Revision Number	Revision Description	Revised By	Revision Date
New	Original issue of document: (Date)		
001	Reviewed	G. Dawson	3/17
002	Procedure Review, No Changes	J. Gonzales	1-15-20
003	Added section 2.12 (backflow prevention) and sections 4.3.3 and 4.3.4 referencing utility connections, communication and PSE/PSV activation in response to **0976-DMTA-20-0078**	Gaudet, B	01/22/21

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1. PURPOSE

The purpose of this procedure is to establish a minimum standard for the design, use and maintenance of covered hoses, clamps and fittings at the BASF Beaumont Site.

2. DEFINITIONS

2.1. Highly Toxic

Highly toxic means LC50 ≤ 200 ppm (≤ 2 mg/L) for 1 hour (inhalation) or LD50 (dermal) ≤ 200 mg/kg. per 29 CFR 1910.1200 Appendix A.

2.2. Toxic

Toxic means 200 ppm < LC50 ≤ 2000 ppm (2 mg/L < LC50 ≤ 20 mg/L) for 1 hour (inhalation) or 200 mg/kg < LD50 (dermal) ≤ 1000 mg/kg, per 29 CFR 1910.1200 Appendix A

2.3. EPCRA Hazardous Material

EPCRA Hazardous Materials are the USEPA Extremely Hazardous Substances (EHS) listed in 40 CFR 302.4

2.4. Higher Hazard Chemical

Flammable Gases or Liquids or other Toxic or Corrosive Materials (with any NFPA Hazard Rating H, F or I > 2 or any HMIS Hazard Rating H, F or P > 2)

2.5. Lower Hazard Chemical

For the purposes of this Procedure, Finished Products and Raw Materials with each of the NFPA or HMIS Hazard Ratings < 2.

2.6. Dedicated Chemical Hose

A hose that is committed to a specific chemical service. This hose shall not be used with incompatible chemicals.

2.7. Utility Hose

A hose used to transfer steam, air, nitrogen or filtered water.

2.8. Breathing Air Hose

A hose used exclusively for breathing air purposes.

2.9. MAWP

Stands for Maximum Allowable Working Pressure

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2 DEFINITIONS CONT'D

2.10. Special Purpose Hoses
A customized hose, other than what is identified in this procedure, with specifications related to the intended service and pressure.

2.11. Whip Check
A safety cable with spring loaded loop ends used to secure hoses in the event of a coupling or connection failure.

2.12. Backflow Preventer
A means to prevent backflow such as a check valve.

2.13. Worm Drive Clamp
A hose clamp that uses a threaded screw to tighten the clamp on the hose and fitting.

NOTE: Chemicals with an NFPA or HMIS Hazard Rating equal to 2 are evaluated on a case-by case basis by Site/Unit EHS / Plant Engineering to determine if higher hazard or lower hazard for the purposes of this Procedure.

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3. SCOPE

This procedure applies to all hoses, clamps, and fittings used in utility or chemical service at BASF Corporation's Beaumont, Texas plant site.

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 services 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 is approved by the site.

4.2. Hoses Not Covered

This procedure does not cover:

- Hoses intended to be permanently installed in piping systems, 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, and/or
- 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.

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4. PROCEDURE CONT'D

4.3. General Requirements

4.3.1. Specifications for materials of construction, pressure rating, couplings, safety factors and color-coding for hoses in utility service (cold/hot water, plant air, nitrogen and steam) must be consistent with current BASF Technical standards for Utility Stations (11-130-15).

4.3.2. The maximum allowable working pressure (MAWP) of the hose assembly must consider the end fittings used and the 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. Utility air and water hoses purchased from the Purchasing approved Vendor come with the reduced MAWP stenciled on the hose.

4.3.3. When connecting utilities hoses to process piping or vessels, pressures must be monitored both locally and remotely (DCS) to ensure pressure ratings are not exceeded, thus activating PSE/PSV's.

4.3.4. In addition to monitoring, when possible vessels/piping should be well vented, or utilities regulated to prevent potential activation of PSE/PSV's.

4.3.5. Proper selection of hoses shall be determined by the job and type of service for which it is to be used.

4.3.6. Check hoses for residual material and be sure to empty and clean hose before use if residual materials are found.

4.3.7. When hooking up drain/bleed valves ensure that they are directed away from personnel.

4.3.8. Hose connections that have a means of locking or clipping must be secured.

4.3.9. Whipchecks should be considered for use on hoses in gas service where human error or equipment failure could result in pressures exceeding the hose burst pressure.

