

PROCEDURE BULLETIN — TEXAS CITY PLANT P-0121

USE AND CONTROL OF HOSES

PLAINTIFF'S EXHIBIT

MON-1403

I. PURPOSE

Provide a systematic means of controlling use of flexible hoses when they are found necessary. The control approach used includes establishing rules, specifying hose material and testing methods, testing frequency and record keeping.

II. POLICY

Use of hoses in chemical process applications is undesirable relative to fixed piping. The objective must be to minimize the use of hoses whenever practical, and control their use where necessary.

III. SCOPE AND DEFINITIONS

A. The control system set forth in this procedure provides guidelines based on minimum needs. Individual department requirements may call for more stringent or more frequent testing and inspection. The very nature of hose systems dictates the need for over-control rather than under-control.

B. Under this procedure hoses have been classified into four groups.

1. Group I includes all hoses in chemical process service within battery limits of operating units.
2. Group II includes all chemical hoses in Material Handling areas and out of battery limits.
3. Group III includes all hoses in air, water, nitrogen or steam service.
4. Group IV includes specialized hoses such as those used on vehicles, heavy equipment and in a laboratory.

Flexible connections in permanent piping systems (expansion joints, "chicsan" joints, bellows, etc.) are covered in piping specifications and not in this procedure.

C. Contractors are expected to comply with the provisions set forth in this procedure. Any variations or deviations from the procedure must be agreed to by the supervisor responsible for the job.

IV. RESPONSIBILITIES

A. Owning Department

1. Develop and implement departmental hose procedures that meet plant standards.
2. Schedule hose tests and maintain adequate records as shown in Appendix A and B. Inspection of these records should be part of the monthly and quarterly safety and housekeeping inspections.
3. Perform visual inspections of all hoses prior to and during use, and semi-annually for Groups III and IV.

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4. Identify hose use and application. Eliminate hose use whenever practical.

B. Plant Engineering Department

1. Conduct and witness hydrostatic hose tests as scheduled by the Owning Department.
2. Maintain hose test facilities. (Hoses that have been tested will be so marked by the Maintenance Department.)

C. Materials and Mechanical Technology Section

Review and approve new hose applications and assist the Owning Department in selection of hose or alternate materials. Approval will be by memo.

D. Loss Prevention and Safety Department

1. Review the use of hoses in chemical service during biennial safety audits with the goal of eliminating such usage whenever practical.
2. Review Owning Department's Group I and II hose records and spot check Group III hoses to assure compliance with proper procedures during biennial safety audits.

V. PROCEDURE

A. Group I and II

Group I and II hoses are used in services where if failure occurred a major loss incident or pollution problem could result. Group I and II hoses are hydrostatically tested, inspected and documented annually. Group I and II hoses include:

Barge Loading Hoses	(BL)
Atmospheric Loading Hoses	(AL)
Pressure Loading Hoses	(PL)
Chemical Transfer Hoses	(CT)

Note: Hoses that are used in dock areas must comply with U. S. Coast Guard regulations.

1. Rules for Use

- a. All hoses to be used in routine service must undergo an LP&S review prior to their being placed in routine service.
- b. All hoses to be used in non-routine or emergency service must be approved by the Materials and Mechanical Technology section and must be approved by local supervision prior to installation.

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- c. All hoses in super-hazardous service, i.e. HCN, ACY, LN and chlorine, will require backup personnel for connection and disconnection, proper breathing protection and other necessary protective equipment.

2. Identification and Record Keeping

- a. Hose Identification - Each hose in Group I and II will be identified by a unique hose number assigned by the Owning Department. This number will follow the established functional item numbering system, consisting of:

(Dept. No. (H) (service type) (sequential number) -
(subnumber, if appropriate)

Example: 50HCT2

This code identifies chemical transfer hose #2 in Department 50.

Areas with large numbers of hoses may use subnumbers to group hoses in a logical manner; for example, Material Handling may group all hoses at a particular dock or loading station.

Replacement hoses will carry the same identification number as the one it's replacing except it will carry a subnumber or letter; e.g., 50HCT2-2 or 50HCT2-A.

- b. Hose Data Records - The following hose data will be maintained by the Owning Department on each hose (see Appendix A):

- (1) Hose identification number
- (2) Monsanto specification number or hose description
- (3) Hose pressure and temperature data:
 - (a) Hose working pressure
 - (b) Hose burst pressure
 - (c) Hose test pressure*
 - (d) Operating temperature
- (4) Maximum system pressure (The maximum system pressure is the pressure of the relief valve setting, or maximum pump pressure when no relief valve is installed plus any static head pressure in the system.)
- (5) Hose installation date
- (6) Hose location
- (7) Special restrictions on use or service

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* See Appendix A, paragraph 2 (c).

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- c. Hose Identification Tag - An identification tag must be affixed to each hose with the information outlined below:

- (1) Hose number
- (2) Service
- (3) Date of manufacture or purchase and installation
- (4) Working pressure
- (5) Test pressure

(For an example of the Hose Identification Tag see Appendix C.)

