**Title:** Hose and Hose Fittings

**Function:** Environmental, Health, and Safety

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**Reviewed:** 12/19  | **Effective:** 01/20  | **Supersedes:** 08/12

**Preparer:** Site Safety Representative

**Owner:** Director, Environ, Health & Safety

**Approver:** SVP and Gen. Mgr., Freeport

## REVISION HISTORY

<table>
<thead>
<tr>
<th>Date</th>
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<th>Details</th>
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| 12/19 | 5 | 2.9 added lean air to utility hose list  
2.10 added lean air definition  
4.17 added hoses & hose color requirements for lean air |
| 12/12 | 4 | updated titles to reflect ICON job descriptions |
| 08/12 | 3 | 1.0 Removed Table II. Use Blank Hose Inventory Table for guide to Unit Hose Inventory |
| | | 2.5-2.9 Added Definitions for Toxic, Highly Toxic, EPCRA Hazardous Material, Higher Hazard Chemicals (HHC), and Lower Hazard Chemicals (LHC). |
| | | 2.9 Chemicals with NFPA or HMIS equal to 2 can be designated HHC or LHC after a Hazard Assessment by Unit/Department DST |
| | | 3.0 Removed the exclusion of hoses < 1/2” diameter from BCF020.007 per corporate requirements. Removed reference to BCF020.004 Compressed Gas Cylinders |
| | | 4.1 Added requirement for Suppliers/ Vendors who load/ off load HHC at BASF Facilities using non-BASF owned chemical hoses to follow this standard or follow a comparable BASF approved hose program that meets these minimum requirements. EHS will approve hose programs. |
| | | 4.2 Added requirement to follow manufacturer’s recommendations or good engineering practices for inspections and testing of hoses not covered by this procedure |
| | | 4.3 Added reference to Blank Hose Inventory Table |
| | | 5.1 Deleted fire hose and sample hose table. Added blank hose inventory table |
| | | 5.2 Revised Hose Inspection/ Testing Frequency Table guidelines |
| | | 5.3 Removed annual requirement. Follow Hose Inspection/ Testing Frequency Table guidelines |
| | | 5.4 Added the ability to extend the inspection frequency of LHC based on a documented Hose Risk Assessment |
| | | 5.5 Added requirement to document the Hose Risk Assessment |
| | | 5.8 Added requirement that hoses used to transfer flammable liquids must not exceed 10⁶ ohms resistance for electrostatic accumulation and be marked to identify them as meeting this requirement |
| | | 5.8 Added requirement for hoses used in Class 1, Division 1 areas must not exceed 10⁶ ohms resistance for electrostatic accumulation and be marked to identify them as meeting this requirement |
| | | 5.8 Stainless steel braided hoses by design meet ohms resistance requirements and are exempt from conductivity testing/marking |
| | | 5.8 Steam and condensate hoses must not exceed 10⁶ ohms resistance for electrostatic accumulation and be marked to identify them as meeting this requirement |
| | | 6.1 Added hyperlink to attachment BCF020.007 Hose to Process Options |
| | | Updated Hose Inspection/ Testing Frequency Table and notes |
| | | Removed Hose to Process Drawings. Attached hyperlink to BCF020.007 Hose to Process Options |
| | | Attached hyperlink to letter (Sample Hose Letter) for Suppliers/Vendors who load/ off load HHC at BASF Facilities using non BASF owned chemical hoses |
1. PURPOSE

The purpose of this standard is to:

- establish uniform minimum specifications for utility service hoses and fittings
- implement unit/department specific process hose selection and use guidelines through the development of a hose inventory table by each unit/department, using blank hose inventory table as a reference guide
- establish a site-wide hose inspection and compliance auditing system
- assign responsibility and accountability for compliance with this standard
- address precautionary measures when using hoses

2. DEFINITIONS

2.1. chemical hose
a portable hose used to transfer process chemicals; may also be known as a process hose

2.2. EPCRA hazardous material
EPCRA hazardous materials are the USEPA extremely hazardous substances (EHS) listed in 40 CFR 302.4.

2.3. higher hazard chemical (HHC)
flammable gases or liquids or other toxic or corrosive materials (with any NFPA hazard rating H, F, or I > 2 or any HMIS rating H, F, or P > 2)

2.4. highly toxic
“Highly toxic” means LC50 < 200 ppm (≤ 2 mg/L) for one (1) hour (inhalation) or LD50 (dermal) ≤ 200 mg/kg. per 29 CFR 1910.1200. See Attachment 2 - Site Hose Specifications by Service.

