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NEWAGE FIRE PROTECTION ENGINEERS PVT LTD

CO_2 SYSTEM PRESENTATION .

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CO_2 SYSTEM

Oldest Fire Fighting System available to mankind, its existence dates back to year 1928 and earlier.

Designed as per NFPA 12, 2015 Ed & IS : 15528: 2004.

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PROPERTIES OF CO_2 GAS .

- Colorless, Odorless, Electrically non-conducting inert gas.
- 1.5 times heavier than air.
- Ratio of expansion of liquid CO2 to gas is very high.

HOW DOES CO2 SYSTEM WORK ?

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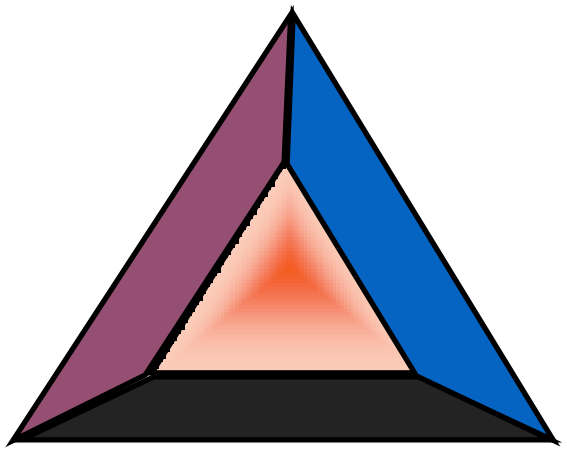

- Fire Triangle.
- Fuel, oxygen, heat – all three are required to sustain a fire.
- Removal of any element of fire triangle results in suppression.
- Principle of Extinguishments.
- 1. By reducing concentration of Oxygen below 16% by volume.
- 2. By producing cooling effect on co2 is stored in cylinder at sub zero temperatures.

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➢ ***ADVANTAGES OF USING CO2 SYSTEM***

- Inert, electrically non-conductive medium is achievable.
- Non-corrosive in nature.
- No clean up required after discharge.
- Economical to install.
- Eco-Friendly.(zero ODP)
- Abundantly available in any part of nation.
- Refill cost is minimal.

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➢ ***APPLICATIONS OF CO_2 SYSTEMS.***

CO2 SYSTEMS CAN BE PROVIDED ONLY ON UNMANNED AREAS .

- Paint Shop Booths & Paint Storage & Mixing Rooms.
- Can be used on Class A, Class B & Class C (E)Hazards.
- Transformers.
- Color Printing machines .
- Battery Rooms.
- Flammable Liquid Storage.

➢ ***ADVANTAGES OF USING CO2 SYSTEM***

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- Only System in the world for past 100 years.
- Practically zero down time as stand by Bank can be provided due to economical cost.
- Simplest and easiest construction.
- Very easy to maintain, no specialist required, even the Owner can maintain the System.
- Suited for unmanned area only , but can be provided for manned area with time delay provision.
- NFPA recommends of 60 seconds which ensures uniform & longer discharge, hence no chance of reignition.
- 100% discharge test possible & no mock test. Possible to see the functionality of each & every component thus ensuring 100% surety.

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Different types of CO_2 SYSTEM

- High Pressure – Storage Pressure 850 PSI AT 27ºC.
- Low Pressure – Storage Pressure 300 PSI which is to be maintained at -18ºC.
- Local Application: Rate by Area method.
  Rate by Volume method.
- Total Flooding: For Surface Fires.
  For Deep Sealed Fires.
- Combination System

