

## Technical Specification for Trolley Mounted Large Area Sanitization Equipment

The Trolley mounted large area sanitization equipment for spraying disinfectant solution for sanitization of suspected contaminated areas in large open spaces. The system incorporates low pressure twin fluid (air & disinfectant liquid) technology generating very fine mist for disinfecting the affected area up to 3000 m<sup>2</sup>.

It has a tank capacity of 50 litres and has a lancing (throw) distance of 12-15 m. This makes the system extremely useful for disinfecting large and high risk premises like Hospitals, Malls, Airports, Metro stations, Railway stations, Bus Stations, Isolation and quarantine centres and high risk Residential areas

### Technical Specifications

- Water / solution storage cylinder (Main cylinder) Capacity : 50 L
- Working Pressure : 8-10 bar
- Lancing Distance : 12-14 m.
- Discharge time: 102 seconds
- Weight of the system: 100-105 kg.
- Compressed air cylinder : 6 L capacity @ 300 bar,
- MOC of air cylinder: Mild steel
- MOC of main cylinder: SS 304





## USER MANUAL

### TROLLEY MOUNTED LARGE AREA SANITIZATION EQUIPMENT: CAPACITY 50 LITRES



Fig.1 System Components

#### Instructions to approach the affected area

It is most helpful to approach the area with a simple plan in advance and take precautions to safely disinfect any large area. Let's look at these step by step.

**Step 1)** Make sure the area is not blocked for the personnel exit route.

**Step 2)** Observe the size and type of area and try and approach the affected area from the side where the approach is accessible and the user should keep in mind that instruction in step 1 are always followed. If the area is closed from three sides then sanitization should be carried out while retracting towards the open access.

This shall have various advantages: -

- User is always safe.
- Maximum range of equipment is achieved.
- Maximum disinfectant solution covers maximum floor area.
- Maximum visibility is achieved.

**Step 3)** Ideal distance from the affected area for operating the equipment can be decided as per the following: -

- Expected intensity of the contaminants in the affected area can often determine how far or close user can be to the area. A safe distance which does not bring user in harm's way or gets affected is most advised.
- The range of the equipment as mentioned on product specification sheet defines the maximum distance from which the sanitization can be tackled. At this distance maximum benefit of coverage can be achieved. This could be the starting point as you move closer to the area, the disinfectant solution can be applied to the floor area more effectively.

**Step 4)** While sanitization is going on, user should not enter the sanitized zone for atleast 5 minutes for chemical

to neutralize any contamination. User access during sanitization will make the sanitization activity ineffective as well as unnecessarily expose user to sanitization chemical. If necessary, move with extreme caution, keeping the following points into consideration.

- Wash skin and eyes repeatedly and thoroughly (shower), to eliminate any remaining hazardous compound.
- Following this, a suitable skin or eye ointment may be used to treat the exposure.

### **Preparation of Disinfectant Solution**

1% Sodium hypochlorite solution, referred as “disinfectant solution” is being recommended for area sanitization. This chemical can be sourced from the trade/industry at a higher concentration (say ‘C’%) such as 4% to 6% or higher, will be referred as “disinfectant concentrate” in this document. Following method is used for dilution of disinfectant concentrate with water (DM/RO).

1. Calculate the volume (Litres) of disinfectant solution (say ‘X’) required for sanitization based on area assessment.
2. Accordingly calculate volume (Litres) of disinfectant concentrate (X/C) and water [X-(X/C)] to make X Litres of disinfectant solution.
3. Measure X/C litres of disinfectant concentrate in one container 1.
4. Measure and add X-(X/C) litres of water in the container 2 having volume X or more.
5. Slowly pour the disinfectant concentrate, using funnel, into water and mix thoroughly after closing the lid, to make the required solution.
6. Transfer the prepared 9 liters of solution to the agent cylinder of the equipment.

Example:

Disinfectant Concentration (C) = 5%

Solution Required (X) = 50L

Disinfectant Concentrate Required =  $50/5=10$  L

Water to be added =  $50-10=40$  L

### **Requirements**

- Empty container 1 for disinfectant concentrate of volume at least X/C litres
- Relatively large container 2 for preparing disinfectant solution having volume X or more liters
- One funnel and a measurement arrangement based on the requirement
- Protective gloves, goggles and safety shoes

### **Operating Instructions**

- Before accessing your sanitization equipment, charge your equipment with 1% disinfectant solution ( 1% Hypochlorite Solution) upto the mark and then open the expellant ( compressed air/nitrogen) cylinder valve. To open the expellant cylinder, pull the knob and turn the wheel knob on the cylinder in the direction as indicated on the knob.
- Before accessing your sanitization equipment, first check and charge your equipment with 1% disinfectant solution ( 1% Hypochlorite Solution).
- Before moving your sanitization equipment turn the wheel knob on the expellant cylinder (Compressed air/nitrogen) to charge the disinfectant solution container. After charging the disinfectant solution cylinder please check if the needle of the pressure gauge on the same cylinder is in green zone.
- If the safety seal has been tampered or broken and if the needle in the pressure gauge is in red zone move to the next closest available sanitization equipment.