4.3.10. Hoses not in use shall be coiled and hung or returned to a recognized storage area.

4.3.11. All new hoses should be marked so they are not mistaken for uninspected / untested hoses when placed in service.

4. PROCEDURE cont'd

4.3. General Rules: cont'd

4.3.12. Hoses in use should not be placed across normal walkways or aisles, where they may be potential tripping hazards. Where this is not feasible, adequate precautions must be taken to identify the potential trip hazard.

4.3.13. In all instances where hose (s) are laid across roads or areas where vehicles may pass, the hose (s) will be protected by placing planking on either side of the hose (s) to bear the weight of the vehicle.

4.3.14. Prior to disconnecting a hose, the pressure shall be bled off. Block valves and bleed valves and a means of backflow prevention (to be located between the hose and the process) shall be installed prior to a hose being put into service

4.3.15. Damaged hoses shall not be used. Crimped hoses must be re-tested before use to ensure the integrity of the hose and must be tested in accordance with the site hose testing procedure.

4.3.16. Utility hoses, when damaged shall not be repaired, but shall be replaced. Special Purpose hoses may be evaluated for repair by the manufacturer. Hoses must be tested by the manufacturer before returning to service.

4.3.17. With the exception of Chemical Hoses, all utility hoses shall be color coded to reflect their use.

A. Plant air & water less than 100 degrees F– Red
B. Steam & water above 100 degrees F- Black
C. Nitrogen – Yellow

4.3.18. The use of worm drive clamps is prohibited.

4.3.19. When "Chicago" type couplers are used in any pressure service, they must be wired or clipped.

4.3.20. Hoses used in chemical service must be emptied, cleared or cleaned after each use to the extent appropriate to the service.

NOTE: *Anytime a hose is used, block valves and a bleed of some type must be used so that the hose may be disconnected safely.*

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4. PROCEDURE CONT'Dcont'd.

4.4. Utility Service

4.4.1. General Specifications

- Specifications for materials of construction, pressure ratings, couplings, safety factors and color coding for hoses in utility service (cold water, plant air, nitrogen, hot water, and steam) must be consistent with the current ***BASF Engineering Technical Standard for Utility Stations (11-130-15)*** (*see* **Section 6., Related Documents**).
- The hose connections to utility and other process systems must be designed to direct the discharge in a manner that avoids potential for employee exposure.

4.4.2. Breathing Air

- In breathing air service, hoses must be equipped with quick connect couplings of the positive lock design.
- Breathing-air line couplings must be incompatible with outlets for plant air or other gas systems to prevent inadvertent servicing of air line respirators with non-respirable gases or oxygen.
- All breathing air components and systems must be NIOSH approved.

4.4.3. Plant Air and Water Less than 100 Degrees F

- Hoses for plant air and water below 100 degrees F shall be color coded **red**, 3/4" ID X 50 ft long, with a maximum working pressure of 250 psig.
- Plant air hoses are to be supplied with "Chicago" type (Crows Foot) couplings attached with stainless steel bands. This type of coupling must be safety clipped or wired when in any pressure service.
- Hoses for pneumatic tools shall be dedicated for that purpose or verified to be dry by purging with air prior to use. **Under no circumstances should instrument air or nitrogen be used to power pneumatic tools.**
- "Perfecting Coupling Series D", single shutoff quick connect couplings will be used on all pneumatic tools. The couplings will be installed on the pressurized side of the connection to shut off flow when the tool is disconnected.
- All hoses used in construction service exceeding ½ inch inside diameter shall have a "Dixon SCV" excess flow valve at the air source.
- Small home-type garden hoses are only permitted on potable water systems.

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4. 4. PROCEDURE CONT'Dcont'd.

4.4.4. Steam and Water Above 100 Degrees F

- Steam and hot water hoses shall be color coded **black**, 3/4" ID X 50 ft long, with a maximum working pressure of 250 psig at 450 degrees F.
- Hoses are to be supplied with M&PM "Boss" ground joint seal hose couplings.
- If the steam pressure at the hose exceeds 80 psig, a pressure regulating valve must be supplied on the line to the steam utility station.
- Hoses and fittings must be designed and assembled in such a manner that the hoses burst before end fittings fail or separate from the hose.
- Hoses must withstand a pressure equal to ten times the MAWP at ambient temperature without bursting.
- Hoses must be designed so that electrostatic charges do not accumulate and must be marked to distinguish them from other hoses. The resistance between end fittings must not exceed 10^6 ohms.

4.4.5. Nitrogen

- Nitrogen hoses shall be color coded yellow, 3/4" ID X 50 ft long, with a maximum working pressure of 250 psig.
- Hoses are to be supplied with a male and female double lock brass Cleco coupling.
- Nitrogen hoses and connections must be supplied with couplings incompatible with other gas systems.
- The use of adapter couplings (such as Thor to Chicago, etc.) is prohibited.