Design Basis

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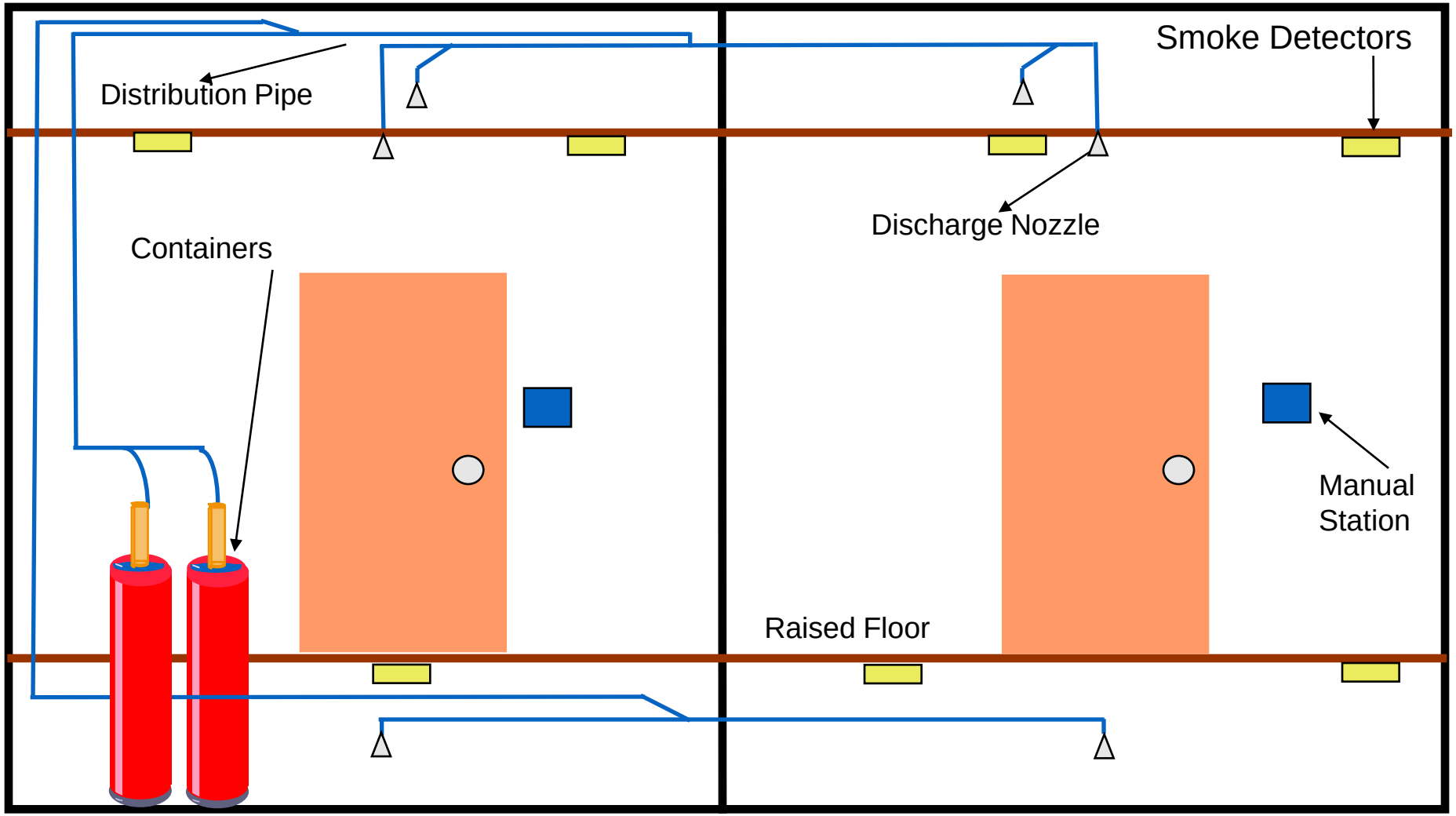
• Applicable Standard	:	NFPA 12, 2015 Ed.
• Room temperature considered	:	21 Deg.C
• Minimum conc. of agent as per	:	
(For Dry Electrical Hazard)	:	50% (Class ‘A’ and ‘C’ Fire).
(For Record (bulk paper) storage, ducts, covered trenches)	:	65% (Class ‘A’ Fire).
(For Fur storage vaults, dust collectors)	:	75% (Class ‘A’ Fire).
• System pressure	:	60 Bar
• Maximum discharge time	:	Total flooding 60 Seconds. Local flooding 30 Seconds
• Safety during maintenance	:	As per NFPA 12, 2015 edition , A manually operated Supervisory lockout valve which can be locked in close position

CO2 GAS Engineered System



SAMPLE CALCULATION .

