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HTH* DRY CHLORINATOR FOR USE IN SEWACE DISPOSAL PLANTS

HTH* dry chlorinator provides an effective solution to a number of sewage treatment problems commonly caused by microbiological action. For example, HTH can disinfect sewage, control slime and neutralize the hydrogen sulfide that causes odors and leads to masonry disintegration. In addition, pre-chlorination with HTH solutions can significantly improve sedimentation and coagulation of colloidal and other fine suspensions in sewage treatment operations.

Advantages of HTH * Dry Chlorinator

HTH dry chlorinator, which contains 65% available chlorine, is a granular or tablet form of calcium hypochlorite, one of the most effective sanitizers known. It is convenient, easy use and handle, doesn't require complex, expensive metering equipment or large storage tanks, and doesn't lose strength dly during storage.

All commercial sanitizers sold for biocidal applications must be registered with the Environmental Protection Agency (EPA). Olin has produced HTH dry chlorinator for over 50 years and has obtained registration for many of these applications. Some of them are presented here, but if your specific needs are not included, contact your nearest Olin sales office. Additional data are on file or we may be able to help you obtain the necessary registration. Be sure to comply with all other Federal, state and local regulations for sewage treatment.

Effluent Disinfection

HTH* dry chlorinator can destroy disease-producing organisms in raw or treated sewage. Therefore, it is often used as a standby treatment in large sewage systems and as a primary timent in smaller ones.

Chlorination for disinfection must take place before the age reaches a septic state. (Sewage becomes septic when its oxygen is lost through decomposition and its sulfates are reduced to hydrogen sulfide.) Since chlorination usually takes 15-30 minutes, a suitable detention basin must be provided.

If hypochlorinators are being used, they should always be located near the influent of the detention basin. If mechanical stirring or other agitators are not being used, chlorination for disinfection should take place before any primary or secondary sedimentation treatments.

The amount of HTH solution required will vary, depending on the concentration and condition of the final effluent. About 30% of the chlorine demand of raw sewage is attributable to settled solids; 40% to suspended and colloidal solids; 30% to dissolved solids.

Disinfection should be controlled by laboratory methods, where possible. In general, use sufficient HTH to provide a chlorine residual of 0.6 to 1.0 ppm after 15-30 minutes of contact. Experience with different types of sewage will usually

establish a relationship between residual chlorine and contact time. This relationship can then become the controlling factor for the operation, with occasional bacteriological checks being made as a safeguard.

When sewage is to be temporarily disinfected before being diluted in a body of water, the following dosages will usually provide satisfactory protection against pollution of the receiving waters:

Raw sewage requires from 10-30 ppm available chlorine Primary treated sewage requires 5-20 ppm available chlorine Primary and secondary treated sewage requires 2-5 ppm available chlorine

Bacteriological tests should be made frequently.

Hydrogen Sulfide Generation Control

Decomposing septic sewage generates hydrogen sulfide, which not only causes an odor problem, but oxidizes into sulfuric acid and causes disintegration of the masonry in the damp area above the water line.

Decomposition can be held in check by "up sewer hypochlorination" using HTH* solution in sufficient quantity to yield 15 ppm available chlorine. HTH solution should be introduced at points throughout the sewer trunk system so that all sewage is treated before it has reached a septic condition. Where sewage has already become septic, a stronger dosage of HTH will be needed. This method of treatment is especially valuable in sluggish collection systems or long outfalls.

Slime Control

In sewer systems and treatment plants, uncontrolled slime can clog conduits, injest trickling filters, restrict water ways and cause ponding of the filters and sludge building.

For slime control in conduits, the chlorination dose must be determined by the chlorine demand of the system. Chlorination in concentrations of 2-15 ppm available chlorine, based on the system's chlorine demand, will control the growth of slime. (These concentrations are equivalent to 100-1000 ppm on the basis of dry solids in the effluent at the point of infection.)

The solution of HTH* must be applied at a point where it will mix thoroughly with the effluent. The application should be repeated as required. Once the infestation has been reduced to an acceptable level, the growth may be controlled by a continuous dose of 0.5 ppm available chlorine.

When ponding of the filters is excessive, filter nozzler often become clogged. Solutions of HTH, fed continuously into the effluent from above the filter nozzles, will clean the filters properly. In extreme cases, HTH solutions containing 15 ppm available chlorine will be necessary. After a thorough cleaning, the filters may be kept slime-free by either of two methods: (1) a continuous dose of 0.1 ppm available chlorine; or (2)

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intermittent application of HTH solution to the dosing tanks. The necessary dosage and frequency of application depend on the severity of the problem.

In activated sludge plants, slime can interfere with proper settling, causing "bulking sludge." HTH solutions containing 2 to 8 ppm available chlorine, introduced into the return sludge line, will effectively control this problem.

B.O.D. Reduction

The discharge of sewage with a high biochemical oxygen demand (B.O.D.) into lakes and streams can cause odors, visual pollution and death to aquatic life.

