temperature
1.	Propane Gas	Horizontal cylindrical Bullet	100	03	300	Maximum 15kg/cm2 for storing, 1.9 kg/cm2 for distributing to shop	Ambient temp (Normal) 10C to 45C
2.	Petrol	UG Tank	50 KL	02	100KL	-	-
3.	Diesel	UG Tank	50 KL	02	50 KL	-	-

	4.	Pertol	UG Tank	30 KL	01	30 KL	-	-
	5.	Diesel	UG Tank	30 KL	01	30 KL	-	-
	6.	CNG (Form F)	Cylinder	16 KG	36	576 KG	-	-
	7.	CNG (Form G)	Cylinder	75 WL	48	3600 WL	-	-
	8.	Paints	Container	-	-	-	-	-

10.4.32 FACT SHEET of R.R. PATEL INDUSTROAL GASES PVT LTD

AHMEDABAD-3: SANAND, BAVLA,VIRAMGAM,MANDAL | *MAH-UNIT-32*

1.	Name of the Factory	:	M/s. R.R. PATEL INDUSTROAL GASES PVT LTD
	Address	:	Survey No. 407, B/H Water man Industries, Sarkhej-Bavla Highway, Vill- Moraiya, Ahmedabad
	Phone no. Fax no. E-mail	: : :	9727722435/9727722436 rrpatelindustries@gmail.com
2.	Occupier	:	Mr Mukesh patel 24, Avadh Residency, Vastral, Ahmedabad (M) 97277 22435
3.	Manager		Mr Lakshmanbhai Makwana B-205, Second Floor, Vrajdham, S G Road, Ahmedabad 9727722436
4	Contact Person	:	

Sr. No.	Name	Designation	Telephone Number		
			Factory / Office	Resident	Mobile
1.	Mr Mukesh Patel	Occupier	-	-	97277 22435
2.	Lakshman Makwana	Manager	-	-	97277 22436
3.	Gulab Sinh	Safety	-	-	97277 81141

5.	Products	:	Chemical
6.	Man Power & Timing		

Shift	Time	Direct Employee		Contractor's Person		Security / Watchman		Total	
		M	F	M	F	M	F	M	F
General	10:30 to 18:00	08	0	5	0	1	0	14	0
1st	6:30 to 15:00	0	0	0	0	0	0	0	0
2nd	15:00 to 23:30	0	0	0	0	0	0	0	0
3rd	11:30 to 6:30	0	0	0	0	0	0	0	0
	Total	0	0	0	0	0	0	14	

7.	Major Hazardous Chemicals

Sr. No.	Name	Type of Storage / Container	Capacity of each Container MT	No. of Container / Vessels	Maximum Storage Capacity MT	Parameters	
						Pressure	Temperature
1.	Ethylene Oxide	Tank	9 KL	03	9 KL	Atm	Amb
2	Ammonia	Cylinder	200 ltr	-	-	Atm	Amb

10.4.33 FACT SHEET of MACRO POLYMERS PVT LTD (UNIT-4)

AHMEDABAD-3: SANAND, BAVLA,VIRAMGAM,MANDAL | *MAH-UNIT-33*

1.	Name of the Factory	:	M/s. MACRO POLYMERS PVT LTD (UNIT-4)
	Address	:	SURVEY NO, 382 & POLT NO D -01 TO D -06A , GALLOPS IDUSTRIAL PARK -2 , VILLAGE – CHACHARVADI VASANA, TAL.- SANAND , DISTRICT – AHEMDABAD (GUJRAT) -382110
	Phone no. Fax no. E-mail	: : :	9979841884 Mayank.parikh@macropolymers.com
2.	Occupier	:	Mr. Mayank Parikh (Director) 9, Golden Tulip, B/h Shreyas School, Manik Bag, Ahmedabad District, Ahmedabad 382150. (M)- 9228010801/02
3.	Manager		Mr. Bhupendra Tripathi Pushkar Eligance, Isanpur,Vatva (M)- 8875002470
4	Contact Person	:	

Sr. No.	Name	Designation	Telephone Number		
			Factory / Office	Resident	Mobile
1.	MAYANK PARIKH	OCCUPIER	9228010801/02	-	9898079801
2.	MR. BHUPENDRA TRIPATHI	MANAGER	9167792646	-	96382 65221
3.	DHAVAL PATEL	SAFETY OFFICER	-	-	7600033743

5.	Products :	Synthetic Resin Manufacturing
6.	Man Power & Timing	

Shift	Time	Direct Employee		Contractor's Person		Security / Watchman		Total	
		M	F	M	F	M	F	M	F
General	08:30 to 17:30	18	0	10	0	-		0	28
1st	06:30 to 14:30	07	0	13	0	05	0	0	25
2nd	14:30 to 22:30	10	0	00	0	-		0	10
3rd	22:30 to 06:30	07	0	11	0	06	0	0	24
	TOTAL	42	0	34	0	11	0	0	87

7. Major Hazardous Chemicals

Sr. No.	Name	Type of Storage / Container	Capacity of each Container MT	No. of Container / Vessels	Maximum Storage Capacity MT	Parameters	
						Pressure	Temperature
1.	C-09 Solvent	Tank	37 KL	1	32 KL	Atm	Amb
2.	C -10 solvent	Tank	37 KL	1	32 KL	Atm	Amb
3	Xylene	UGTank	37 KL	2	30 KL	Atm	Amb
4	N – Butanol	Tank	75 KL	1	60 KL	Atm	Amb
5	MTO	Tank	37 KL	3	24 KL	Atm	Amb
6	ISO-Butanol	Tank	75 KL	1	59 KL	Atm	Amb
7	Foramaline	Tank	36 KL	2	34 KL	Atm	Amb
8	DFA	Tank	50 KL	3	40 KL	Atm	50'
9	Methyl	Tank	30 KL	1	25 KL	Atm	Amb

		Methacrylate						
	10	Butayl Acetate	Tank	17 KL	1	11 KL	Atm	Amb
	11	Toluene	UGTANK	37 KL	2	25 KL	Atm	Amb

10.4.34 FACT SHEET of Indian Oil Corporation Ltd. (Salaya-Mathura Pipe Line)

AHMEDABAD-3: SANAND, BAVLA,VIRAMGAM,MANDAL

MAH-UNIT-34

1.	Name of the Factory	:	Indian Oil Corporation Ltd (Western Region Piplines)
	Address	:	Near Hansalpur Choukadi, VIRAMGAM-382150
	Phone no. Fax no. E-mail	: : :	(M)-90991 89788 -- --
2.	Occupier	:	Shri Aashish Rajiv Gokhale PHONE NO(OFFICE) : (M)- 77788 08663 PHONE : - NO(RESIDENCE) MOBILE NO : 96501 00901 E-MAIL ID :gokhaleash@indianoil.in
3.	Manager	:	Shri Khurshid Alam PHONE NO(OFFICE) : - PHONE NO(RESIDENCE) : - MOBILE NO : 97605 41875 E-MAIL ID : khurshid. alam@indianoil.

4. Contact Person :

Sr. No.	Name	Designation	Telephone Number		
			Factory / Office	Resident	Mobile
1.	Mr Aashish Gokhale	Deputy General Manger (O)	7778808663	-	9650100901
2.	Shri Khurshid Alam	Chief Operations Manager	-	-	9760541875

5. Products : Petroleum Products(Crud Oil & HSD)

6. Man Power & Timing

Shift	Time	Direct Employee		Contractor's Person		Security / Watchman		Total	
		M	F	M	F	M	F	M	F
General	08:30 to 17:30	50	3	120	10	08	1	178	14
1st	06:30 to 14:30	5	-	03	-	08	-	16	-
2nd	14:30 to 22:30	5	-	03	-	08	-	16	-
3rd	22:30 to 06:30	5	-	03	-	08	-	16	-
	Total	65	3	129	10	32	1	240	

7. Major Hazardous Chemicals

Sr. No.	Name	Type of Storage / Container	Capacity of each Container MT	No. of Container / Vessels	Maximum Storage Capacity MT	Parameters	
						Pressure	Temperature
1.	Crude Oil	Storage Tank	2*30000 KL 7*65000 KL	9	65000 KL	Atm.	Amb.
2.	HSD	Storage Tank	2*6000 KL	2	6000 KL	Atm.	Amb.

10.4.35 FACT SHEET of SUZUKI MOTOR GUJARAT PVT LTD

AHMEDABAD-3: SANAND, BAVLA,VIRAMGAM,MANDAL | *MAH-UNIT-35*

1.	Name of the Factory	:	SUZUKI MOTOR GUJARAT PRIVATE. LIMITED.
	Address	:	Block No- 334/335, Hansalpur, Nr, Becharaji, Ta-Madal Ahmedabad- 382130
	Phone no. Fax no. E-mail	: : :	9999500185 Ak.singh@maruti.co.in
2.	Occupier	:	Mr. Tetsuharu Hayasaka/Mr Anil Singh
3.	Manager	:	Mr. Parth K Rajyaguru (AGM – Fire & Safety)/ Mr. Vikas Shirke (DVM – HR)
4.	Contact Person	:	

Sr. No.	Name	Designation	Telephone Number		
			Factory / Office	Resident	Mobile
1.	Mr. Parth K Rajyaguru	AGM – Fire & Safety	9227593782	-	-
2.	Mr. Vikas Shirke	DVM – HR	9662957976	-	-

5.	Products	:	Petroleum Products
6.	Man Power & Timing		

Shift	Time	Direct Employee		Contractor's Person		Security / Watchman		Total	
		M	F	M	F	M	F	M	F
GEN.	08:30 to 17:30	2037	0	338	0	0	0	2375	0
1ST	06:30 to 14:30	2425	0	912	0	0	0	3337	0
2ND	14:30 to 22:30	1439	0	835	0	0	0	2274	0
3RD	22:30 to 06:30	236	0	179	0	0	0	415	0
	Total	6137	0	2264	0	0	0	8401	0

7. Major Hazardous Chemicals

Sr. No.	Name	Type of Storage / Container	Capacity of each Container MT	No. of Container / Vessels	Maximum Storage Capacity MT	Parameters	
						Pressure	Temperature
1.	Propane	Tank	150 MT	5	150 MT	Atm.	Amb.
2.	Petrol	Tank	70 KL	3	70 KL	Atm.	Amb.
3.	Engine Oil	Tank	60 KL	3	60 KL	Atm.	Amb.
4.	Paint & Thinner	Drums	125 KL	5	125 KL	Atm.	Amb.
5.	NG	Pipeline	60000L	2	-	Atm.	Amb.
6.	Hydrogen	Cylinders	-	21	-	Atm.	Amb.
7.	Acetylene	Cylinders	-	72	-	Atm.	Amb.

PREPAREDNESS OF M.A.H. UNITS

CHAPTER - 11

11.1 INTRODUCTION

The major potential risks of MAH Units are maximum storage quantities of the Hazardous Chemicals. However, transportation, processes and handling pose to various hazards. The failure scenarios can be obtained from Risk Assessment and HAZOP. Further, on-site emergency plans of the M.A.H. Units provide the Maximum Credible Scenarios. These worst maximum scenarios are to be considered to be creation of probable chemical emergency in the industrial pockets. However, the management of M.A.H. Units are well prepared to mitigate chemical emergency at their level at certain limit. The details on preparedness by them are described in the as following.

11.2 PRIMARY ASSESSMENT

The location of incidence is most significant factor. Further, the availability of required resources is to be considered as prime important to control such emergency. Worst scenario can be decided based on the involved hazardous chemicals, their properties & quantities. On assessing the situation, immediately appropriate responding actions can be started. Emergency services should have such details on hands, so that emergency handling and controlling measures can be decided in time. Primary Assessment of hazards on basis of maximum storages of major hazardous chemicals are given in **Appendix – A.**

11.3 Fire Protection System Held by MAH Units

The Details of Fire Fighting Equipments, storage of water etc held by MAH Units is given at **Appendix – B.**

11.4 Personal protective equipment Held by MAH units

The details pertaining to Personal Protective Equipments and Safety Equipment held by each MAH units are given at **Appendix – C.**

11.5 MEDICAL FACILITY Held by MAH Units

The Details on Medical Facilities held by MAH Units is given at **Appendix – E.**

11.6 VEHICLES FACILITIES HELD BY MAH UNITS

The Details on vehicles & communication facilities held by MAH is given at **Appendix – D.**

11.7 Material Safety Data Sheets

The M.S.D.S. of selected major hazardous chemicals stored, handled or used by MAH units are given at **Appendix-F.**

OFF - SITE EMERGENCY PLAN

AHMEDABAD DISTRICT

APPENDIX SECTION

REVISED BY

DISTRICT CRISIS GROUP

AHMEDABAD

JANUARY – 2026

Appendix-A

AHMEDABAD DISTRICT CRISIS GROUP

PRIMARY ASSESSMENT OF HAZARDOUS CHEMICALS

A-(1) Vatva-Narol Industrial Pocket (AHMEDABAD-1)

Sr. No	Name of the Unit	Chemical	Storage Quantity (MT)		Damage Distance (m)								
					Pool Fire		BLEVE		UVCE			Toxic Dispersion	
			Largest	Total	FZR	IZR	FZR	IZR	FZR	IZR	D-LFL	D-3	F-1.5
1.	Ami Organics, Vatva	Chlorine	20	20	0	0	0	0	0	0	0	1000	1400
2.	Advance Petrochemicals Ltd	Ethylene Oxide	14	20	25	40	204	431	6	24	15	1700	2100
3.	A K Dyechem	Chlorine	14	14	0	0	0	0	0	0	0	1000	1400
4.	Bodal Chemicals Ltd-U-1, Vatva	Ethylene Oxide	7	14	25	40	204	431	6	24	15	1700	2100
5.	Bodal Chemicals Ltd-U-3, Vatva	Ethylene Oxide	7	7	14	20	104	216	3	12	8	823	1100
6.	Crystal Quinone Pvt Ltd.U-2, Vatva	Ethylene Oxide	7	14	14	20	104	216	3	12	8	823	1100
		Chloro Sulphonic Acid	25	100	0	0	0	0	0	0	0	3800	4000
7.	Jay Chemicals Ind Ltd, Vatva	Ethylene Oxide	7	14	15	21	106	218	4	13	9	823	1100
8.	Parshwnath Dyechem Industries P.L, Vatva	Chlorine	17	17	0	0	0	0	0	0	0	1000	1400
9.	Matangi Industries LLP Unit-01, Vatva	Ethylene Oxide	7	14	14	20	104	216	3	12	8	823	1100
		Chloro Sulphonic Acid	30	60	0	0	0	0	0	0	0	4900	5500
10.	Mayur Dyechem Intermediates Ltd Vatva	Ethylene Oxide	7	14	14	20	104	216	3	12	8	823	1100
		Chloro Sulphonic Acid	28	56	0	0	0	0	0	0	0	3800	4000
11.	Meghachem Industries, Vatva	Chlorine	1	27	0	0	0	0	0	0	0	1000	1400
12.	Meghmani Organics Ltd. Vatva	Chlorine	18	18	0	0	0	0	0	0	0	1000	1400
		MCB	10	20	0	0	0	0	0	0	0	0	0
13	Associate Intermediates Pvt Ltd., Vatva	Ethylene Oxide	7	14	14	20	104	216	3	12	8	823	1100
14	Matangi Industries LLP Unit-02, Vatva	Ethylene Oxide	7	14	14	20	104	216	3	12	8	823	1100
15	Indian Oil Corp. Ltd	Petroleum Product	-	-	-	-	-	-	-	-	-	-	-
16	Saras Industries	Chlorine	15	15	0	0	0	0	0	0	0	1000	1400
17	Sharma & Co.	Chlorine	10	10	0	0	0	0	0	0	0	1000	1400

Legend:

- IZR: Injury Zone Radius : Corresponds to 1st degree burns (5KW/sq.m) for Pool Fire/BLEVE and corresponds to 1% Injuries (0.01 bar) for UVCE
- FZR : Fatalithy Zone Radius : Corresponds to 1 % Lethality (10 KW/sq.m) for Pool Fire/BLEVE and corresponds to 1% lethality (1 bar) for UVCE
- D-3 : Toxic vapour dispersion under Atmospheric Stability Class “D” (Neutral) and wind speed of 3 m/s

Appendix-A
Continue…

AHMEDABAD DISTRICT CRISIS GROUP

PRIMARY ASSESSMENT OF HAZARDOUS CHEMICALS

A-(2) Odhav- Rakhiyal-Naroda - Sabarmati Industrial Pocket (AHMEDABAD-2)

Sr. No.	Name of the Unit	Chemical	Storage Quantity (MT)		Damage Distance (m)								
					Pool Fire		BLEVE		UVCE			Toxic Dispersion	
			Largest	Total	FZR	IZR	FZR	IZR	FZR	IZR	D-LFL	D-3	F-1.5
1.	Parikh Enterprises Pvt. Ltd.	Chlorine	30 Tunner	41	0	0	0	0	0	0	0	1000	1400
2.	Sagar Drugs & Pharmaceuticals Limited	Ethylene Oxide	6	18	13	17	94	196	3	12	7	1000	979
		Chloro sulphonic Acid	50	100	0	0	0	0	0	0	0	4900	5500
3.	Encore Natural Polymers Ltd	Ethylene Oxide	Ethylene Oxide	6	18	13	17	94	196	3	12	7	1000
4.	Super Industries	Phorate	2MT	2 MT	0	0	0	0	0	0	0	0	0

Legend:

- IZR: Injury Zone Radius : Corresponds to 1st degree burns (5KW/sq.m) for Pool Fire/BLEVE and corresponds to 1% Injuries (0.01 bar) for UVCE
- FZR : Fatalithy Zone Radius : Corresponds to 1 % Lethality (10 KW/sq.m) for Pool Fire/BLEVE and corresponds to 1% lethality (1 bar) for UVCE
- D-3 : Toxic vapour dispersion under Atmospheric Stability Class “D” (Neutral) and wind speed of 3 m/s
- F – 1.5 toxic vapour dispersion under Atmospheric Stability Class “F: (Very Stable) with a wind speed of 1.5 m/s.

Appendix-A
Continue…

AHMEDABAD DISTRICT CRISIS GROUP
PRIMARY ASSESSMENT OF HAZARDOUS CHEMICALS

A-(3) Sanand, Bavla ,Viramgam, Mandal Industrial Pocket (AHMEDABAD 3)

Sr. No.	Name of the Unit	Chemical	Storage Quantity (MT)		Damage Distance (m)								
					Pool Fire		BLEVE		UVCE			Toxic Dispersion	
			Largest	Total	FZR	IZR	FZR	IZR	FZR	IZR	D-LFL	D-3	F-1.5
1.	Terra Tech Chemicals (India) Pvt. Ltd	Chlorine	1	192	0	0	0	0	0	0	0	1000	1400
2.	Deedy Chemicals Pvt Ltd	Chlorine	1	45	0	0	0	0	0	0	0	1000	1400
3.	Indian Oil Corporation Ltd. (LPG Bottling Plant, Sanand)	LPG	1400	14000	0	0	1832	3097	234	749	1173	0	0
		LPG	1200	2400	0	0	524	870	112	367	643	0	0
4.	Reliance Petro Marketing Ltd.	LPG	32.7	98.1	0	0	0	0	0	0	0	0	0
5.	Mansi Industries	Chlorine	1	100	0	0	0	0	0	0	0	1000	1400
6.	Pratiksha Chemicals	Chlorine	1	20	0	0	0	0	0	0	0	1000	1400
7.	SHV Energy Pvt. Ltd.	Liquified Petroleum Gas	328	328	457 M	804 M	457 M	804 M	155 M	178 M	-	-	-
8.	Tata Autocomp System Ltd.	Propane	10 Ton	20 Ton	0.064	0.273	0.837	1.09	0.515	0.644	<0.644	0	0
9.	TATA Motors Ltd	Propane	100	300	31	44	592	836	13	27	0	313	382
10.	R.R.Patel Industries gases Pvt Ltd	Ethylene Oxide	7	7	7	20	104	216	3	12	8	823	1100
11.	Excel Formulation	Ethylene Oxide	7	7	7	20	104	216	3	12	8	823	1100
12.	Indian Oil Corporation Ltd. (SMPL)	Crude Oil	45500	409500	88	128	0	0	0	0	0	0	0
13.	Suzuki motors Gujarat private limited	Crude Oil	65000	602500	92	128	0	0	0	0	0	0	0
14.	Macro Polymers Pvt Ltd (Unit-04)	Formaldehyde	10 T	10 T	450	620	0	0	0	0	0	0	0

S. No	Scenario	Downwind Damage distances in 'm'					
		Weather Condition at 1.5 F			Weather Condition at 5.0 D		
		4	12.5	37.5	4	12.5	37.5
			KW/m^2			KW/m^2	
1.	Leak of storage tank T01C	28	22	18	24	18	15
2.	Rupture of storage tank T01C	NA	NA	NA	NA	NA	NA
3.	Leak of storage tank T03B	19	15	12	18	13	11
4.	Rupture of storage tank T03B	NA	NA	NA	NA	NA	NA
5.	Leak of storage tank T04C	19	15	12	18	14	11
6.	Rupture of storage tank T04C	NA	NA	NA	NA	NA	NA
7.	Rupture of storage tank T06B	NA	NA	NA	NA	NA	NA
8.	Rupture of Road Tanker	NA	NA	NA	NA	NA	NA
9.	Leak of MS Pipeline from delivery valve to inlet valve of tank 01C	73	57	48	65	49	39
10.	Rupture of MS Pipeline from delivery valve to inlet valve of tank 01C	268	208	171	249	187	150
11.	Leak of SKO Pipeline from delivery valve to inlet valve of tank 03B	104	81	67	94	69	55
12.	Rupture of SKO Pipeline from delivery valve to inlet valve of tank 03B	55	43	35	73	55	45
13.	Leak of HSD Pipeline from delivery valve to inlet valve of tank 04C	104	81	67	94	69	55
14.	Rupture of HSD Pipeline from delivery valve to inlet valve of tank 04C	49	39	32	51	39	31
15.	Leak of MS Pipeline from Pump house /piping manifold to TLF	73	57	48	65	49	39
16.	Rupture of MS Pipeline from Pump house /piping manifold to TLF	389	300	246	353	263	209
17.	Leak of SKO Pipeline from Pump house /piping manifold to TLF	72	56	47	65	48	38
18.	Rupture of SKO Pipeline from Pump house /piping manifold to TLF	89	69	57	91	68	54
19	Leak of HSD Pipeline from Pump house /piping manifold to TLF	104	81	67	94	69	55
20.	Rupture of HSD Pipeline from Pump house /piping manifold to TLF	129	100	82	130	96	77
21.	Leak of MS Pipeline from Pump house /piping manifold to OMC	89	70	58	79	59	47
22.		377	292	239	333	249	199

S. No	Scenario	Downwind Damage distances in 'm'					
		Weather Condition at 1.5 F			Weather Condition at 5.0 D		
		4	12.5 KW/m²	37.5	4	12.5 KW/m²	37.5
	Rupture of MS Pipeline from Pump house /piping manifold to OMC						
23.	Leak of SKO Pipeline from Pump house /piping manifold to OMC	116	90	74	108	79	63
24.	Rupture of SKO Pipeline from Pump house /piping manifold to OMC	109	84	69	93	69	55
25	Leak of HSD Pipeline from Pump house /piping manifold to OMC	116	90	74	108	79	63
26.	Rupture of HSD Pipeline from Pump house /piping manifold to OMC	108	84	69	93	70	56

Legend

- IZR: Injury Zone Radius : Corresponds to 1st degree burns (5KW/sq.m) for Pool Fire/BLEVE and corresponds to 1% Injuries (0.01 bar) for UVCE
- FZR : Fatalithy Zone Radius : Corresponds to 1 % Lethality (10 KW/sq.m) for Pool Fire/BLEVE and corresponds to 1% lethality (1 bar) for UVCE
- D-3 : Toxic vapour dispersion under Atmospheric Stability Class "D" (Neutral) and wind speed of 3 m/s
- F – 1.5 toxic vapour dispersion under Atmospheric Stability Class "F: (Very Stable) with a wind speed of 1.5 m/s.

