SAFETY OF CONTROL ROOM
FOR
HYDROCARBON INDUSTRY

OISD – STANDARD - 163
Revision - I, September 2004

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Government of India
Ministry of Petroleum & Natural Gas
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SAFETY OF CONTROL ROOM
FOR
HYDROCARBON INDUSTRY

Prepared by :
COMMITTEE ON
“SAFETY OF CONTROL ROOM FOR HYDROCARBON INDUSTRIES”

OIL INDUSTRY SAFETY DIRECTORATE
8th Floor, OIDB Bhavan,
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Preamble

Indian petroleum industry is the energy lifeline of the nation and its continuous performance is essential for sovereignty and prosperity of the country. As the industry essentially deals with inherently inflammable substances throughout its value chain – upstream, midstream and downstream – Safety is of paramount importance to this industry as only safe performance at all times can ensure optimum ROI of these national assets and resources including sustainability.

While statutory organizations were in place all along to oversee safety aspects of Indian petroleum industry, Oil Industry Safety Directorate (OISD) was set up in 1986 Ministry of Petroleum and Natural Gas, Government of India as a knowledge centre for formulation of constantly updated world-scale standards for design, layout and operation of various equipment, facility and activities involved in this industry. Moreover, OISD was also given responsibility of monitoring implementation status of these standards through safety audits.

In more than 25 years of its existence, OISD has developed a rigorous, multi-layer, iterative and participative process of development of standards – starting with research by in-house experts and iterating through seeking & validating inputs from all stake-holders – operators, designers, national level knowledge authorities and public at large – with a feedback loop of constant updation based on ground level experience obtained through audits, incident analysis and environment scanning.

The participative process followed in standard formulation has resulted in excellent level of compliance by the industry culminating in a safer environment in the industry. OISD – except in the Upstream Petroleum Sector – is still a regulatory (and not a statutory) body but that has not affected implementation of the OISD standards. It also goes to prove the old adage that self-regulation is the best regulation. The quality and relevance of OISD standards had been further endorsed by their adoption in various statutory rules of the land.

Petroleum industry in India is significantly globalized at present in terms of technology content requiring its operation to keep pace with the relevant world scale standards & practices. This matches the OISD philosophy of continuous improvement keeping pace with the global developments in its target environment. To this end, OISD keeps track of changes through participation as member in large number of International and national level Knowledge Organizations – both in the field of standard development and implementation & monitoring in addition to updation of internal knowledge base through continuous research and application surveillance, thereby ensuring that this OISD Standard, along with all other extant ones, remains relevant, updated and effective on a real time basis in the applicable areas.

Together we strive to achieve NIL incidents in the entire Hydrocarbon Value Chain. This, besides other issues, calls for total engagement from all levels of the stake holder organizations, which we, at OISD, fervently look forward to.

Jai Hind!!!!

Executive Director
Oil Industry Safety Directorate
FOREWORD

The Oil Industry in India is over 100 years old. As such, various practices have been in vogue because of collaboration/association with different foreign companies and governments. Standardisation in design philosophies, operating and maintenance practices was hardly in existence in national level. This, coupled with feedback from some serious accidents that occurred in the past in India and abroad, emphasised the need for the industry to review the existing state-of-the-art in designing, operating and maintaining of oil and gas installations.

With this in view, the Ministry of Petroleum and Natural Gas in 1986 constituted a Safety Council, assisted by Oil Industry Safety Directorate (OISD) staffed from within the industry for formulating and implementing a series of self regulatory measures aimed at removing obsolescence, standardising and upgrading existing standards to ensure safer operations. Accordingly, OISD constituted a number of functional committees comprising of experts nominated from industry to draw up standards and guidelines on various subjects.

The original document on “Process Control Room Safety” was released by OISD in September 1996. The same was amended incorporating modifications as approved in 19th Safety Council Meeting held in September 2001. Further, to incorporate the latest technological changes and experience gained after implementation of the standard, the OISD Standard on “Process Control Room Safety” was taken up for total review by the Functional Committee. The title of the updated standard has been modified as “Safety of Control Room for Hydrocarbon Industry” with a view to include safety in control rooms associated with Pipeline and Marketing Terminals.

