

**FMC's Recommended Standards for  
Returnable Polyethylene IBC's Containing  
<52% Hydrogen Peroxide (<500 Gallons)**

Hydrogen Peroxide is occasionally transported and stored in tote quantities. FMC recommends the following standards and practices for storage and handling of "Returnable" Hydrogen Peroxide totes. Adherence to these guidelines is necessary to prevent personnel injury or property damage resulting from incidents with Hydrogen Peroxide. Also, always compare FMC specifications to other applicable standards and adopt the most stringent.

Refer to MSDS for additional information.

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The Intermediate Bulk Container (IBC) must meet all applicable government regulations for the transportation and storage of < 52 % Hydrogen Peroxide (H<sub>2</sub>O<sub>2</sub>); UN2014, DOT Packing Group II.

### **I. Design Specifications:**

#### **A. General:**

1. Only H<sub>2</sub>O<sub>2</sub> compatible materials are acceptable for any “wetted” components. This includes those components subject to periodic H<sub>2</sub>O<sub>2</sub> contact, such as the fill cap, breather vents, pressure/vacuum relief vents and dust cap. Contact FMC for list of approved materials.
2. Any “wetted” stainless steel components (304L or 316L only) must be passivated with nitric acid (per FMC passivation specifications).
3. All “wetted” gaskets and o-rings must be TFE-encapsulated silicone, Viton or virgin Teflon; valve seats/seals must be Teflon.
4. IBC should be stenciled ‘FOR H<sub>2</sub>O<sub>2</sub> ONLY’ in 2" high prominently displayed lettering.

#### **B. Bottle (Liner):**

1. Natural, unpigmented, linear polyethylene (PE) must be used (e.g. Exxon Escorene LL-8361, Escorene LL-8460, Quantum Microethene MP 625-661).
2. Only virgin PE resin may be used; regrind is **not** acceptable.
3. Minimum 1/4" thickness for composite IBC's with protective steel frame; 1/2" minimum thickness for All Poly Totes.
4. Must be UV-stabilized.
5. Maximum 5-year life span (i.e. 2 DOT test cycles) for 1/4" wall; 10-years (i.e. 4 DOT test cycles) for 1/2" wall thickness.

#### **C. Frame (Applies only to Composite IBC's):**

1. Must have a framework for protection of inner container, especially from forklift trucks. Mesh size must be smaller than forklift tines.
2. Frame must protect bottom outlet of tank, and should include a substantial trap door, hinged from top.

#### **D. Breather Vent(s):**

1. Polyethylene with TFE membrane is recommended.
2. Breather vents must be resistant to liquid flow and each must have a minimum vapor relief capacity of .004 CFM @ .25 psi.

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visit the FMC website at [www.fmcchemicals.com](http://www.fmcchemicals.com) for more information

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3. A minimum of one breather vent must be provided in the top vapor space of the IBC (preferably in the fill cap).

**E. Emergency Vent:**

1. Must vent a minimum of 6,000 SCFH @ 5 psi.
2. A spring-loaded pressure relief device with a cracking pressure of between 3 psi (minimum) and 10 psi (maximum) is recommended. A fusible device alone is not an acceptable means for providing emergency venting for H<sub>2</sub>O<sub>2</sub> IBC's.

**F. Vacuum Relief:**

1. Must be of sufficient capacity to maintain internal pressure at less than 1.0-psi vacuum (i.e. > 13.7 psia) at 30 gpm discharge flow.

**G. Outlet Assembly:**

1. Supported, 304L or 316L s.s. valve assembly (passivated) is preferred. A Polyethylene or Polypropylene valve assembly is also permitted; however, it must be replaced every 2-1/2 years - i.e. at the time of the DOT test cycle.
2. Valve must be properly drilled/vented for peroxide service. See FMC drawing FS-23462, sheet 1A for an example of properly vented ball valve.
3. Flanged or welded connections are preferred over threaded. Bulkhead fittings are not recommended.
4. Dust cap must be tethered and liquid tight with pressure relief/venting capability. See FMC drawing FS-23462; sheet 1A for example of a properly vented dust cap.

**H. Fill Cap:**

1. Natural, unpigmented high-density polyethylene is recommended; only virgin material may be used (i.e. no grind).
2. Must be tightened to IBC manufacturer's specifications.
3. Must be tethered to IBC frame or bottle.

