



**PM 88**  
**Storage Tank Cleaning**  
**Dilute Acid Materials**

Product Application Manual

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## 1. GENERAL INFORMATION

### 1.1 DEFINITIONS

#### PM 88 - Strong Cleaner and Disinfectant

Designed to be used for cleaning and disinfection of water storage tanks and towers, filtration gallery walls and assorted wetted surfaces where minor foaming during the cleaning process and rinse down is not problematic.

#### PM 100 - Powder/Catalyst

An Organic Acid to be mixed with contents of the containers of PM88 **immediately** prior to use.

### 1.2 TANK, TOWER and SURFACE APPLICATIONS

The System is ready to use when the PM 100 powder and the contents of containers of liquid PM88 are mixed.

Wet the walls and columns with water, spray on solution gently from top to bottom, rinse thoroughly, neutralize and drain.

The tank is now clean and disinfected, ready to be returned to service.

The application Equipment Comprises of one acid-proof diaphragm pump (110V, .35 hp) complete with a 20' or 40' telescopic lance (1.8 gpm max., 65 PSI) and 200 ft. – 300 ft. of hose and hardware on a hose reel.

**1.2.A – Wells, Air Stripper and Filtration Media. DO not use PM 88 on any well, Air Stripper Media or Filter Media applications! Please see the separate application instructions for PM 77 for these types of applications.**

### 1.3 DISPOSAL

In basic form, the materials need only pH correction by chemical neutralization and/or dilution. However, specific approval may be required for the disposal of the material and rinse products prior to each discharge to the environment or sewage line as in current practice when cleaning a tank.

### 1.4 MATERIAL USAGE

The amount of PM 88 with associated PM 100 required to clean a standard design water storage tank or tower is typically one 55 gallon drum per 500,000 gallons.

Note: (each 55 gallon kit = typically 600 – 1,000 Ft<sup>2</sup> coverage).

Note: The degree of contamination or biofouling in a tank (which directly determines the PM 100 material consumption) is not directly related to the length of time the tank has been in service.

Factors such as the nutrient content of the water, the temperature, prolonged or stagnant storage and the efficiency of previous cleaning will also determine the material demand of the tank or tower in order to return it to a clean, uncontaminated state, suitable for the storage of drinking water.

The following is a table of typical application rates of the PM88 system:

<u>Tank Size</u>	<u>PM 88 Application Rate (gallons)</u>			
	<u>Stored Volume (Gallons)</u>	<u>Light</u>	<u>Standard</u>	<u>Heavy</u>
	50,000	5	5	10
	100,000	10	10	15
	250,000	15	20	25
	500,000	30	40	55
	1,000,000	60	75	90
	2,000,000	100	125	150
	3,000,000	135	175	205
	4,000,000	170	215	255
	5,000,000	200	250	300
	6,000,000	230	285	340
	7,000,000	260	320	380
	8,000,000	290	355	420
	9,000,000	320	390	460
	10,000,000	350	425	500

**Notes:**

**Light product consumption would typically be expected where a tank has:**

- a. Higher (>25 Ft) and/or circular walls
- b. Fewer columns (or dome roof)
- c. Good surface or approved lining

**Heavy product consumption would typically be expected where a tank has:**

- a. Lower walls (< 20Ft)
- b. Many columns
- c. Poor surface (or very pitted surface)

## 1.5 DOWNTIME

When trained, a three-man team can usually complete the cleaning of storage tanks up to 4 million gallons capacity in one working day. Tanks less than 2 million gallons of storage capacity are usually completed in 4 - 6 hours. Note: the design and number of interior supports will effect the cleaning time and amount of cleaning product required.

The three-man team will consist of two men within the tank and one man controlling surface activities and safety procedures.

Depending on the degree of experience, specific training may be needed to achieve these production rates.

## 1.6 TRAINING

Training of your personnel in the handling, application and disposal of materials is recommended. Ideally, such training will be done on site in an actual cleaning operation. Initial on-site training costs are included in the purchase price of the materials and purchase or rental of the application equipment.

## 2. ON SITE APPLICATION PROCEDURE

### 2.1 PM 88

Is a mixture of acids and disinfectants, which clean and disinfect water storage tanks and towers, contaminated water treatment plants and biofouled filtration gallery walls.