2.5. lower hazard chemical (LHC)
for the purposes of this procedure, finished products and raw materials with each of the NFPA or HMIS Hazard Ratings < 2

NOTE: Chemicals with an NFPA or HMIS hazard equal to two (2) are evaluated on a case-by case basis by DST to determine higher hazard or lower hazard for the purposes of this procedure.
2.6. **maximum allowable working pressure (MAWP)**
the pressure rating stamped on the hose that may not be exceeded at any time during use

2.7. **permanent hose**
a hose that is not portable and is intended to remain installed in the process in the place of a rigid pipe

2.8. **toxic**
“Toxic” means $200 \text{ ppm} < \text{LC50} < 2000 \text{ ppm}$ ($2 \text{ mg/L} < \text{LC50} < 20 \text{ mg/L}$) for one (1) hour (inhalation) or $200 \text{ mg/kg} < \text{LD50} (\text{dermal}) < 1000\text{mg/kg}$, per 29CFR 1910.1200. See Attachment 2 - Site Hose Specifications by Service.

2.9. **utility hose**
a portable hose used only to transfer nitrogen, air, water, steam, & lean air

2.10. **lean air**
air mixture with additional nitrogen to reach 6% volume of O2 with process variations per Acrylic Monomers safety concept alignment

3. **SCOPE**
This procedure applies to all portable hoses and hose fittings, rented or purchased, that will be used on the Freeport site.

NOTE: This standard does not apply to permanent hoses used in the process. Permanent hoses shall fall under the inspection and guidance of the mechanical integrity process.

4. **PROCEDURE**

4.1 **Hoses Covered**
This procedure covers BASF owned hoses designed to be routinely connected and disconnected that are used in either the service addressed below or to transfer process chemicals, raw materials, or finished products. Non-BASF owned loading/unloading hoses handling higher hazard chemicals that will be connected to BASF owned equipment/processes on-site by contractors, transport companies, or suppliers (i.e., unloading/loading raw materials or hazardous waste), must be tested/inspected by the owner either according to this procedure or by a comparable procedure that EHS has approved. See Attachment 3 - Sample Hose Letter.

4.2. **Hoses Not Covered**
This procedure does not cover:
- hoses intended to be permanently installed in piping, such as vibration or weigh cell isolators, or that are integral parts of chemical transfer/processing equipment, such as railcar unloading booms or urethane mold machines
- permanently installed hydraulic system hoses that transfer hydraulic pressure
- permanently installed refrigerant system hoses
- open-ended hoses (such as those used as drain lines or pump suction dip tubes)
- hoses used in non-hazardous solids conveyance
- tubing
- fire water and potable water system hoses

Design, inspection, and/or testing of hoses that are excluded from this hose procedure should either follow manufacturer or other good engineering practice guidelines or should be addressed according to the facility’s preventive maintenance/mechanical integrity program for the corresponding equipment or piping system.

Non-BASF owned hoses used to load/offload HHC on site must follow these standard requirements or a comparable inspection/testing program approved by EHS.

4.3. Select the proper hose(s) for the process chemicals or utility service and the specified fittings. Reference Attachment 1 - Blank Hose Inventory Table.

4.4. New hoses, upon receiving, shall be visually inspected and color coded or tagged to identify the inspection frequency.

4.5. Before each use, visually inspect the hose for defects and proper gaskets. If a hose is defective, apply a danger tag, and remove it from service.

4.6. Utility hoses are intended for the utility of service and shall not be used to transfer chemicals. Check the hose for residual materials. If residuals are present, clean the hose before use.

4.7. Do not use utility air to clear hoses. Use a flush medium that will not react with the product, and drain into a suitable container.

4.8. Avoid “shotgun” type valve arrangements. The openings to utility and other process systems should be designed to direct the discharge in a manner that avoids potential for employee exposure.

4.9. If using hoses with cam lock (quick connect) fittings, the ears must be tied or pinned to prevent accidental uncoupling. On fittings with lock pin or locking arm capabilities, the pins/arms must be locked in place. The exception is for water hoses being used for washing down purposes.
4.10. Hoses that are blocked in at both ends must be depressurized as soon as possible to prevent an overpressure situation resulting from possible thermal expansion.