4.5. Chemical Service

4.5.1. The use of hose for movement of chemical gases or liquids will, whenever possible, be avoided. Permanent applications will employ appropriately designed, permanently installed piping.

4.5.2. Each operating unit will specify the hoses and fittings to be used for particular chemical service. This specification will include consideration of compatibility, pressure rating, temperature rating and wear. Couplings used for chemical service are required to have a positive means of locking.

4.5.3. Hoses transferring flammable liquids or hoses used in Class I Div. 1 areas must be designed so that electrostatic charges do not accumulate and must be marked to distinguish them from other hoses. The resistance between end fittings must not exceed 10^6 ohms.

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4. 4. PROCEDURE CONT'Dcont'd.

4.5. Chemical Service cont'd

4.5.4. Hoses used for chemical washout or dilute chemical handling shall be color coded Green or Blue, Teflon lined, 1" ID with lengths of 15 to 50 ft. Fittings shall be stainless steel cam lock with gaskets compatible to chemical service.

4.6. Inspections

4.6.1. All hoses shall have vinyl ID tags covered with vinyl shrink-wrap sleeves with permanent serial numbers, date, and test pressure for identification.

4.6.2. Steam and hot water hoses must be marked with the MAWP and applicable electrostatic performance markings.

4.6.3. The user shall perform a visual inspection of the hose, fittings, clamps, ID tags, and gaskets prior to each use. Hoses with obvious defects are to be removed from service.

4.6.4. A documented inspection shall be performed for all hoses as indicated in table #1 below. Hose inspection may be performed by designated BASF personnel or an approved vendor. The inspection shall include:

- A visual check of the condition of the hose, fittings, and clamps
- A hydraulic pressure test at 1.5 times the maximum allowable working pressure

4.6.5. Each unit or department shall be responsible for ensuring hoses in use meet the inspection requirements of this procedure.

4.6.6. Hose inspection will be performed by the packout warehouse supervisor. All inspection records will be maintained by this individual. See Attachment 2

4.6.7. Each unit or department is responsible for coordinating inspection and testing with the packout warehouse supervisor

4.6.8. Inspection Prior to Use
Before each use, the user must perform a visual inspection of

- the hose, hose fittings and clamps, gaskets, and
- the compatibility of the hose for the application.

Hoses that do not pass visual inspection must be so marked and taken out of service.

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4.6. Inspection Cont'd

4.6.9. The color codes for inspections shall follow the below sequence and shall continue on a four year rotational basis.
Blue; 2016 – Yellow; 2017 – Green; 2018 – Red 2019
Blue; 2020 – Yellow; 2021 – Green; 2022 – Red 2023 etc

4.6.10. GHX is the approved hose and fitting vendor for the Beaumont site and will provide only hose and fittings that meet the BASF standards. Hose testing recommendations from GHX are below in Attachment 1

5. RESPONSIBILITIES

5.1. Beaumont Operations Managers and TES Manager
Have primary responsibility for implementation of this procedure.

5.2. Health, and Safety Manager
Has primary responsibility for the initiation, re-issuance, administration, and/or interpretation of this procedure.

5.3. Beaumont Site Employees and Contractors
Have primary responsibility for adherence to procedure including identifying deficiencies in the procedure, and identifying, reporting and correcting activities not in compliance with the procedure.

6. RELATED DOCUMENTS

BASF Engineering Technical Standard for Chemical Piping, Volume. 2
BASF Engineering Technical Standard for Hydrostatic Testing Procedures and Precautions, Volume 3 - (18-225-03)
BASF Engineering Technical Standard for Utility Stations, Volume 2 - (11-130-15)
Table 1 Inspection requirements and Frequency Table
Attachment 1 Inspection Recommendations from GHX
Attachment 2 Hose Inspection Form

