

DISINFECTION OF DRINKING WATER



Chlorination of drinking water supply is one of the most significant application in public health protection.

Water supply systems disinfect water using Chlorine because of its economy, germicidal potency and efficiency. Over 98% of the drinking water systems world wide disinfect water with chlorine based compounds.

Chlorine based disinfectants are the only major disinfectant with lasting residual properties that prevent microbial re-growth and provide continuous protection through the distribution from the treatment plant to the tap.

Prevention and control of water borne diseases through source water protection and proper treatment techniques are critically important. Untreated or inadequately treated drinking water supplies, primarily from surface water sources, contain micro organisms that can cause "out brake" of water borne diseases.

As per [WHO Guidelines for Drinking Water Quality](#)

TERMINAL DISINFECTION OF PIPED DRINKING WATER IS OF PARAMOUNT IMPORTANCE AND IS ALMOST UNIVERSAL.

CHLORINE AND HYPOCHLORINE ARE THE MOST OFTEN USED.

IEC FABCHEM LIMITED is a pioneer in the field of Chlorination. Various types & models and capacities of Chlorination Systems are available for different applications.

TYPES OF CHLORINATORS

1. Vacuum feed chlorinators.
2. Gravity feed chlorinators (Tower Type)
3. Sodium Hypochlorite generator and dosing system.

TYPES OF CHLORINATORS AND METHOD OF DOSING

1. VACUUM FEED CHLORINATORS

The vacuum feed chlorinator capacity ranges from 50 gms/hr to 200 Kgs/hr. Water mixes with chlorine under vacuum conditions at the injector. Chlorine gas is handled under vacuum conditions in the chlorinator which provides additional safety for operation. The motive water force is required to be supplied to ejector which creates the vacuum. In the absence of motive water, a suitable booster pump may be provided. When the gas withdrawal rate exceeds 40 Kg/hr, evaporator must be used for vaporizing liquid chlorine.

MODELS

- Tonner/Cylinder Mounted Chlorinator capacities ranging from 50gms to 10 Kgs/hr.
- wall mounted chlorinator capacities ranging from 50 gms to 40 Kgs/hr.
- Floor cabinet model from 50gms to 200 Kgs/hr.

Method of dosing

A. Gravity Dosing (Fig. A)

Vacuum feed chlorinators are suitable for dosing chlorine solution in gravity-sumps/ reservoirs/ open channels. Motive water pressure has to be provided to the injector with respect to the friction loss calculated for length of piping and elevation at dosing point.

B. Pressure main Dosing (Fig. C, D & F)

Vacuum feed chlorinators are also suitable for pressure main dosing. Here the chlorine solution can be injected into the pressure main i.e.,

- The chlorine solution can be dosed at the outlet of the pressure filter.
- Pipeline raising to an overhead tank.
- Into the pressure main for a large distribution network, etc.,

In this type of pressure main dosing the motive water to the injector will be the back pressure calculated as per the pipe friction loss due to length + elevation at dosing point + pressure in the pipeline into which the chlorine solution is to be injected. A booster pump / motive water pressure for the injector operation is required.

C. Dosing in the Suction of a Pump (Fig. E)

When the condition arises that the chlorine solution has to be dosed to a very high pressure main, the capacity of the pump to develop the motive pressure required for operating the injector becomes a critical factor. In such conditions it is recommended to dose the chlorine solution from the injector in to the suction side of the main pump.

There is a general misconception that the pump will be subjected to a high level of chlorine concentration which will corrode the pump parts. But the fact is that even though the chlorine solution of the injector is 2500 ppm when it is dosed into the pump suction it will be diluted to 3-5 ppm. The reason being that the chlorinator is sized for the total flow rate of the pump at 3-5 ppm.

2. GRAVITY FEED CHLORINATORS

The chlorinators range from 0.5 Kg/hr to 40 Kgs/hr. It utilizes gaseous chlorine from tonners/cylinders which is counter currently mixed with water in a packed column. It is one of the most economical chlorinator and especially useful when motive water supply pressure and electric power is not available.

Method of dosing (Fig. B)

Gravity feed chlorinators are suitable only for gravity dosing of chlorine solution in sump reservoir / open channel.

3. SODIUM HYPOCHLORITE GENERATOR AND DOSING SYSTEM

Water supplies are also disinfected with sodium hypochlorite which is also a chlorine based disinfectant. The sodium hypochlorine generator produces sodium hypochlorite from commonly available sources such as common salt (Sodium chloride). Water and power. It is specially useful for remote regions where cost of transportation of chlorine and hypochlorite is high and where there is a lack of facility for safe storage of chlorine and sodium hypochlorite.

- Capacity of the generators - 30 gms/day to 12 kgs/day of chlorine content. Sodium hypochlorite can be dosed in a sump or pressure main by using a suitable metering pump or ejector based dosing system.

Method of Dosing Point of Dosing


1. In Gravity dosing into sump/tank. (Fig. G)
2. Into the main pressure of pipeline for a large distribution network. (Fig. H)
3. Pipeline raising to an overhead tank (Fig. H)

Spot Chlorination Metering Pump

Sodium hypochlorite is dosed into the pressure main with the help of a metering pump. The generated sodium hypochlorite is stored in a storage tank and metered as per required dosage rate into the pressure main

Ejector based system

Sodium hypochlorite from feed tank is sucked by the ejector under metered flow condition and mixed with main line water.

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TYPES OF CHLORINATOR AND METHOD OF DOSING