This condition can usually be avoided by applying HTH* solution to the effluent until a substantial residual is obtained. Application should be made at a point which will permit a 10-20 minute contact period before the discharge of the effluent into the stream. Minimum dosage to a residual of about 0.2 ppm after a contact time of at least 10 minutes will reduce the effluent's B.O.D. 10-30%. Where longer-lasting or greater B.O.D. reductions are necessary, dosage to higher chlorine residuals is recommended.

How to Prepare Solutions of HTH " Dry Chlorinator

Each of the applications listed above requires a specific concentration of solution, measured in parts per million (ppm) of available chlorine. To prepare the proper strength solution follow these simple steps:

- 1. Determine the volume of the holding tank (in cubic feet or cubic inches).
- 2. Find the capacity of the tank in gallons. If the volume has been determined in cubic inches, use Formula (2).
 - (1) Gallons $= 7.48 \times \text{Volume in cubic feet}$
 - (2) Gallons = $.0043 \times \text{Volume}$ in cubic inches
- 3. Use Table 1 to determine how many ounces of HTH dry chlorinator must be added to the number of gallons of water to obtain the required ppm of available chlorine. (Never add HTH dry chlorinator to anything but water.) For a volume of water that does not appear in Table 1, simply calculate between values.

Storage and Handling

Store in a cool, dry, well ventilated place away from combustible materials, and avoid contamination with any foreign material. Protect against physical damage. Drums may rupture if exposed to heat.

Toxico oxical Properties

The acute oral LD₁₀ (rat) is 850 mg/kg. The acute dermal LD₁₆ (rahbit) is greater than 2 g/kg. The acute inhalation LC₁₆ is less than 20 mg/l and greater than 2 mg/l in inspired air for one hour (rat). HTH* dry chlorinator is corrosive to the skin and eyes. It was not found to be a mutagen in the Ames assay and is not known to be a carcinogen.

Table 1

Required Amounts of HTH* Dry Chlorinator*

(Pounds – Ounces)

Available Chlorine (ppm)	Water (Gallons)				
	10	50	100	500	1,000
1			_	0~½0	0-1/5
15	-	0-1/4	0-1/10	0-11/2	0-3
25		0-1/4	0-1/2	0-3	0-6
50	0-Vio	0-1/2	0-1	0-6	0-12-
100	0-1/5	0-1	0-2	10-11	1-5
200	0-%	0-2	0-4	1-5	2-19
300	0-1/3	0-3	0-6	2-0	4-6
400	0-%	0-4	0-8	2-10	5-4
500	0-1	0-6	0-11	. 3-4	6-8
1,000	0-2	0-12	1-6	6-8	13-0

*For convenience in measuring-mail quantities, 2 leaspoons of granular HTH equals approximately [4 ounce]

Personnel Protection

HTH* dry chlorinator is easy to handle and use. As with any chemical, however, certain precautions should be taken. Do not get in eyes, on skin or on clothing. Avoid breathing dust. Do not take internally. Wear goggles, coveralls and neoprene, rubber or PVC gloves and boots. Read label instructions before using product.

First Aid

Ingestion: Give bread soaked in milk, followed by large amounts of water. If person is conscious and vomiting, plafface down with head lower than hips. Get immediate medical attention.

Skin Contact: Flush with water for 15 minutes. Call a physician.

Eye Contact: Flush with water for 15 minutes. Call a physician. Inhalation: Remove victim to fresh air. Call a physician.

Spill and Leak Procedures

Remove all sources of ignition. Wear a NIOSH/MSHA approved dust and chlorine respirator. Follow OSHA regulations for respirator use (see Title 29, Section 1910.134, Code of Federal Regulations). Wear goggles, coveralls and rubber, neoprene or PVC gloves and boots. Clean up in a manner to minimize contamination with organic material. Do not return spilled material to original container. Place in a fresh container and isolate outside or in a well ventilated area. Do not

^{*}Stock solutions should be freshly prepared and kept in properly labeled containers to protect against contamination. Unused stock solutions should be discarded.

Notume of a rectangular tank:
V = Length × Width × Height

Volume of a circular tank: V = 3.142 × Radius × Radius × Height

or V = 0.785 × Diameter × Diameter × Height

seal the container. Flush any residual material with large quantities of water. Wash all contaminated clothing before reuse. In the event of a large spill call 203-356-2345.

Disposal

Dispose of unused product in a manner approved for this material. Consult appropriate Federal, state and local regulatory agencies to ascertain proper disposal procedures.

Shipping Information

HTH* dry chlorinator is available in granular or tablet form in 100 lb. fiber drums.

Technical Assistance

Technical assistance is available to facilitate further investigation of HTH* dry chlorinator. If you have a question or need more information, please call or write your nearest Olin sales office.

Keep HTH® out of reach of children. Danger. See principal label for complete precautionary information and storage and handling.

The use of HTH* dry chlorinator for the purposes described in this bulletin has been registered with the United States Environmental Protection Agency, but may not have been approved or registered for use or sale for such purposes in other countries. Olin Corporation assumes no responsibility for compliance with the laws of any country except the United States.

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