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TABLE #1

Hose Service	Inspection / Testing Requirements	Frequency
Steam or Hot Condensate	• At ambient temperature, each hose must be subjected to a hydrostatic test at 1.5 times the MAWP with water to indicate hose leaks.	At least every two years
Nitrogen	• Visual inspection, and • Leak test using an appropriate fluid at pressures not exceeding the MAWP *.	At least every three years
Plant air and water less than 100 degrees F.	• Visual inspection, and • Leak test using an appropriate fluid at pressures not exceeding the MAWP *.	At least every three years
Pressurized gas: >15 psig operating pressure; and >1 " nominal diameter.	• Visual inspection, and • 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 *.	At least every two years
Gases or liquids Highly Toxic by inhalation or skin absorption.	• Visual inspection, and • Hydrostatic test at 1.5 times the MAWP with water or appropriate fluid, or with an inert gas (ex. air / nitrogen) under water not exceeding the MAWP, to indicate hose leaks *.	At least every year
Gases or liquids acutely toxic by inhalation (LC50 less than 200 ppm) or skin absorption (LD50 less than 200 mg/kg)	• Visual inspection, and • Hydrostatic test at 1.5 times the MAWP with water or appropriate fluid, or with an inert gas (ex. air / nitrogen) under water not exceeding the MAWP, to indicate hose leaks *.	Annually
EPCRA Hazardous Material w/o secondary containment or transferred between vessels on navigable waters.	• Visual inspection, and • Hydrostatic test at 1.5 times the MAWP with water or appropriate fluid, or with an inert gas (ex. air / nitrogen) under water not exceeding the MAWP, to indicate hose leaks *. • NOTE: EPCRA Hazardous Materials that have secondary containment (& are not transferred between vessels on navigable waters) should be treated as "Higher Hazard Chemicals" (see below).	At least every year
Higher Hazard Chemicals, i.e. - NFPA flammable gases or liquids; other Toxic or corrosive materials.	• Visual inspection, and • Leak test using an appropriate fluid at pressures not exceeding the MAWP *.	At least every two years
Lower Hazard Chemicals	• Visual Inspection	At least every three years

Notes:

1. Where requirements overlap, use the more conservative one.
2. Hoses may be replaced with new hoses in lieu of testing.
3. Refer to ***BASF Engineering Technical Standard 18-225-03 for Hydrostatic Testing Procedures and Precautions***.
4. Liquid, gas and flammability criteria apply to operating conditions.

*****Pneumatic testing at pressures up to the MAWP is acceptable, regardless of the hose size, for sites / units, etc., which may have hazards associated with water reactivity and hydro testing. Hoses, which require pneumatic pressure testing should be properly tagged, indicating pneumatic testing requirement and test pressure. Pneumatic leak testing can be performed at the maximum expected operating pressure (including upsets) with the approval of Site / Unit Engineering & EHS.

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Attachment 1

Hose Testing Procedure

1. Visually inspect hose and fittings for any noticeable deficiencies that would prevent pressuring up with water to 1.5 times WAWP (250 psig max. for chemical hoses). Discard any hose that has obvious defects. **Chemical hoses that are kinked should be failed and not tested**.

2. Dispose of air, water, and N2 hoses if they are over three years old. These hoses, at the discretion of operations can be discarded and replaced in lieu of testing any time.

3. Hook up one end of the hose to recommended portable test rack and lock down or clip fittings and use whip checks.

4. Add fitting with a ¼ " quarter turn ball valve on the other end to allow bleeding off air from hose while filling with water.

5. Fill hose with water and bleed air off the other end of hose through the ¼" ball valve until water with no air bubbles is flowing out. Then block in ¼" ball valve.

   Note- Test gauges should be calibrated before starting hose testing.

6. Using hydro test pump, pump up pressure on air, water, and N2 hoses slowly until 1.5 times MAWP of the weakest component of the hose and fittings is met.

   Note - Chemical hoses should be tested at no more than 250 psig due to the pressure rating of the CAM and Groove fittings.

7. Keep pressure on hose for 3 minutes.

8. Chemical and steam hoses that pass the hydrostatic test will need resistance testing between end fittings not to exceed 10^6 ohms. Log ohms on test form.

9. If hose / fittings pass tests add a new test data tag and correct color code sleeve for the test year. Using a heat gun and heat shrink clear tubing to seal the test data and color sleeve to the hose to protect testing data.

10. If hoses pass or fail, the "Hose Hydrostatic Test Inspection Form" will need to be filled out and kept for three years.

11. For chemical hoses record the manufacture date on the test form. This date will be etched on the hose ferrules.

12. Bleed water pressure off hose before disconnecting, drain, coil and properly store on rack.

Failed hoses should have the ends cut off and properly disposed of (usually put in the dry contaminated material dumpster).

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Attachment 2

HOSE HYDROSTATIC TEST INSPECTION FORM

DATE: _____ **HOSE SERIAL #** _____

Hose Service and Description: _____

_____

TEST PROCEDURE

PASS	FAIL	TEST CRITERIA
Visual Inspection:		
		Hose tag present with legible serial number
		Cracks, holes, splits
		Hose ends appropriate for intended service
		Hose end reinforcements, if present are intact and free from defects
Hydrostatic Inspection:		
		Pressure tested to _____ PSI (1.5 MAWP) and held for five minutes
Electrostatic Performance Inspection:		
		Electrical resistance between hose ends less than or equal to 10^6 ohms

Inspection Results: _____

_____

Hose Disposition:

	Hose passed, attached _____ colored band to hose. Returned to service.
	Hose failed, sent to maintenance for repair and retest.
	Hose failed, destroyed.

Test Performed by:

_____ _____ _____

Printed Name **Signature** **Date**

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