

Bulk Storage Tank Guidelines

1.0 Introduction: PureMash® Skid

The PureMash Fermentation skid requires MashGuard One as one of the two precursor chemicals to generate *chlorine dioxide*. This bulletin is intended to assist in the selection and installation of a bulk chemical storage tank. It is intended to be used as a guide in conjunction with good engineering practice, and adherence to local codes and standards.

2.0 Site Evaluation

The PureMash bulk storage tank should be located in close proximity to the PureMash Fermentation skid. Consideration must be given to tank truck deliveries, and the need for road clearance and access.

The *hydrogen peroxide* in MashGuard One causes it to be slightly effervescent, thus generating small gas bubbles that accumulate in high points in the piping. The bulk storage area should be designed to allow for proper sloping of the lines to prevent pump air binding. This will be further addressed in Section 9.0 Piping and Gasketing Materials.

3.0 Materials of Construction

Several materials are suitable for the storage of MashGuard One. The most common is cross-linked high-density polyethylene (HDPE). These tanks are usually readily available in various sizes.

Fiberglass Reinforced Plastic (FRP) tanks are also suitable for the storage of MashGuard One. The resin selection for a FRP storage tank should be Hetron 922, Derakane 411, or approved equal. These tanks are usually custom fabricated to the client specifications.

316L stainless steel is also a suitable material. Stainless steel storage tanks require passivation, which builds an oxide layer on the interior surface of the tank, protecting it from corrosion.

4.0 Tank Capacity and Description

A typical tank truck delivery is 4,000 gallons of MashGuard One. It is recommended in most applications that a minimum of a 5,000 gallon storage tank be installed. This allows a full truck to be unloaded, and gives the user some additional room for inventory.



Several nozzles need to be available on the vessel for level detection, draining, filling, and inspection access. The following two tables outline the required and recommended list of tank nozzles. All nozzles recommended are to be 3", 150#, ANSI type, unless otherwise noted.

4.0 Figure A: Required Tank Nozzles

TOP OF VESSEL	Truck Unloading Connection 2" dia. (with piping insert to within 6" of the tank bottom with siphon breaker)
SIDE OF VESSEL	Tank Vent, one pipe diameter larger than the tank unloading inlet piping. (with 180 deg. bend and screen) Pump Suction
	TANK DRAIN

4.0 Figure B: Recommended Tank Nozzles

TOP OF VESSEL	Tank Level (Ultrasonic)
SIDE OF VESSEL	Tank Manway Access, (HDPE tanks 19" dia., (mfg. Std.), FRP tanks 24" size) Tank Level Bottom (Alternate – Jogler armored level glass)
	Tank Level Top (Alternate – Jogler armored level glass)
	Tank Manway Access

5.0 Weather Protection

MashGuard One should be maintained **between 40° F (5° C) and 100° F (38° C)**. To maintain proper storage conditions, consideration should be given to tank insulation, pipe heat tracing, tank heating, and indoor installation. If the MashGuard One temperature drops below 40° F (5° C), the *sodium chlorate* may begin to crystallize and precipitate out of the solution which will lead to operational problems with the unit.

6.0 Tank Unloading Requirements

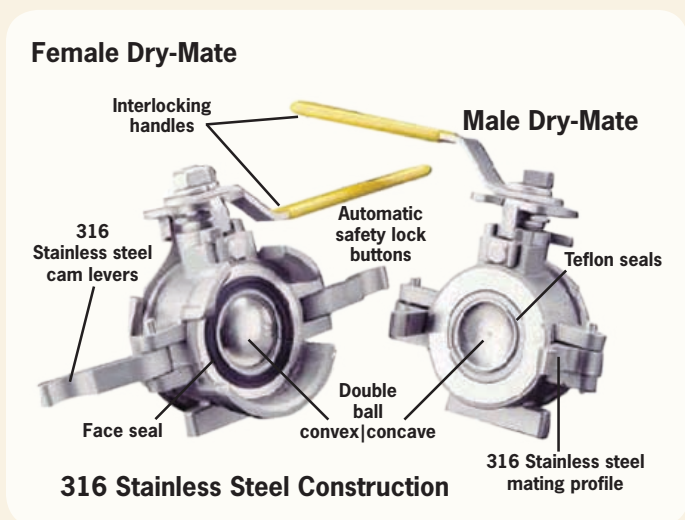
MashGuard One is delivered in dedicated chemical trucks equipped with an unloading pump, and approximately 40 feet of unloading hose. **Under no circumstances should air be used to unload or blow down the unloading hoses or MashGuard One lines.** Plant air typically contains oil, which will adversely react with the MashGuard One, and cause it to decompose.

Only properly trained and approved personnel should unload MashGuard One. **It is critical that no other chemical, especially acids, be unloaded into the MashGuard One tank.** *Sulfuric acid* is the second precursor chemical used to make *chlorine dioxide*. If an acid tank truckload were inadvertently unloaded into a MashGuard One tank, catastrophic equipment damage and possible personnel injury could occur.

It is strongly recommended that the MashGuard One tank unloading manual valve be “Locked and Tagged” and that only the shift supervisor or unloading supervisor have access to the key.