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• Area	:	Electrical room.
• Dimensions L X W X H	:	10 MTR X 5 MTR X 3 MTR
• Enclosed /Open	:	Enclosed .
• Type of Flooding	:	Total
• Volume in Cu mtr (V)	:	150.
• Room temperature considered	:	21 Deg.C
• Minimum design concentration)	:	50%
• Material Conversion factor (MCF)as per NFPA 12	:	1.6
• Flooding factor (Kg/ Cu Mtr) (FF) as per NFPA 12	:	0.8
• Basic Quantity of CO2 gas in Kg V X MCF X VF	:	150 X 1.6 X 0.8 = 192
• Capacity of each CO2 Cylinder	:	45 Kg .
• No of CO2 Cylinders required .	:	4.26 , say 5 Nos .

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- Newage Co2 system has provision to actuate the system Automatically , Pneumatically, or Manually .

- Automatic : From Fire Detectors
- Pneumatically : Through Nitrogen /CO2 gas
- Manual : Through Manual Release switch or Through Manual lever on Master CO2 cylinder
- Flow calculation can be provided with the help of UL Listed software .

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➢ ***APPLICATIONS OF CO_2 SYSTEMS***

- Electric Generators.
- Switchgear Equipments.
- Panels.
- Transformers.
- Drawing Offices.
- Diesel & Electrical Locomotives.
- Cables Galleries.
- Record Data Storages
- Engine test cells

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➢ ***DATA REQUIRED FROM OWNER***

- Hazard is Enclosed or Open .
- Materials involved in the protected area.
- Dimensions of Hazard .Length x Width x Height .
- Height should give details of Main void +False ceiling + False flooring .
- Surrounding area that could affect protected hazard.
- Any opening or outlets.
- Other electrical appliances like A/C or Fuel devices etc.
- Discharge to be Automatic or Manual or Both.
- Location of CO_2 Cylinders and Control panels .
- Site location .
- Main Bank & Standby Bank is required

➢ MAJOR COMPONENTS OF CO2 SYSTEM

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SR NO	COMPONENT	DESCRIPTION	APPROVAL
1	CO2 CYLINDER	68 LTR WATER CAPCITY FILLED WITH 45 KG CO2 GAS .	IS 7285 AND PESO .
2	CO2 VALVES		
2.1	MASTER VALVE	ELECTRO PNEUMATIC AND MANUAL	VDS/UL/FM
2.2	SLAVE VALVE	PNEUMATIC	VDS/UL/FM
3	DISCHARGE AND INTERCONNECTION HOSES ,MANIFOLD CHECK VALVE ,NOZZLES	-	LLOYDS/UL/FM
4	ONLINE HANGING TYPE WEIGHT MONITORING DEVICE WITH LIMIT SWITCH	-	
5	DIRECTIONAL VALVES ,PIPING ,FITTINGS	-	-

CO2 CYLINDER BANK .