This document will be reviewed periodically for improvement based on the new experiences and better understanding. Suggestions may be addressed to:

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These documents are intended only to supplement rather than replace the prevailing statutory requirements.
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ON
“PROCESS CONTROL ROOM SAFETY”

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**Amended Edition – September 2001**

Incorporated modifications / changes / additions based on amendments approved in 19th safety council meeting held in September 2001.
# COMMITTEE ON

"SAFETY OF CONTROL ROOM FOR HYDROCARBON INDUSTRY"

*First Revision*

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*In addition to above, several other experts from the industry contributed in preparation, review and finalization of this document.*
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ANNEXURE –I: SELECTION OF TYPE OF CONSTRUCTION FOR CONTROL ROOMS

ANNEXURE-II: LIMITING ROOM / SPACE FOR A CONTROL ROOM

ANNEXURE-III: ESSENTIAL LAYOUT REQUIREMENT OF CONTROL ROOM
SAFETY OF CONTROL ROOM FOR HYDROCARBON INDUSTRY

1.0 INTRODUCTION

Hydrocarbon processing and handling plants are inherently hazardous. Today’s trend of large and complex plants presents substantial risk potential. The hydrocarbon industry over the years learnt lessons from fires and explosions throughout the world and has been updating plant safety norms. Control room safety has vital importance to plant operations and operating personnel working in the proximity of risk areas.

It is not intended that requirement of this standard should be applied rigidly to existing premises where for a variety of reasons, it may not be practicable to comply with. This standard shall, however, create awareness and help in selective implementation of the recommendation when major modifications are undertaken at existing installations.

2.0 SCOPE

The requirements of this standard are applicable to Control Rooms in Petroleum Refineries, Oil/Gas Production & Process Plants, Marketing Terminals, LPG Filling Plants, Pipeline installations (including pumping/compressor stations) etc.

This standard lays minimum requirement(s) for prevention of damage to Control and Communication system located within the control room from accidental fire / blasts and also ensuring protection to personnel working inside the control room.

This document does not cover safety requirements of control rooms for offshore installations.

This document defines the criteria for sizing, locating and selecting the type of construction of control room buildings for the facilities mentioned above.

Detailed design procedures are not included in this document and shall be as per relevant codes of practice of Bureau of Indian Standards and other applicable codes of practice.

In case of conflict / contradiction, the stringent requirement shall prevail.

3.0 DEFINITIONS

3.1 CONTROL ROOM

“Control Room” is a protective enclosure equipped with control & communication services and environmental treatment necessary for proper functioning of the Hydrocarbon Processing and Handling Installation. The control room could either be blast-resistant or non-blast resistant as applicable to the type of installation.

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3.2 BLAST-RESISTANT BUILDINGS

“Blast-resistant buildings” are defined as buildings or other structures capable of withstanding the effects of an accidental plant explosion giving rise to the pressure/time effects. In resisting such explosion, the building may suffer damage provided that this does not result in collapse, danger to personnel or render control equipment inoperable. However, capable of withstanding a static overpressure of 3 psi due to pressure/ time effects of explosion, the building shall remain gas-tight for preventing ingress of contaminated air following explosion.

3.3 HAZARDOUS AREAS

Hazardous areas are the areas encompassing storage tanks, equipment, piping manifolds, valves etc. where hydrocarbon vapours and radiant heat hazard exists.

For classification and the extent of hazardous area, refer Petroleum Rules.

3.4 SHALL

“Shall” indicates a mandatory requirement.

3.5 SHOULD

“Should” indicates a requirement which is recommendatory in nature.

3.6 MAY

“May” indicates provisions that are optional.

4.0 GENERAL REQUIREMENTS

4.1 CONTROL ROOM FUNCTIONS

Control Room serves the following functions:

- Control centre for operation/ monitoring of various facilities involving process, utilities, boosting & delivery operation upstream and downstream for POL, LPG and LNG transportation in hydrocarbon industry.
  - Process inventory controls.
  - All emergency shutdown controls.
  - Office for essential operating staff and shift engineer.
Housing Communication facilities including telephone/ VHF/ Voice mail / plant communication, internet services and CCTV as applicable.