- d. Hose Inspection and Test Certification Sheet Form (Appendix B) - "Hose Inspection and Test Certification" sheet will be filled out each time a hose is tested. The form will be filled out by Maintenance and will be filed by the Owning Department (current form only to be kept).

- e. Hose Test Tag - A "Hose Test Tag" will be affixed to each hose by Maintenance indicating date of test. The hose test tag will be a rectangular metal tag, as shown on Appendix C, affixed to the hose by a band-it strap.

3. Testing

- a. Frequency of testing:

1. New Hoses - All new Group I and II hoses must be tested before installation.
2. Hoses in Service - All Group I and II hoses must be tested once a year, preferably during the first two months of the year. Hoses that have not been tested by March 31 should not be used until the hose has been tested and the hose test tag for the current year has been affixed.

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- b. Request for Testing - Owning unit is responsible for issuing an MWO to hydrostatically test the hose. The MWO must indicate hose identification number, and must specify hose test pressure and hose location. This can be accomplished by issuing one MWO with a list of hoses to be tested attached to the MWO.
- c. Test Procedure - Hoses will be inspected and hydrostatically tested by Maintenance at a suitable test facility as per the proper test procedure (Appendix A).

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4. Hose Replacement

- a. Hoses which do not pass the hose test must be replaced with a new hose. The new hose identification number will be assigned by the Owning Department and a hose identification tag will be made and installed by Maintenance. The new hose will be tested and a hose test tag attached.
- b. Hoses which are found to be defective will not be repaired and must be discarded.
- c. Hoses are not to be automatically replaced because of age.

5. Purchasing and Inspection

- a. The purchase order or blanket release should specify that the vendor supply all necessary information and documentation for completion of Item No. 2 (above), i.e., (1) hose type and material, (2) manufacturer, (3) maximum working pressure, (4) burst pressure, (5) date of manufacture, (6) special restrictions on use or service.
- b. All hoses shall be inspected at the MMTS receiving inspection station to confirm information in Item 5.a.

B. Group III

Group III hoses are used in less severe services and failure would not generally result in serious injuries or process difficulties. However, this group normally has the largest number of hoses in service and the most frequently used. They are often connected to process lines containing hazardous chemicals. In emergencies they are sometimes used to transfer chemicals. As a result, this group presents the most serious hazards and should be treated as such. Except for steam, Group III hoses are not required to be hydrostatically tested but must be visually inspected semi-annually. Steam hoses must be hydrostatically tested annually like Group I and II. Group III hoses include:

- a. Utility Hoses (water, air, nitrogen) (UT)
- b. Steam Hoses (75# utility stations only) (ST)
- c. Low pressure, oxygen-acetylene, welding hoses (W)

Special precautions for hoses used in nitrogen service are detailed in Procedure Bulletin P-0126. All nitrogen hoses must conform to those standards as well as the testing and inspection codes contained herein.

1. Rules for Use

- a. Hard piping should be considered in preference to utility hoses whenever:

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- (1) Their use requires connection to lines carrying toxic and/or flammable chemicals.
 - (2) Their use is frequent; i.e., greater than once per week.
- b. Proper use of Group III hoses when connecting to process equipment:
- (1) Visual inspection of hose and hose connections.
 - (2) Purge hose prior to use.
 - (3) Secure all crowsfoot connections with safety pins.
 - (4) Always open utility hose station valve first and open process connection valve last.
- c. Proper use of Group III hoses when disconnecting from process equipment:
- (1) Always close process connection valve first and close utility hose station valve last.
 - (2) Depressure hose by opening bleed valve at utility hose station.
- d. Group III hoses used with super-hazardous materials will require a backup to connect or disconnect, proper breathing protection and other necessary protective equipment.
- e. When a Group III hose has been contaminated with process chemicals, it must be decontaminated and disposed of. The hose must be cut, removing the connections at both ends so that it cannot be reused.

2. Identification and Records

- a. Utility and steam hoses are not to be identified by a hose number and no records will be kept. Identification will be by hose color. Utility hoses are red or green and steam hoses are black. For nitrogen hose identification see Procedure Bulletin P-0126.
- b. Hose Inspection Tag - The inspection verification tag will be a band of vinyl color tape (Scotch #190A or equivalent) on each end of the hose next to coupling. The color code listed below will be used. If a hose does not have current coded tape on it, this hose is not to be used. The following colors will be applied upon completion of testing:

January - Even Years - Blue

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July - Even Years - White
January - Odd Years - Red
July - Odd Years - Green

3. Hose Inspection

- a. Frequency of Inspection - Hoses must be inspected semi-annually, preferably during January and July. Hoses that have not been currently inspected should not be used until the Hose Inspection Tag for the current inspection has been affixed.
- b. Inspection - Owing Unit is responsible for inspection of the hoses as per the visual inspection procedure in Appendix A, and installing the correct tape band on all hoses passing the test. Compliance should be verified during monthly and quarterly inspections.

4. Hose Replacement

- a. Hoses which are found to be defective should not be repaired but should be discarded, with one exception. Hoses with damaged end connections can be repaired but hoses must be hydrostatically tested after repair.