Appendix-B

AHMEDABAD DISTRICT CRISIS GROUP

INDUSTRIAL POCKET – AHMEDABAD-1: VATVA –NAROL

FIRE PROTECTION SYSTEM HELD BY MAH UNITS

Sr. No	Name of MAH Unit	Water Tank			D.G Set		Fire Pump Set		Bucket		Fire Extinguisher						HOSE REEL	
											CO_2		DCP		FOAM			
		O/H	U/G	A/G	No.	KVA	No.	LPM	Kg	No	Kg	No	Kg	No	Kg	No.	mtr	No
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
1	ASSOCIATE INTERMEDIATES PVT LTD.	-	78 KL	-	01	125	03	137 m^3/h	9 lit	3	4.5	17	6	12	-	-	30m	8
2	ADVANCE PETROCHEMICALS LTD	-	-	50,000 lit	-	-	1	45 HP	9 lit	15	4.5	2	6	15	-	-	30m	1
3	A K DYECHEM	-	-	3000 lit	-	-	-	-	9 lit	5	4.5	-	6	1	-	-	30m	-
4	AMI ORGANICS	15000 lit	50000 lit	-	1	-	1	30 HP	9 lit	10	4.5	5	6	14	25	01	30m	8
5	BODAL CHEMICAL LTD UNIT-1	50000 lit	150000 lit	20000 lit	2	250	2	30 HP	9 lit	20	4.5	15	6	32	50	02	30m	15
6	BODAL CHEMICAL LTD UNIT-3	10000lit	25000 lit	10000 lit	1	125	1	30 HP	9 lit	12	4.5	5	6	20	50	1	30m	6
7	CRYSTAL QUINON E PVT LTD (UNIT-2)	50000 lit	50000 lit	55000 lit	1	125	1	40 HP	9 lit	28	4.5	8	6	32	-	-	30m	13
8	INDIAN OIL CORP. LTD	-	10400 KL	-	3	625, 325	6	120 HP	9 lit	32	4.5	17	9	108	22.5	6	30m	76
9	JAY CHEMICALS IND LTD UNIT-3	50000 lit	-	100000 lit	1	125	2	120 HP	9 lit	30	4.5	13	50 kg,5 kg	4, 32	50 lit	2	30m	21
10	MATANGI INDUSTRIES LLP (UNIT-01)	-	70,000 lit	-	1	125	2	30HP	9 lit	12	4.5	12	6	35	50 lit	9	30m	9
11	MAYUR DYECHEM INTERMEDIATES LTD (UNIT-1)	10000 lit	25000 lit	-	1	500	-	-	9 lit	10	4.5	5	6	14	50 lit	1	-	-
12	MEGHA CHEM INDUSTRIES	-	15000 lit	-	-	-	-	-	9 lit	5	4.5	2	6	10	-	-	-	-
13	MEGHMANI ORGANICS LTD	100000 lit	400000 lit	-	1	1000	4	120 HP, 50 HP, 25 HP, 20 HP	9 lit	18	4.5	42	6	35	45 lit	30	30m	19
14	PARSHWNATH DYE CHEM INDUSTRIES PVT LTD	-	-	3,00,000 lit	1	250	1	-	9 lit	15	4.5	6	6	8	-	1	30m	8
15	SARAS INDUSTRIES	-	3000 lit	-	-	-	-	-	9 lit	-	-	-	6	1	-	-	-	-
16	SHARMA & CO.	-	20000 lit	-	-	-	-	-	9 lit	10	4.5	2	6	2	-	-	-	-
17	MATANGI INDUSTRIES LLP (UNIT-02)	-	70,000 lit	-	1	125	2	30HP	9 lit	12	4.5	12	6	35	50 lit	9	30m	9

Appendix-B

Continue…

AHMEDABAD DISTRICT CRISIS GROUP

INDUSTRIAL POCKET – AHMEDABAD-2: ODHAV – RAKHIYAL-NARODA –SABARMATI

FIRE PROTECTION SYSTEM HELD BY MAH UNITS

Sr. No	Name of MAH Unit	Water Tank			D.G Set		Fire Pump Set		Bucket		Fire Extinguisher						HOSE REEL	
											CO_2		DCP		FOAM			
		O/H	U/G	A/G	No.	KVA	No.	LPM	Kg	No	Kg	No	Kg	No	Kg	No.	mtr	No
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
1	Parikh Enterprises Pvt. Ltd.	6 LAC LIT	80000 LIT	1000 LIT	1	300	-	-	9 lit	16	-	-	6	10	-	-	-	-
2	Sagar Drugs & Pharmaceuticals Limited	-	-	260 KL	2	250 & 320	2	10+5 HP	9 lit	10	4.5	7	6	6	10	6	60 FT	3
3	Encore Natural Polymers Ltd	-	3 ltr	0	1	750	2	300	9 lit	15	4.5	15	6	19	5	8	-	-
4	Super Industries	5 KL	5 KL	-	-	-	-	-	9 lit	1	-	2	-	-	-	-	15 FT	1

Appendix-B

Continue…

AHMEDABAD DISTRICT CRISIS GROUP

INDUSTRIAL POCKET – AHMEDABAD-3 Sanand, Bavla, Viramgam, Mandal

FIRE PROTECTION SYSTEM HELD BY MAH UNITS

Sr. No	Name of MAH Unit	Water Tank			D.G Set		Fire Pump Set		Bucket		Fire Extinguisher						HOSE REEL	
											CO_2		DCP		FOAM			
		O/H	U/G	A/G	No.	KVA	No.	LPM	Kg	No	Kg	No	Kg	No	Kg	No.	mtr	No
1	Terra Tech Chemicals (India) Pvt. Ltd	10 KL	5KL*4	-	1	160	-	-	9 lit	8	4.5	6	9	20	4.5	2	-	-
2	Deedy Chemicals Pvt Ltd	-	-	-	-	-	-	-	9 lit	2	4.5	2	6	2	-	-	-	-
3	Indian Oil Corporation Ltd. (LPG Bottling Plant, Sanand)	2 KL	-	1135 LTR*3	-	-	-	-	9 lit	4	4.5	12	6	130	-	-	15	100
4	Reliance Petro Marketing Ltd.	-	-	-	1	180	2	6833	9 lit	16	4.5	5	9	32	-	-	36000	32
5	Mansi Industries	-	-	-	-	-	-	-	9 lit	5	4.5	2	6	2	-	-	-	-
6	Pratiksha Chemicals	50 KL	40 KL	-	-	-	-	-	9 lit	10	4.5	2	6	5	-	-	-	-
7	INDIAN OIL CORP. LTD	9860 KL	-	-	2	500/250	6	410	9 lit	30	4.5 6.8	14 2	10 75	85 13	-	-	15MTR	50
8	SHV Energy Pvt. Ltd.	-	-	8314 KL	2	320, 40	6	410 M3/HR	9 lit	8	4.5	7	10 50	59 3	-	-	15	26
9	Tata Autocomp System Ltd.	-	4	2	1	5	3	5	9 lit	10	4.5	10	6	70	50	4	25	7
10	TATA Motors Ltd	3400 KL, 660 KL*2	-	2	-	-	4	800M3/HR	9 lit	16	6.5 22.5	1 1	6	-	--	-	60MTR	1
11	R.R.Patel Industries gases Pvt Ltd	-	-	-	-	-	-	-	9 lit	10	4.5	2	6	10	-	-	-	-
12	Excel Formulation	2 KL	90 KL	-	1	50	2	1000	9 lit	7	4.5	6	6	20	2	-	4	2
13	Suzuki Motors Gujarat private limited	900000 Ltr	11000000 Ltr	-	1	125	-	-	10	8	5	5	5	5	5	--	-	-
14	Macro Polymers Pvt Ltd (Unit-04)	-	01	01	01	380 KVA	3	10.8M3/HR 273M3/HR 273M3/HR	9 lit	36 nos	4.5 kg 09 kg	1502	6Kg, 9 Kg 75kg	02 34 04			15	07

Appendix-C

AHMEDABAD DISTRICT CRISIS GROUP

INDUSTRIAL POCKET – AHMEDABAD-1: VATVA –NAROL

PERSONAL PROTECTIVE EQUIPMENTS HELD BY MAH UNITS

Sr. No	Name of MAH Unit	Helmet	Hand Gloves	Safety Goggles	Safety Shoes	Face Shield	Ear Plug	Gum Boots	Canister Mask	Chemical Suit	Fire Suit	SBA		Air Line Respirator	Safety Belt	Chlorine Kit	Ammonia Kit	Explosive Meter	Oxygen Meter
												Duration	Nos						
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
1	ASSOCIATE INTERMEDIATES PVT LTD.	50	30	34	50	1	-	2	1	2	2	30 min	4	-	2	-	-	1	-
2	ADVANCE PETROCHEMICALS LTD	24	24	15	22	1	5	12	2	-	2	30 min	1	-	2	-	-	1	-
3	A K DYECHEM	2	4	1	2	2	-	2	-	-	-	30 min	2	-	-	1	1	-	-
4	AMI ORGANICS	50	25	15	38	1	10	12	2	1	-	30 min	2	-	2	1	-	-	-
5	BODAL CHEMICAL LTD UNIT-1	115	100	35	100	2	15	25	10	3	1	30 min	3	-	10	-	-	-	1
6	BODAL CHEMICAL LTD UNIT-3	67	67	15	65	1	10	15	10	2	1	30 min	3	-	6	-	-	-	-
7	CRYSTAL QUINON E PVT LTD (UNIT-2)	50	50	25	60	4	25	10	8	3	1	30 min	2	-	2	-	-	1	1
8	INDIAN OIL CORP. LTD	96	100	95	95	-	5	4	-	-	4	30 min	4	-	6	-	-	2	2
9	JAY CHEMICALS IND LTD UNIT-3	50	150	50	100	4	50	20	4	3	1	30 min	2	-	5	-	-	1	1
10	MATANGI INDUSTRIES LLP UNIT-01	35	50	20	30	20	10	20	10	6	-	30 min	4	-	6	-	-	1	1
11	MAYUR DYECHEM INTERMEDIATES LTD (UNIT-1)	100	100	100	-	2	10	25	10	1	-	30 min	1	-	2	-	-	-	-
12	MEGHACHEM INDUSTRIES	30	50	25	-	-	-	50	1	1	-	30 min	2	-	1	1	1	-	-
13	MEGHMANI ORGANICS LTD	250	250	25	250	8	10	120	5	4	1	30 min	4	1	5	1	-	-	1
14	PARSHWNATH DYE CHEM INDUSTRIES PVT LTD	100	120	20	30	4	4	30	-	1	-	30 min	3	-	6	1	-	-	-
15	SARAS INDUSTRIES	1	1	1	-	-	-	-	-	-	-	30 min	2	-	-	1	-	-	-
16	SHARMA & CO.	3	3	3	3	-	-	3	-	-	-	30 min	2	-	-	1	-	-	-
17	MATANGI INDUSTRIES LLP UNIT-02	55	30	25	35	22	15	28	20	5	-	30 min	4	-	6	-	-	0	1

Appendix-C

AHMEDABAD DISTRICT CRISIS GROUP

INDUSTRIAL POCKET – AHMEDABAD-2 : ODHAV - RAKHIYAL -NARODA –SABARMATI

PERSONAL PROTECTIVE EQUIPMENTS HELD BY MAH UNITS

Sr. No	Name of MAH Unit	Helmet	Hand Gloves	Safety Goggles	Safety Shoes	Face Shield	Ear Plug	Gum Boots	Canister Mask	Chemical Suit	Fire Suit	SBA		Air Line Respirator	Safety Belt	Chlorine Kit	Ammonia Kit	Explosive Meter	Oxygen Meter
												Duration	Nos						
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
1	Parikh Enterprises Pvt. Ltd.	48	300	50	-	2	200	2	-	-	-	30 min	5	2	4	2	-	-	-
2	Sagar Drugs & Pharmaceuticals Limited	70	40	20	-	1	80	30	2	1	1	30 min	3	-	2	-	-	-	-
3	Encore Natural Polymers Ltd	21	45	28	5	4	50	5	-	2	2	30 min	2	-	4	-	-	-	1
4	Super Industries	5	20	5	10	-	-	1	-	-	-	30 min	-	-	-	-	-	-	-

Appendix-C

AHMEDABAD DISTRICT CRISIS GROUP

INDUSTRIAL POCKET – AHMEDABAD-3: Sanand, Bavla, Viramgam, Mandal Industrial Pocket

PERSONAL PROTECTIVE EQUIPMENTS HELD BY MAH UNITS

Sr. No	Name of MAH Unit	Helmet	Hand Gloves	Safety Goggles	Safety Shoes	Face Shield	Ear Plug	Gum Boots	Canister Mask	Chemical Suit	Fire Suit	SBA		Air Line Respirator	Safety Belt	Chlorine Kit	Ammonia Kit	Explosive Meter	Oxygen Meter
												Duration	Nos						
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
1	Terra Tech Chemicals (India) Pvt. Ltd	50	100	100	20	4	-	40	3	15	-	30 min	3	-	5	2	-	-	1
2	Deedy Chemicals Pvt Ltd	30	30	5	5	-	-	-	-	-	-	30 min	3	-	11	-	-	-	-
3	Indian Oil Corporation Ltd. (LPG Bottling Plant, Sanand)	40	4	2	-	2	50	1	-	-	1	30 min	2	-	2	-	--	2	-
4	Reliance Petro Marketing Ltd.	45	38	12	42	-	10	2	-	-	2	30 min	2	-	1	-	-	1	1
5	Mansi Industries	20	100	20	-	-	--	-	2	2	2	30 min	3	-	5	4	-	-	-
6	Pratiksha Chemicals	20	20	20	25	25	20	20	-	-	-	30 min	2	-	-	1	-	-	-
7	SHV Energy Pvt. Ltd.	35	19	20	2	10	15	12	2	-	1	30 min	2	-	2	-	-	1	-
8	Tata Autocomp System Ltd.	150	500	100	150	10	50	10	100	2	2	30 min	2	-	10	-	-	-	-
9	TATA Motors Ltd	600	5000	1200	120	90	100	15	-	-	2	30 min	2	-	20	-	-	1	1
10	R.R.Patel Industries gases Pvt Ltd	25	72	25	20	30	25	-	-	-	1	30 min	-	-	25	-	-	-	3
11	Excel Formulation	22	10	2	16	-	10	-	2	-	-	30 min	-	2	-	-	-	--	-
12	Indian Oil Corporation Ltd. (SMPL)	200	50	30	80	4	70	70	50	2	4	30 min	10	5	10	-	-	10	10
13	Suzuki Motors Gujarat private limited	150	500	100	150	10	50	10	100	2	2	30 min	2	-	10	-	-	-	-
14	Macro Polymers Pvt Ltd (Unit-04)	100	500	100	100	5	20	10	10	0	0	30 min	0	01	05	0		01	01

Appendix-D

AHMEDABAD DISTRICT CRISIS GROUP

EMERGENCY VEHICLES FACILITIES HELD BY MAH UNITS

Sr. No.	Name of Factories	Emergency Vehicles / Equipments						
		Bus	Truck	Dumper	JCB	Tractor	Crane	Car
1	2	3	4	5	6	7	8	9
INDUSTRIAL POCKET –AHMEDABAD-1 : VATVA –NAROL								
1.	ASSOCIATE INTERMEDIATES PVT LTD.	-	-	-	-	-	-	1
2.	ADVANCE PETROCHEMICALS LTD	-	-	-	-	-	-	1
3.	A K DYECHEM	-	-	-	-	-	-	1
4.	AMI ORGANICS	-	-	-	-	-	-	1
5.	BODAL CHEMICAL LTD UNIT-1	-	-	-	-	-	-	1
6.	BODAL CHEMICAL LTD UNIT-3	-	-	-	-	-	-	1
7.	CRYSTAL QUINON E PVT LTD (UNIT-2)	-	-	-	-	-	-	1
8.	INDIAN OIL CORP. LTD	-	-	-	-	-	-	1
9.	JAY CHEMICALS IND LTD UNIT-3	-	-	-	-	-	-	1
10.	MATANGI INDUSTRIES LLP (Unit-01)	-	-	-	-	-	-	1
11.	MAYUR DYECHEM INTERMEDIATES LTD (UNIT-1)	-	-	-	-	-	-	3
12.	MEGHACHEM INDUSTRIES	-	-	-	-	-	-	2
13.	MEGHMANI ORGANICS LTD	-	-	-	-	-	-	1
14.	PARSHWNATH DYE CHEM INDUSTRIES PVT LTD	-	-	-	-	-	-	1
15.	SARAS INDUSTRIES	-	-	-	-	-	-	1
16.	SHARMA & CO.	-	-	-	-	-	-	1
17.	MATANGI INDUSTRIES LLP (Unit-02)	-	-	-	-	-	-	1
INDUSTRIAL POCKET – AHMEDABAD-2 : ODHAV – RAKHIYAL- NARODA-SABARMATI								
1.	Parikh Enterprises Pvt. Ltd.	-	-	-	-	-	-	1
2.	Sagar Drugs & Pharmaceuticals Limited	-	-	-	-	-	-	1
3.	Encore Natural Polymers Ltd	-	-	-	-	-	-	-
4.	Super Industries	-	-	-	-	-	-	1
INDUSTRIAL POCKET –AHMEDABAD- 3: INDUSTRIAL POCKET : SANAND, BAVLA, VIRAMGAM, MANDAL								
1.	Terra Tech Chemicals (India) Pvt. Ltd	-	-	-	-	-	-	1
2.	Deedy Chemicals Pvt Ltd	-	-	-	-	-	-	1
3.	Indian Oil Corporation Ltd. (LPG Bottling Plant, Sanand)	Jeep-1	-	-	-	-	-	6
4.	Reliance Petro Marketing Ltd.	-	-	-	-	-	-	1
5.	Mansi Industries							

6.	Pratiksha Chemicals	0	0	0	0	0	0	2
7.	SHV Energy Pvt. Ltd.	Jeep-1	2			Matador-2		1
8.	Tata Autocomp System Ltd.	2	Jrrp-2	-	-	-	-	1
9.	TATA Motors Ltd	14	4	Jeep-3	04 Delivery van	-	01 force	1
10.	R.R.Patel Industries gases Pvt Ltd	-	-	-	-	-	-	-
11.	Excel Formulation	-	-	-	-	-	-	1
12.	Indian Oil Corporation Limited (Salaya Mathura Pipeline)	-	-	-	-	-	-	8
13.	Suzuki motors Gujarat private limited	Jeep-1	-	-	-	-	-	-
14.	Macro Polymers Pvt Ltd (U-4)	-	-	-	-	-	-	1

Appendix-E

AHMEDABAD DISTRICT CRISIS GROUP

MEDICAL FACILITIES AT MAJOR INDUSTRIES

Sr. No.	Name of Factories	Name of Factory Medical Officer	First Aid Box	No. of Ambulance	No. of Beds in OHC	Stretcher	Other Equipments
1	2	3	4	5	6	7	8
INDUSTRIAL POCKET –AHMEDABAD-1 : VATVA –NAROL							
1.	ASSOCIATE INTERMEDIATES PVT LTD.	-	1	-	-	2	-
2.	ADVANCE PETROCHEMICALS LTD	Dr Dodiya SIR	2	-	-	-	-
3.	A K DYECHEM	-	2	-	-	-	-
4.	AMI ORGANICS	Dr Ushma Shah	2	-	-	-	-
5.	BODAL CHEMICAL LTD UNIT-1	--	3	-	1	1	-
6.	BODAL CHEMICAL LTD UNIT-3	--	2	-	1	1	-
7.	CRYSTAL QUINON E PVT LTD (UNIT-2)	--	3	-	1	1	-
8.	INDIAN OIL CORP. LTD	Dr Sunilbhai	4	-	-	3	-
9.	JAY CHEMICALS IND LTD UNIT-3	Dr Nikhil patel	3	-	1	1	-
10.	MATANGI INDUSTRIES LLP Unit-01	Dr Sudir l. Trivedi M-9327455070	3	-	1	1	-
11.	MATANGI INDUSTRIES LLP Unit-02	Dr Sudir l. Trivedi M-9327455070	3	-	1	1	-
12.	MAYUR DYECHEM INTERMEDIATES LTD (UNIT-1)	Dr Malav Shah M-9327012020	2	-	-	1	-
13.	MEGHACHEM INDUSTRIES	Dr Priteshbhai Shah	1	-	-	1	-
14.	MEGHMANI ORGANICS LTD	Dr Sudir l. Trivedi M-9327455070	2	-	1	1	-
15.	PARSHWNATH DYE CHEM INDUSTRIES PVT LTD	-	2	-	-	-	-
16.	SARAS INDUSTRIES	-	2	-	-	-	-
17.	SHARMA & CO.	-	2	-	-	-	-
INDUSTRIAL POCKET – AHMEDABAD-2 : ODHAV – RAKHIYAL- NARODA-SABARMATI							
1.	Parikh Enterprises Pvt. Ltd.	Dr. Kirit B. Shah, M. 94260 12396	4	-	-	1	-
2.	Sagar Drugs & Pharmaceuticals Limited	Shri Umakant Parikh, M. 94267 08347	1	-	-	1	-
3.	Encore Natural Polymers Ltd	Dr. Naishadh N. Shah M. 98255 84712	1	-	-	-	-
4.	Super Industries	-	2	-	-	-	-

INDUSTRIAL POCKET –AHMEDABAD-3 : SANAND, BAVLA, VIRAMGAM, MANDAL							
1.	Terra Tech Chemicals (India) Pvt. Ltd	Dr. Nikhil Patel M. 9898037357	5	1	1	2	-
2.	Deedy Chemicals Pvt Ltd	-	1	-	-	-	-
3.	Indian Oil Corporation Ltd. (LPG Bottling Plant, Sanand)	Dr. Tushar Shah	1	-	-	-	-
4.	Reliance Petro Marketing Ltd.	-	1	-	-	-	-
5.	Pratiksha Chemicals	-	02	0	0	01	-
6.	Mansi Industries	6	20	1	8	6	30
7.	Indian Oil Corporation Limited (Salaya Mathura Pipeline)	-	5	-	-	2	-
8.	SHV Energy Pvt. Ltd.	Dr. K.D.Pandit	2	-	-	-	-
9.	Tata Autocomp System Ltd.	Dr. Rashesh Shah, Medical Officer, M. 98252 09830	3	1	1	1	-
10.	TATA Motors Ltd	Dr. Vasubhai M. Patel Ph. No. 9898622666	18	1	-	3	-
11.	R.R.Patel Industries gases Pvt Ltd	-	-	-	-	-	-
12.	Excel Formulation	-	4	-	-	1	-
13.	Macro Polymers Pvt Ltd Unit-04	-	2	-	-	-	-
14.	Suzuki Motors Gujarat Private limited	-	1	-	-	-	-

APPENDIX – F

LIST OF M.S.D.S.

LIST OF MATERIAL SAFETY DATA SHEET (M.S.D.S)

SR NO.	SUBJECT
1.	Chlorine
2.	Chloro Sulphonic Acid
3.	Ethylene Oxide
4.	Mono Chloro Benzene
5.	Parathion Methyl
6.	Thionyl Chloride
7.	Phorate
8.	Oleum
9.	Sulphuric Acid
10.	Methanol
11.	HSD-High Speed Diesel
12.	MS-Motor Spirit
13.	ATF-Aviation Turbine Fuel
14.	SKO- Superior Kerosene Oil
15.	Ethanol

MATERIAL SAFETY DATA SHEET
SCHEDULE-5, RULE-68-J2(2),3(3) OF GFR 1963 (1995)
SCHEDULE-9, RULE 17 OF MSIHC RULE 1989 (2000)

(CHLORINE)

SECTION: 1. Product and company identification

1.1. Product identifier

Product form	:	Substance
Name	:	Chlorine
CAS No	:	7782-50-5
Formula	:	Cl2

1.2. Relevant identified uses of the substance or mixture and uses advised against

Use of the substance/mixture	:	Industrial use. Use as directed.