4.2 CONTROL ROOM BUILDING

The building to accommodate:

- Console room and Rack rooms
- Computer room
- UPS room
- AC plant and AHU room
- Battery room with battery charger sets.
- Clean agent cylinder room / Fire extinguishing system.
- Offices for Officers-in-charge directly involved in Operation & maintenance of plant. Sitting arrangement for staff directly involved in operation and maintenance of DCS.
- Essential services such as instrument calibration facility, Engineering Room and Optimization Room / computers & advanced control room.
- Essential amenities: Locker room, discussion room. Record room, Dining room, toilet etc.
- Control room shall cater for minimum essential occupancy. Similarly, sub-station block when combined with control room shall have space only for essential requirement.
- Control room / sub-station buildings shall not have any provision for conference hall, library etc., where assembly of people may take place. Personnel, not related to essential functions of plant control, shall not be stationed in the control room.
- A set of emergency tools stored and displayed in a wall-mounted cupboard with a glass cover for using in emergency.

4.3 LAYOUT & TYPE OF CONSTRUCTION

The type of construction shall be based on the table provided under Annexure-I. In cases other than those listed in Annexure-I, the type of construction shall be decided after appropriate risk evaluation.

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In order to provide sufficient resistance to sustain generated blast pressures, based on risk category and placing/seating of the control room on plot, any one of the following types of construction shall be adopted:

**Type-A (Non-blast resistant)**

Single-storied column-beam frame construction with concrete floor/ roof slab and brick filler walls.

**Type-B (Blast resistant)**

Single-storied RCC construction (column-beam and external wall or any other framing system) structurally suitable for design loads. Concrete roof slab of minimum 150 mm thick and concrete peripheral walls of minimum 230 mm thick shall be considered. All openings on peripheral wall (for cable entries) shall be through MCT’s with proper (equal grade as for structural works) concrete plugging.

It is assumed that structure shall be subjected to blast loading only once in lifetime of the structure.

Essential facilities to be included in the control room (both Type A & B) are indicated under Clause 4.2.

Limiting room/space and essential layout requirements for a control room are also brought out in Annexure-II and Annexure-III.

### 4.4 NOISE LEVELS

Noise level in the building shall not be allowed to exceed the following limits:

- Control rooms not continuously manned
  - 60 dB (A)

- Control rooms continuously manned
  - 50 dB (A)

The reflected noise level shall be reduced by providing acoustic ceiling and acoustic material on the upper part of the walls wherever necessary.

In case of impulsive and/or tonal character noise, the above limits shall stand reduced by 5 dB (A).

Noise from Heating Ventilation & Air-conditioning (HVAC) equipment transmitted through ducts shall not result in sound pressure levels inside the room higher than 10 dB (A) below the maximum acceptable noise level in that room.

Noise that is not related to equipment but is produced by use of various areas need not be considered.

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4.5 ACCESS CONTROL

An Access Control System for a Control Room may be provided as per organizational requirements for “Entry validation”. An alternate emergency exit shall be an essential component of the system, keeping in view the safety of personnel inside the control room.

5.0 SAFETY REQUIREMENTS

5.1 LOCATION

Control room should be located in a non-hazardous area upwind of process plants / hydrocarbon storage and handling facilities. It shall not be located on a lower level than surrounding plants and tank farms. There shall be no structure that would fall on the control room in case of a blast.

The location of control room and its separation distances from process units / block facilities shall be as per OISD-STD-118 on “Layouts for Oil & Gas Installations”.

Based on expected risk from the source, the control room building shall be located on the plot and type of construction assigned (refer Clause 4.3).

Unless otherwise required from plant processing considerations, the structural design of type-B control rooms shall be undertaken for a static overpressure of 3 psi.

5.2 ARCHITECTURAL PLANNING

GENERAL CONSIDERATIONS

The following are recommended for all types of control rooms:

(i) Control room shall be of one storey above grade construction to facilitate quick evacuation in emergency and shall cater for minimum essential occupancy.

(ii) Where control room and sub-station buildings are to be located side by side, the type of construction of Control room shall be as per Clause 4.3. Transformers should be located in open area on the rear side of sub-station. Fire protection for sub-station and related equipment/ facilities shall be in line with OISD-STD-173 (Fire Prevention and Protection System for Electrical Installations).

(iii) Even in case of sub-station being located adjacent to control room, the blower room & AHU of Control room shall be located within the walls of control room. However, for pressurization requirement of sub-station, the blower should be located in the sub-station itself. Exceptions, if necessary, may be considered on case to case basis. AHU and blower room should be located on the far side of the process plant.