High concentration Chlorine disinfection is no longer required for typical cleanings.

#### 2.1(2) PACKAGING

PM 88 is supplied in 55-gallon drums with a separate container of PM100 powder.

#### 2.1(3) PREPARATION

**From a usage view, PM 88 is a two-part material comprised of the mixing of 1 lb. of PM 100 powder for each 5 gallons of PM 88 to be used. These two components should be stored as packaged and mixed on site immediately prior to use.**

#### 2.1(4) SAFETY

When using these materials, the following personal protection should be worn at all times.

Breathing: Disposable paper facemasks suitable for hydrochloric acid fumes - 3M 8246 or equivalent.

Hands: Acid-proof gloves.

Eyes, Face and Head: Full-face protector/visor mounted on a hard hat.

Safety Clothing: Waterproof hooded suits and boots.

## **2.2 APPLICATION PROCEDURE**

**2.2(1) Disinfect** all footwear and equipment to be taken into the tank.

**2.2(2) Close all washout valves.**

**2.2(3)** Wash down all internal surfaces with drinking water prior to application of PM products.

**2.2(4)** Mixing procedures for PM 88 and - Five (5) gallons of PM 88 is mixed with one (1) pound of PM 100 powder prior to use.

**2.2(5)** Apply the mixed liquid directly to all wetted/damp vertical surfaces. Also to any pipe work, ladders, ball valves and mechanicals.

Begin at the top and progress down to the floor, wetting the surfaces without much run-off.

Apply the liquid evenly and consistently to all surfaces regardless of how dirty they appear.

**Do not "wash" or over apply to the surfaces waiting for a visual confirmation that cleaning is occurring before moving on.**

**2.2(6)** Rinse all treated surfaces with copious quantities of drinking water between **ten minutes and one hour** after application. **Timing is not critical within these parameters.**

**2.2(7)** Visually inspect the rinsed surfaces, particularly in the vicinity of the inlet and the highest water level. If any areas are still dirty, reapply PM 88 to these areas only until clean. Rinse again as in 2.2.5.

**2.2(8)** When all surfaces are satisfactorily clean and disinfected the floor will be covered with rinse water containing diluted PM 88 removed biofilm residues and dirt. This rinse water is usually between pH 3 and pH 4.

**2.2(9)** Note: **The use of chlorine disinfection is no longer necessary, if approved by your state regulatory agency.**

## **2.3 NEUTRALISATION and DISPOSAL PROCEDURES**

**2.3(1)** Count the empty containers that have been used and be sure it matches the number delivered.

**2.3(2)** Apply the neutralizer directly on to the rinse water throughout the tank, applying more where it is deep. Walk around in the water to assist the mixing process.

Note: When working in confined spaces the atmosphere should be monitored for Oxygen depletion at all times. During neutralization, small amounts of Carbon Dioxide gas may be liberated although this is highly unlikely due to the very dilute nature of wash down materials.

After thorough mixing, take the average pH reading of the rinse down water at various locations in the tank.

**2.3(3)** If the average pH is less than 6.5 add a proportional extra amount of neutralizer and measure again.

**2.3(4)** When the average pH is between 6.5 and 8, the rinse water is usually suitable for discharge to the environment; but occasionally tankers or alternative means of disposal may be required depending on state or local regulations.

**NOTE - Ensure that approval for discharge has been obtained if the projected discharge does not meet your current permit.**

**2.3(5)** Having previously rinsed down walls with copious amounts of water per 2.2(6) the floor area should now be rinsed to waste by hosing with drinking water (it may assist the flushing procedure to use brushes and squeegees, as it would without the use of PM products).

**2.3(6)** The storage tank can now be filled with water for drinking and subject to bacteriological testing as specified by the state regulatory agency before being introduced into local drinking water supply.

## **2.4 NOTES**

**All application equipment should be rinsed** after each and every operation by pumping drinking water through the entire system.

PM 88 will generally not harm ladders, pipe work, sealants, coatings, and mechanical fittings.

All PM 88 cleaning and disinfection materials have received NSF certification, copies of the certification and product MSDS are available on request.