SECTION 2: Hazard identification

2.1. Classification of the substance or mixture

GHS-US classification

Ox. Gas 1	H270
Liquefied gas	H280
Acute Tox. 2 (Inhalation: gas)	H330
Skin Corr. 1A	H314
Eye Dam. 1	H318
STOT SE 3	H335
Aquatic Acute 1	H400

2.2. Label elements

GHS-US labeling

Hazard pictograms (GHS-US) :

GHS03 GHS04 GHS05 GHS06 GHS07 GHS09

Signal word (GHS-US) : DANGER

Hazard statements (GHS-US) :
H270 - MAY CAUSE OR INTENSIFY FIRE; OXIDIZER
H280 - CONTAINS GAS UNDER PRESSURE; MAY EXPLODE IF HEATED
H314 - CAUSES SEVERE SKIN BURNS AND EYE DAMAGE
H330 - FATAL IF INHALED
H400 - VERY TOXIC TO AQUATIC LIFE
CGA-HG22 - CORROSIVE TO THE RESPIRATORY TRACT

Precautionary statements (GHS-US) :
P202 - Do not handle until all safety precautions have been read and understood
P244 - Keep reduction valves/valves and fittings free from oil and grease
P260 - Do not breathe gas
P264 - Wash hands thoroughly after handling
P271+P403 - Use and store only outdoors or in a well-ventilated place
P273 - Avoid release to the environment
P280+P284 - Wear protective gloves, protective clothing, eye protection, respiratory protection, and/or face protection
P370+P376 - In case of fire: Stop leak if safe to do so
P405 - Store locked up
P501 - Dispose of contents/container Dispose in a safe manner in accordance with local/national regulations
CGA-PG05 - Use a back flow preventive device in the piping
CGA-PG20+CGA-PG10 - Use only with equipment of compatible materials of construction and rated for cylinder pressure
CGA-PG12 - Do not open valve until connected to equipment prepared for use
CGA-PG18 - When returning cylinder, install leak tight valve outlet cap or plug
CGA-PG06 - Close valve after each use and when empty
CGA-PG02 - Protect from sunlight when ambient temperature exceeds 52°C (125°F)

2.3. Other hazards

Other hazards not contributing to the classification : None.

2.4. Unknown acute toxicity (GHS US)

No data available

SECTION 3: Composition/Information on ingredients

3.1. Substance

Name	Product identifier	%
Chlorine (Main constituent)	(CAS No) 7782-50-5	100

3.2. Mixture

Not applicable

SECTION 4: First aid measures

4.1. Description of first aid measures

First-aid measures after inhalation : Remove to fresh air and keep at rest in a position comfortable for breathing. If not breathing, give artificial respiration. If breathing is difficult, trained personnel should give oxygen. Call a physician. . WARNING: To avoid possible chemical burns, the rescuer should avoid breathing any exhaled air from the victim.

First-aid measures after skin contact : Avoid breathing vapors. In case of contact, immediately flush affected areas with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Call a physician. Wash clothing before reuse. Discard contaminated shoes.

First-aid measures after eye contact : Immediately flush eyes thoroughly with water for at least 15 minutes. Hold the eyelids open and away from the eyeballs to ensure that all surfaces are flushed thoroughly. Contact an ophthalmologist immediately.

First-aid measures after ingestion : Ingestion is not considered a potential route of exposure.

4.2. Most important symptoms and effects, both acute and delayed

Symptoms/injuries after inhalation : Overexposure to concentrations moderately above the TLV of 1 ppm irritates the eyes and respiratory tract. Very brief exposure to a concentration of 1000 ppm may be fatal. Acts as an asphyxiant at high concentrations. Inhalation of high concentrations (e.g, greater than 15 ppm) causes choking, coughing, burning of the throat, and severe irritation of the upper respiratory tract; additionally, pulmonary edema, bronchitis, and pneumonitis may result.

4.3. Indication of any immediate medical attention and special treatment needed

Obtain medical assistance.

SECTION 5: Firefighting measures

5.1. Extinguishing media

Suitable extinguishing media : Use extinguishing media appropriate for surrounding fire.

5.2. Special hazards arising from the substance or mixture

Fire hazard : Oxidizer. May accelerate the burning of other combustible materials.

Reactivity : No reactivity hazard other than the effects described in sub-sections below.

5.3. Advice for firefighters

Firefighting instructions	:	Evacuate all personnel from the danger area. Use self-contained breathing apparatus (SCBA) and protective clothing. Immediately cool containers with water from maximum distance. Stop flow of gas if safe to do so, while continuing cooling water spray. Remove ignition sources if safe to do so. Remove containers from area of fire if safe to do so. On-site fire brigades must comply with OSHA 29 CFR 1910.156 and applicable standards under 29 CFR 1910 Subpart L—Fire Protection.
Protection during firefighting	:	**DANGER! Toxic, corrosive, high-pressure gas.**.
Special protective equipment for fire fighters	:	Standard protective clothing and equipment (Self Contained Breathing Apparatus) for fire fighters.
Specific methods	:	Use fire control measures appropriate for the surrounding fire. Exposure to fire and heat radiation may cause gas containers to rupture. Cool endangered containers with water spray jet from a protected position. Prevent water used in emergency cases from entering sewers and drainage systems Stop flow of product if safe to do so Use water spray or fog to knock down fire fumes if possible.
Other information	:	Containers are equipped with a pressure relief device. (Exceptions may exist where authorized by DOT.).

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

General measures	:	**DANGER: Oxidizing gas. Corrosive.** Evacuate personnel to a safe area. Wear a self-contained breathing apparatus and appropriate personal protective equipment (PPE). (gas tight, chemical-protective) Approach suspected leak area with caution. Remove all sources of ignition. Toxic, corrosive vapor can spread from spill. Contact with flammable materials may cause fire or explosion. Ventilate area or move container to a well-ventilated area. Before entering the area, especially a confined area, check the atmosphere with an appropriate device. Prevent from entering sewers, basements and workpits, or any place where its accumulation can be dangerous.

6.1.1. For non-emergency personnel

No additional information available

6.1.2. For emergency responders

No additional information available

6.2. Environmental precautions

Prevent waste from contaminating the surrounding environment. Prevent soil and water pollution. Dispose of contents/container in accordance with local/regional/national/international regulations. Contact supplier for any special requirements.

6.3. Methods and material for containment and cleaning up

No additional information available

6.4. Reference to other sections

See also sections 8 and 13.

SECTION 7: Handling and storage

7.1. Precautions for safe handling

Precautions for safe handling : Do not breathe gas/vapor. Avoid all contact with skin, eyes, or clothing. Emergency eye wash fountains and safety showers should be available in the immediate vicinity of any potential exposure

Wear leather safety gloves and safety shoes when handling cylinders. Protect cylinders from physical damage; do not drag, roll, slide or drop. While moving cylinder, always keep in place removable valve cover. Never attempt to lift a cylinder by its cap; the cap is intended solely to protect the valve. When moving cylinders, even for short distances, use a cart (trolley, hand truck, etc.) designed to transport cylinders. Never insert an object (e.g, wrench, screwdriver, pry bar) into cap openings; doing so may damage the valve and cause a leak. Use an adjustable strap wrench to remove over-tight or rusted caps. Slowly open the valve. If the valve is hard to open, discontinue use and contact your supplier. Close the container valve after each use; keep closed even when empty. Never apply flame or localized heat directly to any part of the container. High temperatures may damage the container and could cause the pressure relief device to fail prematurely, venting the container contents. For other precautions in using this product, see section 16.

7.2. Conditions for safe storage, including any incompatibilities

Storage conditions : Avoid oil, grease and all other combustible materials

Store only where temperature will not exceed 125°F (52°C). Post "No Smoking/No Open Flames" signs in storage and use areas. There must be no sources of ignition. Separate packages and protect against potential fire and/or explosion damage following appropriate codes and requirements (e.g, NFPA 30, NFPA 55, NFPA 70, and/or NFPA 221 in the U.S.) or according to requirements determined by the Authority Having Jurisdiction (AHJ). Always secure containers upright to keep them from falling or being knocked over. Install valve protection cap, if provided, firmly in place by hand when the container is not in use. Store full and empty containers separately. Use a first-in, first-out inventory system to prevent storing full containers for long periods. For other precautions in using this product, see section 16

OTHER PRECAUTIONS FOR HANDLING, STORAGE, AND USE: When handling product under pressure, use piping and equipment adequately designed to withstand the pressures to be encountered. Never work on a pressurized system. Use a back flow preventive device in the piping. Gases can cause rapid suffocation because of oxygen deficiency; store and use with adequate ventilation. If a leak occurs, close the container valve and blow down the system in a safe and environmentally correct manner in compliance with all international, federal/national, state/provincial, and local laws; then repair the leak. Never place a container where it may become part of an electrical circuit.

7.3. Specific end use(s)

None.

SECTION 8: Exposure controls/personal protection

8.1. Control parameters

Chlorine (7782-50-5)		
ACGIH	ACGIH TLV-TWA (ppm)	0.5 ppm
ACGIH	ACGIH TLV-STEL (ppm)	1 ppm
USA OSHA	OSHA PEL (Ceiling) (mg/m³)	3 mg/m³
USA OSHA	OSHA PEL (Ceiling) (ppm)	1 ppm
USA IDLH	US IDLH (ppm)	10 ppm

8.2. Exposure controls

Appropriate engineering controls : Use only in a closed system. A corrosion-resistant, forced-draft fume hood is preferred. LOCAL EXHAUST: A corrosion-resistant system is acceptable.

Eye protection : Wear safety glasses with side shields. Wear goggles and a face shield when transfilling or breaking transfer connections. Provide readily accessible eye wash stations and safety showers. Wear safety glasses with side shields or goggles when transfilling or breaking transfer connections.

Skin and body protection	:	Wear metatarsal shoes and work gloves for cylinder handling, and protective clothing where needed. Wear appropriate chemical gloves during cylinder changeout or wherever contact with product is possible. Select per OSHA 29 CFR 1910.132, 1910.136, and 1910.138.
Respiratory protection	:	When workplace conditions warrant respirator use, follow a respiratory protection program that meets OSHA 29 CFR 1910.134, ANSI Z88.2, or MSHA 30 CFR 72.710 (where applicable). Use an air-supplied or air-purifying cartridge if the action level is exceeded. Ensure that the respirator has the appropriate protection factor for the exposure level. If cartridge type respirators are used, the cartridge must be appropriate for the chemical exposure. For emergencies or instances with unknown exposure levels, use a self-contained breathing apparatus (SCBA).
Thermal hazard protection	:	Wear cold insulating gloves when transfilling or breaking transfer connections.

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

Physical state	:	Gas
Appearance	:	Greenish-yellow gas. Amber liquid (under pressure).
Molecular mass	:	71 g/mol
Color	:	Greenish gas.
Odor	:	Pungent.
Odor threshold	:	Odor threshold is subjective and inadequate to warn for overexposure. 0.23 mg/m³ (Dixon and Ikels)
pH	:	Not applicable.
Relative evaporation rate (butyl acetate=1)	:	No data available
Relative evaporation rate (ether=1)	:	Not applicable.
Melting point	:	-101 °C (-149.85°F)
Freezing point	:	No data available
Boiling point	:	-34.05 °C (-29.25°F)
Flash point	:	Not applicable.
Critical temperature	:	144 °C
Auto-ignition temperature	:	Not applicable.
Decomposition temperature	:	No data available
Flammability (solid, gas)	:	No data available
Vapor pressure	:	6.9 bar (100 psia) (@20°C [68°F])
Critical pressure	:	77.11 bar (1118.4 psia)
Relative vapor density at 20 °C	:	No data available
Relative density	:	1.6
Density	:	2.7 kg/m³ (at 50 °C)
Relative gas density	:	2.5
Solubility	:	Water: 8620 mg/l
Log Pow	:	Not applicable.
Log Kow	:	Not applicable.
Viscosity, kinematic	:	Not applicable.
Viscosity, dynamic	:	Not applicable.
Explosive properties	:	Not applicable.
Oxidizing properties	:	Oxidizer.
Explosion limits	:	Non flammable.

9.2. Other information

Gas group	:	Liquefied gas
Additional information	:	Gas/vapor heavier than air. May accumulate in confined spaces, particularly at or below ground level

SECTION 10: Stability and reactivity

10.1. Reactivity

No reactivity hazard other than the effects described in sub-sections below.

10.2. Chemical stability

Stable under normal conditions.

10.3. Possibility of hazardous reactions

May occur.

10.4. Conditions to avoid

Air contact. High temperature. Moisture. Incompatible materials.

10.5. Incompatible materials

Chlorine reacts with most materials, especially flammable materials, other reducing agents, and nearly all metals. At temperatures below 250°F (121°C) certain common metals (e.g. iron, copper, steel, lead, nickel) resist reaction with dry chlorine, but others (e.g. aluminum, arsenic, gold, mercury, tin, titanium) react. Moist chlorine is highly corrosive except to glass, stoneware, porcelain, and certain alloys and only at low pressure. Titanium ignites spontaneously on contact with dry chlorine. Carbon steel ignites in chlorine at temperatures near 483°F (251°C).

10.6. Hazardous decomposition products

Toxic fumes. Chlorides.

SECTION 11: Toxicological information

11.1. Information on toxicological effects

Acute toxicity : Inhalation:gas: FATAL IF INHALED.

Chlorine (\f)7782-50-5	
LC50 inhalation rat (ppm)	146.5 ppm/4h
ATE US (gases)	146.500 ppmV/4h

Skin corrosion/irritation : CAUSES SEVERE SKIN BURNS AND EYE DAMAGE.
pH: Not applicable.

Serious eye damage/irritation : CAUSES SERIOUS EYE DAMAGE.
pH: Not applicable.

Respiratory or skin sensitization : Not classified

Germ cell mutagenicity : Not classified

Carcinogenicity : Not classified

Reproductive toxicity : Not classified

Specific target organ toxicity (single exposure) : MAY CAUSE RESPIRATORY IRRITATION.

Specific target organ toxicity (repeated exposure) : Not classified

Aspiration hazard : Not classified

Symptoms/injuries after inhalation : Overexposure to concentrations moderately above the TLV of 1 ppm irritates the eyes and respiratory tract. Very brief exposure to a concentration of 1000 ppm may be fatal. Acts as an asphyxiant at high concentrations. Inhalation of high concentrations (e.g. greater than 15 ppm) causes choking, coughing, burning of the throat, and severe irritation of the upper respiratory tract; additionally, pulmonary edema, bronchitis, and pneumonitis may result.

SECTION 12: Ecological information

12.1. Toxicity

Ecology - general : VERY TOXIC TO AQUATIC LIFE.

Chlorine (7782-50-5)	
LC50 fish 1	0.44 mg/l (Exposure time: 96 h - Species: Lepomis macrochirus [flow-through])
EC50 Daphnia 1	0.017 mg/l (Exposure time: 48 h - Species: Daphnia magna)

Chlorine (7782-50-5)	
LC50 fish 2	0.014 mg/l (Exposure time: 96 h - Species: Oncorhynchus mykiss [flow-through])

12.2. Persistence and degradability

Chlorine (7782-50-5)	
Persistence and degradability	Not applicable for inorganic gases.

12.3. Bioaccumulative potential

Chlorine (7782-50-5)	
BCF fish 1	(no bioaccumulation expected)
Log Pow	Not applicable.
Log Kow	Not applicable.
Bioaccumulative potential	No data available.

12.4. Mobility in soil

Chlorine (7782-50-5)	
Mobility in soil	No data available.
Ecology - soil	Because of its high volatility, the product is unlikely to cause ground or water pollution.

12.5. Other adverse effects

Other adverse effects : May cause pH changes in aqueous ecological systems.

Effect on ozone layer : None

SECTION 13: Disposal considerations

13.1. Waste treatment methods

Waste disposal recommendations : Do not attempt to dispose of residual or unused quantities. Return container to supplier.

SECTION 14: Transport information

In accordance with DOT

Transport document description : UN1017 Chlorine, 2.3

UN-No.(DOT) : UN1017

Proper Shipping Name (DOT) : Chlorine

Class (DOT) : 2.3 - Class 2.3 - Poisonous gas 49 CFR 173.115

Hazard labels (DOT) : Poison Gas
2.3 - Poison gas

DOT Special Provisions (49 CFR 172.102) : 2 - This material is poisonous by inhalation (see 171.8 of this subchapter) in Hazard Zone B (see 173.116(a) or 173.133(a) of this subchapter), and must be described as an inhalation hazard under the provisions of this subchapter
B9 - Bottom outlets are not authorized
B14 - Each bulk packaging, except a tank car or a multi-unit-tank car tank, must be insulated with an insulating material so that the overall thermal conductance at 15.5 C (60 F) is no more than 1.5333 kilojoules per hour per square meter per degree Celsius (0.075 Btu per hour per square foot per degree Fahrenheit) temperature differential. Insulating materials must not promote corrosion to steel when wet
N86 - UN pressure receptacles made of aluminum alloy are not authorized
T50 - When portable tank instruction T50 is referenced in Column (7) of the 172.101 Table, the applicable liquefied compressed gases are authorized to be transported in portable tanks in accordance with the requirements of 173.313 of this subchapter
TP19 - The calculated wall thickness must be increased by 3 mm at the time of construction. Wall thickness must be verified ultrasonically at intervals midway between periodic hydraulic tests (every 2.5 years). The portable tank must not be used if the wall thickness is less than that prescribed by the applicable T code in Column (7) of the Table for this material

MATERIAL SAFETY DATA SHEET
SCHEDULE-5, RULE-68-J2(2),3(3) OF GFR 1963 (1995)
SCHEDULE-9, RULE 17 OF MSIHC RULE 1989 (2000)

(CHLORO SULPHONIC ACID)

Section 1: Chemical Product and Company Identification

Product Name: Chlorosulfonic acid

Catalog Codes: SLC1441

CAS#: 7790-94-5

RTECS: FX5730000

TSCA: TSCA 8(b) inventory: Chlorosulfonic acid

CI#: Not applicable.

Synonym: Sulfuric Chlorohydrin, Chlorosulfuric acid

Chemical Name: Chlorosulfonic Acid

Chemical Formula: ClSO3H

Contact Information:

Sciencelab.com, Inc.
14025 Smith Rd.
Houston, Texas 77396

US Sales: **1-800-901-7247**
International Sales: **1-281-441-4400**

Order Online: ScienceLab.com

CHEMTREC (24HR Emergency Telephone), call: 1-800-424-9300

International CHEMTREC, call: 1-703-527-3887

For non-emergency assistance, call: 1-281-441-4400

Section 2: Composition and Information on Ingredients

Composition:

Name	CAS #	% by Weight
Chlorosulfonic acid	7790-94-5	100

Toxicological Data on Ingredients: Chlorosulfonic acid LD50: Not available. LC50: Not available.

Section 3: Hazards Identification

Potential Acute Health Effects:
Extremely hazardous in case of skin contact (irritant), of ingestion. Very hazardous in case of skin contact (corrosive), of eye contact (irritant), of inhalation. Hazardous in case of skin contact (permeator). Liquid or spray mist may produce tissue damage particularly on mucous membranes of eyes, mouth and respiratory tract. Skin contact may produce burns. Inhalation of the spray mist may produce severe irritation of respiratory tract, characterized by coughing, choking, or shortness of breath. Inflammation of the eye is characterized by redness, watering, and itching. Skin inflammation is characterized by itching, scaling, reddening, or, occasionally, blistering.

Potential Chronic Health Effects:
CARCINOGENIC EFFECTS: Not available. MUTAGENIC EFFECTS: Not available. TERATOGENIC EFFECTS: Not available. DEVELOPMENTAL TOXICITY: Not available. The substance is toxic to lungs, mucous membranes. Repeated or prolonged exposure to the substance can produce target organs damage. Repeated or prolonged contact with spray mist may produce chronic eye irritation and severe skin irritation. Repeated or prolonged exposure to spray mist may produce respiratory tract irritation leading to frequent attacks of bronchial infection.

Section 4: First Aid Measures

Eye Contact:
Check for and remove any contact lenses. Immediately flush eyes with running water for at least 15 minutes, keeping eyelids open. Cold water may be used. Do not use an eye ointment. Seek medical attention.

Skin Contact:
If the chemical got onto the clothed portion of the body, remove the contaminated clothes as quickly as possible, protecting your own hands and body. Place the victim under a deluge shower. If the chemical got on the victim's exposed skin, such as the hands : Gently and thoroughly wash the contaminated skin with running water and non-abrasive soap. Be particularly careful to clean folds, crevices, creases and groin. Cold water may be used. If irritation persists, seek medical attention. Wash contaminated clothing before reusing.

Serious Skin Contact:
Wash with a disinfectant soap and cover the contaminated skin with an anti-bacterial cream. Seek medical attention.

Inhalation: Allow the victim to rest in a well ventilated area. Seek immediate medical attention.

Serious Inhalation:
Evacuate the victim to a safe area as soon as possible. Loosen tight clothing such as a collar, tie, belt or waistband. If breathing is difficult, administer oxygen. If the victim is not breathing, perform mouth-to-mouth resuscitation. WARNING: It may be hazardous to the person providing aid to give mouth-to-mouth resuscitation when the inhaled material is toxic, infectious or corrosive. Seek immediate medical attention.

Ingestion:
Do not induce vomiting. Loosen tight clothing such as a collar, tie, belt or waistband. If the victim is not breathing, perform mouth-to-mouth resuscitation. Seek immediate medical attention.

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: Non-flammable.

Auto-Ignition Temperature: Not applicable.

Flash Points: Not applicable.

Flammable Limits: Not applicable.

Products of Combustion: Not available.

Fire Hazards in Presence of Various Substances: Not applicable.

Explosion Hazards in Presence of Various Substances:
Explosive in presence of reducing materials. Non-explosive in presence of open flames and sparks, of shocks, of heat, of oxidizing materials, of combustible materials, of organic materials, of metals, of acids, of alkalis, of moisture.

Fire Fighting Media and Instructions: Not applicable.

Special Remarks on Fire Hazards: Not available.

Special Remarks on Explosion Hazards: Not available.

Section 6: Accidental Release Measures

Small Spill:
Dilute with water and mop up, or absorb with an inert dry material and place in an appropriate waste disposal container. If necessary: Neutralize the residue with a dilute solution of sodium carbonate.

Large Spill:
Corrosive liquid. Stop leak if without risk. Absorb with DRY earth, sand or other non-combustible material. Do not get water inside container. Do not touch spilled material. Use water spray curtain to divert vapor drift. Prevent entry into sewers,

Section 7: Handling and Storage

Precautions:
Keep container dry. Do not breathe gas/fumes/ vapour/spray. Never add water to this product In case of insufficient ventilation, wear suitable respiratory equipment If ingested, seek medical advice immediately and show the container or the label. Avoid contact with skin and eyes Keep away from incompatibles such as reducing agents, organic materials, metals, alkalis, moisture. May corrode metallic surfaces. Store in a metallic or coated fiberboard drum using a strong polyethylene inner package.

Storage:
May corrode metallic surfaces. Store in a metallic or coated fiberboard drum using a strong polyethylene inner package. Corrosive materials should be stored in a separate safety storage cabinet or room.

Section 8: Exposure Controls/Personal Protection

Engineering Controls:
Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapors below their respective threshold limit value.

Personal Protection:
Splash goggles. Lab coat. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Gloves.

Personal Protection in Case of a Large Spill:
Splash goggles. Full suit. Vapor respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

Exposure Limits: Not available.

Section 9: Physical and Chemical Properties

Physical state and appearance: Liquid.

Odor: Strong.

Taste: Strong.

Molecular Weight: 116.52 g/mole

Color: Light.

pH (1% soln/water): 1 [Acidic.]

Boiling Point: 158°C (316.4°F)

Melting Point: -80°C (-112°F)

Critical Temperature: Not available.

Specific Gravity: 1.76 (Water = 1)

Vapor Pressure: 1 mm of Hg (@ 20°C)

Vapor Density: 4.02 (Air = 1)

Volatility: Not available.

Odor Threshold: Not available.