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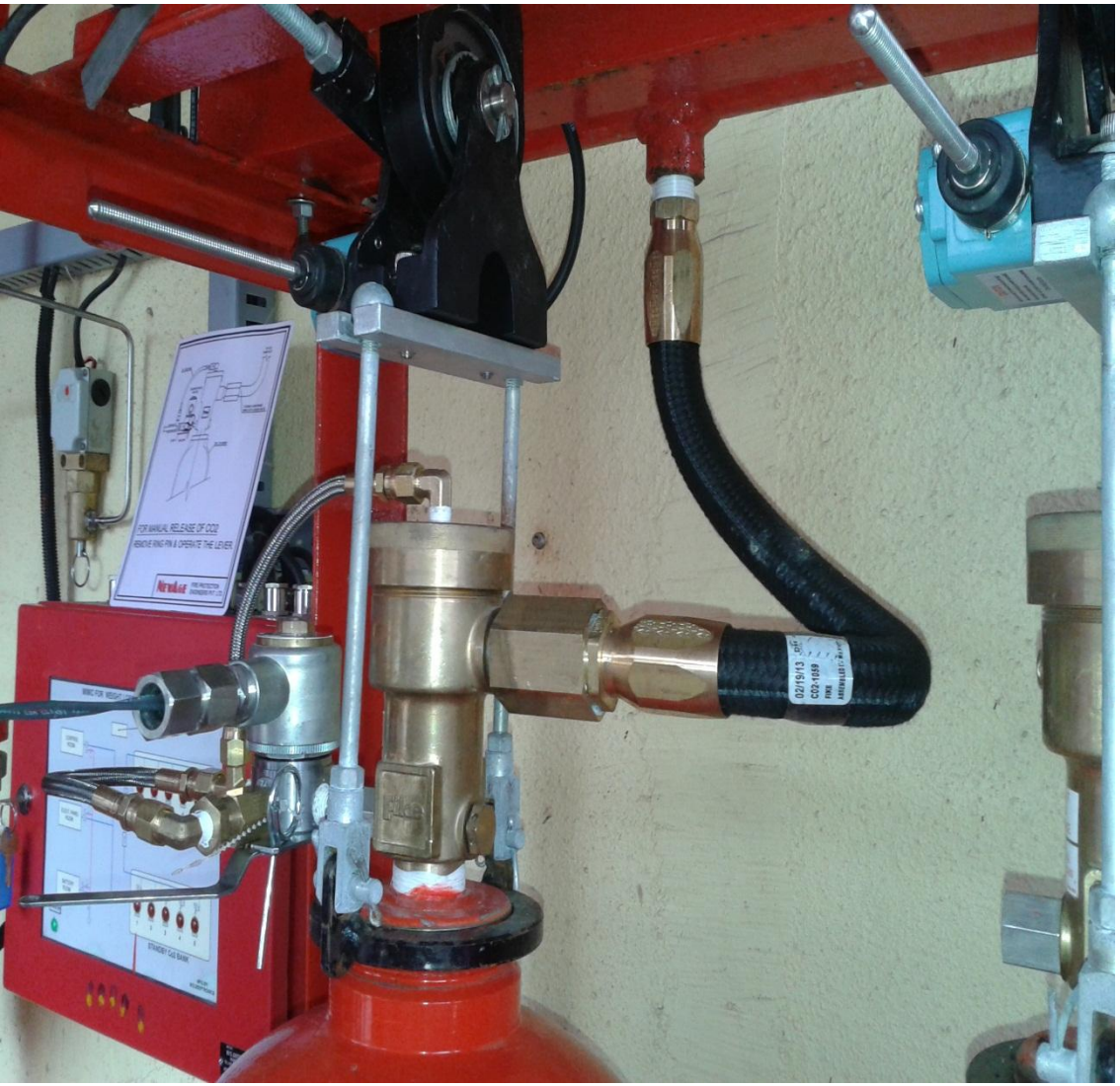
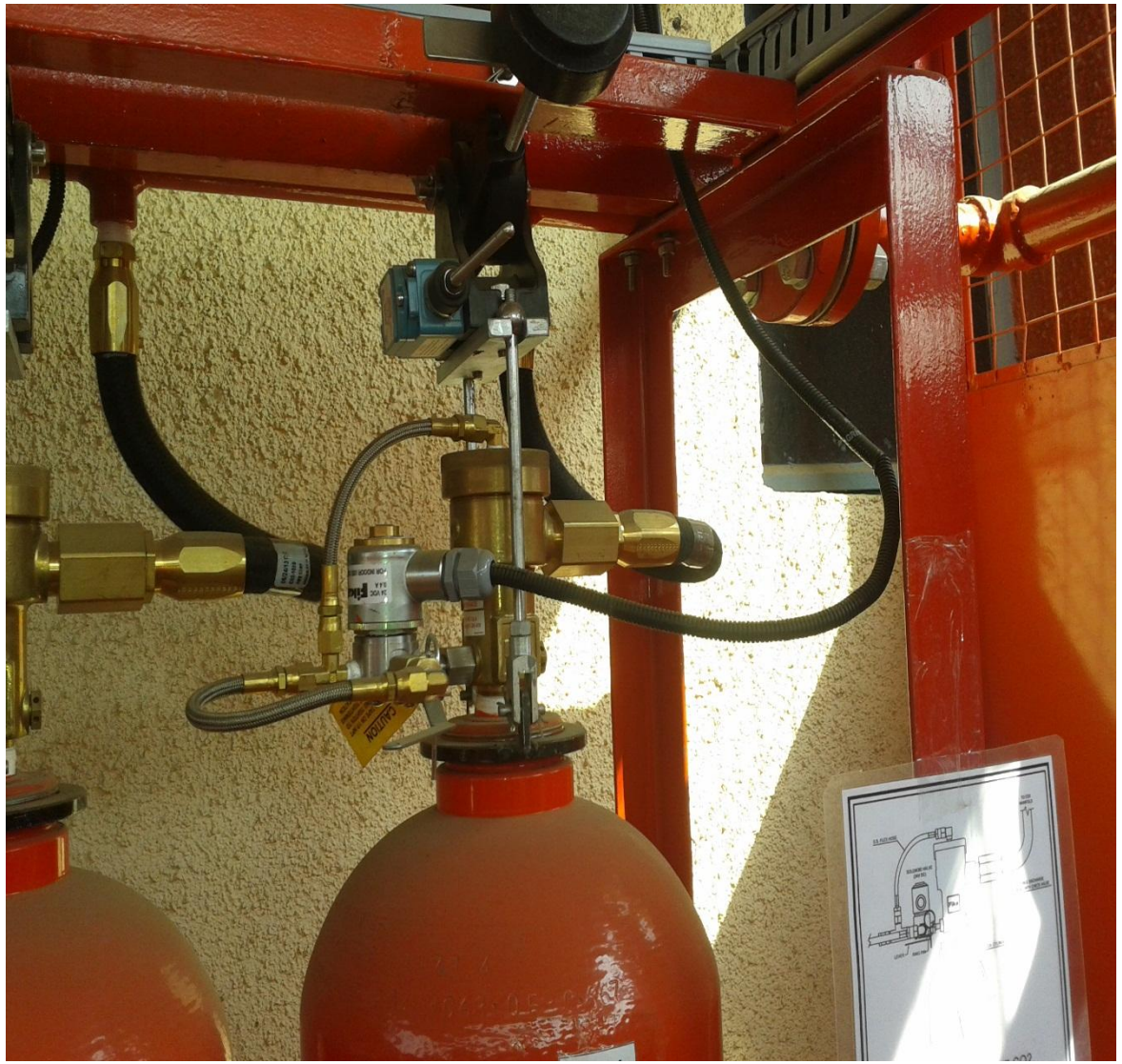
