

9.9. RESPIRATORS

The basic purpose of any respirator is to protect the respiratory system from inhalation of hazardous chemicals. Respirators provide protection, either by removing contaminants from the air before it is inhaled or by supplying an independent source of respirable air. A respirator that provides breathing gas from a source, independent of the surrounding atmosphere instead of purifying the atmosphere, is called air-supplying respirator. A respirator serves as a barrier against contaminated atmosphere.



9.10. AIR-PURIFYING RESPIRATOR

9.10.1. Disposable Mask

A disposable mask provides protection against particulate matter. These masks are made of paper, synthetic material, surgical gauze or cellulose. This is the simplest and most common type of mask. However, this type of mask does not offer effective protection against very fine dust and toxic chemicals.

RESPIRATORS		
Type	Characteristics	Protects against
Dust Respirator	Single or double filters of lint, cotton, wool, etc. which can be replaced when plugged with particulate matter. Resin impregnated wool filter for dust of 10 micron or less	Nuisance dusts and pneumoconiosis producing dusts, powders, mists having TLV (Threshold Limit Value), not less than 0.1 mg/m of air
Light Chemical Cartridge Respirator	Mouth-cum-nose piece. Activated charcoal used for absorbing gases and fumes	Light concentration of fumes about 0.1% by volume – of acid fumes and paint spray
Heavy Chemical of Cartridge Respirator	Mouth-cum-nose piece, usually having a mixture of calcium hydroxide with sodium or potassium hydroxide used as a reacting agent	Light concentrations acid fumes and specified gases. Usually for concentration not exceeding 0.1% by volume.
Canister Gas Masks	Face piece or mouthpiece connected by a flexible tube to a canister containing neutralising chemicals or specified gases	Specified fumes/ vapours/ gases not exceeding a concentration of 2% by volume, for a maximum period specified by the supplier (usually ½ hr.) Oxygen deficient
Self-contained Breathing Apparatus (SCBA)	Compressed air or oxygen cylinder supplying breathing air/oxygen; full face mask connected to the cylinder	environment and toxic gas environment of high concentration

9.11. COLOUR CODE FOR CANISTERS

Colour of canister	Protection against exposure to
Black	Organic vapour
White	Acid gases
Yellow	Organic vapour and acid gases

Green
Brown
White with green stripes
White with yellow stripes
Blue
Red

Ammonia
Organic vapour, acid gases and ammonia
Hydrocyanic acid vapour or hydrogen cyanide gas
Chlorine
Carbon monoxide
Acid gases, organic vapours, carbon monoxide and ammonia

Source: IS:8318-1977 Colour identification marking for air purifying canisters and cartridges.



9.12. MECHANICAL RESPIRATOR

Mechanical respirator with ultramicroscopic particulate filter is usually used against dust hazards. It has a single or thin filter assembly. The two-stage filter consists of a cotton pre-filter to trap large particles and a resin impregnated wool filter to retain very fine particles. This type of respirator filters out particles less than 5 microns.

9.13. CHEMICAL RESPIRATOR

Chemical respirators are suitable for the protection of workers in situations where concentrations of airborne chemicals exceed their respective Permissible Limit of Exposure. Chemical respirators are of two types (1) Chemical Cartridges (2) Gas Mask



9.13.1. Chemical Cartridges

Chemical cartridges usually consist of a half-mask which covers the nose and mouth only and has a single or twin cartridge filter assembly, attached. This respirator should always be worn with goggles or a face shield in a workplace, containing not more than 0.1% of contaminants.

9.13.2. Gas Mask

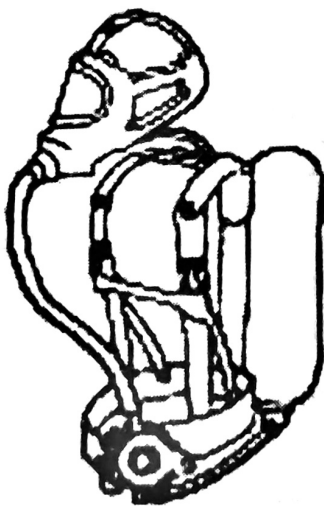
This respirator consists of a full face piece, which covers the eyes, nose and mouth, connected either directly or by a non-kink flexible hose to a canister, containing a granular adsorbent, specific for that type or a combination of contaminants carried on a belt round the waist. This respirator protects workers from 0.1% to 2% concentration of chemicals at the workplace.

9.14. AIR-SUPPLYING RESPIRATOR

Air supplying respirators are suitable for use in an oxygen-deficient atmosphere. They are of the following types:

9.14.1. Air Line Respirator

The supplied air suit is a form of continuous air line respirator. Air line respirators may be in the form half-mask, full face piece, hood or helmet, or a complete suit. The respirable air is supplied to the user through a hose connected to a central source, either a compressed air cylinder or a compressor.



Self-Contained Breathing Apparatus (SCBA)

9.14.2. Self-Contained Breathing Apparatus

Self-contained breathing apparatus are specially designed to afford respiratory protection during escape in emergency situations. In this, air is supplied from a cylinder, which is an integral part of the apparatus and carried on the operator's back.

The degree of protection of the respiratory protective devices largely depends on the quality and their proper selection. For further details, IS:9623-1980 "Recommendations for the Selection, Use and Maintenance of Respiratory protective Devices" may be referred to.