Water/Oil Dist. Coeff.: Not available.

Ionicity (in Water): Not available.

Dispersion Properties: See solubility in water.

Solubility: Easily soluble in cold water, hot water.

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: 158°C (316.4°F)

Conditions of Instability: Not available.

Incompatibility with various substances:
Extremely reactive or incompatible with alkalis, moisture. Reactive with reducing agents, organic materials, metals.

Corrosivity:
Highly corrosive in presence of aluminum, of zinc. Corrosive in presence of steel, of copper. Slightly corrosive to corrosive in presence of stainless steel(304), of stainless steel(316). Non-corrosive in presence of glass.

Special Remarks on Reactivity: Not available.

Special Remarks on Corrosivity: Not available.

Polymerization: No.

Section 11: Toxicological Information

Routes of Entry: Dermal contact. Eye contact. Inhalation. Ingestion.

Toxicity to Animals:
LD50: Not available. LC50: Not available.

Chronic Effects on Humans: The substance is toxic to lungs, mucous membranes.

Other Toxic Effects on Humans:
Extremely hazardous in case of skin contact (irritant), of ingestion. Very hazardous in case of skin contact (corrosive), of inhalation. Hazardous in case of skin contact (permeator).

Special Remarks on Toxicity to Animals: Not available.

Special Remarks on Chronic Effects on Humans: Not available.

Special Remarks on other Toxic Effects on Humans: Not available.

Section 12: Ecological Information

Ecotoxicity: Not available.

BOD5 and COD: Not available.

Products of Biodegradation:
Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

Toxicity of the Products of Biodegradation: The products of degradation are more toxic.

Special Remarks on the Products of Biodegradation: Not available.

MATERIAL SAFETY DATA SHEET
SCHEDULE-5, RULE-68-J2(2),3(3) OF GFR 1963 (1995)
SCHEDULE-9, RULE 17 OF MSIHC RULE 1989 (2000)

(ETHYLENE OXIDE)

Section-1 IDENTIFICATION OF THE SUBSTANCE/PREPARATION AND OF THE COMPANY/UNDERTAKING

1.1 Identification of the substance/preparation:
Commercial name: ETHYLENE OXIDE
Chemical name: ETHYLENE OXIDE C_2H_4O
Synonyms: Ethoxyethane, Oxirane, Amprolene, Anprolene, Epoxyethane.
1.2 Use of the substance /preparation: Organic synthesis

Section 2 – HAZARD IDENTIFICATION

2.1 Classification of the substance/preparation: Hazard class and category code.
GHS Category:

Health	Environmental	Physical
Carcinogenicity Category: 1B Mutagenicity category: 1B Acute Toxicity Inhalation category: 3 Eye Irritation Category: 2 Specific Target Organ Toxicity SE 3 Skin Irritation Category: 2	Aquatic Toxicity – Category- NA	Flammable – Category 1

Data reference: http://toxnet.nlm.nih.gov/cgi-bin/sis
NA: Not available, SE: Single Exposure

GHS Category table for reference:

Study/hazard statement	Category 1	Category 2	Category 3	Category 4	Category 5
Acute Oral LD50	≤ 5 mg/kg Fatal if swallowed	> 5 ≤ 50 mg/kg Fatal if swallowed	> 50 ≤ 300 mg/kg Toxic if swallowed	> 300 ≤ 2000 mg/kg Harmful if swallowed	> 2000 ≤ 5000mg/kg May be harmful if swallowed
Acute Dermal LD50	≤ 50 mg/kg Fatal in contact with skin	> 50 ≤ 200 mg/kg Fatal in contact with skin	> 200 ≤ 1000 mg/kg Toxic in contact with skin	> 1000 ≤ 2000 mg/kg Harmful in contact with skin	> 2000 ≤ 5000 mg/kg May be harmful in contact with skin
Acute Inhalation Dust LC50 Gases LC50 Vapours LC50	≤ 0.05 mg/L ≤ 100 ppm/V ≤0.5 mg/L Fatal if inhaled	> 0.05 ≤ 0.5 mg/L > 100 ≤ 500 ppm/V >0.5 ≤ 2.0 mg/L Fatal if inhaled	> 0.5 ≤ 1.0 mg/L > 500 ≤ 2500 ppm/V > 2.0 ≤ 10 mg/L Toxic if inhaled	> 1.0 ≤ 5 mg/L >2500 ≤ 20000 ppm/V > 10 ≤ 20 mg/L Harmful if inhaled	See footnote below this table
Flammable liquids	Flash point < 23 degrees C and initial boiling point ≤ 35 degrees C. Extremely flammable liquid and vapour	Flash point < 23 degrees C and initial boiling point > 35 degrees C. Highly flammable liquid and vapour	Flash point ≥ 23 degrees C≤ 60 degrees C. Flammable liquid and vapour	Flash point > 60 degrees C ≤ 93 degrees C. Combustible liquid	Not Applicable

Note: Gases concentration are expressed in parts per million per volume (ppmV).
NOTE 1: Category 5 is for mixtures which are of relatively low acute toxicity but which under certain circumstances may pose a hazard to vulnerable populations. These mixtures are anticipated to have an oral or dermal LD50 value in the range of 2000-5000 mg/kg bodyweight or equivalent dose for other routes of exposure. In light of animal welfare considerations, testing in animals in Category 5 ranges is discouraged and should only be considered when there is a strong likelihood that results of such testing would have a direct relevance for protecting human health.
NOTE 2: These values are designed to be used in the calculation of the ATE for classification of a mixture based on its ingredients and do not represent test results. The values are conservatively set at the lower end of the range of Categories 1 and 2, and at a point approximately 1/10th from the lower end of the range for Categories 3 – 5.

GHS Category table for reference: Continued

Study/hazard statement	Category 1	Category 2	Category 3
Eye Irritation	Effects on the cornea, iris or conjunctiva that are not expected to reverse or that have not fully reversed within 21 days. Causes severe eye damage.	2A: Effects on the cornea, iris or conjunctiva that fully reverse within 21 days. Causes severe eye irritation. 2B : Effects on the cornea, iris or conjunctiva that fully reverse within 7 days. Causes eye irritation.	Not applicable
Skin Irritation	Destruction of skin tissue, with sub categorization based on exposure of up to 3 minutes (A), 1 hour (B), or 4 hours (C). Causes severe skin burns and eye damage.	Mean value of ≥2.3 > 4.0 for erythema / eschar or edema in at least 2 of 3 tested animals from gradings at 24, 48, and 72 hours (or on 3 consecutive days after onset if reactions are delayed); inflammation that persists to end of the (normally 14-day) observation period. Causes skin irritation.	Mean value of ≥1.5 < 2.3 for erythema / eschar or edema in at least 2 of 3 tested animals from gradings at 24, 48, and 72 hours (or on 3 consecutive days after onset if reactions are delayed). Causes mild skin irritation.
Environment: Acute Toxicity Category	96 hr LC_{50} (fish) ≤1 mg/L 48 hr EC_{50} (crustacea) ≤ 1 mg/L, 72/96 hr ErC_{50} (aquatic plants) ≤ 1 mg/L Very toxic to aquatic life	96 hr LC_{50} (fish) >1≤ 10 mg/L 48 hr EC_{50} (crustacea) >1≤ 10 mg/L 72/96 hr ErC_{50} (aquatic plants) >1≤ 10 mg/L Toxic to aquatic life	96 hr LC_{50} (fish) >10≤ 100 mg/L 48 hr EC_{50} (crustacea) >10≤ 100 mg/L 72/96 hr ErC_{50} (aquatic plants) >10≤ 100 mg/L Harmful to aquatic life
Flammable Aerosol	Extremely flammable aerosol	Flammable aerosol	Not Applicable
Flammable solids	Using the burning rate test, substances or mixtures other than metal powders: (a) wetted zone does not stop fire and (b) burning time < 45 seconds or burning rate > 2.2 mm/second Using the burning rate test, metal powders that have burning time ≤ 5 minutes Flammable solid	Using the burning rate test, substances or mixtures other than metal powders: (a) wetted zone does not stop fire for at least 4 minutes and (b) burning time < 45 seconds or burning rate > 2.2 mm/second Using the burning rate test, metal powders that have burning time > 5 ≤ 10 minutes Flammable solid	Not Applicable
Flammable gases	Gases, which at 20 degrees C and a standard pressure of 101.3 kPA: (a) are ignitable when in a mixture of 13% or less by volume in air; or (b) have a flammable range with air of at least 12 percentage points regardless of the lower flammable limit. Extremely flammable gas	Gases, other than those of category 1, which, at 20 degrees C and a standard pressure of 101.3 kPA, have a flammable range while mixed in air. Flammable gas	Not Applicable

GHS Label: GHS02: Flame, GHS04: Pressure Gas, GHS06: Acute Toxicity, GHS08: Carcinogen

Signal word: Danger

Details of statements:

Hazard Statements	H220 Extremely flammable gas. H350 May cause cancer H340 May cause genetic defects H331 Toxic if inhaled. H319 Causes serious eye irritation. H335 May cause respiratory irritation H315 Causes skin irritation.
Precautionary Statement Prevention	P103: Read label before use. P210: Keep away from heat/sparks/open flames/hot surfaces. No smoking. P102: Keep out of reach of children. P201 Obtain special instructions before use. P202 Do not handle until all safety precautions have been read and understood P281 Use personal protective equipment as required. P261: Avoid breathing dust/fume/gas/mist/vapours/spray. P271 Use only outdoors or in a well-ventilated area. P264 Wash ... *exposed parts of the body to be washed thoroughly after handling*. P280: Wear protective gloves/protective clothing/eye protection/face protection
Precautionary Statement Response	P377 Leaking gas fire: Do not extinguish, unless leak can be stopped safely. P381 Eliminate all ignition sources if safe to do so. P308 IF exposed or concerned: P313 Get medical advice/attention. P101: If medical advice is needed, have product container or label at hand. P304 IF INHALED: P340 Remove to fresh air and keep at rest in a position comfortable for breathing P311 Call a POISON CENTER or doctor/physician P321: Specific treatment (see ... *<reference to supplemental first aid instruction>* on this label).* P305 IF IN EYES: P351 Rinse cautiously with water for several minutes P338 Remove contact lenses, if present and easy to do. Continue rinsing P337 If eye irritation persists: P313 Get medical advice/attention P312 Call a POISON CENTER or doctor/physician if you feel unwell. P302 IF ON SKIN: P352 Wash with plenty of soap and water. P332 If skin irritation occurs:

	P313 Get medical advice/attention P362 Take off contaminated clothing and wash before re-use.
Precautionary Statement Storage	P403: Store in a well-ventilated place. P405 Store locked up. P233: Keep container tightly closed.
Precautionary Statement Disposal	Follow local regulation.

Hazard ratings:

NFPA HAZARD CODES	RATINGS SYSTEM
HEALTH: 3	**0 = No Hazard**
FLAMMABILITY: 4	**1 = Slight Hazard**
INSTABILITY: 3	**2 = Moderate Hazard**
	3 = Serious Hazard
	4 = Severe Hazard

Data Reference: http://toxnet.nlm.nih.gov/cgibin/sis/search.

2.2 Information pertaining to particular dangers for human:

Toxic substance with carcinogenic and mutagenic effects. Acute intoxication leads to central nervous system attenuation and narcotic effects occur. After swallowing possibility of aspiration (passage into the lung) and danger of chemical pneumonia (pulmonary oedema). Product irritates eyes and skin. High vapour concentrations irritate respiratory system and eyes and may lead to fast coma and death. Liquid is absorbed through skin and may develop allergic eruption. Chronic effects cause bone marrow damage, haemopoiesis disorder and may develop leukaemia.

2.3 Information pertaining to particular dangers for the environment:

Possible adverse effects on aquatic organisms.

2.4 Other adverse effects:

Extremely flammable and easily ignitable substance. Danger of ignition at normal temperature. Readily evaporates and vapours form with air toxic and explosive mixtures heavier than air. Mixtures keep above ground and after ignition they spread fast into far distances. Ignition possible when exposed to hot surfaces, sparks, naked flames and by electrostatic discharges too. The substance is practically insoluble in water, floats on the water level and forms toxic and explosive mixtures above the water level. Risk of explosion if emptied into drains or released into wastewater. Attacks rubber and plastics.

Target Organs: Brain and Spleen.

Route of entry:

Skin Contact	Skin Absorption	Eye Contact	Inhalation	Ingestion
Yes	Yes	Yes	Yes	Yes

DATA REFERENCE: http://toxnet.nlm.nih.gov/cgibin/sis/search.

Health hazards:

Source	NTP listed?	IARC cancer review group?	OSHA Regulated?
Carcinogenicity	The chemical is known to be human carcinogen	The chemical is carcinogenic to humans	The chemical appears at 29 CFR part 1910 subpart Z

DATA REFERENCE: Toxic release inventory (TRI) basis of Occupational Safety and Health Administration (OSHA) carcinogen, National Toxicological program (NTP), International Agency for Research on Cancer (IARC), http://toxnet.nlm.nih.gov/cgi-bin/sis/search.

Section 3 – COMPOSITION & INFORMATION ON INGREDIENTS

Ingredients / Hazardous	CAS No.	EINECS No.	Percentage
Ethylene Oxide/Yes	75-21-8	200-849-9	100 %

Data reference: http://ecb.jrc.ec.europa.eu/esis/

Section 4 – FIRST AID MEASURES

4.1 General advice

IMMEDIATE MEDICAL ATTENTION IS REQUIRED AFTER INHALATION OR AFTER SWALLOWING.

In case of health troubles or doubts, seek medical advice immediately and show this Material Safety Data Sheet.

Ensure activity of vitally important functions until the arrival of the doctor (artificial respiration, inhalation of oxygen, heart massage). If patient is unconscious, or in case of danger of blackout, transport patient in a stabilised position. In case of first degree burns (painful redness), and second degree burns (painful blisters), cool the affected area with cold running water for a long time. In case of third degree burns (redness, cracking pale skin, usually without pain), do not cool affected skin, dress the area with sterile dry gauze only.

4.2 Inhalation

Remove patient to fresh air, keep him warm and in order to rest quietly. Avoid walking. Seek medical advice.

SYMPTOMS AND EFFECTS: irritation, headache, dizziness, weakness, stupefaction, irritant coughing, convulsions, unconsciousness, possible respiratory inhibition or arrest.

4.3 Skin contact

Immediately take off all contaminated clothing and footwear. Flush effected area with copious quantities of water. Seek medical advice.

SYMPTOMS AND EFFECTS: mild irritation, degreasing, absorption, eruption and blistering.

4.4 Eye contact

Immediately flush eyes with clean lukewarm water and continue flushing for at least 15 minutes – keep the eyelids widely apart and flush thoroughly with mild water stream from the inner to the outer canthus. Seek medical advice.

SYMPTOMS AND EFFECTS: severe irritation, cornea damage.

4.5 Swallowing

Never give anything by mouth to an unconscious person, just put patient into a stabilized position. Seek medical advice immediately.

SYMPTOMS AND EFFECTS: nausea, vomiting, convulsions, irregular heartbeat.

Section 5 – FIRE FIGHTING MEASURES

5.1 Suitable extinguishing media: Use water spray or fog nozzle to keep container cool. Move container away from fire if there is no risk.

5.2 Extinguishing media to be avoided

Not applicable

5.3 Caution about specific danger in case of fire and fire-fighting procedures

Danger of violent reaction or explosion. Vapours may travel considerable far distances and cause subsequent ignition. Vapours are heavier than air, may cumulate along the ground and in enclosed spaces – danger of explosion. Do not empty into drains. When burning, it emits carbon monoxide, carbon dioxide and irritant fumes. Containers with the substance exposed to excessive heat may explode. May polymerize exothermically if heated or contaminated. If the polymerization takes place inside a container, the container may rupture violently. Vapors may burn inside a container. Under prolonged exposure to fire or heat the containers may rupture violently and rocket.

5.4 Special protective equipment for fire-fighters

Wear full protective fire-resistant clothing and self-contained breathing apparatus. Vapors may react violently with caustic soda, hydrated lime (quicklime), magnesium chloride, ammonia, alcohols and amines. Most materials other than stainless steel or nickel will cause polymerization or decomposition. Decomposition may cause exothermic rearrangement.

Section 6 –ACCIDENTAL RELEASE MEASURES

6.1 Person-related safety precautions

Isolate hazard area. Evacuate all unauthorized personnel not participating in rescue operations from the area. Avoid entry into danger area. Remove all possible sources of ignition. Stop traffic and switch off the motors of the engines. Do not smoke and do not handle with naked flame. Use explosion-proof lamps and non-sparking tools. Avoid contact with the substance. Apply recommended full protective personal equipment. When escaping from the contaminated area, wear mask with cartridge against organic vapours. In case of general average, evacuate personnel from danger area. In places under the ground level and in enclosed spaces (including drains) risk of explosion and accumulation of toxic vapours.

6.2 Precautions for protection of the environment

Prevent from further leaks of substance. Do not allow substance to enter soil, water and sewage systems. In case of substance discharge to water courses or water containers, inform water consumers immediately, stop service and exploitation of water.

6.3 Recommended methods for cleaning and disposal

Pump off substance safely, soak up residues with compatible porous material and forward for disposal in closed containers. Dispose off under valid legal waste regulations.

Section 7 –HANDLING AND STORAGE

7.1 Information for safe handling

Observe all fire-fighting measures (no smoking, do not handle with naked flame and remove all possible sources of ignition). Take precautionary measures against static discharges. Wear recommended personal protective equipment and observe instructions to prevent possible contact of substance with skin and eyes and

inhalation. Avoid leak to environment. Vapors are heavier than air.

7.2 Information for storage

Storerooms should meet the requirements for the fire safety of constructions and electrical facilities and should be in conformity with valid regulations. Store in cool, well-ventilated place with effective exhaust, away from heat and all sources of ignition. Store in tightly closed container. Do not store together with oxidizing agents. Take precautionary measures against static discharges. Avoid leak to environment. May polymerize exothermically if heated or contaminated. If the polymerization takes place inside a container, the container may rupture violently. Vapors may burn inside a container.

7.3 Information for specific use

Not applicable.

Section 8 –EXPOSURE CONTROL & PERSONAL PROTECTION

8.1 Occupational Exposure Limits:

Material	Source	Type	ppm	mg/m3	Notation
ETHYLENE OXIDE	ACGIH	TWA	1		
	ACGIH	STEL	5		
	ACGIH	SKIN_DES TWA	NA		
	NIOSH	IDLH	NA		
	OSHA	TWA	1		
	OSHA	STEL	5		

NA: Data not available

DATA REFERENCE: http://toxnet.nlm.nih.gov/cgi-bin/sis/search.

Provide adequate ventilation when using the material and follow the principles of good occupational hygiene to control personal exposure.

Recommended determination method in the work place atmosphere: gas chromatography, detector tube.

8.2 Occupational exposure controls

Collective protection measures: General and local ventilation, effective exhaust.

Individual protection measures: Personal protective equipment (PPE) for the protection of eyes, hands and skin corresponding with the performed labour has to be kept at disposition for the employees. In cases, where the workplace exposure control limits cannot be observed with the help of technical equipment or where it is not possible to ensure that the respiratory system exposure does not represent a health hazard for the personnel, adequate respiratory protection have to be kept at disposition. In the case of continuous use of this equipment during constant work, safety breaks have to be scheduled, if the PPE-character requires this. All PPE have to be kept in disposable state and the damaged or contaminated equipment has to be replaced immediately.

RECOMMENDED PERSONAL PROTECTIVE EQUIPMENT (PPE):

HANDS	EYES	BODY	RESPIRATORY
			

Respiratory protection: If the exposure limit is exceeded and engineering controls are not feasible, wear a supplied air, full-face piece respirator, airline hood, or full face piece self-contained breathing apparatus. protective mask with canister A (brown coloured, protecting against organic vapours), self-contained breathing

Eye protection: Use chemical safety goggles and/or a full face shield where splashing is possible. Maintain eye wash fountain and quick-drench facilities in work area.
Hand protection: Wear gloves of impervious material.
Body protection: Wear impervious protective clothing, including boots, gloves, lab coat, apron or coveralls, as appropriate, to prevent skin contact. Protective coverall antistatic design recommended, impervious when handling big amounts (nitrile rubber), sealed leather footwear (free from synthetic adhesives)
Hygiene Measures: Wash hands, forearms and face thoroughly after handling. Appropriate techniques should be used to remove potentially contaminated clothing. Wash contaminated clothing before reusing. Ensure that eyewash stations and safety showers are close to the workstation location.

8.3 Environmental exposure controls

Proceed in accordance with valid air and water legislative regulations.
Engineering measures: Use only with adequate ventilation. If user operations generate dust, fumes, vapor or mist, use process enclosures, local exhaust ventilation or other engineering controls to keep worker exposure to airborne contaminants below any recommended limits. The engineering controls also need to keep gas, vapor or dust concentrations below any lower explosive limits. Use explosion-proof ventilation equipment.

Section 9 –PHYSICAL AND CHEMICAL PROPERTIES

Appearance	Liquid, colourless or light yellow
Odour	Characteristic
Solubility in water	Completely soluble in water above 11.4 °C
Relative Density (H2O=1) @ 0°C	0.882
Boiling Point °C	10.7 °C
Melting Point °C	-111 °C
Relative Vapour Density (Air=1)	1.5
Flash point °C	0°C Open cup
Auto ignition °C	440 °C
Vapour pressure (mmHg) @ 25 °C	1.4
Molecular weight	44.06
Explosive limits in air % by volume	LEL 3% UEL 100%
PH	NA
Viscosity mPa.s @10 °C	0.254
Pour point	NA
Evaporation rate (ether=1)	NA
Octanol/water partition coefficient log Kow	-0.30
% volatile	NA

NA: NOT AVAILABLE

Section 10 –CHEMICAL STABILITY AND REACTIVITY INFORMATION

10.1 Conditions to avoid
Concentrations within the explosion limits, sources of ignition, high temperature, sun radiation.
10.2 Material to avoid
AIR AND WATER REACTIONS:
Highly flammable. Flammable over a wide vapor-air concentration range. Must be diluted on the order of 24 to 1 with water to lose flammability. Soluble in water. Highly flammable, severe explosion hazard when exposed to flame. The autoignition temperature may be as low as 140° C in presence of rust. Rapid compression of the vapor with air causes explosion. Ethylene oxide vapor may be initiated into explosive decomposition in absence of air [Hess, L. G., et al., Ind. Eng. Chem., 1950, 42, p. 1251]. Metal fittings containing magnesium, copper or silver should be avoided, since traces of acetylene in ethylene oxide may produce metal acetylides capable of detonating the vapor [MCA SD-38, 1971]. Violent polymerization occurs on contact with strong bases (alkali hydroxides, ammonia) or acids, amines, metallic potassium, oxides (aluminum oxide, iron oxide, rust), covalent halides (aluminum chloride, ferric chloride, tin(IV) chloride) [Gupta, A. K., J. Soc. Chem. Ind., 1949, 68, p. 179]. Violent reaction with m-nitroaniline, magnesium perchlorate, mercaptans, thiols, triethylamine [Bretherick, 5th ed., 1995, p. 316]. Ethylene oxide and SO2 can react violently in pyridine solution with pressurization if ethylene oxide is in excess (Nolan, 1983, Case History 51).
REACTIVE GROUPS: Epoxides
10.3 Hazardous decomposition products: Pure EO decomposes explosively if detonated, ignited or heated to about 560 °C, even in absence of air.
Polymerization: Very susceptible to polymerization initiated at ambient temperature by acids, bases or catalysts such as anhydrous Chlorides or Iron, Aluminium, Tin, and metal oxides. Iron rust must be removed from any equipment containing Ethylene oxide. The polymerization is exothermic. Thermal initiatation startsat around 100 Cand once started will be promoted by Iron. If the remperature is not controlled the polymerization will self accelerate causing vapourization of unreacted ethylene oxide and possibly explosive decomposition of the vapour. Slow polymerization can also occure , producing solid polymer, which is thermally stable.

