

MEDICAL GAS MANAGEMENT & SAFETY

GROUP : 4

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INTRODUCTION

- The Medical gas pipeline system is a key element of every hospital with emphasis on safety, reliability and purity of the gases.
- It provides vital medical gases for patients in ventilation and various clinical applications.
- The piping is designed, colour coded and installed based on strict national regulation.

TYPES OF MEDICAL GASES

- Oxygen - White 
- Nitrous oxide - Blue 
- Medical air – Black & white 
- Carbon dioxide - Grey 
- Nitrogen - Black 
- Medical vacuum – Yellow 
- Anaesthesia Waste Exhaust - Yellow 

PRESSURE AT WHICH THE GASES ARE MAINTAINED

- Medical Air – At 380 kPa (55psi)
- Oxygen – At 380 kPa (55psi)
- Carbon di oxide – At 345 kPa (50psi)
- Nitrogen – At 1.2 MPa (175 psi)
- Nitrous Oxide – At 345 kPa (50 psi)



TYPES OF CYLINDERS



CENTRALIZED MEDICAL GAS DELIVERY SYSTEM- ADVANTAGES

- Instant availability of gases.
- Clean, Safe & reliable delivery of gas.
- Continuous flow of gas when and where required.
- Minimal accidental hazards due to mishandling of cylinders.
- No distressing sign of oxygen cylinders in the bed side.
- Elimination of noise / damages produced by their movement.
- Protection of sterile areas from contamination caused by use and movement of cylinder.
- Economy on purchase of cylinders