4.11. When using hoses, avoid routing across traffic areas, i.e., aisles and walkways.

4.12. In all instances in which hose(s) are laid across roads or areas where vehicles may pass, the hose(s) will be protected by placing planking, hose ramps, or rubber forms on either side of the hose(s) to bear the weight of the vehicle. The exception is for hoses being used to wash down an area.

4.13. If hose splicing is required, the manufacturer or manufacturer’s representative (vendor) shall splice it. The hose unit shall be pressure tested, per manufacturer’s recommendations, after splicing to ensure reliability. The vendor making the repair shall provide documentation.

4.14. Adapters may be used to connect a hose to a truck or rail car that is not equipped with fittings that match BASF hose fitting standards.

Example: A “nitrogen to air” adapter will allow nitrogen to be used on a truck equipped with air fittings.

All adapters must be clearly labeled, so that they are only used for loading transport vessels and not used throughout the plant (i.e., air movers).

4.16 If hose whipping is a concern, a whip check or safety cable should be considered.

4.17 The following colors are specified for utility hoses:
- red - air
- green - water
- yellow - nitrogen
- black – steam
- blue – lean air

4.18 When portable chemical hoses or utility hoses are ordered, they must be ordered with new hose specs for crimped fittings, and utility hoses must match the hose color requirements.
5. HOSE INSPECTION TESTING AND RECORDING

5.1 The DOT, under the guidance of his respective manager, shall implement an inspection program for chemical and utility steam hoses. Attachment 1 - Blank Hose Inventory Table can serve as a reference for listing unit hoses.

5.2 Portable chemical and utility steam hoses shall be inspected and documented according to the hose inspection/testing frequency table below.

5.3 The inspection of hoses shall include:

- Check the condition of the hose covering; check for cracks, brittleness, blisters, worn spots, holes, structure weakening kinks, and exposed reinforcement media (wire, nylon, etc.).
- Check the hose for secure clamps/bands while clamps/bands are phased out, conditions, and approved type(s).
- Check the condition of hose end fittings, gaskets, and securing devices, i.e., ears, lugs, and pins.
- Pressure test hose at one and one-half (1½) times the maximum allowable working pressure (MAWP). The MAWP of hose assemblies must consider the end fittings used and method of attachment that could render the hose assembly MAWP less than that of the hose material. If this is the case, hose assemblies must be marked with the reduced MAWP.

NOTE: If any defects are found, the hose must be repaired or removed from service and a danger tag applied. Only minor repairs are allowed, i.e., ear repairs, replacing screwed end fittings. Repairs must meet manufacturers' original specifications. For hose splicing refer to Section 4.13.

5.4 For hoses used in general utility service or air, water and nitrogen, and lower hazard chemicals, the inspection and/or testing frequency may be extended based upon a documented analysis of the associated risk using the BASF risk matrix and site experience for hose failures in the specific service. However, in all cases, the inspection/testing frequency shall not exceed that recommended by the manufacturer.

5.5 Any completed risk assessment should be documented in the unit’s/department’s hose table.

5.6 The inspection of all portable hoses shall be completed in the first quarter of the year, as required by the hose inspection/testing frequency table, for audit purposes.
5.7 Color-code temporary hoses with paint from an aerosol can those hoses passing inspection to indicate the year of the inspection for temporary hoses.

<table>
<thead>
<tr>
<th>Last Number in Year of Inspection</th>
<th>Color</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 or 5</td>
<td>yellow</td>
</tr>
<tr>
<td>1 or 6</td>
<td>green</td>
</tr>
<tr>
<td>2 or 7</td>
<td>orange</td>
</tr>
<tr>
<td>3 or 8</td>
<td>brown</td>
</tr>
<tr>
<td>4 or 9</td>
<td>blue</td>
</tr>
</tbody>
</table>

5.8 The color code bar should be approximately six inches (6”) wide and painted next to the fittings at each end of the hose without obstructing any information labeled on the hose or fitting.

5.9 Upon receiving a new hose, for the purpose of preventing ignition sources or static electricity build-up, hoses used in Class 1, Division 1 areas or used to transfer flammables, steam, or condensate must:

- not exceed $10^6$ ohms of resistance as measured between the end fittings
- be marked to identify that they meet these requirements to prevent electrostatic charge accumulation
- By design, stainless steel braided hoses are conductive and meet this requirement. They are exempt from ohms testing and marking.