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(iv) Control Room entry shall have double doors. The air curtain facility at inner door may be considered to prevent any dust entry inside the control room.

(v) Toughened and shatter proof glass shall be used for doors/ windows in control rooms.

(vi) Minimum two exits shall be provided in such a way that each has a different unobstructed escape route. These routes shall be properly identified and displayed. The emergency exits shall be properly identified, displayed and shall be as per National Building Code of India and Factories Act.

(vii) Drainage system for control room building shall be provided with suitable traps to prevent back-flow of explosive vapours during plant upset or spills. Floor level of the building (including the floor supporting the false flooring) should be higher compared to the grade level outside the building.

CONSIDERATIONS SPECIFIC TO BLAST-RESISTANT CONTROL ROOM

The blast resistant control room shall comply with following additional requirements:

a) The openings through walls shall not exceed seven percent (7%) of wall area. (refer Annexure-III). Area of each window shall not exceed 0.25 sq.m. Glass used for windows shall be toughened & shatter-proof of 7 psi rating. Window slits shall be vertical with slit width not exceeding 0.30 m.

b) Number of doors provided shall be minimum so that positive pressure can be maintained inside control room.

c) The entries / exits to the control room shall face the least hazardous area.

d) Any entry to control room building shall be protected with baffle wall of blast-resistant construction with suitable overlap on both sides against entry of direct blast pressure wave. Baffles shall be at 45 degree / 90 degree to the access way.

e) Fire-resistant partition / Isolation shall be provided between various risks where fire protection is provided to prevent spread of fire to the adjoining protected areas. Doors, if provided between protected areas, shall be fire check doors.

f) Adequate ventilation will be maintained in the control room with a minimum of five to six air changes per hour. Air intake to be properly located.

g) No equipment shall be placed on the roof other than air-intake system and exhaust stacks.
5.3 ELECTRICAL REQUIREMENTS

Where sub-station and control room is a combined block, the following safety features are to be adopted:

(i) Emergency lighting (AC/ DC) at strategic locations in the control room and rack room shall be provided in order to facilitate safe shutdown / escape from sub-station/control room during emergency.

(ii) Adequate communication system such as VHF/Hot-line telephone link shall be provided at strategic locations within control room and sub-station with emergency power back-up.

(iii) Paging system with tone generators or any suitable plant communication system should be provided for alerting working personnel in the plant. Also, suitable manual fire warning system should be provided.

(iv) Portable emergency lights should be provided in control room.

(v) Exhaust fan shall be provided in the Battery Room. Electrical fittings used inside battery room shall be flame proof.

(vi) Electrical fittings provided in the control room shall be in line with OISD-STD-113(Area Classification for Electrical Installation).

(vii) Close circuit TV system may be provided based on requirement.

5.4 INSTRUMENTATION REQUIREMENTS

The following safety features shall be incorporated in the control room design:

(i) Adequate clearance between cabinets/ racks and wall of control room shall be provided for proper access to the equipment during testing/ maintenance. Minimum distance of 1m between equipment to wall of control room and minimum distance of 2m in aisle is recommended.

(ii) Where console and rack/cabinet are located in the same room, the console shall have a minimum aisle space of 2m from control panel or rack/cabinet.

(iii) Hydrocarbon/LEL detector shall be provided in the air-intake duct. On actuation, it shall simultaneously give an alarm, close the damper and cause tripping of the AHU.

(iv) Indication of online hydrocarbon / toxic gas detectors should be available with alarm in the Process Control room. Additionally minimum 2 nos. of portable gas detectors shall be provided.

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5.5 AIR CONDITIONING

The following safety features shall be adopted in the design of control room air conditioning system:

(i) Separate supply and return air ducting shall be provided for control room.

(ii) Dampers shall be installed in ducts, where they pierce fire walls or at the point the duct(s) emerge from air conditioning plant room. These dampers must have 90 minutes fire rating (resistance) and may be of single blade/multi blade design pneumatically operated and actuated by smoke detector units.

(iii) With operation of the automatic (smoke / hydrocarbon / toxic gas) detector within the air duct, the supply and return air ducts must be cut-off and the air conditioning plant tripped.

(iv) Air intake point shall be located preferably at opposite side of process units. Fresh air shall be drawn from an electrically safe classified area as away as possible but not less than 16 m from area processing hydrocarbons and other gases. Chemical filter of suitable design should be installed at fresh air intake.