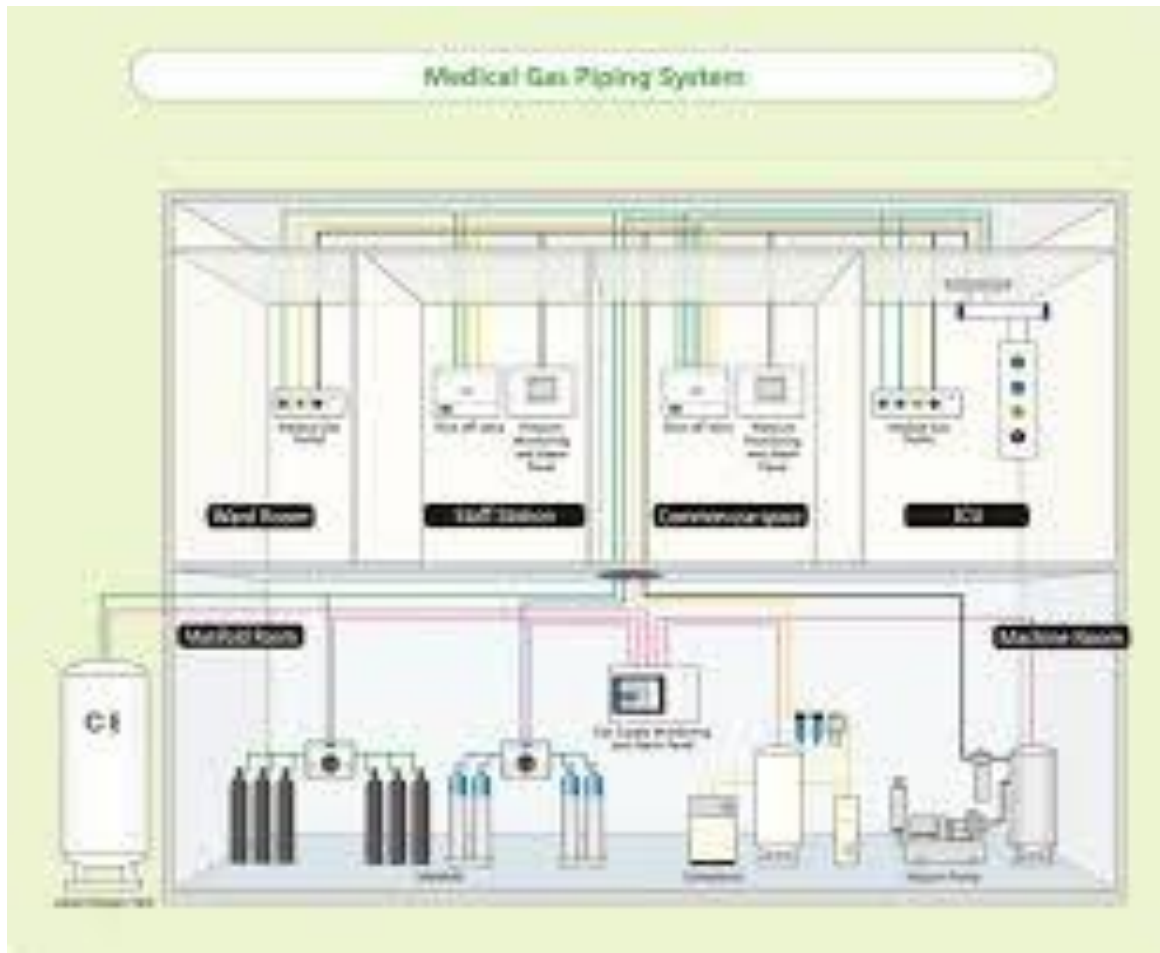
COLOR CODINGS IN THE PIPELINES

Canada	USA	UK
OXYGEN	OXYGEN	OXYGEN
CARBON DIOXIDE	CARBON DIOXIDE	CARBON DIOXIDE
NITROUS OXIDE	NITROUS OXIDE	NITROUS OXIDE
CYCLO-PROPANE	CYCLO-PROPANE	CYCLO-PROPANE
HELIUM	HELIUM	HELIUM
MEDICAL VACUUM	MEDICAL VACUUM	MEDICAL VACUUM
NITROGEN	NITROGEN	NITROGEN
MEDICAL AIR	MEDICAL AIR	MEDICAL AIR
INSTRUMENT AIR	INSTRUMENT AIR	INSTRUMENT AIR
INSTRUMENT VACUUM	INSTRUMENT VACUUM	INSTRUMENT VACUUM
CARBON MONOXIDE	CARBON MONOXIDE	CARBON MONOXIDE
O ₂ and N ₂ MIXTURE	O ₂ and N ₂ MIXTURE	O ₂ and N ₂ MIXTURE
		O ₂ and N ₂ MIXTURE

SYSTEM COMPONENTS

- Sources
- Piping networks
- Valves
- Warning and alarm systems
- Outlets and inlets
- Secondary equipment

MEDICAL GAS PIPING SYSTEM



Cylinders in a box, safe?



CYLINDERS STORED IN MANIFOLD SYSTEM



BULK O2 CYLINDERS



A SET OF MEDICAL GASES OUTLETS/INLETS



Storage

- securing of cylinders (**EFA/2010/008**)
- medical gases only
- no flammable materials to be stored
- ventilation
- separation of full and empty
- stock rotation
- good signage

MANAGEMENT & SAFETY

- The manufacturer of medical gases must have a valid licence issued by the state drug controller as per the provisions of the Drug and Cosmetic Act 1940.
- Separate pipework's are designed, fixed, constructed and shall be identified by colours with the direction of the flow marked on them.
- Cylinders to be stored in vertical position with top up and chained to ensure that they are secure.
- Proper signage indicating “Full” and “Empty” cylinders (HTM 02-01).
- The organisation should adhere to statutory requirements under the provision of Indian explosives act, gas cylinder rules, static and mobile pressure vessel rules.
- License to be obtained for storage tanks more than 1000 kl from Petroleum explosives and safety organisation (PESO).

MANAGEMENT & SAFETY

- Storage tanks must be situated outside the hospital building near an exit. Tank should be built at one meter from floor level with 7-foot distance to be maintained on all four sides of the tank.
- Liquid Medical Oxygen (LMO) must have a primary source of supply, secondary reserve supply and third source of supply that comes automatically in line in case of plant failures.
- Maintenance should be carried out in regular basis.



MANGEMENT OF LEAK

- The quantity of leak from a system might range from extremely low up to an emergency situation.
- Leaks usually occur from supply tubes used it can be of the following:
 - a. Non detectable leak can be a minor leak from wall-mounted system, can be easily repaired as routine maintenance activity.
 - b. Detectable leak (with a hissing sound) pose as a minimal hazard to the patients and staffs. When detected the patients are transferred to bottled oxygen and maintenance team is notified for immediate repair.
 - c. Catastrophic leak poses as a major threat with chances of fire. Staffs are trained to bring out an utility emergency and provide respiratory care for the patients immediately.
- A master alarm panel provides continuous monitoring of medical gas installations across the hospitals.
- The local alarm indicators should be readily noticeable to the staffs to avoid hassle.
- The shut valves must placed in adequate locations with the staff awareness.



Caution
Cylinder
storage area



Danger
Oxygen cylinder



Danger
Compressed gas



No smoking

No naked light



**No combustible
materials**



Danger
Liquid nitrogen



**Ensure adequate
ventilation**



**Do not work
alone**

O2 PLANT SAFETY MEASURES