Section 11 –TOXICOLOGICAL INFORMATION

11.1 Acute effects
Toxic substance with carcinogenic and mutagenic effects. Acute intoxication leads to central nervous system attenuation and narcotic effects occur. After swallowing possibility of aspiration (passage into the lung) and danger of chemical pneumonia (pulmonary oedema). Product irritates eyes and skin. High vapour concentrations irritate respiratory system and eyes and may lead to fast coma and death. Liquid is absorbed through skin and may develop allergic eruption.
Acute toxicity data:

Parameter	Route	Species	Values	Exposure period
LD50	Oral	Rat	330 mg/Kg	Not applicable
LC50	Inhalation	Rat	1460 ppm	4 hours

11.2 Repeated dose toxicity
Chronic effects cause bone marrow damage, haemopoiesis disorder and may develop leukaemia.
11.3 Sensitisation
May cause skin allergy.
11.4 CMR effects (carcinogenity, mutagenicity, toxicity for reproduction)
Proved carcinogenic effects for humans. Substance has mutagenic effects.
11.5 Toxicokinetics, metabolism, distribution: NA.

Section 12 –ECOLOGICAL INFORMATION

12.1 Ecotoxicity data:

Parameter	Route	Species	Values	Exposure period
LC50	Inhalation	Gold fish	90 mg/L	24 hours

http://toxnet.nlm.nih.gov/cgi-bin/sis/search
12.2 Mobility: NA
12.3 Persistence and degradability: Ethylene oxide hydrolyzes to ethylene glycol. Biodegradation is expected in a wastewater treatment plant.
12.4 Bioaccumulative potential: NA

12.5 Results of PBT assessment Persistence and Degradation: Photo-degrade in air.
12.6 Other adverse effects: Environmental Fate: A high adsorptive in soil is expected.

Section 13– DISPOSAL CONSIDERATION

Local Legislation: Disposal should be in accordance with applicable regional, national, and local laws and regulations. This product should not be dumped, spilled, rinsed or washed into sewers or public waterways.
13.1 Recommended disposal methods for the substance / preparation
Product reuse or disposal in accordance with valid waste legislative regulations.
13.2 Recommended disposal methods for contaminated packaging
Product is transported in tank-vehicles.
13.3 Waste management measures that control exposure of humans and environment
Proceed in accordance with valid health, air and water legislative regulations.
13.4 Waste regulation: Follow local regulation.

Section 14– TRANSPORT INFORMATION

International Transport Regulation:
ADR/RID (Road/Rail), IMDG (Sea) and ICAO/IATA (Air)
14.1
Proper Shipping Name: Ethylene Oxide
Hazard Class: 2.3, Flammable Liquid
UN Number: 1040

MATERIAL SAFETY DATA SHEET
SCHEDULE-5, RULE-68-J2(2),3(3) OF GFR 1963 (1995)
SCHEDULE-9, RULE 17 OF MSIHC RULE 1989 (2000)

(MONO CHLORO BENZENE)

Section 1: Chemical Product and Company Identification

Section 1: Chemical Product
Product Name: Chlorobenzene
CAS#: 108-90-7
Synonym: Monochlorobenzene
Chemical Name: Not available.
Chemical Formula: C_6H_5Cl

Section 2: Composition and Information on Ingredients

Composition:

Name	CAS #	% by Weight
Chlorobenzene	108-90-7	100

Toxicological Data on Ingredients: Chlorobenzene: ORAL (LD50): Acute: 1110 mg/kg [Rat]. 2300 mg/kg [Mouse].

Section 3: Hazards Identification

Potential Acute Health Effects:
Very hazardous in case of skin contact (irritant), of eye contact (irritant), of ingestion, of inhalation. Hazardous in case of skin contact (corrosive, sensitizer, permeator). Inflammation of the eye is characterized by redness, watering, and itching. Skin inflammation is characterized by itching, scaling, reddening, or, occasionally, blistering.

Potential Chronic Health Effects:
Very hazardous in case of skin contact (irritant), of eye contact (irritant), of ingestion, of inhalation. Hazardous in case of skin contact (corrosive, sensitizer, permeator). CARCINOGENIC EFFECTS: Not available. MUTAGENIC EFFECTS: Not available. TERATOGENIC EFFECTS: Not available. DEVELOPMENTAL TOXICITY: Not available. The substance is toxic to kidneys, lungs, the nervous system, liver, mucous membranes. Repeated or prolonged exposure to the substance can produce target organs damage. Repeated or prolonged inhalation of vapors may lead to chronic respiratory irritation.

Section 4: First Aid Measures

Eye Contact:
Check for and remove any contact lenses. Immediately flush eyes with running water for at least 15 minutes, keeping eyelids open. Cold water may be used. Do not use an eye ointment. Seek medical attention.

Skin Contact:
If the chemical got onto the clothed portion of the body, remove the contaminated clothes as quickly as possible, protecting your own hands and body. Place the victim under a deluge shower. If the chemical got on the victim's exposed skin, such as the hands : Gently and thoroughly wash the contaminated skin with running water and non-abrasive soap. Be particularly careful to clean folds, crevices, creases and groin. If irritation persists, seek medical attention. Wash contaminated clothing before reusing.

Serious Skin Contact:
Wash with a disinfectant soap and cover the contaminated skin with an anti-bacterial cream. Seek immediate medical attention.

Inhalation:
Allow the victim to rest in a well ventilated area. Seek immediate medical attention.

Serious Inhalation: Not available.

Section 4: First Aid Measures (Continued)

Ingestion:
Do not induce vomiting. Examine the lips and mouth to ascertain whether the tissues are damaged, a possible indication that the toxic material was ingested; the absence of such signs, however, is not conclusive. Loosen tight clothing such as a collar, tie, belt or waistband. If the victim is not breathing, perform mouth-to-mouth resuscitation. Seek immediate medical attention.

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: Flammable.

Auto-Ignition Temperature: 638°C (1180.4°F)

Flash Points: CLOSED CUP: 29.44°C (85°F).

Flammable Limits: LOWER: 1.3% UPPER: 7.1%

Products of Combustion: These products are carbon oxides (CO, CO2).

Fire Hazards in Presence of Various Substances: Flammable in presence of open flames and sparks.

Explosion Hazards in Presence of Various Substances:
Risks of explosion of the product in presence of mechanical impact: Not available.
Risks of explosion of the product in presence of static discharge: Not available.

Fire Fighting Media and Instructions:
Flammable liquid, soluble or dispersed in water.
SMALL FIRE: Use DRY chemical powder.
LARGE FIRE: Use alcohol foam, water spray or fog. Cool containing vessels with water jet in order to prevent pressure build-up, autoignition or explosion.

Special Remarks on Fire Hazards: Not available.

Special Remarks on Explosion Hazards: Not available.

Section 6: Accidental Release Measures

Small Spill:
Absorb with an inert material and put the spilled material in an appropriate waste disposal.

Large Spill:
Flammable liquid. Keep away from heat. Keep away from sources of ignition. Stop leak if without risk. Absorb with DRY earth, sand or other non-combustible material. Do not touch spilled material. Prevent entry into sewers, basements or confined areas; dike if needed. Eliminate all ignition sources. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

Section 7: Handling and Storage

Precautions:
Keep container dry. Keep away from heat. Keep away from sources of ignition. Ground all equipment containing material. Do not ingest. Do not breathe gas/fumes/ vapour/spray. Never add water to this product In case of insufficient ventilation, wear suitable respiratory equipment If ingested, seek medical advice immediately and show the container or the label. Avoid contact with skin and eyes.

Storage:
Flammable materials should be stored in a separate safety storage cabinet or room. Keep away from heat. Keep away from sources of ignition. Keep container tightly closed. Keep in a cool, well-ventilated place. Ground all equipment containing material. A refrigerated room would be preferable for materials with a flash point lower than 37.8°C (100°F).

Section 8: Exposure Controls/Personal Protection

Engineering Controls:
Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapors below their respective threshold limit value. Ensure that eyewash stations and safety showers are proximal to the work-station location.

Personal Protection:
Splash goggles. Lab coat. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Gloves.

Section 8: Exposure Controls/Personal Protection (Continued)

Personal Protection in Case of a Large Spill:
Splash goggles. Full suit. Vapor respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

Exposure Limits:
TWA: 10 (ppm) TWA: 46 (mg/m3) Consult local authorities for acceptable exposure limits.

Section 9: Physical and Chemical Properties

Physical state and appearance: Liquid.

Odor	: Almond-like.
Taste	: Not available.
Molecular Weight	: 112.56 g/mole
Color	: Colorless
pH (1% soln/water)	: Not available.
Boiling Point	: 132°C (269.6°F)
Melting Point	: -45.6°C (-50.1°F)
Critical Temperature	: Not available.
Specific Gravity	: 1.1058 (Water = 1)
Vapor Pressure	: 8.8 mm of Hg (@ 20°C)
Vapor Density	: 3.88 (Air = 1)
Volatility	: Not available.
Odor Threshold	: 0.2 ppm
Water/Oil Dist. Coeff.	: Not available.
Ionicity (in Water)	: Not available.
Dispersion Properties	: See solubility in water, methanol, diethyl ether.
Solubility	: Soluble in methanol, diethyl ether. Very slightly soluble in cold water.

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available.

Conditions of Instability: Not available.

Incompatibility with various substances: Not available.

Corrosivity: Not available.

Special Remarks on Reactivity: Not available.

Special Remarks on Corrosivity: Not available.

Polymerization: No.

Section 11: Toxicological Information

Routes of Entry: Dermal contact. Eye contact. Inhalation. Ingestion.

Toxicity to Animals: Acute oral toxicity (LD50): 1110 mg/kg [Rat]

Chronic Effects on Humans:
The substance is toxic to kidneys, lungs, the nervous system, liver, mucous membranes.

Other Toxic Effects on Humans:
Very hazardous in case of skin contact (irritant), of ingestion, of inhalation. Hazardous in case of skin contact (corrosive, sensitizer, permeator).

Special Remarks on Toxicity to Animals: Not available.

Special Remarks on Chronic Effects on Humans: Not available.

Special Remarks on other Toxic Effects on Humans: Not available.

Section 12: Ecological Information

Ecotoxicity: Not available.

BOD5 and COD: Not available.

Products of Biodegradation:
Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

Toxicity of the Products of Biodegradation: The products of degradation are more toxic.

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations

Waste Disposal :

Section 14: Transport Information

Land transport (ADR-RID)
Proper shipping name : CHLOROBENZENE
UN N° : 1134
H.I. nr : 30
ADR - Class : 3
Labelling - Transport : 3 : Flammable liquid.
ADR - Group : III

Sea transport (IMDG) [English only]
Proper shipping name : CHLOROBENZENE
UN N° : 1134
IMO-IMDG - Class or division : 3 : Flammable liquid.
IMO-IMDG - Packing group : III

Air transport (ICAO-IATA) [English only]
Proper shipping name : CHLOROBENZENE
UN N° : 1134
IATA - Class or division : 3 : Flammable liquid.
IATA - Packing group : III

MATERIAL SAFETY DATA SHEET
SCHEDULE-5, RULE-68-J2(2),3(3) OF GFR 1963 (1995)
SCHEDULE-9, RULE 17 OF MSIHC RULE 1989 (2000)

(PARATHION METHYLE)

Section 1. Identification of the Substance/Mixture and of the Company/Undertaking

1.1 Product Code: 25786
Product Name: Methyl Parathion
Synonyms: phosphorothioic acid, O,O-dimethyl O-(4-nitrophenyl) ester; BAY 11405;

1.2 Relevant identified uses of the substance or mixture and uses advised against:
Relevant identified uses: For research use only, not for human or veterinary use.

Section 2. Hazards Identification

2.1 Classification of the Substance or Mixture:

Acute Toxicity: Inhalation, Category 2
Acute Toxicity: Oral, Category 2
Acute Toxicity: Skin, Category 3
Specific Target Organ Toxicity (repeated exposure), Category 2
Aquatic Toxicity (Acute), Category 1
Aquatic Toxicity (Chronic), Category 1

2.2 Label Elements:

GHS Signal Word: **Danger**

GHS Hazard Phrases:

H300: Fatal if swallowed.
H311: Toxic in contact with skin.
H330: Fatal if inhaled.
H373: May cause damage to {organs} through prolonged or repeated exposure.
H400: Very toxic to aquatic life.
H410: Very toxic to aquatic life with long lasting effects.

GHS Precaution Phrases:

P260: Do not breathe {dust/fume/gas/mist/vapors/spray}.
P264: Wash {hands} thoroughly after handling.
P273: Avoid release to the environment.
P280: Wear {protective gloves/protective clothing/eye protection/face protection}.
P284: Wear respiratory protection {}.

GHS Response Phrases:

P301+310: IF SWALLOWED: P310: Immediately call a POISON CENTER or doctor/physician.
P302+352: IF ON SKIN: Wash with plenty of soap and water.
P304+340: IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing.

P314: Get medical attention/advice if you feel unwell.
P320: Specific treatment is urgent {see ... on this label}.
P330: Rinse mouth.
P361+364: Take off immediately all contaminated clothing and wash it before reuse.
P391: Collect spillage.

GHS Storage and Disposal Phrases:

Please refer to Section 7 for Storage and Section 13 for Disposal information.

2.3 Adverse Human Health Effects and Symptoms:

Fatal if inhaled or swallowed.
Material may be irritating to the mucous membranes and upper respiratory tract.
May cause damage to {organs} through prolonged or repeated exposure.
May cause eye, skin, or respiratory system irritation.
Toxic in contact with skin.
Very toxic to aquatic life with long lasting effects.
To the best of our knowledge, the toxicological properties have not been thoroughly investigated.

Section 3. Composition/Information on Ingredients

CAS # / RTECS #	Hazardous Components (Chemical Name)/ REACH Registration No.	Concentration	EC No./ EC Index No.	GHS Classification
298-00-0 TG0175000	Methyl parathion	100.0 %	206-050-1 015-035-00-7	Flam. Liq. 3: H226 Acute Tox.(O) 2: H300 Acute Tox.(D) 3: H311 Acute Tox.(I) 2: H330 STOT (RE) 2: H373 Aquatic (A) 1: H400 Aquatic (C) 1: H410

Section 4. First Aid Measures

4.1 Description of First Aid Measures:

In Case of Inhalation: Remove to fresh air. If not breathing, give artificial respiration or give oxygen by trained personnel. Get immediate medical attention.

In Case of Skin Contact: Immediately wash skin with soap and plenty of water for at least 15 minutes. Remove contaminated clothing. Get medical attention if symptoms occur. Wash clothing before reuse.

In Case of Eye Contact: Hold eyelids apart and flush eyes with plenty of water for at least 15 minutes. Have eyes examined and tested by medical personnel.

In Case of Ingestion: Wash out mouth with water provided person is conscious. Never give anything by mouth to an unconscious person. Get medical attention. Do NOT induce vomiting unless directed to do so by medical personnel.

Section 5. Fire Fighting Measures

5.1	**Suitable Extinguishing Media:**	Use alcohol-resistant foam, carbon dioxide, water, or dry chemical spray. Use water spray to cool fire-exposed containers.
	Unsuitable Extinguishing Media:	A solid water stream may be inefficient.
5.2	**Flammable Properties and Hazards:**	No data available.
		No data available.
	Flash Pt:	No data.
	Explosive Limits:	LEL: No data. UEL: No data.
	Autoignition Pt:	No data.
5.3	**Fire Fighting Instructions:**	As in any fire, wear self-contained breathing apparatus pressure-demand (NIOSH approved or equivalent), and full protective gear to prevent contact with skin and eyes.

Section 6. Accidental Release Measures

6.1	**Protective Precautions, Protective Equipment and Emergency Procedures:**	Avoid breathing vapors and provide adequate ventilation. As conditions warrant, wear a NIOSH approved self-contained breathing apparatus, or respirator, and appropriate personal protection (rubber boots, safety goggles, and heavy rubber gloves).
6.2	**Environmental Precautions:**	Take steps to avoid release into the environment, if safe to do so.
6.3	**Methods and Material For Containment and Cleaning Up:**	Contain spill and collect, as appropriate. Transfer to a chemical waste container for disposal in accordance with local regulations.

Section 7. Handling and Storage

7.1	**Precautions To Be Taken in Handling:**	Avoid breathing dust/fume/gas/mist/vapours/spray. Avoid prolonged or repeated exposure.
7.2	**Precautions To Be Taken in Storing:**	Keep container tightly closed. Store in accordance with information listed on the product insert.

Section 8. Exposure Controls/Personal Protection

8.1 Exposure Parameters:

CAS #	Chemical Name	Jurisdiction	Recommended Exposure Limits	Notations
298-00-0	Methyl parathion	ACGIH TLV	TLV: 0.2 mg/m3	
		France VL	TWA: 0.2 mg/m3	

8.2 Exposure Controls:

8.2.1	**Engineering Controls (Ventilation etc.):**	Use process enclosures, local exhaust ventilation, or other engineering controls to control airborne levels below recommended exposure limits.
8.2.2	**Personal protection equipment:**	
	Eye Protection:	Safety glasses
	Protective Gloves:	Compatible chemical-resistant gloves
	Other Protective Clothing:	Lab coat
	Respiratory Equipment (Specify Type):	NIOSH approved respirator, as conditions warrant.
	Work/Hygienic/Maintenance Practices:	Do not take internally. Facilities storing or utilizing this material should be equipped with an eyewash and a safety shower. Wash thoroughly after handling.

Section 9. Physical and Chemical Properties

9.1 Information on Basic Physical and Chemical Properties

Physical States:	[ ] Gas [ ] Liquid [X] Solid
Appearance and Odor:	A solid
pH:	No data.
Melting Point:	No data.
Boiling Point:	No data.
Flash Pt:	No data.
Evaporation Rate:	No data.
Flammability (solid, gas):	No data available.
Explosive Limits:	LEL: No data. UEL: No data.
Vapor Pressure (vs. Air or mm Hg):	No data.
Vapor Density (vs. Air = 1):	No data.
Specific Gravity (Water = 1):	No data.
Solubility in Water:	No data.
Solubility Notes:	Soluble (slightly) in: chloroform; MeOH;
Octanol/Water Partition Coefficient:	No data.
Autoignition Pt:	No data.
Decomposition Temperature:	No data.
Viscosity:	No data.

9.2 Other Information

Percent Volatile:	No data.
Molecular Formula & Weight:	C8H10NO5PS 263.2

Section 10. Stability and Reactivity

10.1	**Reactivity:**	No data available.
10.2	**Stability:**	Unstable [ ] Stable [X]
10.3	**Stability Note(s):**	Stable if stored in accordance with information listed on the product insert.
	Polymerization:	Will occur [ ] Will not occur [X]
10.4	**Conditions To Avoid:**	No data available.
10.5	**Incompatibility - Materials To Avoid:**	strong oxidizing agents
10.6	**Hazardous Decomposition or Byproducts:**	carbon dioxide carbon monoxide nitrogen oxides phosphorous oxides sulfur oxides

Section 11. Toxicological Information

11.1 Information on Toxicological Effects: The toxicological effects of this product have not been thoroughly studied.
Methyl Parathion - Toxicity Data: Intraperitoneal LD50 (rat): 2800 ug/kg; Subcutaneous LD50 (rat): 6 mg/kg; Oral LD50 (mouse): 17800 ug/kg; Intraperitoneal LD50 (mouse): 5400 ug/kg; Subcutaneous LD50 (mouse): 18 mg/kg;

Chronic Toxicological Effects: Methyl Parathion - Investigated as an agricultural chemcial, mutagen, reproductive effector, and tumorigen.
Only select Registry of Toxic Effects of Chemical Substances (RTECS) data is presented here. See actual entry in RTECS for complete information.
Methyl Parathion RTECS Number: TG0175000

Carcinogenicity: NTP? No IARC Monographs? No OSHA Regulated? No

CAS #	Hazardous Components (Chemical Name)	NTP	IARC	ACGIH	OSHA
298-00-0	Methyl parathion	n.a.	3	A4	n.a.

Section 12. Ecological Information

12.1 Toxicity: Avoid release into the environment.
Runoff from fire control or dilution water may cause pollution.

12.2 Persistence and Degradability: No data available.

12.3 Bioaccumulative Potential: No data available.

12.4 Mobility in Soil: No data available.

12.5 Results of PBT and vPvB assessment: No data available.

12.6 Other adverse effects: No data available.

Section 13. Disposal Considerations

13.1 Waste Disposal Method: Dispose in accordance with local, state, and federal regulations.

Section 14. Transport Information

14.1 LAND TRANSPORT (US DOT):

DOT Proper Shipping Name: Toxic solid, organic, n.o.s. (Methyl Parathion)
DOT Hazard Class: 6.1 POISON
UN/NA Number: UN2811 **Packing Group:** I

14.1 LAND TRANSPORT (European ADR/RID):

ADR/RID Shipping Name: Toxic solid, organic, n.o.s. (Methyl Parathion)
UN Number: 2811 **Packing Group:** I
Hazard Class: 6.1 - POISON

14.3 AIR TRANSPORT (ICAO/IATA):

ICAO/IATA Shipping Name: Toxic solid, organic, n.o.s. (Methyl Parathion)
UN Number: 2811 **Packing Group:** I
Hazard Class: 6.1 - POISON **IATA Classification:** 6.1

Additional Transport Information: Transport in accordance with local, state, and federal regulations.
When sold in quantities of less than or equal to 1 mL, or 1 g, with an Excepted Quantity Code of E1, E2, E4, or E5, this item meets the De Minimis Quantities exemption, per IATA 2.6.10. Therefore packaging does not have to be labeled as Dangerous Goods/Excepted Quantity.

MATERIAL SAFETY DATA SHEET
SCHEDULE-5, RULE-68-J2(2),3(3) OF GFR 1963 (1995)
SCHEDULE-9, RULE 17 OF MSIHC RULE 1989 (2000)

(THIONYL CHLORIDE)

Section 1: Chemical Product

Product Name: Thionyl chloride

Catalog Codes:

CAS#: 7719-09-7

RTECS: XM5150000

TSCA: TSCA 8(b) inventory: Thionyl chloride

CI#: Not available.

Synonym: Sulfurous oxychloride; Sulfinyl chloride; Sulfur chloride oxide; Sulfurous dichloride; Thionyl dichloride

Chemical Name: Thionyl chloride

Chemical Formula: Cl2OS

Section 2: Composition and Information on Ingredients

Composition:

Name	CAS #	% by Weight
Thionyl chloride	7719-09-7	100

Toxicological Data on Ingredients: Thionyl chloride: VAPOR (LC50): Acute: 500 ppm 1 hours [Rat].

Section 3: Hazards Identification

Potential Acute Health Effects:
Very hazardous in case of skin contact (irritant), of eye contact (irritant), of ingestion, of inhalation. Hazardous in case of skin contact (corrosive, permeator), of eye contact (corrosive). Liquid or spray mist may produce tissue damage particularly on mucous membranes of eyes, mouth and respiratory tract. Skin contact may produce burns. Inhalation of the spray mist may produce severe irritation of respiratory tract, characterized by coughing, choking, or shortness of breath. Severe over-exposure can result in death. Inflammation of the eye is characterized by redness, watering, and itching. Skin inflammation is characterized by itching, scaling, reddening, or, occasionally, blistering.

Potential Chronic Health Effects:
CARCINOGENIC EFFECTS: Not available. MUTAGENIC EFFECTS: Not available. TERATOGENIC EFFECTS: Not available. DEVELOPMENTAL TOXICITY: Not available. The substance may be toxic to upper respiratory tract, skin, eyes. Repeated or prolonged exposure to the substance can produce target organs damage. Repeated or prolonged contact with spray mist may produce chronic eye irritation and severe skin irritation. Repeated or prolonged exposure to spray mist may produce respiratory tract irritation leading to frequent attacks of bronchial infection. Repeated exposure to a highly toxic material may produce general deterioration of health by an accumulation in one or many human organs.

Section 4: First Aid Measures

Eye Contact:
Check for and remove any contact lenses. In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Get medical attention immediately.