(v) Control room is to be pressurized to 3-5 mm WG, if it is located within 16 m from process plant or, lies within hazardous area classified as per OISD-STD-113 on “Area Classification for Electrical Installation”.

(vi) Positive pressurisation shall be maintained where specifically called for by modulation of fresh air, relief and return dampers. Pressurisation being the primary requirement, its system shall have 100% auto standby system including fan, filter, relief dampers etc. Alarm (visual & audio) shall occur upon loss of pressurisation.

To purge space of undesirable air, the fresh air damper shall be full open. When positive pressurisation is a critical requirement, the return air damper of AC system shall be in a closed position. The remote relief dampers will modulate open to exhaust the purge air. The purge cycle shall occur upon start-up and upon a loss of pressurisation. All operations shall be automatic.

(vii) Separate mechanical purge system is also acceptable to meet the desired intent. Care shall be taken to adequately purge the space prior to energizing non-explosion proof electrical equipment.

(viii) The purge cycle should operate a minimum of five air changes per hour to assure a complete purge. The purge air shall be drawn from an electrically safe classified area.

(ix) Ducts under negative pressure shall be free of leaks and given suitable protection from mechanical damage and corrosion to prevent hazardous concentrations of flammables from being admitted to the control room.

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(x) AC plant room shall be ventilated with a minimum of fifteen air changes per hour.

5.6 **GENERAL REQUIREMENT**

(i) Instrumentation & electric cable entry to the control room shall be made through identified cable transit blocks or any other medium which are liquid-and-vapour-tight and also fire resistant. All spare cable entries shall be properly sealed.

(ii) In case of blast resistant design of control room, adequate cable transit blocks with dummy blocks shall be provided for future expansion.

(iii) Protection against rat menace shall be incorporated through periodic pest control and proper sealing at vulnerable points.

(iv) Single line schematics highlighting the power supply sources to the instrumentation / DCS etc. should be available in the control room for ensuring positive electrical isolation of the circuit to be worked upon. Any modification / change should be incorporated in the document as part of management of change.

6.0 **FIRE PROTECTION SYSTEM**

6.1 **FIRE WATER**

Control room building from outside shall be provided with hydrant coverage. Number of hydrants provided shall be in line with OISD-STD-116.

6.2 **SMOKE / HEAT DETECTION SYSTEM**

(i) Smoke detectors alongwith audio-visual fire alarm system shall be provided at strategic locations in the control room building to cover, as a minimum, all normally un-manned areas and enclosed cabinet including rack room, space above false ceiling, UPS room, cable cellar, documentation room and engineering room where smoke and hot spot could develop.

The battery room and storage room shall be provided with heat detectors.

6.3 **CLEAN AGENT FIRE EXTINGUISHING SYSTEM**

Clean agent fire extinguishing flooding system should be provided in un-manned areas for electrical / instrumentation control viz. computer room, UPS room, PLC cabinets, rack rooms etc. where the activation should be automatic through smoke detection system. It is preferable to divide cabinets into zones and direct the Clean agent into the cabinets of affected zone. However, for manned areas inside control

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room, the clean agent flooding operation should be on manual mode based on audio-visual alarm from smoke detection system.

Areas protected by having clean agent flooding provision shall be segregated from unprotected areas with fire safe partition and all openings shall be provided with fire safe doors.

When designing clean agent fire extinguishing system, care is to be taken so that the actual concentration of the clean agent in the normally occupied control room does not exceed the “No Observable Adverse Effect Level”. Selection of clean agent shall be made so that oxygen concentration in the atmosphere always remains above sixteen percent (16% by weight).

For complete awareness of use and handling the Clean agent and breathing apparatus, proper training shall be imparted with practical demonstrations to the personnel using the control room. Periodical checks shall be ensured to maintain adequate inventory of clean agent.

Smoke detector system shall actuate the Flooding System of clean agent. The system should be either automatic or manual.

However, in manned Console room, alarm to be provided against hazardous exposure through gas / smoke detection system.

6.4 EVACUATION IN EMERGENCY

To facilitate evacuation of personnel during emergency:

- Assembly points (as identified under disaster management plan) shall be displayed in the control room at minimum three strategic locations.

- Boards should indicate the guideline to be followed for safe evacuation.