- Push the cylinder from the handle on the trolley guiding it towards the affected/infected area.
- After reaching the intended area of infection uncoil the discharge hose and place the gun in your natural working hand while taking the hose over and supporting it on the shoulder of the same hand.
- Remove the safety seal on the gun by pulling it vertically outward.
- Now open the expellant cylinder valve by turning the wheel knob in the direction marked on it till it locks to discharge the expellant into the disinfectant solution container.
- The trolley mounted sanitization equipment consists of two outlets from the expellant cylinder, one goes into the disinfectant solution container the other one goes into the gun. One outlet from disinfectant solution container also meets into the gun.
- The mist gun can now be operated using the gun trigger. Apply pressure on the trigger provided on the gun to start disinfectant solution to discharge. You can switch between two modes by operating the "mode selector" provided on the nozzle of twin fluid mist gun (Jet mode and mist mode). Use Jet mode to disinfect area from a greater distance and spray mode to disinfect from a closer distance with a wider coverage area.
- Spray on the infected area floor such that the disinfectant enters the floor zone and move closer as the infected area floor is covered by the disinfectant and thus decreasing the effect of virus/bacteria.

### **Application of disinfectant solution in the affected area**

- The personnel can switch between mist mode and jet mode by rotating the nozzle in clockwise or anti-clockwise direction. When the intensity of infection is at its peak it is recommended to use jet mode to disinfect the area from a greater distance and bring the intensity of infection down. When the affected area is covered from a distance and the level of infection becomes less intense the personnel can use mist mode for a wider coverage area to disinfect the area completely. Spray mode also creates a barrier between the affected area and the personnel to protect him/her from virus attack when the sanitization is to be carried out from a close proximity.
- Aim the gun at the base of the floor or surface of the area, press the trigger on the gun to discharge the disinfectant solution.
- Aim towards the floor of the area closest to you then move forward to fully utilize the disinfectant solution. Spray from left to right or moving around the area to cover the floor base of the area or any uneven surfaces completely with disinfectant solution.
- Your sanitization equipment allows you stop and go control by controlling the trigger on the gun.
- If in case, sanitization on wall is required, it should be carried out from bottom and then towards upward at a maximum height of 3-4 feet, keeping safety and the potential damage to the wall into consideration.
- The disinfectant solution being corrosive in nature necessitates that any metal exposed to the agent including the agent container shall be thoroughly rinsed with fresh water.

**Note:** - Guide lines above mentioned are safe practices, but a real sanitization scenario might require instant decisions to be made and therefore such scenarios demand proper training, experience, practice and guidance.

The sanitization personnel should always make use of personal protective clothing along with the personal protective gears and in no case do sanitization if he is wearing loose or any other clothing.

### **Maintenance Schedule & Tasks**

The trolley mounted large area sanitization equipment is to be checked regularly by a qualified person at

least every 12 months to ensure that it functions properly, working according to the following test scope. The qualified person must be legitimized by CFEES, DRDO Delhi.

### Task & Scope

Test Interval Task Type	After Every Use	Regularly	Annual Service
	TP	TP	TP
General condition, cleanness.	VI/C	VI/C	VI/C
Legible, complete wording. (Instruction sticker.)	VI/R	VI/R	VI/R
Hydraulic pressure test.	NA	NA	R every 3 <sup>rd</sup> year (As per IS:2190).
Fittings, hoses, and safety features.	VI/R	VI/R	VI/R
Protective coating if any (e.g. corrosion).	VI/R	VI/R	VI/R
Trigger and interruption features (ball valve).	I/R	I/R	I/R
Threaded connections for mechanical damage and easy running.	I/R	I/R	I/R
Check functions of pressure gauge.	I/R	I/R	I/R
Function of overpressure valve.	VI/R	VI/R	VI/R
Continued suitability of the extinguishing agent; condition of the inside.	I/R	I/R	I/R
Safety features for any signs of damage.	I/R	I/R	I/R
Sealed surfaces and seals.	I/R	I/R	I/R
Refill/Repair agent cylinder if the seal has been tampered or broken	I/R	I/R	I/R
Weight of propellant cylinder/expellant cartridge. If weight reduced by 10%, replace/repair	I/R	I/R	I/R
Affix servicing evidence (test stamp) after servicing and filling have been completed.	I/R	I/R	I/R

**TP= CFEES trained personnel, R= Replacement OR Repair, VI= Visual Inspection, C= Clean & Polish, I= Inspection**

### Maintenance of Container and Compressed air cylinder

All activities necessary for preserving the proper working status of pressure vessels or become necessary as part of servicing and repair work must be performed by the authorized personnel only as per norms of the land.

### Troubleshooting & Remedy

Fault	Possible Causes	Remedy
No or low or high pressure in the disinfectant solution container tank.	Pressure Gauge non-functional. Relief valve released pressure. Cylinder discharged.	Investigate reason for high pressure. (e.g. high temperature. Contact CFEES or Fire Services or Firm for refill.
Gun does not spray.	Gun ducts clogged.	Contact CFEES, DRDO Delhi for rectification.
Nozzle does not spray.	Gun trigger not pulled through completely. Cylinder valve not open.	Pull gun trigger completely towards yourself. The gun to check discharge.
Other faults	Contact CFEES, DRDO Delhi.	

## **Repair**

Repair work can be necessary or inevitable to maintain trouble free proper operation of the disinfection system. It is in the interests of the operator's safety to use original spare parts; this also protects personnel and the environment from unforeseeable dangers.

If repair work is not performed at all or incorrectly or if original spare parts are not used. CFEES is not liable for any damage caused when using the product.

Repairs should only be carried out by CFEES or the firms trained personnel only!!

## **First Aid Measures for 4-6% Sodium hypochlorite Solution- disinfectant concentrate**

- Eyes: Immediately flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical aid immediately.
- Skin: Get medical aid immediately. Immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes
- Ingestion: Do not induce vomiting. If victim is conscious and alert, give 2-4 cupfuls of milk or water. Get medical aid immediately.
- Inhalation: Get medical aid immediately. Remove from exposure and move to fresh air immediately. If not breathing, give artificial respiration. If breathing is difficult, give oxygen.