The MashGuard One tank unloading connection is a 2” Banjo Corporation dry-mate ball valve supplied by the chemical provider. This valve will not allow a typical camlock truck connection to be used to unload the incorrect chemical into the MashGuard One tank.

Figure 6.0 Tank Unloading Diagram



The valve is constructed of 316 stainless steel with Viton, EPDM, and Kalrez® face seals. The seats are 100% Teflon. This valve’s unique construction has several built-in safety features. When liquid is flowing, the two halves cannot be uncoupled without turning both handles to the closed position. When the dry-mate halves are apart, the handles cannot be turned to the open position (see Figure 6.0).

7.0 Labeling

The MashGuard One unloading station shall be labeled and tagged properly to avoid any confusion by the chemical delivery driver. The MashGuard One storage tank should also be labeled with the appropriate “Oxidizer” labels, and the area should be labeled as a “Non-Smoking” area. An example of a PureMash tank National Fire Protection Agency (NFPA) label is shown below (see Figure 7.0).

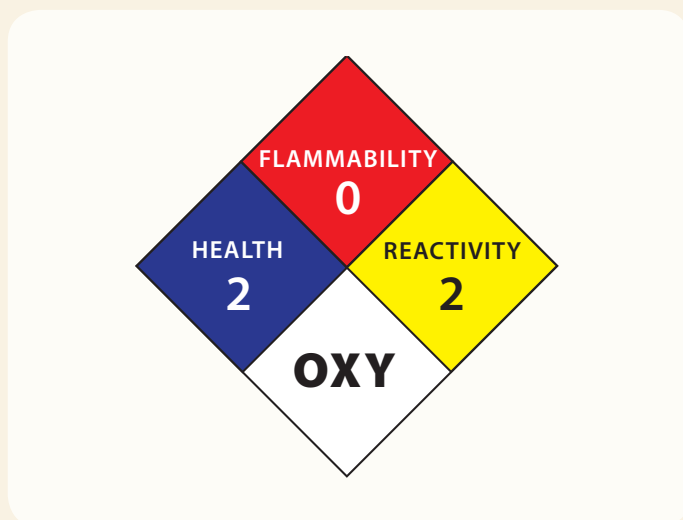
8.0 Chemical Containment Requirements

The MashGuard One chemical provider utilizes a Responsible Care® chemical supplier program, which means that before bulk chemical deliveries of MashGuard One will be allowed at a client’s site, several critical items must be met.

The MashGuard One tank **MUST** be installed in its own diked containment area. In the event of a spill or leak, this will prevent the inadvertent mixing of incompatible chemicals, which may cause the MashGuard One to decompose or react. The volumetric capacity of the diked area should not be less than 110% of the greatest amount of liquid that can be released from the largest tank within the diked area, assuming a full tank.

The MashGuard One storage area should be drained to an alkaline or neutral sewer to prevent mixing with acids, thus forming *chlorine dioxide*.

Figure 7.0 Tank Labeling Diagram



9.0 Piping and Gasketing Materials

The recommended piping material is socket welded, or flanged schedule 80 PVC pipe and fittings. Minimize line lengths and the use of threaded connections to prevent leak points. 316L stainless steel pipe and fittings are also suitable materials, after passivation.

Piping containing MashGuard One should be protected from temperatures below 40° F (5° C). Installations in areas where the temperature is low for extended periods should be insulated, electrically heat traced, or located indoors.

All piping should be well supported and sloped towards the PureMash Fermentation Skid unit at ¼" per foot. The PVC piping line size should be 2" for both the sulfuric acid, and MashGuard One chemical feed lines.

The recommended gasket material is 1/8" thick expanded Teflon sheet material cut in a full-face pattern.

10.0 Safety Requirements

The National Fire Protection Association (NFPA), as well as the Occupational Safety and Health Administration (OSHA), should be consulted when designing and / or installing a chemical storage area.

The MashGuard One storage tank should be located in a well-lit area. Organic materials, such as paper, wood, and cotton rags, should not be allowed to accumulate due to their incompatibility with oxidizers like MashGuard One.

Personnel involved in plant operations where oxidizers are stored must receive instruction in handling the material, including manufacturer recommendations.

As with any chemical storage area, a safety shower and eyewash station must be located and easily accessible for personnel working in the MashGuard One storage area. The chemical unloading area should be curbed, and the drain

routed to an alkaline sewer to prevent mixing with acids which will form chlorine dioxide.

A water supply must also be available for washing down the equipment and any residual chemical spills that may occur during unloading.

11.0 Pre-shipment Checklist

The following items must be completed before a delivery of MashGuard One will be allowed:

1. Tank materials of construction compatible with MashGuard One
2. Tank must be vented (see 4.0 Figure A)
3. Tank must have top-fill unloading capabilities
4. Tank must have proper labeling
5. Tank level must be visually verifiable
6. Tank unloading line equipped with 2" dry-mate ball valve (supplied with the PureMash Fermentation skid)
7. Tank must be diked, and capable of holding 110% of tank contents
8. Manual shut-off valve located inside the dike area
9. Tank must be located away from reactive chemicals (spills from other tanks into MashGuard One dike area must not occur)
10. Eyewash, and safety shower located at unloading station
11. Site has MSDS sheets
12. Wash-up water available at unloading station



For more information email info@puremash.com

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