- Personnel shall be trained in the use of self-contained breathing apparatus and periodic mock drills should be conducted for efficacy of safe evacuation plan.

6.5 FIRST AID FIRE EQUIPMENTS

Following First Aid Fire Equipment shall be provided in the control room in line with OISD-STD-116:

- Portable CO2 extinguishers for control room and computer room etc.
- DCP/CO2 Fire Extinguishers for Sub-station building and office area.

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Number of equipment shall be decided on case-to-case basis depending upon size of control room and number of personnel in the control room.

7.0 PERSONAL PROTECTIVE EQUIPMENT

The personal protective equipment shall be considered for control room in line with OISD-STD-155. This should include following as applicable.

- Self-contained Breathing Air Apparatus
- Water-gel Blankets
- Eye washer near battery room
- Suitable canister masks as per identified hazards.
- Acid proof aprons and safety goggles in the battery room.
- Safety wears for handling fire-scavenging material as per manufacturers' recommendations.

8.0 STRUCTURAL SAFETY

The Structural design for Type-B structures (blast resistant construction) shall consider static overpressure as indicated under Clause 5.1.

Roof slab and walls of Type-B structures shall be doubly reinforced.

Control room building shall be designed taking into consideration the respective wind / seismic requirements. Wind and / or seismic load need not be considered to act simultaneous with blast loads.

Design of structural members under blast conditions shall be done for load factor of unity.

Safe bearing capacity of soil/pile shall be increased by 50% under blast conditions.
9.0 REFERENCES

(1) The Petroleum Rules.
(2) NFPA
(3) TAC Regulations
(4) API-752 on “Management of Hazards Associated with Location of Process Plant Building”.
(5) Loss Prevention in Process Industries by Frank P. Lees.
(6) ISA-RP 60.1 on Control Centre Facilities.
(7) National Building Code.
### ANNEXURE – I

#### SELECTION OF THE TYPE OF CONSTRUCTION FOR CONTROL ROOMS

<table>
<thead>
<tr>
<th>PLANT / UNIT</th>
<th>CONTROL ROOM LOCATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Upto 60 M</td>
<td>60 - 120 M</td>
</tr>
<tr>
<td>Crude Distillation / Visbreaker / Delayed Coker / Gas Concentration unit / Hydro-desulphurisation / Reformer / Hydrogen plant</td>
<td>Type –B</td>
</tr>
<tr>
<td></td>
<td>Type-A</td>
</tr>
<tr>
<td>Vacuum Distillation / Sulphur Recovery / Solvent Extraction-MEK, Furfural, Phenol, Sulfolane / Bitumen / Coke Calcination</td>
<td>Type-A</td>
</tr>
<tr>
<td></td>
<td>Type-A</td>
</tr>
<tr>
<td>FCC / Hydrocracker / Propane Deasphalting / LPG Sweetening</td>
<td>Type-B</td>
</tr>
<tr>
<td></td>
<td>Type-B</td>
</tr>
<tr>
<td>Pressurised storage for LPG/ C2 / C3 / C4</td>
<td>Type-B</td>
</tr>
<tr>
<td></td>
<td>Type-B</td>
</tr>
<tr>
<td>Pressurised Storage for LPG, C3 &amp; C4 (mounded)</td>
<td>Type-B</td>
</tr>
<tr>
<td></td>
<td>Type-B</td>
</tr>
<tr>
<td>C2/C3/ LPG Recovery</td>
<td>Type-B</td>
</tr>
<tr>
<td></td>
<td>Type-B</td>
</tr>
<tr>
<td>Crude stabilisation</td>
<td>Type-A</td>
</tr>
<tr>
<td></td>
<td>Type-A</td>
</tr>
<tr>
<td>Offsite Storage Facility : POL / Crude</td>
<td>Type-A</td>
</tr>
<tr>
<td></td>
<td>Type-A</td>
</tr>
<tr>
<td>Marketing terminals ( Bulk Loading included) (POL)</td>
<td>Type-A</td>
</tr>
<tr>
<td>(LPG) (could be located at less than 30 m)</td>
<td>Type-B</td>
</tr>
<tr>
<td>Power Plants (could be located at less than 30 m)</td>
<td>Type-A</td>
</tr>
<tr>
<td>Pipelines Terminals (Gas) with compressor station</td>
<td>Type-A</td>
</tr>
<tr>
<td>Pipelines Terminals (LPG) with pumping station</td>
<td>Type-B</td>
</tr>
<tr>
<td>LPG Storage &amp; LNG (Refrigerated)</td>
<td>Type-B</td>
</tr>
<tr>
<td>Pipelines Terminal for Crude oil / Multiproduct with pumping facility</td>
<td>Type-A</td>
</tr>
<tr>
<td></td>
<td>Type-A</td>
</tr>
</tbody>
</table>