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**II. FMC Management Practices:**

**A. Introducing new IBC's into service:**

1. Check all fittings, gaskets, etc. for H<sub>2</sub>O<sub>2</sub> compatibility.
2. Ensure that breather vents have been provided for IBC vapor space and the outlet dust cap.
3. Check bottom outlet valve to ensure that it is vented and is equipped with white Teflon seats.
4. Ensure that IBC top is equipped with pressure & vacuum relief valve(s).
5. Visually inspect interior and exterior of IBC for any damage, defects, and contamination.
6. Completely fill IBC with good quality water source. Hold for a minimum of 16 hours and check for leakage. Drain when satisfied there is no leakage.
7. Stencil on the top of IBC and on two sides 'FOR H<sub>2</sub>O<sub>2</sub> USE ONLY' in 2" minimum letters.
8. Stencil 'IN-SERVICE' date and 'TEST DUE' date on side of container. IBC must be leak tested and inspected every 2-1/2 years, per DOT 49 CFR §180.352\*. The most recent leak test date must be marked on the UN plate per DOT 49 CFR §180.352(d)\*.

**B. Inspection after return from user:**

1. Note the 'RETEST DATE' date on the UN plate. If more than 2-1/2 years has elapsed since last test date, take IBC out of service for retest/inspection per DOT 49 CFR §180.352. ¼" PE liner on Composite IBC's must be replaced after 5 years of service; ½" thick All Poly Totes must be taken out of service after 10 years.\*
2. Reject any IBC that has been used for any product other than H<sub>2</sub>O<sub>2</sub>. If there is a heel present, it must be checked to insure that it is H<sub>2</sub>O<sub>2</sub> or clean water before proceeding. Discard H<sub>2</sub>O<sub>2</sub> heel according to proper local, state, and federal procedures.
3. Inspect the exterior of the IBC completely and carefully. Reject any IBC that exhibits any damage that would affect IBC integrity. If the fill cap seal is broken, or if there is any evidence that the top closure fittings have been tampered with or removed, the IBC must be taken out of service until it has been confirmed that no contamination has occurred.
4. Inspect the interior of the IBC with a light probe and reject any IBC with interior damage or evidence of contamination.

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**C. IBC preparation prior to filling:**

1. Inspect breather vent(s); replace any that show signs of damage, wear, or pluggage.
2. Inspect all gaskets. Replace any that show signs of damage or wear.
3. Inspect general condition of service equipment (e.g. pressure/vacuum relief valves, fittings, etc.) and frame. Repair or replace as required.
4. Inspect outlet valve assembly for proper operation and seal.
5. Visually inspect the interior of the IBC through the fill cap using a light probe to determine that there is no residue of any kind in the IBC. Use caution to ensure no contaminants enter the IBC. If water will not remove the contaminants, then discard the IBC. The use of solvents, detergents, etc. will increase the potential for product contamination.

**D. IBC filling:**

1. Fill the IBC taking every precaution to avoid spilling. Do not fill over 95% of the capacity of the IBC.
2. During filling, the operator should be alert for reaction inside the IBC. If there is any indication of reaction or decomposition, the process should be halted and all personnel should leave the area. As soon as it is safe to re-enter the area, dispose of the product in the IBC, triple wash the IBC and discard in accordance with all local, state, and federal guidelines.
3. Check all top fittings for proper tightness. Follow manufacturer's closure tightening specifications (use of torque wrench is recommended).
4. Attach tamper evident seal to fill cap, bottom outlet dust cap & protective door. The fill cap tether should be secured to prevent complete removal, but with sufficient slack to allow the fill cap to be opened 1/4 to 1/3 turn for venting during discharge.
5. Analyze each IBC lot for product H<sub>2</sub>O<sub>2</sub> assay and stability.
6. Filled IBC's should be set aside for 24 hours prior to placement in inventory or shipment. After 24 hours, check the filled IBC for evidence of leakage or decomposition. IBC swelling indicates unacceptable decomposition. IBC's that are observed to swell or leak should be emptied, the contents properly disposed of and the IBC rejected.

**E. Reject IBC disposal:**

1. IBC's rejected for any reason should be triple rinsed and disposed of in accordance with federal, state, and local regulations.

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**III. Recommended User Practices:**