Skin Contact:
In case of contact, immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Cover the irritated skin with an emollient. Wash clothing before reuse. Thoroughly clean shoes before reuse. Get medical attention immediately.

Serious Skin Contact:
Wash with a disinfectant soap and cover the contaminated skin with an anti-bacterial cream. Seek immediate medical attention.

Inhalation:
If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention immediately.

Serious Inhalation:
Evacuate the victim to a safe area as soon as possible. Loosen tight clothing such as a collar, tie, belt or waistband. If breathing is difficult, administer oxygen. If the victim is not breathing, perform mouth-to-mouth resuscitation. WARNING: It may be hazardous to the person providing aid to give mouth-to-mouth resuscitation when the inhaled material is toxic, infectious or corrosive. Seek immediate medical attention.

Ingestion:
Do NOT induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. If large quantities of this material are swallowed, call a physician immediately. Loosen tight clothing such as a collar, tie, belt or waistband.

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: Non-flammable.

Auto-Ignition Temperature: Not applicable.

Flash Points: Not applicable.

Flammable Limits: Not applicable.

Products of Combustion: Not available.

Fire Hazards in Presence of Various Substances: Not applicable.

Explosion Hazards in Presence of Various Substances:
Risks of explosion of the product in presence of mechanical impact: Not available. Risks of explosion of the product in presence of static discharge: Not available.

Fire Fighting Media and Instructions: Not applicable.

Special Remarks on Fire Hazards: When heated to decomposition it emits toxic fumes.

Special Remarks on Explosion Hazards:
It will explode in the presence of several chemicals: Azidoacetylacid, Chlorylperchlorate, N,N-Dimethylformamide, Dimethyl sulfoxide and acyl halides, Hexafluoropropylideneaminolithium, Linseed oil + quinoline, o-Nitrobenzoylacetic acid, p-Nitrobenzoyl and cold ammonia solution, o-Nitrophenylacetic acid; Sodium hydroxide, Sulfur dioxide, Toluene + ethanol+ water, water.

Section 6: Accidental Release Measures

Small Spill: Absorb with an inert material and put the spilled material in an appropriate waste disposal.

Large Spill:
Corrosive liquid. Poisonous liquid. Stop leak if without risk. Absorb with DRY earth, sand or other non-combustible material. Do not get water inside container. Do not touch spilled material. Use water spray curtain to divert vapor drift. Use water spray to reduce vapors. Prevent entry into sewers, basements or confined areas; dike if needed. Call for assistance on disposal. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

Section 7: Handling and Storage

Precautions:
Keep container dry. Keep away from heat. Keep away from sources of ignition. Keep away from direct sunlight or strong incandescent light. Do not ingest. Do not breathe gas/fumes/ vapor/spray. Never add water to this product. Avoid shock and friction. In case of insufficient ventilation, wear suitable respiratory equipment. If ingested, seek medical advice immediately and show the container or the label. Avoid contact with skin and eyes. Keep away from incompatibles such as metals, acids, alkalis, moisture.

Storage: Keep container tightly closed. Keep container in a cool, well-ventilated area.

Section 8: Exposure Controls/Personal Protection

Engineering Controls:
Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapors below their respective threshold limit value. Ensure that eyewash stations and safety showers are proximal to the work-station location.

Personal Protection:
Face shield. Full suit. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Gloves. Boots.

Personal Protection in Case of a Large Spill:
Splash goggles. Full suit. Vapor respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

Exposure Limits:
CEIL: 1 (ppm) from OSHA (PEL) [United States] CEIL: 1 from ACGIH (TLV) [United States] CEIL: 1 (ppm) from NIOSH [United States] TWA: 1 (ppm) [Denmark] STEL: 1 (ppm) [Belgium] STEL: 1 (ppm) [United Kingdom (UK)] Consult local authorities for acceptable exposure limits.

Section 9: Physical and Chemical Properties

Physical state and appearance: Liquid. (Fuming liquid.)

Odor: Suffocating.

Taste: Not available.

Molecular Weight: 118.98 g/mole

Color: Colorless to light yellow.

pH (1% soln/water): Not applicable.

Boiling Point: 76°C (168.8°F)

Melting Point:
-104.5°C (-156.1°F) Decomposition temperature: >140 deg. C

Critical Temperature: Not available.

Specific Gravity: 1.638 (Water = 1)

Vapor Pressure: 13.3 kPa (@ 21°C)

Vapor Density: 4.1 (Air = 1)

Volatility: Not available.

Odor Threshold: Not available.

Water/Oil Dist. Coeff.: Not available.

Ionicity (in Water): Not available.

Dispersion Properties: Not available.

Solubility:
Insoluble in cold water. Miscible with chloroform, benzene, carbon tetrachloride

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available.

Conditions of Instability: Incompatible materials, moisture/moist air, temperatures above 140 deg. C

Incompatibility with various substances:
Reactive with metals, acids, alkalis, moisture. The product may undergo hazardous decomposition, condensation or polymerization, it may react violently with water to emit toxic gases or it may become self-reactive under conditions of shock or increase in temperature or pressure.

Corrosivity: Non-corrosive in presence of glass.

Special Remarks on Reactivity:
Thionyl chloride fumes on exposure to moist air. In the presence of moisture/water it decomposes and liberates toxic gases of hydrogen chloride and sulfur dioxide. Decomposes when heated above 140 deg. C forming chlorine, sulfur dioxide, sulfur monochloride, hydrogen chloride. Thionyl chloride decomposes in acids, alcohols, alkalies. It is also incompatible with amines, ammonia, chloryl perchlorate, dimethyl sulfoxide, hexafluoro isopropylidene amino lithium, linseed oil, quinoline, sodium, sulfinyl chloride, N,N-Dimethylformamide, metals. It reacts with Grignard reagents to form suloxides.

Special Remarks on Corrosivity: Not available.

Polymerization: Will not occur.

Section 11: Toxicological Information

Routes of Entry: Absorbed through skin. Dermal contact. Eye contact. Inhalation. Ingestion.

Toxicity to Animals:
WARNING: THE LC50 VALUES HEREUNDER ARE ESTIMATED ON THE BASIS OF A 4-HOUR EXPOSURE. Acute toxicity of the vapor (LC50): 500 1 hours [Rat].

Chronic Effects on Humans: May cause damage to the following organs: upper respiratory tract, skin, eyes.

Other Toxic Effects on Humans:
Extremely hazardous in case of inhalation (lung corrosive). Very hazardous in case of skin contact (irritant), of ingestion, . Hazardous in case of skin contact (corrosive, permeator), of eye contact (corrosive).

Special Remarks on Toxicity to Animals: Not available.

Special Remarks on Chronic Effects on Humans: Not available.

Special Remarks on other Toxic Effects on Humans:
Acute Potential Health Effects: Skin: Corrosive. Causes skin burns. May be absorbed through skin in harmful amounts. Eyes: Corrosive. Causes eye burns. Lachrymator. May cause conjunctivitis, corneal damage. Inhalation: Corrosive. Harmful if

inhaled. Causes chemical burns to the respiratory tract. Inhalation may be fatal as a result of spasm, inflammation, edema of the larynx and bronchi, chemical pneumonitis, and pulmonary edema. Toxic exposure to fumes of Thionyl chloride reacting with water may result in delayed pulmonary response, bronchiolitis Oblitereans(inflammmation of the bronchioles). Ingestion: Corrosive. Harmful if swallowed. Causes gastrointestinal/digestive tract burns. May cause severe and permanent damage to the digestive tract.

Section 12: Ecological Information

Ecotoxicity: Not available.

BOD5 and COD: Not available.

Products of Biodegradation:
Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

Toxicity of the Products of Biodegradation: The products of degradation are more toxic.

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations

Waste Disposal:
Waste must be disposed of in accordance with federal, state and local environmental control regulations.

Section 14: Transport Information

DOT Classification: Class 8: Corrosive material

Identification: : Thionyl chloride UNNA: 1836 PG: I

Special Provisions for Transport: Not available.

MATERIAL SAFETY DATA SHEET
SCHEDULE-5, RULE-68-J2(2),3(3) OF GFR 1963 (1995)
SCHEDULE-9, RULE 17 OF MSIHC RULE 1989 (2000)

(PHORATE)

1. **Chemical Product Identification**

Product Name :_PHORATE 10% CG
Chemical Classification : Toxic
Synonyms : O, O-Diethyl ethylthiomethyl phosphorodithioate, O, O-Diethyl-S-(Ethylthio) methyl phosphorodithioate, Thimet
Formula : C7H17O2PS3

2. **Composition / Information on Ingredients**

Composition	Content %
Phorate	10

3. **Hazards Identification**

Effects of Exposure / Symptoms:
Phorate has a very high acute toxicity to humans, fish and wildlife. It is a cholinesterase inhibitor. Symptoms include headache, tightness of chest, nausea or vomiting, abdominal cramps, diarrhoea, convulsions. Absorption through the skin may have the same effects.

4. **First Aid Measures**

Inhalation: Remove the person to fresh air area and atropine powder or tablet may be given.
Skin: Remove the contaminated clothes and wash the affected area with plenty of water and soap. The affected area may be decontaminated with 5-10% soln. of ammonia or

2-5% soln. of chloramine.
Eyes: Flush eyes with water for at least 15 mins.
Ingestion: Induce vomiting. Give half a glass of a 2% NallCO, soln. with 2-3 tablespoonful's triturated activated charcoal to drink.

5. **Fire-Fighting Measures**
Flammability : No
Flash Point °C in OC : 160
Boiling : 118-120 at
Melting point : -42.8

6. **Accidental Release Measures**
Fire Extinguishing Media:
Keep containers cool by spraying water, if exposed to heat or flame.
Unusual Hazards Shock can shatter containers, releasing the contents. When heated to decomposition, toxic fumes of sulfur oxides, phosphorus oxides, and nitrogen oxides are emitted.

7. **Handling And Storage**
Phorate and its formulations are used as insecticide-nematicide. Certain oxidation products of phorate are found to be more toxic than phorate itself. Phorate has some potential to reach through soil and contaminate ground water. Phorate is highly toxic to both cold and warm water fish.
Antidotes/Dosage: Atropine sulphate (powder or tablet); 0.15% to 1% atropine sulphate for instilling in the eyes; Atropine sulphate for injection; 2-PAM, TMB-4, Toxogonin.

8. **Exposure Controls/Personal Protection**
Inhalation: Remove the person to fresh air area and atropine powder or tablet may be given.
Skin: Remove the contaminated clothes and wash the affected area with plenty of water and soap. The affected area may be decontaminated with 5-10% soln. of ammonia or 2-5% soln. of chloramine.
Eyes: Flush eyes with water for at least 15 min.
Ingestion: Induce vomiting. Give half a glass of a 2% NallCO, soln. with 2-3 tablespoonful's triturated activated charcoal to drink.
Antidotes / Dosages: See "Additional Information

9. **Physical and Chemical Properties**
Auto ignition Temperature °C : Explosion
Sensitivity to impact : Stable Explosion
Sensitivity to static Electricity :
Hazardous Combustion Products : When heated to decomposition it emits SOx and Pox.
Hazardous Polymerization : Will not occur
Combustible Liquid : Yes
Hazardous Polymerization : Will not occur

10. Stability and Reactivity

Chemical Stability : Stable at room temperature
Incompatibility with other material : Alkalai
Reactivity : Hydrolysed in presence of water and alkali

11. Toxicological Information

LD50 (oral-rat) mg/kg : 3.7 mg/kg
STEL : 0.2 mg/m3, skin
LC50 (rat) mg/kg : 0.011 mg/liter for 1
Permissible : 0.05 mg/m3, skin
TLV (ACGIH) : 0.05 mg/m3, skin

12. Disposal Considerations

Disposal: Improper disposal of this product is a violation of Federal law.
For disposal as a waste, this product may be hazardous waste.

13. Transport Information

Not applicable.

14. Regulatory Information

Not applicable.

15. Other Information

All information and instructions provided in this Material Safety Data Sheet (MSDS) are based on the current state of scientific and technical knowledge at the date indicated on the present MSDS and are presented in good faith and believed to be correct. This information applies to the product as such. In case of new formulations or mixes, it is necessary to ascertain that a new danger will not appear. It is the responsibility of persons on receipt of this MSDS to ensure that the information contained herein is properly read and understood by all people who may use, handle, dispose or in any way come in contact with the product. If the recipient subsequently produce formulations containing this product, it is the recipient's sole responsibility to ensure the transfer of all relevant information from this MSDS to their own MSDS.

MATERIAL SAFETY DATA SHEET
SCHEDULE-5, RULE-68-J2(2),3(3) OF GFR 1963 (1995)
SCHEDULE-9, RULE 17 OF MSIHC RULE 1989 (2000)

(OLEUM)

1. PRODUCT AND COMPANY IDENTIFICATION

1.1 Product identifiers

Product name : Sulfuric acid, fuming

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)

Acute toxicity, Inhalation (Category 2), H330
Skin corrosion (Category 1A), H314
Serious eye damage (Category 1), H318
Specific target organ toxicity - single exposure (Category 3), Respiratory system, H335

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram

Signal word: Danger

Hazard statement(s)

H314	Causes severe skin burns and eye damage.
H330	Fatal if inhaled.
H335	May cause respiratory irritation.

Precautionary statement(s)

P260	Do not breathe dust/ fume/ gas/ mist/ vapours/ spray.
P264	Wash skin thoroughly after handling.
P271	Use only outdoors or in a well-ventilated area.
P280	Wear protective gloves/ protective clothing/ eye protection/ face protection.
P284	Wear respiratory protection.
P301 + P330 + P331	IF SWALLOWED: rinse mouth. Do NOT induce vomiting.
P303 + P361 + P353	IF ON SKIN (or hair): Remove/ Take off immediately all contaminated clothing. Rinse skin with water/ shower.
P304 + P340	IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing.
P305 + P351 + P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P310	Immediately call a POISON CENTER or doctor/ physician.
P320	Specific treatment is urgent (see supplemental first aid instructions on this label).
P363	Wash contaminated clothing before reuse.
P403 + P233	Store in a well-ventilated place. Keep container tightly closed.
P405	Store locked up.
P501	Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS

Reacts violently with water.

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

Synonyms : Oleum

Formula : H_2O_4S
Molecular Weight : 98.08 g/mol
CAS-No. : 8014-95-7
Index-No. : 016-019-00-2

Hazardous components

Component	Classification	Concentration
Oleum		
	Acute Tox. 2; Skin Corr. 1A; Eye Dam. 1; STOT SE 3; H314, H330, H335	90 - 100 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

4. FIRST AID MEASURES

4.1 Description of first aid measures

General advice
Consult a physician. Show this safety data sheet to the doctor in attendance.Move out of dangerous area.

If inhaled
If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact
Take off contaminated clothing and shoes immediately. Wash off with soap and plenty of water. Take victim immediately to hospital. Consult a physician.

In case of eye contact
Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.Continue rinsing eyes during transport to hospital.

If swallowed
Do NOT induce vomiting. Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed
no data available

5. FIREFIGHTING MEASURES

5.1 Extinguishing media

Suitable extinguishing media
Dry powder

5.2 Special hazards arising from the substance or mixture
Sulphur oxides

5.3 Advice for firefighters
Wear self contained breathing apparatus for fire fighting if necessary.

5.4 Further information
no data available

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures
Wear respiratory protection. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas.
For personal protection see section 8.

6.2 Environmental precautions
Prevent further leakage or spillage if safe to do so. Do not let product enter drains.

6.3 Methods and materials for containment and cleaning up
Soak up with inert absorbent material and dispose of as hazardous waste. Do not flush with water. Keep in suitable, closed containers for disposal.

6.4 Reference to other sections
For disposal see section 13.

7. HANDLING AND STORAGE

7.1 Precautions for safe handling
Avoid contact with skin and eyes. Avoid inhalation of vapour or mist.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities
Keep container tightly closed in a dry and well-ventilated place. Containers which are opened must be carefully resealed and kept upright to prevent leakage.
Never allow product to get in contact with water during storage.

strongly hygroscopic

7.3 Specific end use(s)
Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

Components with workplace control parameters
Contains no substances with occupational exposure limit values.

8.2 Exposure controls

Appropriate engineering controls
Avoid contact with skin, eyes and clothing. Wash hands before breaks and immediately after handling the product.

Personal protective equipment

Eye/face protection
Tightly fitting safety goggles. Faceshield (8-inch minimum). Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Splash contact
Material: Nitrile rubber
Minimum layer thickness: 0.4 mm
Break through time: 31 min
Material tested:Camatril® (KCL 730 / Aldrich Z677442, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374
If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection
Complete suit protecting against chemicals, Flame retardant protective clothing, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection
Where risk assessment shows air-purifying respirators are appropriate use a full-face respirator with multi-purpose combination (US) or type ABEK (EN 14387) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure
Prevent further leakage or spillage if safe to do so. Do not let product enter drains.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: viscous liquid
b)	Odour	no data available
c)	Odour Threshold	no data available
d)	pH	no data available
e)	Melting point/freezing point	no data available
f)	Initial boiling point and boiling range	no data available
g)	Flash point	not applicable
h)	Evapouration rate	no data available
i)	Flammability (solid, gas)	no data available
j)	Upper/lower flammability or explosive limits	no data available
k)	Vapour pressure	7 hPa (5 mmHg) at 37.7 °C (99.9 °F) 3 hPa (2 mmHg) at 25 °C (77 °F)
l)	Vapour density	3.39 - (Air = 1.0)
m)	Relative density	1.925 g/cm3 at 25 °C (77 °F)
n)	Water solubility	no data available
o)	Partition coefficient: n-octanol/water	no data available

p)	Auto-ignition temperature	no data available
q)	Decomposition temperature	no data available
r)	Viscosity	no data available
s)	Explosive properties	no data available
t)	Oxidizing properties	no data available

9.2 Other safety information

Relative vapour density 3.39 - (Air = 1.0)

10. STABILITY AND REACTIVITY

10.1 Reactivity
no data available

10.2 Chemical stability
Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions
Reacts violently with water.

10.4 Conditions to avoid
Exposure to moisture.

10.5 Incompatible materials
Metals, Water, Acetaldehyde, Acetonitrile, metal acetylides, Chlorates

10.6 Hazardous decomposition products
Other decomposition products - no data available
In the event of fire: see section 5

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity
LC50 Inhalation - rat - 1 h - 347 ppm

Dermal: no data available

no data available

Skin corrosion/irritation
no data available

Serious eye damage/eye irritation
no data available

Respiratory or skin sensitisation
no data available

Germ cell mutagenicity
no data available

Carcinogenicity

IARC: No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

ACGIH: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by ACGIH.

NTP: No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

OSHA: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

Reproductive toxicity
no data available

no data available

Specific target organ toxicity - single exposure
no data available

Specific target organ toxicity - repeated exposure
no data available

Aspiration hazard
no data available

Additional Information
RTECS: WS5605000

Material is extremely destructive to tissue of the mucous membranes and upper respiratory tract, eyes, and skin., Cough, Shortness of breath, Headache, Nausea

Stomach - Irregularities - Based on Human Evidence
Stomach - Irregularities - Based on Human Evidence

12. ECOLOGICAL INFORMATION

12.1 Toxicity
no data available

12.2 Persistence and degradability
no data available

12.3 Bioaccumulative potential
no data available

12.4 Mobility in soil
no data available

12.5 Results of PBT and vPvB assessment
PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects
no data available

13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Product
Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material. Dissolve or mix the material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber.

Contaminated packaging
Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)
UN number: 1831 Class: 8 Packing group: I
Proper shipping name: Sulfuric acid, fuming
Reportable Quantity (RQ):
Marine pollutant: No
Poison Inhalation Hazard: No

IMDG
UN number: 1831 Class: 8 (6.1) Packing group: I EMS-No: F-A, S-B
Proper shipping name: SULPHURIC ACID, FUMING

MATERIAL SAFETY DATA SHEET
SCHEDULE-5, RULE-68-J2(2),3(3) OF GFR 1963 (1995)
SCHEDULE-9, RULE 17 OF MSIHC RULE 1989 (2000)

(SULPHURIC ACID)

Section 1: Chemical Product

Product Name: Sulfuric acid

Catalog Codes: SLS2539, SLS1741, SLS3166, SLS2371, SLS3793

CAS#: 7664-93-9

RTECS: WS5600000

TSCA: TSCA 8(b) inventory: Sulfuric acid

CI#: Not applicable.

Synonym: Oil of Vitriol; Sulfuric Acid

Chemical Name: Hydrogen sulfate

Chemical Formula: H2-SO4

Section 2: Composition and Information on Ingredients

Composition:

Name	CAS #	% by Weight
Sulfuric acid	7664-93-9	95 - 98

Toxicological Data on Ingredients: Sulfuric acid: ORAL (LD50): Acute: 2140 mg/kg [Rat.]. VAPOR (LC50): Acute: 510 mg/m 2 hours [Rat]. 320 mg/m 2 hours [Mouse].

Section 3: Hazards Identification

Potential Acute Health Effects:
Very hazardous in case of skin contact (corrosive, irritant, permeator), of eye contact (irritant, corrosive), of ingestion, of inhalation. Liquid or spray mist may produce tissue damage particularly on mucous membranes of eyes, mouth and respiratory tract. Skin contact may produce burns. Inhalation of the spray mist may produce severe irritation of respiratory tract, characterized by coughing, choking, or shortness of breath. Severe over-exposure can result in death. Inflammation of the eye is characterized by redness, watering, and itching. Skin inflammation is characterized by itching, scaling, reddening, or, occasionally, blistering.

Potential Chronic Health Effects:
CARCINOGENIC EFFECTS: Classified 1 (Proven for human.) by IARC, + (Proven.) by OSHA. Classified A2 (Suspected for human.) by ACGIH. MUTAGENIC EFFECTS: Not available. TERATOGENIC EFFECTS: Not available. DEVELOPMENTAL TOXICITY: Not available. The substance may be toxic to kidneys, lungs, heart, cardiovascular system, upper respiratory tract, eyes, teeth. Repeated or prolonged exposure to the substance can produce target organs damage. Repeated or prolonged

contact with spray mist may produce chronic eye irritation and severe skin irritation. Repeated or prolonged exposure to spray mist may produce respiratory tract irritation leading to frequent attacks of bronchial infection. Repeated exposure to a highly toxic material may produce general deterioration of health by an accumulation in one or many human organs.

Section 4: First Aid Measures

Eye Contact:
Check for and remove any contact lenses. In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Cold water may be used. Get medical attention immediately.

Skin Contact:
In case of contact, immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Cover the irritated skin with an emollient. Cold water may be used.Wash clothing before reuse. Thoroughly clean shoes before reuse. Get medical attention immediately.

Serious Skin Contact:
Wash with a disinfectant soap and cover the contaminated skin with an anti-bacterial cream. Seek immediate medical attention.

Inhalation:
If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention immediately.

Serious Inhalation:
Evacuate the victim to a safe area as soon as possible. Loosen tight clothing such as a collar, tie, belt or waistband. If breathing is difficult, administer oxygen. If the victim is not breathing, perform mouth-to-mouth resuscitation. WARNING: It may be hazardous to the person providing aid to give mouth-to-mouth resuscitation when the inhaled material is toxic, infectious or corrosive. Seek immediate medical attention.

Ingestion:
Do NOT induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Loosen tight clothing such as a collar, tie, belt or waistband. Get medical attention if symptoms appear.

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: Non-flammable.

Auto-Ignition Temperature: Not applicable.

Flash Points: Not applicable.

Flammable Limits: Not applicable.

Products of Combustion:
Products of combustion are not available since material is non-flammable. However, products of decompostion include fumes of oxides of sulfur. Will react with water or steam to produce toxic and corrosive fumes. Reacts with carbonates to generate carbon dioxide gas. Reacts with cyanides and sulfides to form poisonous hydrogen cyanide and hydrogen sulfide respectively.

Fire Hazards in Presence of Various Substances: Combustible materials

Explosion Hazards in Presence of Various Substances:
Risks of explosion of the product in presence of mechanical impact: Not available. Risks of explosion of the product in presence of static discharge: Not available. Slightly explosive in presence of oxidizing materials.