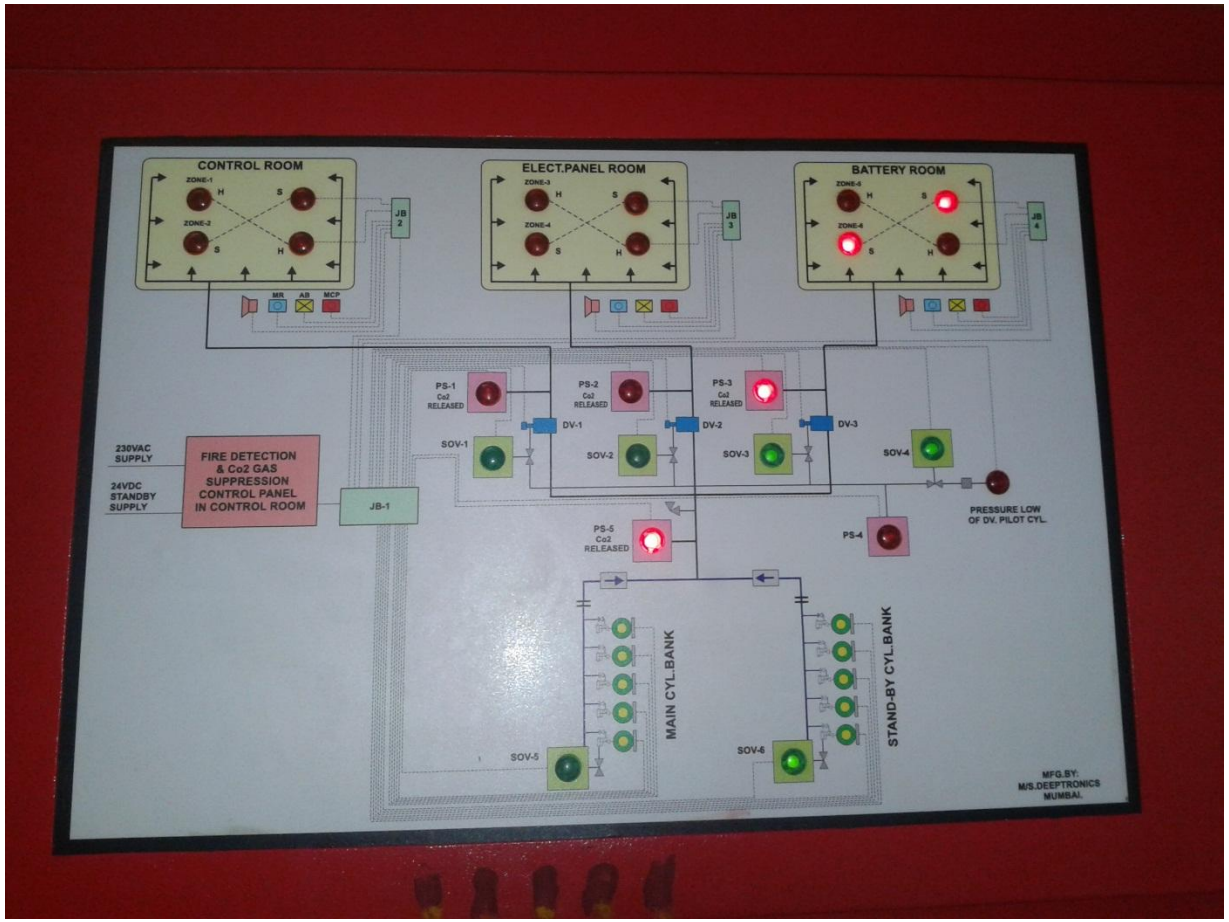
CO2 VALVES , HOSES AND WEIGHING DEVICE.