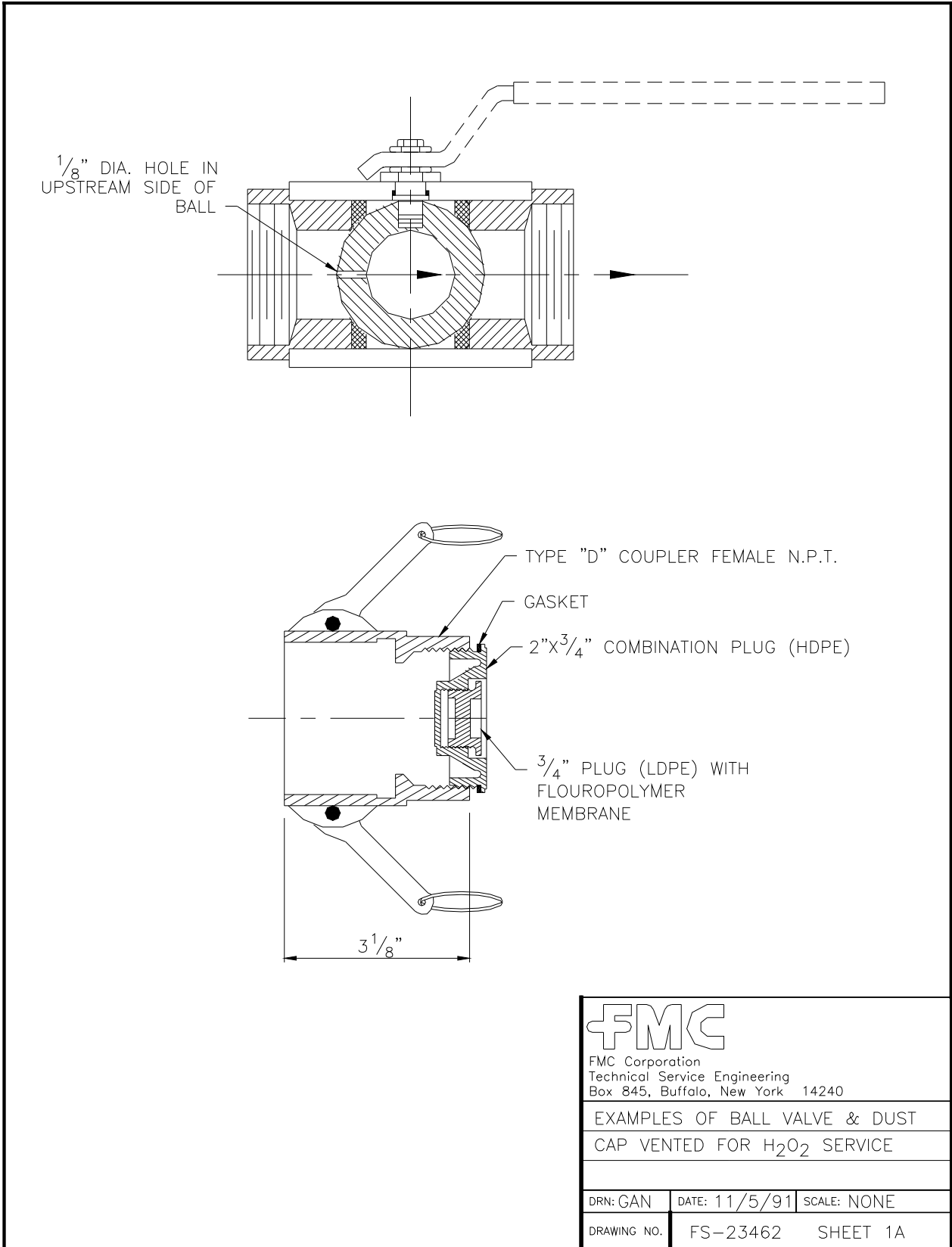
1. On receipt of filled IBC, the user should inspect for evidence of damage, swelling, or leakage. Ensure that fill cap, bottom outlet dust cap and protective door seals have not been tampered with. If any of the above is noted, the IBC **must not be used**, and user should immediately contact FMC for further instruction.
2. The user must ensure that the IBC transfer/unloading system is dedicated for Hydrogen Peroxide service only. The system must be designed and constructed with approved materials and safety relief devices. Additional information is available from FMC upon request.
3. After the user has determined that the IBC and the transfer/unloading system are in order, he may begin preparation for unloading by opening the fill cap approximately 1/4 to 1/3 turn, without breaking the seal, to provide adequate venting for the discharge operation.

**Note: Top unloading is not recommended by FMC; IBC's are intended for bottom discharge only. To prevent contamination during use, user must never remove the fill cap and all other top closure fittings.**

4. Remove bottom outlet dust cap and protective door seals. Ensure bottom outlet valve is closed, carefully remove dust cap (tethered), and connect to discharge fitting using properly passivated equipment of acceptable materials of construction. Note: When connecting and disconnecting to IBC, the proper personnel protective equipment must be worn.
5. Open bottom discharge valve slowly and ensure there are no leaks. It is recommended that the unloading rate not exceed 30 GPM.
6. After IBC is completely empty, close discharge valve, disconnect discharge fitting, replace dust cap, close bottom assembly protective door, and close the fill cap. FMC may not accept the IBC if it is returned with a heel.
7. **Please contact FMC if there are any problems with the IBC or its contents, or any concerns regarding the proper storage, transportation, handling and use of Hydrogen Peroxide.**

**\* Unless other arrangements have been made, the IBC "owner" will have primary responsibility for compliance with the IBC retest and inspection requirements of DOT 49 CFR §180.352, and replacement of the PE liner.**

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