Fire Fighting Media and Instructions: Not applicable.

Special Remarks on Fire Hazards:
Metal acetylides (Monocesium and Monorubidium), and carbides ignite with concentrated sulfuric acid. White Phosphorous + boiling Sulfuric acid or its vapor ignites on contact. May ignite other combustible materials. May cause fire when sulfuric acid is mixed with Cyclopentadiene, cyclopentanone oxime, nitroaryl amines, hexalithium disilicide, phorphorous (III) oxide, and oxidizing agents such as chlorates, halogens, permanganates.

Special Remarks on Explosion Hazards:
Mixturesofsulfuricacidandanyofthefollowingcanexplode:p-nitrotoluene,pentasilver trihydroxydiaminophosphate, perchlorates, alcohols with strong hydrogen peroxide, ammonium tetraperoxychromate, mercuric nitrite, potassium chlorate, potassium permanganate with potassium chloride, carbides, nitro compounds, nitrates, carbides, phosphorous, iodides, picratres, fulminats, dienes, alcohols (when heated) Nitramide decomposes explosively on contact with concentrated sulfuric acid. 1,3,5-Trinitrosohexahydro-1,3,5-triazine + sulfuric acid causes explosive decompositon.

Section 6: Accidental Release Measures

Small Spill:
Dilute with water and mop up, or absorb with an inert dry material and place in an appropriate waste disposal container. If necessary: Neutralize the residue with a dilute solution of sodium carbonate.

Large Spill:
Corrosive liquid. Poisonous liquid. Stop leak if without risk. Absorb with DRY earth, sand or other non-combustible material. Do not get water inside container. Do not touch spilled material. Use water spray curtain to divert vapor drift. Use water spray to reduce vapors. Prevent entry into sewers, basements or confined areas; dike if needed. Call for assistance on disposal. Neutralize the residue with a dilute solution of sodium carbonate. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

Section 7: Handling and Storage

Precautions:
Keep locked up.. Keep container dry. Do not ingest. Do not breathe gas/fumes/ vapor/spray. Never add water to this product. In case of insufficient ventilation, wear suitable respiratory equipment. If ingested, seek medical advice immediately and show the container or the label. Avoid contact with skin and eyes. Keep away from incompatibles such as oxidizing agents, reducing agents, combustible materials, organic materials, metals, acids, alkalis, moisture. May corrode metallic surfaces. Store in a metallic or coated fiberboard drum using a strong polyethylene inner package.

Storage:
Hygroscopic. Reacts. violently with water. Keep container tightly closed. Keep container in a cool, well-ventilated area. Do not store above 23°C (73.4°F).

Section 8: Exposure Controls/Personal Protection

Engineering Controls:
Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapors below their respective threshold limit value. Ensure that eyewash stations and safety showers are proximal to the work-station location.

Personal Protection:
Face shield. Full suit. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Gloves. Boots.

Personal Protection in Case of a Large Spill:
Splash goggles. Full suit. Vapor respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

Exposure Limits:
TWA: 1 STEL: 3 (mg/m3) [Australia] Inhalation TWA: 1 (mg/m3) from OSHA (PEL) [United States] Inhalation TWA: 1 STEL: 3 (mg/m3) from ACGIH (TLV) [United States] [1999] Inhalation TWA: 1 (mg/m3) from NIOSH [United States] Inhalation TWA: 1 (mg/m3) [United Kingdom (UK)]Consult local authorities for acceptable exposure limits.

Section 9: Physical and Chemical Properties

Physical state and appearance: Liquid. (Thick oily liquid.)

Odor: Odorless, but has a choking odor when hot.

Taste: Marked acid taste. (Strong.)

Molecular Weight: 98.08 g/mole

Color: Colorless.

pH (1% soln/water): Acidic.

Boiling Point:
270°C (518°F) - 340 deg. C Decomposes at 340 deg. C

Melting Point: -35°C (-31°F) to 10.36 deg. C (93% to 100% purity)

Critical Temperature: Not available.

Specific Gravity: 1.84 (Water = 1)

Vapor Pressure: Not available.

Vapor Density: 3.4 (Air = 1)

Volatility: Not available.

Odor Threshold: Not available.

Water/Oil Dist. Coeff.: Not available.

Ionicity (in Water): Not available.

Dispersion Properties: See solubility in water.

Solubility:
Easily soluble in cold water. Sulfuric is soluble in water with liberation of much heat. Soluble in ethyl alcohol.

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available.

Conditions of Instability:
Conditions to Avoid: Incompatible materials, excess heat, combustible material materials, organic materials, exposure to moist air or water, oxidizers, amines, bases. Always add the acid to water, never the reverse.

Incompatibility with various substances:
Reactive with oxidizing agents, reducing agents, combustible materials, organic materials, metals, acids, alkalis, moisture.

Corrosivity:
Extremely corrosive in presence of aluminum, of copper, of stainless steel(316). Highly corrosive in presence of stainless steel(304). Non-corrosive in presence of glass.

Special Remarks on Reactivity:
Hygroscopic. Strong oxidizer. Reacts violently with water and alcohol especially when water is added to the product. Incompatible (can react explosively or dangerously) with the following: ACETIC ACID, ACRYLIC ACID, AMMONIUM HYDROXIDE, CRESOL, CUMENE, DICHLOROETHYL ETHER, ETHYLENE CYANOHYDRIN, ETHYLENEIMINE, NITRIC ACID, 2-NITROPROPANE, PROPYLENE OXIDE, SULFOLANE, VINYLIDENE CHLORIDE, DIETHYLENE GLYCOL MONOMETHYL ETHER, ETHYL ACETATE, ETHYLENE CYANOHYDRIN, ETHYLENE GLYCOL MONOETHYL ETHER ACETATE, GLYOXAL, METHYL ETHYL KETONE, dehydrating agents, organic materials, moisture (water), Acetic anhydride, Acetone, cyanohydrin, Acetone+nitric acid, Acetone + potassium dichromate, Acetonitrile, Acrolein, Acrylonitrile, Acrylonitrile +water, Alcohols + hydrogen peroxide, ally compounds such as Allyl alcohol, and Allyl Chloride, 2-Aminoethanol, Ammonium hydroxide, Ammonium triperchromate, Aniline, Bromate + metals, Bromine pentafluoride, n-Butyraldehyde, Carbides, Cesium acetylene carbide, Chlorates, Cyclopentanone oxime, chlorinates, Chlorates + metals, Chlorine trifluoride, Chlorosulfonic acid, 2-cyano-4-nitrobenzenediazonium hydrogen sulfate, Cuprous nitride, p-chloronitrobenzene, 1,5-Dinitronaphthlene +

sulfur, Diisobutylene, p-dimethylaminobenzaldehyde, 1,3-Diazidobenzene, Dimethylbenzylcarbinol + hydrogen peroxide, Epichlorohydrin, Ethyl alcohol + hydrogen peroxide, Ethylene diamine, Ethylene glycol and other glycols, , Ethylenimine, Fulminates, hydrogen peroxide, Hydrochloric acid, Hydrofluoric acid, Iodine heptafluoride, Indane + nitric acid, Iron, Isoprene, Lithium silicide, Mercuric nitride, Mesityl oxide, Mercury nitride, Metals (powdered), Nitromethane, Nitric acid + glycerides, p-Nitrotoluene, Pentasilver trihydroxydiaminophosphate, Perchlorates, Perchloric acid, Permanganates + benzene, 1-Phenyl-2-methylpropyl alcohol + hydrogen peroxide, Phosphorus, Phosphorus isocyanate, Picrates, Potassium tert-butoxide, Potassium chlorate, Potassium Permanganate and other permanganates, halogens, amines, Potassium Permanganate + Potassium chloride, Potassium Permanganate + water, Propiolactone (beta)-, Pyridine, Rubidium aceteylene carbide, Silver permanganate, Sodium, Sodium carbonate, sodium hydroxide, Steel, styrene monomer, toluene + nitric acid, Vinyl acetate, Thalium (I) azidodithiocarbonate, Zinc chlorate, Zinc Iodide, azides, carbonates, cyanides, sulfides, sulfites, alkali hydrides, carboxylic acid anhydrides, nitriles, olefinic organics, aqueous acids, cyclopentadiene, cyano-alcohols, metal acetylides, Hydrogen gas is generated by the action of the acid on most metals (i.e. lead, copper, tin, zinc, aluminum, etc.). Concentrated sulfuric acid oxidizes, dehydrates, or sulfonates most organic compounds.

Special Remarks on Corrosivity:
Non-corrosive to lead and mild steel, but dillute acid attacks most metals. Attacks many metals releasing hydrogen. Minor corrosive effect on bronze. No corrosion data on brass or zinc.

Polymerization: Will not occur.

Section 11: Toxicological Information

Routes of Entry: Absorbed through skin. Dermal contact. Eye contact. Inhalation. Ingestion.

Toxicity to Animals:
WARNING: THE LC50 VALUES HEREUNDER ARE ESTIMATED ON THE BASIS OF A 4-HOUR EXPOSURE. Acute oral toxicity (LD50): 2140 mg/kg [Rat.]. Acute toxicity of the vapor (LC50): 320 mg/m3 2 hours [Mouse].

Chronic Effects on Humans:
CARCINOGENIC EFFECTS: Classified 1 (Proven for human.) by IARC, + (Proven.) by OSHA. Classified A2 (Suspected for human.) by ACGIH. May cause damage to the following organs: kidneys, lungs, heart, cardiovascular system, upper respiratory tract, eyes, teeth.

Other Toxic Effects on Humans:
Extremely hazardous in case of inhalation (lung corrosive). Very hazardous in case of skin contact (corrosive, irritant, permeator), of eye contact (corrosive), of ingestion, .

Special Remarks on Toxicity to Animals: Not available.

Special Remarks on Chronic Effects on Humans:
Mutagenicity: Cytogenetic Analysis: Hamster, ovary = 4mmol/L Reproductive effects: May cause adverse reproductive effects based on animal data. Developmental abnormalities (musculoskeletal) in rabbits at a dose of 20 mg/m3 for 7 hrs.(RTECS) Teratogenecity: neither embryotoxic, fetoxic, nor teratogenetic in mice or rabbits at inhaled doses producing some maternal toxicity

Special Remarks on other Toxic Effects on Humans:
Acute Potential Health Effects: Skin: Causes severe skin irritation and burns. Continued contact can cause tissue necrosis. Eye: Causes severe eye irritation and burns. May cause irreversible eye injury. Ingestion: Harmful if swallowed. May cause permanent damage to the digestive tract. Causes gastrointestial tract burns. May cause perforation of the stomach, GI bleeding, edema of the glottis, necrosis and scarring, and sudden circulatory collapse(similar to acute inhalation). It may also cause systemic toxicity with acidosis. Inhalation: May cause severe irritation of the respiratory tract and mucous membranes with sore throat, coughing, shortness of breath, and delayed lung edema. Causes chemical burns to the repiratory tract. Inhalation may be fatal as a result of spasm, inflammation, edema of the larynx and bronchi, chemical pneumonitis, and pulmonary edema. Cause corrosive action on mucous membranes. May affect cardiovascular system (hypotension, depressed cardiac output, bradycardia). Circulatory collapse with clammy skin, weak and rapid pulse, shallow respiration, and scanty urine may follow. Circulatory shock is often the immediate cause of death. May also affect teeth(changes in teeth and supporting structures - erosion, discoloration). Chronic Potential Health Effects: Inhalation: Prolonged or repeated inhalation may affect behavior (muscle contraction or spasticity), urinary system (kidney damage), and cardiovascular system, heart (ischemic heart leisons), and respiratory system/lungs(pulmonary edema, lung damage), teeth (dental discoloration, erosion). Skin: Prolonged or repeated skin contact may cause dermatitis, an allergic skin reaction.

Section 12: Ecological Information

Ecotoxicity: Ecotoxicity in water (LC50): 49 mg/l 48 hours [bluegill/sunfish].

BOD5 and COD: Not available.

Products of Biodegradation:
Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

Toxicity of the Products of Biodegradation: The products of degradation are less toxic than the product itself.

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations

Waste Disposal:
Sulfuric acid may be placed in sealed container or absorbed in vermiculite, dry sand, earth, or a similar material. It may also be diluted and neutralized. Be sure to consult with local or regional authorities (waste regulators) prior to any disposal. Waste must be disposed of in accordance with federal, state and local environmental control regulations.

Section 14: Transport Information

DOT Classification: Class 8: Corrosive material

Identification: : Sulfuric acid UNNA: 1830 PG: II

Special Provisions for Transport: Not available.

MATERIAL SAFETY DATA SHEET
SCHEDULE-5, RULE-68-J2(2),3(3) OF GFR 1963 (1995)
SCHEDULE-9, RULE 17 OF MSIHC RULE 1989 (2000)

(METHANOL)

Section 1: Chemical Product

Product Name: Methyl alcohol

Catalog Codes: SLM3064, SLM3952

CAS#: 67-56-1

RTECS: PC1400000

TSCA: TSCA 8(b) inventory: Methyl alcohol

CI#: Not applicable.

Synonym: Wood alcohol, Methanol; Methylol; Wood Spirit; Carbinol

Chemical Name: Methanol

Chemical Formula: CH3OH

Section 2: Composition and Information on Ingredients

Composition:

Name	CAS #	% by Weight
Methyl alcohol	67-56-1	100

Toxicological Data on Ingredients: Methyl alcohol: ORAL (LD50): Acute: 5628 mg/kg [Rat]. DERMAL (LD50): Acute: 15800 mg/kg [Rabbit]. VAPOR (LC50): Acute: 64000 ppm 4 hours [Rat].

Section 3: Hazards Identification

Potential Acute Health Effects:
Hazardous in case of skin contact (irritant), of eye contact (irritant), of ingestion, of inhalation. Slightly hazardous in case of skin contact (permeator). Severe over-exposure can result in death.

Potential Chronic Health Effects:
Slightly hazardous in case of skin contact (sensitizer). CARCINOGENIC EFFECTS: Not available. MUTAGENIC EFFECTS: Mutagenic for mammalian somatic cells. Mutagenic for bacteria and/or yeast. TERATOGENIC EFFECTS: Classified POSSIBLE for human. DEVELOPMENTAL TOXICITY: Not available. The substance is toxic to eyes. The substance may be toxic to blood, kidneys, liver, brain, peripheral nervous system, upper respiratory tract, skin, central nervous system (CNS), optic nerve. Repeated or prolonged exposure to the substance can produce target organs damage. Repeated exposure to a highly toxic material may produce general deterioration of health by an accumulation in one or many human organs.

Section 4: First Aid Measures

Eye Contact:
Check for and remove any contact lenses. Immediately flush eyes with running water for at least 15 minutes, keeping eyelids open. Cold water may be used. Get medical attention.

Skin Contact:
In case of contact, immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Cover the irritated skin with an emollient. Cold water may be used.Wash clothing before reuse. Thoroughly clean shoes before reuse. Get medical attention immediately.

Serious Skin Contact:
Wash with a disinfectant soap and cover the contaminated skin with an anti-bacterial cream. Seek immediate medical attention.

Inhalation:
If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention immediately.

Serious Inhalation:
Evacuate the victim to a safe area as soon as possible. Loosen tight clothing such as a collar, tie, belt or waistband. If breathing is difficult, administer oxygen. If the victim is not breathing, perform mouth-to-mouth resuscitation. WARNING: It may be hazardous to the person providing aid to give mouth-to-mouth resuscitation when the inhaled material is toxic, infectious or corrosive. Seek immediate medical attention.

Ingestion:
If swallowed, do not induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Loosen tight clothing such as a collar, tie, belt or waistband. Get medical attention immediately.

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: Flammable.

Auto-Ignition Temperature: 464°C (867.2°F)

Flash Points: CLOSED CUP: 12°C (53.6°F). OPEN CUP: 16°C (60.8°F).

Flammable Limits: LOWER: 6% UPPER: 36.5%

Products of Combustion: These products are carbon oxides (CO, CO2).

Fire Hazards in Presence of Various Substances:
Highly flammable in presence of open flames and sparks, of heat. Non-flammable in presence of shocks.

Explosion Hazards in Presence of Various Substances:
Risks of explosion of the product in presence of mechanical impact: Not available. Explosive in presence of open flames and sparks, of heat.

Fire Fighting Media and Instructions:
Flammable liquid, soluble or dispersed in water. SMALL FIRE: Use DRY chemical powder. LARGE FIRE: Use alcohol foam, water spray or fog.

Special Remarks on Fire Hazards:
Explosive in the form of vapor when exposed to heat or flame. Vapor may travel considerable distance to source of ignition and flash back. When heated to decomposition, it emits acrid smoke and irritating fumes. CAUTION: MAY BURN WITH NEAR INVISIBLE FLAME

Special Remarks on Explosion Hazards:
Forms an explosive mixture with air due to its low flash point. Explosive when mixed with Choroform + sodium methoxide and diethyl zinc. It boils violently and explodes.

Section 6: Accidental Release Measures

Small Spill:
Dilute with water and mop up, or absorb with an inert dry material and place in an appropriate waste disposal container.

Large Spill:
Flammable liquid. Poisonous liquid. Keep away from heat. Keep away from sources of ignition. Stop leak if without risk. Absorb with DRY earth, sand or other non-combustible material. Do not get water inside container. Do not touch spilled material. Use water spray to reduce vapors. Prevent entry into sewers, basements or confined areas; dike if needed. Call for assistance on disposal. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

Section 7: Handling and Storage

Precautions:
Keep locked up.. Keep away from heat. Keep away from sources of ignition. Ground all equipment containing material. Do not ingest. Do not breathe gas/fumes/ vapor/spray. Wear suitable protective clothing. In case of insufficient ventilation, wear suitable respiratory equipment. If ingested, seek medical advice immediately and show the container or the label. Avoid contact with skin and eyes. Keep away from incompatibles such as oxidizing agents, metals, acids.

Storage:
Store in a segregated and approved area. Keep container in a cool, well-ventilated area. Keep container tightly closed and sealed until ready for use. Avoid all possible sources of ignition (spark or flame).

Section 8: Exposure Controls/Personal Protection

Engineering Controls:
Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapors below their respective threshold limit value. Ensure that eyewash stations and safety showers are proximal to the work-station location.

Personal Protection:
Splash goggles. Lab coat. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Gloves.

Personal Protection in Case of a Large Spill:
Splash goggles. Full suit. Vapor respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

Exposure Limits:
TWA: 200 from OSHA (PEL) [United States] TWA: 200 STEL: 250 (ppm) from ACGIH (TLV) [United States] [1999] STEL: 250 from NIOSH [United States] TWA: 200 STEL: 250 (ppm) from NIOSH SKIN TWA: 200 STEL: 250 (ppm) [Canada] Consult local authorities for acceptable exposure limits.

Section 9: Physical and Chemical Properties

Physical state and appearance: Liquid.

Odor: Alcohol like. Pungent when crude.

Taste: Not available.

Molecular Weight: 32.04 g/mole

Color: Colorless.

pH (1% soln/water): Not available.

Boiling Point: 64.5°C (148.1°F)

Melting Point: -97.8°C (-144°F)

Critical Temperature: 240°C (464°F)

Specific Gravity: 0.7915 (Water = 1)

Vapor Pressure: 12.3 kPa (@ 20°C)

Vapor Density: 1.11 (Air = 1)

Volatility: Not available.

Odor Threshold: 100 ppm

Water/Oil Dist. Coeff.: The product is more soluble in water; log(oil/water) = -0.8

Ionicity (in Water): Non-ionic.

Dispersion Properties: See solubility in water.

Solubility: Easily soluble in cold water, hot water.

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available.

Conditions of Instability: Heat, ingnition sources, incompatible materials

Incompatibility with various substances: Reactive with oxidizing agents, metals, acids.

Corrosivity: Non-corrosive in presence of glass.

Special Remarks on Reactivity:
Can react vigorously with oxidizers. Violent reaction with alkyl aluminum salts, acetyl bromide, chloroform + sodium methoxide, chromic anhydride, cyanuirc chlorite, lead perchlorate, phosphorous trioxide, nitric acid. Exothermic reaction with sodium hydroxide + chloroform. Incompatible with beryllium dihydride, metals (potassium and magnesium), oxidants (barium perchlorate, bromine, sodium hypochlorite, chlorine, hydrogen peroxide), potassium tert-butoxide, carbon tetrachloride, alkali metals, metals (aluminum, potassium magnesium, zinc), and dichlormethane. Rapid autocatalytic dissolution of aluminum, magnesium or zinc in 9:1 methanol + carbon tetrachloride - sufficiently vigorous to be rated as potentially hazardous. May attack some plastics, rubber, and coatings.

Special Remarks on Corrosivity: Not available.

Polymerization: Will not occur.

Section 11: Toxicological Information

Routes of Entry: Absorbed through skin. Eye contact. Inhalation. Ingestion.

Toxicity to Animals:
WARNING: THE LC50 VALUES HEREUNDER ARE ESTIMATED ON THE BASIS OF A 4-HOUR EXPOSURE. Acute oral toxicity (LD50): 5628 mg/kg [Rat]. Acute dermal toxicity (LD50): 15800 mg/kg [Rabbit]. Acute toxicity of the vapor (LC50): 64000 4 hours [Rat].

Chronic Effects on Humans:
MUTAGENIC EFFECTS: Mutagenic for mammalian somatic cells. Mutagenic for bacteria and/or yeast. TERATOGENIC EFFECTS: Classified POSSIBLE for human. Causes damage to the following organs: eyes. May cause damage to the following organs: blood, kidneys, liver, brain, peripheral nervous system, upper respiratory tract, skin, central nervous system (CNS), optic nerve.

Other Toxic Effects on Humans:
Hazardous in case of skin contact (irritant), of ingestion, of inhalation. Slightly hazardous in case of skin contact (permeator).

Special Remarks on Toxicity to Animals: Not available.

Special Remarks on Chronic Effects on Humans:

Passes through the placental barrier. May affect genetic material. May cause birth defects and adverse reproductive effects(paternal and maternal effects and fetotoxicity) based on animal studies.

Special Remarks on other Toxic Effects on Humans:

Section 12: Ecological Information

Ecotoxicity: Ecotoxicity in water (LC50): 29400 mg/l 96 hours [Fathead Minnow].

BOD5 and COD: Not available.

Products of Biodegradation:
Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

Toxicity of the Products of Biodegradation: The products of degradation are less toxic than the product itself.

Special Remarks on the Products of Biodegradation:
Methanol in water is rapidly biodegraded and volatilized. Aquatic hydrolysis, oxidation, photolysis, adsorption to sediment, and bioconcentration are not significant fate processes. The half-life of methanol in surfact water ranges from 24 hrs. to 168 hrs. Based on its vapor pressure, methanol exists almost entirely in the vapor phase in the ambient atmosphere. It is degraded by reaction with photochemically produced hydroxyl radicals and has an estimated half-life of 17.8 days. Methanol is physically removed from air by rain due to its solubility. Methanol can react with NO2 in pollulted to form methyl nitrate. The half-life of methanol in air ranges from 71 hrs. (3 days) to 713 hrs. (29.7 days) based on photooxidation half-life in air.

MATERIAL SAFETY DATA SHEET
SCHEDULE-5, RULE-68-J2(2),3(3) OF GFR 1963 (1995)
SCHEDULE-9, RULE 17 OF MSIHC RULE 1989 (2000)

(HSD-High Speed Diesel Oil)

1. Chemical identity

Chemical name: Diesel Oil		*Chemical classification*: Flammable liquid
Synonyms: Automotive Diesel Oil		*Trade name*: HSD
Formula Range: C_{13} - C_{18}	*C.A.S. NO.*68476-30-2.	*U.N.NO.* 1202
Regulated identification Codes/Label: .	*Shipping name*: HSD *Hazchem code class 3* *Hazardous waste* : N.A.	