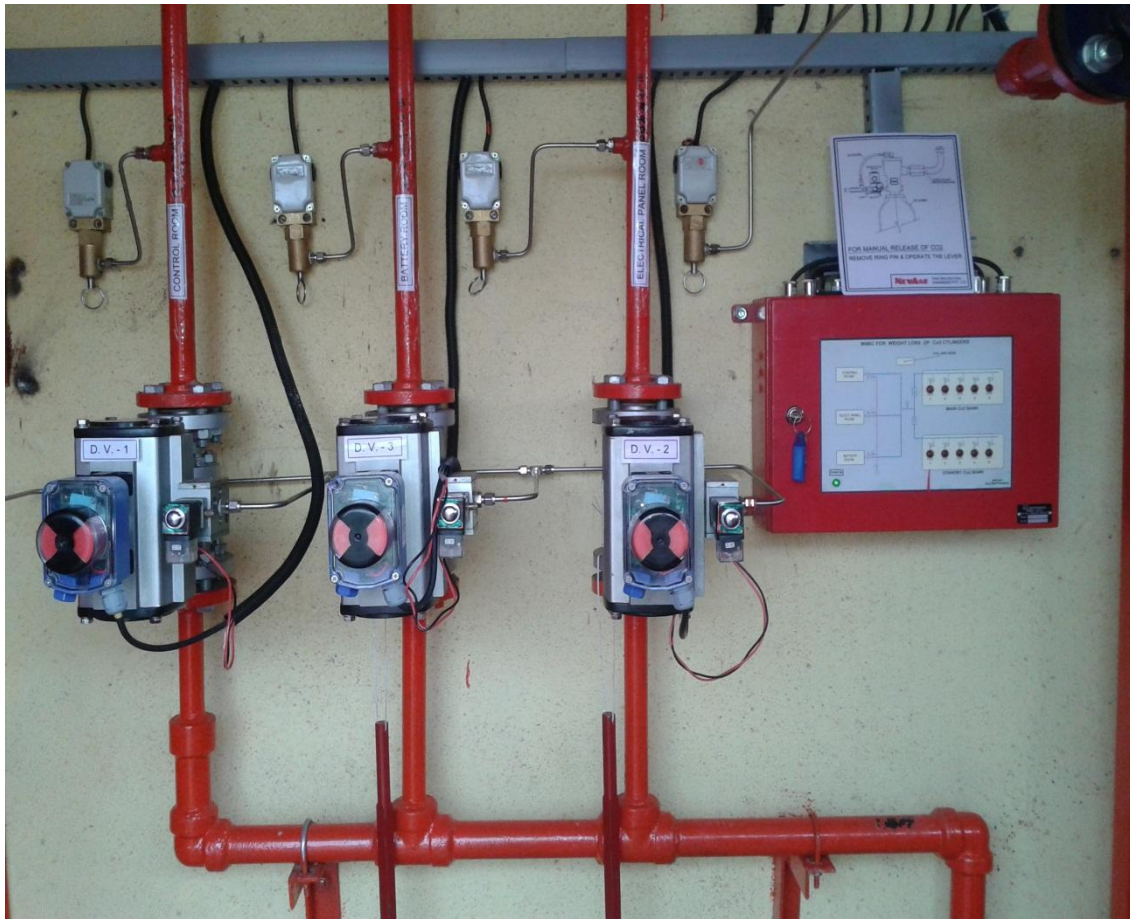




WEIGHING SCALE .MAIN & STANDBY BANK.

MIMIC PANELS AND DIRECTIONAL VALVES





CO2 GAS RELEASE PANELS .

CO2 SYSTEM INSTALLED AT GAIL .

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➢ ***SAFETY ASPECT FOR CO_2 SYSTEM INSTALLED***

➢ Direct contact with co2 can cause severe frostbite burn to skin. This hazard is limited to vicinity of nozzle.

➢ Detail and glow sign must be prominently displayed in hazardous area to aware persons for protection provided by co2.

➢ Exit system in glow sign must be clearly and prominently displayed for safe passage of personnels.

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➢ ***SAFETY ASPECT FOR CO_2 SYSTEM INSTALLED***

- Alarm should be strategically located for clear audible.
- Necessary equipments must be provided for removing the discharge .
- Co2 after fire incident to ensure removal of co2 before entry of personnel.
- BA set must be provided for safety people.