6. CONNECTING AND DISCONNECTING HOSES

6.1. When hooking up a utility hose to a process, one must have a block valve at both ends, a check valve to prevent backflow into hose(s), the means to measure pressure, and the means to drain/depressurize the hose(s), i.e., bleed valve or vent valve and be connected to a properly designed utility station. See Attachment 4: hose to process option drawing, Drawing A1 as an example. For process to process hose(s), one must have a block valve on both ends and a means to drain/depressurize the hose(s) as a minimum requirement. See Attachment 4 Drawing B2. For process flows with plugging potential, see Drawing B1.

Exceptions to 6.1 above would involve cases in which a utility hose (air/nitrogen) are connected to a process tank truck or tank car for the purpose of pressuring off or padding while loading/unloading. The utility hose must be connected to a properly designed utility station and attached to a vent and cannot be attached to a seal leg or dip tube.
The exception to 6.1 above and the valve drawings for utility hose to process and process to process alignments, Attachment 4 Drawings A1, B1, and B2, are minimum requirements. A hazard assessment must be done on every job, and, if needed or desired, additional valves and bleeds be added. Consider backflow into hoses when performing the assessment.

6.2. Hoses must be depressurized before disconnecting. Take special care when depressurizing hoses that contained products that are prone to form plugs, i.e., H₂SO₄, NaOH, KOH, thick slurries, etc. These products have a tendency to plug small bore bleeds/vents.

6.3. If you are clearing a hose into a piece of equipment, you shall consider the following:
- Can the hose handle the pressure of the flush/purge medium?
- Is the flush/purge medium compatible with the product or material in the vessel, line, tank, etc., into that you are purging?
- If a sudden surge of the flush/purge medium enters the vessel line, tank, etc., will it create an overpressure or overfill situation?

6.4. Once hoses are removed, they must be cleared or cleaned of all materials and dried.

6.5. The hoses should be placed in racks or storage areas, away from aisles or walkways.

7.0 ATTACHMENTS

7.1 Attachment 1: Blank Hose Inventory Table
7.2 Attachment 2: Site Hose Specifications by Service
7.3 Attachment 3: Sample Hose Letter
7.4 Attachment 4: hose to process option drawings
- Drawing A1: utility to process hoses
- Drawing B1: process to process hoses
- Drawing B2: process to process hoses (alternate)
# HOSE INSPECTION/TESTING FREQUENCY TABLE

<table>
<thead>
<tr>
<th>Hose Service</th>
<th>Inspection/Testing Requirements</th>
<th>Frequency</th>
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</thead>
<tbody>
<tr>
<td>steam and hot condensate</td>
<td>• At ambient temperature, each hose must be subjected to a hydrostatic test at 1.5 times the MAWP with water to indicate hose leaks.</td>
<td>at least every two (2) years</td>
</tr>
<tr>
<td>pressurized gas:</td>
<td>• visual inspection, and&lt;br&gt;• hydrostatic test at 1.5 times the MAWP using water or appropriate fluid, or with an inert gas (ex. air/nitrogen) under water not exceeding the MAWP, to indicate hose leaks</td>
<td>at least every two (2) years</td>
</tr>
<tr>
<td>• &gt;15psig operating pressure and&lt;br&gt;• &gt;1” nominal diameter</td>
<td></td>
<td></td>
</tr>
<tr>
<td>gases or liquids highly toxic by inhalation or skin absorption</td>
<td>• visual inspection, and&lt;br&gt;• hydrostatic test at 1.5 times the MAWP using water or appropriate fluid, or with an inert gas (ex. air/nitrogen) under water not exceeding the MAWP, to indicate hose leaks</td>
<td>at least every year</td>
</tr>
<tr>
<td>EPRCA hazardous material w/o secondary containment or transferred between vessels on navigable waters</td>
<td>• visual inspection, and&lt;br&gt;• hydrostatic test at 1.5 times the MAWP using water or appropriate fluid, or with an inert gas (ex. air/nitrogen) under water not exceeding the MAWP, to indicate hose leaks</td>
<td>at least every year</td>
</tr>
<tr>
<td>higher hazard chemicals, i.e., NFPA flammable gases or liquids; other toxic or corrosive materials</td>
<td>• visual inspection, and&lt;br&gt;• leak test using an appropriate fluid pressure not exceeding the MAWP</td>
<td>at least every two (2) years</td>
</tr>
<tr>
<td>lower hazard chemicals</td>
<td>• visual inspection</td>
<td>at least every three (3) years</td>
</tr>
</tbody>
</table>

**Notes:**

1. Hoses may be replaced with new hoses in lieu of testing.
3. Liquid, gas, and flammability criteria apply to operating conditions.