Hazardous ingredients	*C.A.S.NO.*	*Hazardous ingredients*	*C.A.S.NO.*
Diesel	*68476-30-2*	*Benzene Trace*	*71-43-2*
		Naphthalene Trace	*91-20-3*
		Sulphur Trace	*7704-34-9*

Diesel is complex mixture of hydrocarbons .It's exact composition depends on the source of crude oil from which it is produced and the refining methods used

2. Physical and chemical data

Boiling point/Range (deg.C) : 215 - 376. *Physical state*: Liquid. *Appearance*: yellowish brown
Melting/freezing point (deg.C) : N. A.
Vapour pressure: 2.12 to 26mm Hg at 21 deg C.
Odour: Perceptible odour
Vapour density: N.A.
Solubility in water @ 30 deg.C: Insoluble
Specific gravity: 0.86 - 0.90 at 20 deg C
Others: Pour Point: 6 - 18 deg. C.

3. Fire and explosion Hazard data

Flammability: Yes	*LEL*: 0.6%	*Flash point(deg C)* : 32 (OC)
TDG Flammability: class 3 .	UEL: 6%	*Flash point(deg C)* : N.A. (CC)

Auto Ignition Temp : 225 deg. C
Explosion sensitivity to impact: not sensitive to Mechanical Impact.
Explosion sensitivity to static electricity: For vapors sensitivity exist
Hazardous Combustion Products: carbon monoxide, Nitrogen oxide. and other aromatic hydrocarbons
Hazardous Polymerization: N.A.

Combustible liquid: Yes	*Explosive material*: Yes	*Corrosive material*: No
Flammable material ; yes	Oxidiser: N.A.	
Pyrophoric material: N.A.	*Organic peroxide*: N.A.	

4. Reactivity data

Chemical stability: Stable *Incompatibility with other material*: oxidizers such Peroxides ,Nitric acid and Perchorates
Hazardous reaction products: on fire it will liberate some amount of carbon monoxide, sulphur dioxide Nitrogen oxide. and other aromatic hydrocarbons

5. Health Hazard data

Routes of entry: : Inhalation, Skin absorption ,ingestion *Effects of Exposure / symptoms*: excessive inhalation Vapors cause rapid breathing, excitability, staggering, headache, fatigue, nausea and vomiting, dizziness, drowsiness, narcosis convulsions, coma, **Skin Contact**: Skin-dryness, cracking, irritation eyes watering, stinging and inflammation.				
Emergency treatment: In case of eye or Skin contact, flush with plenty of water. Remove soaked clothing. in case of excessive inhalation move the victim to fresh air, obtain medical assistance				
L.D$_{50}$ (Oral-Rat) : > 5g/kg		*L.C $_{50}$: (rat 4hrs)* 5g/m3		
Permissible Exposure limit: N.A.		*Odour threshold*: N.A.		
TLV (ACGIH) : 800 ppm		*STEL*: N.A.		
NFPA Hazard signals	*Health*	*Flammability*	*Reactivity/Stability*	*Special*
	1	2	0	-

6. Preventive measures

Personal Protective equipment: Canister type gas mask. PVC or Rubber. Goggles giving complete protection to eyes. Eye wash fountain with safety shower.
Handling and storage precautions: Do not expose to heat and naked lights, keep containers and valves closed when not in use.

7. Emergency and first aid measures

Fire:

Fire extinguishing media: Foam, Carbon dioxide, Dry Chemical Powder. Water may be used to cool fire-exposed containers. *Special procedure*: Shut off leak, if safe to do so, .Keep non-involved people away from spill site. Eliminate all sources of ignition. *Unusual hazards*: it will spread along the ground and collect in sewers
Exposure: **Skin contact** ; in case of contact with Skin flush with fresh water, remove containment clothing, **Inhalation**: in case of excessive inhalation move the victim to fresh air, If problem in breathing give artificial respiration; give oxygen. obtain medical assistance **Ingestion**: Give water to conscious victim to drink; do not induce vomiting. *Antidotes/Dosages*: N.A.
Spills: *Steps to be taken* Shut off leak, if safe to do so, .Keep non-involved people away from spill site. Eliminate all sources of ignition. Prevent spill entering in to sewers, for Major spillage contact Emergency services *Waste Disposal method*: N.A.

MATERIAL SAFETY DATA SHEET
SCHEDULE-5, RULE-68-J2(2),3(3) OF GFR 1963 (1995)
SCHEDULE-9, RULE 17 OF MSIHC RULE 1989 (2000)

(MS-Motor Spirit)

1. Chemical identity

Chemical name: Petrol			*Chemical classification*: Flammable liquid
Synonyms: Gasoline, Motor spirit			*Trade name*: Petrol
Formula: mixture of hydrocarbons	*C.A.S. NO.* 8006-61-9.		*U.N.NO.* 1203.
Regulated identification Codes/Label:	*Shipping name*: Gasoline, Petrol *Hazchem code*: class 3 *Hazardous waste ID No*: N.A.		
Hazardous ingredients	*C.A.S.NO.*	*Hazardous ingredients*	*C.A.S. NO.*
Gasoline	*8006-61-9*	*n-Hexane Trace* *Benzene Trace*	*110-54-3* *71-43-2*
Gasoline is complex mixture of hydrocarbons .It's exact composition depends on the source of crude oil from which it is produced and the refining methods used			

2. Physical and chemical data

Boiling point/Range (deg.C) : 30 to 215 C	*Physical state*: Liquid	*Appearance*: Orange, red
Melting/freezing point (deg.C) : -90 to -75.		
Vapor pressure: 300 to 600 mm Hg (20 deg C)		
Odor: Characteristic odor	*Vapor density*: 3-4	
solubility in water @ 30 deg.C: 1-100ppm /100 ml water		
Specific Gravity 0.75-0.85 at 20 deg C.		*ph* NA
Others: Floatability (water): Floats;		

3. Fire and explosion Hazard data

Flammability: yes ignited by Sparks/flames.	*LEL*: 1.4%	*UEL*: 7.6%.
Flash point(deg C) : typically about -38 to -42 (CC)		
TDG Flammability: Class 3		
Ignition Temp (deg C) : 456		
Explosion sensitivity to impact: not sensitive to Mechanical Impact		
Explosion sensitivity to static electricity: For vapors sensitivity exist		
Hazardous Combustion Products: carbon monoxide, Nitrogen oxide. and other aromatic hydrocarbons		
Hazardous Polymerization: N.A.		
Combustible liquid: Yes	*Explosive material*: Yes	*Corrosive material*: No

Flammable material: Yes	*Oxidiser*: N.A.	*Others*: N.A.
Pyrophoric material: N.A.	*Organic peroxide*: N.A.	

4. Reactivity data

Chemical stability: Stable *Incompatibility with other material*: oxidizers such Peroxides ,Nitric acid and Perchorates
Hazardous reaction products: on fire it will liberate some amount carbon monoxide, Nitrogen oxide. and other aromatic hydrocarbons

5. Health Hazard data

Routes of entry: Inhalation, Skin absorption ,ingestion *Effects of Exposure/ symptoms*: **Inhalation:** excessive inhalation Vapors cause rapid breathing, excitability, staggering, headache ,fatigue ,nausea and vomiting, dizziness, drowsiness, narcosis convulsions, coma, **Skin Contact**: Skin-dryness, cracking, irritation eyes watering, stinging and inflammation.
Emergency treatment: in case of contact with Skin flush with fresh water, remove containment clothing, in case of excessive inhalation move the victim to fresh air, obtain medical assistance.
TLV (ACGIH) : 300 ppm *STEL*: 500 *Permissible Exposure limit*: $L.D_{50}$ *(Oral-Rat)* : 13.6 g/kg $L.C_{50}$: (rat for 4hrs) 43g/m3 *Odor threshold*: N.A.

NFPA Hazard signals	*Health*	*Flammability*	*Reactivity/Stability*	*Special*
	0	3	0	-

6. Preventive measures

Personal Protective equipment: Gloves, eye protection preferred.
Handling and storage precautions: eliminate all sources of ignition at storage, ensure good ventilation, ground and bond the containners

7. Emergency and first aid measures

Fire: *Fire extinguishing media*: Foam, Carbon dioxide, Dry Chemical Powder. Water may be used to cool fire-exposed containers. *Special procedure*: Shut off leak, if safe to do so, .Keep non-involved people away from spill site. Issue warning: " FLAMMABLE". Eliminate all sources of ignition. *Unusual hazards*: Vapor heavier than Air it will spread along the ground and collect in sewers
Exposure:

First aid measures: **Skin contact** ; in case of contact with Skin flush with fresh water, remove containment clothing, **Inhalation**: in case of excessive inhalation move the victim to fresh air, If problem in breathing give artificial respiration; give oxygen. obtain medical assistance **Ingestion**: Give water to conscious victim to drink; do not induce vomiting. *Antidotes/Dosages*: N.A.
Spills: *Steps to be taken*: Shut off leak, if safe to do so, .Keep non-involved people away from spill site. Eliminate all sources of ignition. Prevent spill entering in to sewers, for Major spillage contact Emergency services *Waste Disposal method*: N.A.

MATERIAL SAFETY DATA SHEET
SCHEDULE-5, RULE-68-J2(2),3(3) OF GFR 1963 (1995)
SCHEDULE-9, RULE 17 OF MSIHC RULE 1989 (2000)

(ATF-Aviation Turbine Fuel)

A. Identification

- Typical Composition : Kerosene, Hydro-desulfurized, Naphthalene & Ethyl benzene
- Characteristics : Colourless to yellow in appearance, Liquid with petroleum odour, immiscible in water

B. Physical Properties

- Specific Gravity : 0.807 (Range)
- Boiling Point : 160°C to 300°C
- Flash Point : >23°C
- Auto Ignition Temp. : 210°C
- Vapour Pressure : 1 KPa @ 37°C
- Vapour Density : 5.7 (Range) (Air = 1)
- Flammability Limits : Lower (LEL) = 0.7%; Upper (UEL) = 5%
- Category : Class B (Flash Point >23°C)

C. Fire/Explosion Hazards

ATF presents a moderate fire hazard. The vapour is invisible, heavier than air and spreads along the ground. Heating can cause pressure rise with risk of bursting and subsequent explosion

Fire Fighting: Foam, carbon dioxide, dry chemical powder, halons or water sprays /fog are to be used for fire fighting.

D. Health Hazards

- IDLH : Not Available
- TLV/TWA : 200 ppm
- Target Organs : Eyes & Skin
- Pathway : Inhalation, Ingestion, Skin & Eye contact
- Symptoms : Irritation in skin, nose & eyes, headache.

E. First Aid

- Eye: No specific first aid measures are required. As a precaution, remove contact lenses, if worn, and flush eyes with water.
- Skin: Wash skin with water immediately and remove contaminated clothing and shoes. Get medical attention if any symptoms develop. To remove material from skin, use soap and water. Discard contaminated clothing and shoes or thoroughly clean before reuse.
- Breathe: If a person breathes large amounts of this chemical, move the exposed person to fresh air. If breathing has stopped, give artificial respiration. If breathing is difficult, give oxygen and give medical attention as soon as possible if breathing difficulties continue.
- Swallow - If this chemical has been swallowed, get medical attention immediately. Do not make person vomit. Never give anything by mouth to an unconscious person.

MATERIAL SAFETY DATA SHEET
SCHEDULE-5, RULE-68-J2(2),3(3) OF GFR 1963 (1995)
SCHEDULE-9, RULE 17 OF MSIHC RULE 1989 (2000)

(SKO-Superior Kerosene Oil)

1. Chemical Identification

Chemical Name : Kerosene
Synonyms : Superior Kerosene Oil
Formula : Mixture of hydrocarbons
Chemical classification : Flammable Liquid
Trade name : SKO
C.A.S No. : 8008-20-6
U.N.No. : 1223

Shipping name : SKO

Regulated identification : SKO
Hazardous west ID No. : 17
Hazchem No. : Class 3

Hazardous Ingredients
Benzene
Naphthalene Trace
C.A.S.No. :
100-41-4
91-20-3

2. Physical & Chemical data

Boiling Range / points : 300°C to 570°c
Melting / freezing points: 18°C to 46°c
Vapour Density (Air-1) : >1
Specific Gravity water : 0.78-0.84
Physical state : Liquid
Appearance : Colourless
Vapour Pressure : 0.50mm Hg
Solubility in water : <0.1%
PH : NA

3. Fire and Explosion Hazards Data

Flammability : Yes
TDG Flammability : Class 3
LEL : 0.7%
UEL : 5%
Flash Point : 32°C
Flash Point :
Auto ignition : 225°C

Explosion Sensitivity to impact : Non sensitive to Mechanical Impact
Explosion Sensitivity to Static Electricity : For vapors sensitivity exist
Hazardous Combustion Products : Carbon monoxide, Nitrogen Oxide and other aromatic hydrocarbons

Hazardous Ploymerisation : N.A
Combustible Liquid : Yes
Flammable material : Yes
Pyrophoric material : NA
Explosive material : Yes
Oxidiser : NA
Organic peroxide : NA
Corrosive material : No
Other : NA

4. Reactivity Data

Chemical stability : Stable
Incompatibility with other material : Oxidizers such peroxides, Nitric acid and Perchorates
Hazardous Reaction Products : On fire it will be liberate some amount carbon monoxide, Sulphur dioxide Nitrogen Oxide and other aromatic hydrocarbons

5. Health Hazards Data

Routes of Entry : Inhalation , Skin absorption, ingestion
Effects of Exposure Symptoms : Excessive inhalation vapors cause rapid breathing, excitability, staggering ,headache, fatigue, nausea and vomiting, dizziness, drowsiness, narcosis convulsions, coma
Emergency Treatment : in case of eye or Skin contract fresh with plenty of fresh water , remove containment clothing, in case of excessive inhalation move the victim to fresh air, obtain medical assistance.

TLV (ACGIH) : 800 PPm STEL : 500 PPm
Permissible Exposure Limit : $L.D_{50}$ (Oral –Rat) : 5 g/Kg $L.C_{50}$: >340 mg/m^3/1H

NFPA Hazards Signals	Health	Flammability	Stability	Special
	0	2	0	-

6. Preventive measures
Personal Protective equipment : Canister type gas mask. PVC or Rubber. Goggles giving complete protection to eyes. Eye wash fountain with safety.
Handling and storage Precautions : Do not expose to heat and naked lights, keep containers and valves closed when not in use.

7. Emergency and First aid measures
Fire — Fire Extinguishing media : Foam. CO_2, Dry Chemical Powder. Water may be used to cool fire exposed containers
Fire — Special procedures : Shut off leak, if safe to do so,. Keep non –involved people away from spill site. Eliminate all sources all sources of ignition.
Unusual Hazards : It will spread along the ground and collect in sewers

Exposure — First Aid measures : **Skin contact** ; in case of contact with Skin flush with fresh water, remove containment clothing
Inhalation: in case of excessive inhalation move the victim to fresh air, If problem in breathing give artificial respiration; give oxygen obtain medical assistance
Ingestion : Give water to conscious victim to drink; do not induce vomiting.

Antidotes/Dosages : NA

Spills — Steps to be taken : Shut off leak , if safe to do so, Keep non – Involved people away from spillage site. Eliminate all sources of ignition. Prevent spill entering in to sewers, for Major spillage contact emergency services.

Waste disposal Method : NA

MATERIAL SAFETY DATA SHEET
SCHEDULE-5, RULE-68-J2(2),3(3) OF GFR 1963 (1995)
SCHEDULE-9, RULE 17 OF MSIHC RULE 1989 (2000)

(Ethanol)

Section 1 - Chemical Product and Company Identification

MSDS Name: Ethanol, Absolute
Synonyms: Ethyl Alcohol; Ethyl Alcohol Anhydrous; Ethyl Hydrate; Ethyl Hydroxide; Fermentation Alcohol; Grain Alcohol
Company Identification:
VEE GEE Scientific, Inc.
13600 NE 126th Pl Ste A
Kirkland, WA 98034
For information in North America, call: 425-823-4518

Section 2 - Composition, Information on Ingredients

CAS#	Chemical Name	Percent	EINECS/ELINCS
64-17-5	Ethanol	ca. 100	200-578-6

Hazard Symbols: F
Risk Phrases: 11

Section 3 - Hazards Identification

Emergency Overview
Appearance: Colorless clear liquid. Flash Point: 16.6 deg C. **Warning!** Flammable liquid and vapor. Causes respiratory tract irritation. May cause central nervous system depression. Causes severe eye irritation. This substance has caused adverse reproductive and fetal effects in humans. Causes moderate skin irritation. May cause liver, kidney and heart damage.
Target Organs: Kidneys, heart, central nervous system, liver.
Potential Health Effects
Eye Contact: Causes severe eye irritation. May cause painful sensitization to light. May cause chemical conjunctivitis and corneal damage.
Skin Contact: Causes moderate skin irritation. May cause cyanosis of the extremities.
Ingestion: May cause gastrointestinal irritation with nausea, vomiting and diarrhea. May cause systemic toxicity with acidosis. May cause central nervous system depression, characterized by excitement, followed by headache, dizziness, drowsiness, and nausea. Advanced stages may cause collapse, unconsciousness, coma and possible death due to respiratory failure.
Inhalation: Inhalation of high concentrations may cause central nervous system effects characterized by nausea, headache, dizziness, unconsciousness and coma. Causes respiratory tract irritation. May cause narcotic effects in high concentration. Vapors may cause dizziness or suffocation.
Chronic Exposure: May cause reproductive and fetal effects. Laboratory experiments have resulted in mutagenic effects. Animal studies have reported the development of tumors. Prolonged exposure may cause liver, kidney, and heart damage.

Section 4 - First Aid Measures

Eye Contact: Get medical aid. Gently lift eyelids and flush continuously with water.
Skin Contact: Get medical aid. Wash clothing before reuse. Flush skin with plenty of soap and water.
Ingestion: Do not induce vomiting. If victim is conscious and alert, give 2-4 cupfuls of milk or water. Never give anything by mouth to an unconscious person. Get medical aid.
Inhalation: Remove from exposure and move to fresh air immediately. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical aid. Do NOT use mouth-to-mouth resuscitation.
Notes to Physician: Treat symptomatically and supportively. Persons with skin or eye disorders or liver, kidney, chronic respiratory diseases, or central and peripheral nervous sytem diseases may be at increased risk from exposure to this substance.
Antidote: None reported.

Section 5 - Fire Fighting Measures

General Information: Containers can build up pressure if exposed to heat and/or fire. As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear. Vapors may form an explosive mixture with air. Vapors can travel to a source of ignition and flash back. Will burn if involved in a fire. Flammable Liquid. Can release vapors that form explosive mixtures at temperatures above the flashpoint. Use water spray to keep fire-exposed containers cool. Containers may explode in the heat of a fire.
Fire Extinguishing Media: For small fires, use dry chemical, carbon dioxide, water spray or alcohol-resistant foam. For large fires, use water spray, fog, or alcohol-resistant foam. Use water spray to cool fire-exposed containers. Water may be ineffective. Do NOT use straight streams of water.
Autoignition Temperature: 363°C (685.40°F)
Flash Point: 16.6°C (61.88°F)
Explosion Limits, lower: 3.3 vol%.
Explosion Limits, upper: 19.0 vol%
NFPA Rating: (estimated) Health: 2; Flammability: 3; Instability: 0

Section 6 - Accidental Release Measures

General Information: Use proper personal protective equipment as indicated in Section 8.
Spills/Leaks: Absorb spill with inert material (e.g. vermiculite, sand or earth), then place in suitable container. Remove all sources of ignition. Use a spark-proof tool. Provide ventilation. A vapor suppressing foam may be used to reduce vapors.

Section 7 - Handling and Storage

Handling: Wash thoroughly after handling. Use only in a well-ventilated area. Ground and bond containers when transferring material. Use spark-proof tools and explosion proof equipment. Avoid contact with eyes, skin, and clothing. Empty containers retain product residue (liquid and/or vapor) and can be dangerous. Keep container tightly closed. Avoid contact with heat, sparks and flame. Avoid ingestion and inhalation. Do not pressurize, cut, weld, braze, solder, drill, grind, or expose empty containers to heat, sparks or open flames.
Storage: Keep away from heat, sparks, and flame. Keep away from sources of ignition. Store in a tightly closed container. Keep from contact with oxidizing materials. Store in a cool, dry, well-ventilated area away from incompatible substances. Flammables-area. Do not store near perchlorates, peroxides, chromic acid or nitric acid.

Section 8 - Exposure Controls, Personal Protection

Chemical Name	ACGIH	NIOSH	OSHA - Final PELs	OSHA - Vacated Pels
Ethanol	1000 ppm	1000 ppm TWA 1900 mg/m3 TWA 3300 ppm IDLH	1000 ppm TWA 1900 mg/m3 TWA	1000 ppm TWA 1900 mg/m3 TWA

Engineering Controls: Use explosion-proof ventilation equipment. Facilities storing or utilizing this material should be equipped with an eyewash facility and a safety shower. Use adequate general or local exhaust ventilation to keep airborne concentrations below the permissible exposure limits.
Personal Protective Equipment
Eyes: Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166.
Skin: Wear appropriate protective gloves to prevent skin exposure.
Clothing: Wear appropriate protective clothing to prevent skin exposure.
Respirators: A respiratory protection program that meets OSHA's 29 CFR 1910.134 and ANSI Z88.2 requirements or European Standard EN 149 must be followed whenever workplace conditions warrant a respirator's use.

Section 9 - Physical and Chemical Properties

Physical State: Clear liquid
Appearance: Colorless
Odor: Mild, pleasant
pH: Not available
Vapor Pressure: 59.3 mm Hg @ 20° C
Vapor Density: 1.59
Evaporation Rate: Not available
Viscosity: 1.200 cP @ 20° C
Boiling Point: 78° C
Freezing/Melting Point: -114.1° C
Decomposition Temperature: Not available
Solubility: Miscible
Specific Gravity/Density: 0.790 @ 20° C
Molecular Formula: C2H5OH
Molecular Weight: 46.0414

Section 10 - Stability and Reactivity

Chemical Stability: Stable under normal temperatures and pressures.
Conditions to Avoid: Incompatible materials, ignition sources, excess heat, oxidizers.
Incompatibilities with Other Materials: Strong oxidizing agents, acids, alkali metals, ammonia, hydrazine, peroxides, sodium, acid anhydrides, calcium hypochlorite, chromyl chloride, nitrosyl perchlorate, bromine pentafluoride, perchloric acid, silver nitrate, mercuric nitrate, potassium-tert-butoxide, magnesium perchlorate, acid chlorides, platinum, uranium hexafluoride, silver oxide, iodine heptafluoride, acetyl bromide, disulfuryl difluoride, tetrachlorosilane plus water, acetyl chloride, permanganic acid, ruthenium (VIII) oxide, uranyl perchlorate, potassium dioxide.
Hazardous Decomposition Products: Carbon monoxide, irritating and toxic fumes and gases, carbon dioxide.
Hazardous Polymerization: Will not occur.

Section 11 - Toxilogical Information

Carcinogenicity: ACGIH: A4 - Not Classifiable as a Human Carcinogen
Epidemiology: Ethanol has been shown to produce fetotoxicity in the embryo or fetus of laboratory animals. Prenatal exposure to ethanol is associated with a distinct pattern of congenital malformations that have collecetively been termed the "fetal alcohol syndrome".
Teratogenicity: Oral, Human - woman: TDLo = 41 gm/kg (female 41 week(s) after conception) Effects on Newborn - Apgar score (human only) and Effects on Newborn - other neonatal measures or effects and Effects on Newborn - drug dependence.
Reproductive Effects: Intrauterine, Human - woman: TDLo = 200 mg/kg (female 5 day(s) pre-mating) Fertility - female fertility index (e.g. # females pregnant per # sperm positive females; # females pregnant per # females mated).
Neurotoxicity: No information available.
Mutagenicity: DNA Inhibition: Human, Lymphocyte = 220 mmol/L.; Cytogenetic Analysis: Human, Lymphocyte = 1160 gm/L.; Cytogenetic Analysis: Human, Fibroblast = 12000 ppm.; Cytogenetic Analysis: Human, Leukocyte = 1 pph/72H (Continuous).; Sister Chromatid Exchange: Human, Lymphocyte = 500 ppm/72H (Continuous).