**Notes:**

1. Distance bands indicated above are to be used for deciding the type of construction for Control Room. This standard excludes minimum interdistances between the block facilities for which OISD-STD 118 shall be referred.
2. Beyond 120 m distance, control room need not be of blast resistant type.
3. Plants not listed in above table shall be studied on case-to-case basis.
4. If control room is located less than 30m away from unit, blast resistant requirement shall be decided on case-to-case basis.
5. The buildings at Sectionalising valve stations and separate intermediate pigging stations for pipelines are unmanned and hence not considered as control room. In these locations Type-A or even Porta cabin may be provided. This is applicable for the crude oil, POL, LPG and GAS.

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ANNEXURE – II

LIMITING ROOM/SPACE FOR A CONTROL ROOM

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Requirement</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Basic functional rooms/spaces</td>
<td>Console room, rack room, instrumentation calibration room and computer room, Engineering Room, PLC/ Advance control / Optimisation room.</td>
</tr>
<tr>
<td>2.</td>
<td>Services/utility rooms/spaces</td>
<td>UPS room, battery room, HVAC room and clean agent cylinder room</td>
</tr>
<tr>
<td>3.</td>
<td>Accommodation and office requirement for control room staff</td>
<td>Seating space for control room staff, viz. operators, shift engineers, shift-in-charge, Engineers In-charge directly involved in Operation &amp; maintenance and record room, Toilet, discussion rooms, room for essential maintenance personnel, locker and change room, dining room, space for fire extinguishing and personal protective equipment</td>
</tr>
<tr>
<td>4.</td>
<td>Amenities (for control room staff only)</td>
<td></td>
</tr>
</tbody>
</table>

Note: -

1. Space provided in the control room shall essentially be for authorized working personnel within the premises.
2. No space shall be provided for repair and/or workshop (even for control room maintenance) within the control room premises.
## ESSENTIAL LAYOUT REQUIREMENT OF CONTROL ROOM

<table>
<thead>
<tr>
<th>Details</th>
<th>Applicability exclusive to</th>
</tr>
</thead>
<tbody>
<tr>
<td>All rooms/spaces shall be enclosed within blast resistant peripheral walls and roof. The structure shall be rectangular in plan.</td>
<td>Type-B structures</td>
</tr>
<tr>
<td>Entry/exit shall be from side opposite susceptible to blast. Baffle walls with roof shall be provided to prevent direct entry of blast wave in the control room. Baffles shall be at 45° or 90° to the access way.</td>
<td>Type-B structures</td>
</tr>
<tr>
<td>Manned room/space shall have at least two separate and distinct means of emergency exit. Requirements of emergency exits shall be as per National Building Code of India and other applicable (Factories) acts.</td>
<td>All type of structures</td>
</tr>
<tr>
<td>Air-conditioned areas shall be provided with air lock lobbies.</td>
<td>All type of structures</td>
</tr>
<tr>
<td>Openings in walls for AC plant/AHU, toilet etc shall be located on wall facing non-hazardous area. Openings for exhaust fans shall be protected with blast resistant concrete hood. Openings for pipes/cables shall be sealed to prevent entry of vapor/gas</td>
<td>Type-B structures</td>
</tr>
<tr>
<td>Fire protected areas shall be isolated from non-protected areas. Suitable fire rated doors shall be used</td>
<td>All type of structures</td>
</tr>
<tr>
<td>Area of openings shall not exceed 7% of wall area</td>
<td>Type-B structures</td>
</tr>
<tr>
<td>Area of openings shall not exceed 15% of wall area</td>
<td>Type-A structures</td>
</tr>
<tr>
<td>Window area shall not exceed 0.25m², with width of windows not exceeding 0.30m. Toughened glass or shatter proof glass of 7psi rating shall be used</td>
<td>Type-B structures</td>
</tr>
</tbody>
</table>

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