NOTE: If a hose is to be used open ended only, the fitting connection on one end must be removed.

- b. Hoses are not to be automatically replaced due to age.

C. Group IV

Group IV hoses include specialized type hoses such as automotive or vehicular hoses and very small ($\frac{1}{4}$ ") hoses that are used in the laboratory or on gas cylinders. However, if the hoses are used in a high pressure or hazardous service, even small hoses should be classified as Group I hoses. Group IV hoses should be visually inspected annually. The judgement of the individual department supervisor must be carefully exercised to determine if a hose falls into a Group IV or Group I category.

1. Rules for Use

There are no specific rules for the use of Group IV hoses except that good judgment and common sense must be applied when selecting the correct hose for specific applications.

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2. Identification and Record Keeping

Testing inspection and record keeping for these hoses is not required. However, good common sense and safe practices and visual inspection should still be applied to these hoses.

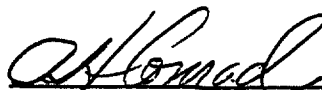
VI. SUMMARY

Good judgement must always prevail when using any hose. Whenever there is doubt or question concerning the use of hoses in any service, every resource is to be used in relieving the doubt or answering the question. These resources include unit supervision, Engineering Services and Loss Prevention and Safety.

Reviewed by:
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APPENDIX A
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USE AND CONTROL OF HOSES

HOSE TESTING PROCEDURES

1. Visual Inspection

- a. Non-Metal Hoses - The hose should be layed out full length and examined for the following defects which are all causes for hose rejection:

Outer cover blistered or loose.

Outer cover excessively abraided exposing reinforcement.

Outer cover cut (Small cuts in the outer cover can be tolerated unless the cover in the immediate area is loose or the reinforcement is exposed.)

Kinks - For evidence of weak spot or kink, pick up hose every two feet. A weak spot will let the hose partially collapse when picked up in this manner.

Bulges

Soft Spots - Check for soft spots by pressing with the thumb the area adjacent to the end connection for about two feet.

End connection damaged.

- b. Metal Hoses - Metal hose construction usually consists of a corrugated metal tube (much like a bellows) and a metal braid covering. They are extremely susceptible to damage by over-stressing in tension, excessive bending, crushing and broken metal braid. The hose should be layed out full length and examined for the following defects which are all causes for rejection:

Metal braid broken.

Kinks or permanent deformation.

Overstressing damage - Metal braid pattern is elongated or corrugations of tube have expanded.

End connection damaged - Strands broken or braid loose at end connections.

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USE AND CONTROL OF HOSES

2. Hydrostatic Test Procedure (For all Group I, II and Steam Hoses)

- a. Lay the hose out full length to permit easy movement under test pressure. The hose's end connections must be secured so they cannot fly off.
 - b. Fill hose with water and bleed all air by raising vent end of hose. (Chloride free water should be used for stainless steel hoses.)
 - c. Raise pressure slowly in hose (avoiding pulsations) to $1\frac{1}{2}$ times the maximum hose system working pressure (specified by Owning Unit). The maximum pressure that the hose can be subjected to during normal or abnormal operations (i.e., maximum pump discharge pressure or relief valve set pressure). At times the maximum hose system pressure will have to be determined by engineering audit. The test pressure should be no less than 225 psig under any circumstances.
 - d. Hold this pressure for five minutes. For barge loading hoses hold for thirty minutes due to greater tube wall thickness.
 - e. With hose under pressure examine hose for leaks, especially near the end connections. Also inspect for any bulging or swollen areas.
 - f. Any hose with leaks or bulging spots is to be discarded.
3. Hose Inspection and Test Certification sheet will be filled out by the Maintenance Department, reflecting results of hose test. Maintenance will forward certification sheet to the Owning Department for filing.
 4. Hose Test Tag with test will be installed by Maintenance on hoses passing test.

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APPENDIX B
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HOSE INDEX		UNIT		SERVICE		
HOSE NUMBER	DESCRIPTION VIA "L" MANUAL NUMBER FOR STANDARD HOSES	SIZE DIA. LENGTH	MANUFACTURER'S NUMBER	HOSE TAG INFORMATION	HOSE PRESSURE DATA	1. Test. Date 2. Initial Location 3. Man. Test. Procedure
				1. HOSE NUMBER 2. SERVICE 3. DATE OF MAKEUP, 4. WORKING PRESS. 5. TEST PRESS. 6. BURST PRESS.	WORKING Press. BURST Press. TEST Press. WORKING Press. BURST Press. TEST Press.	1. 2. 3. 4. 5. 6.
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				1. HOSE NUMBER 2. SERVICE 3. DATE OF MAKEUP, 4. WORKING PRESS. 5. TEST PRESS. 6. BURST PRESS.	WORKING Press. BURST Press. TEST Press. WORKING Press. BURST Press. TEST Press.	1. 2. 3. 4. 5. 6.

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APPENDIX B
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USE AND CONTROL OF HOSES

HOSE INSPECTION AND TEST CERTIFICATION SHEET

Hose Number _____
Test Pressure _____
Hose Manufacturer _____
Manufacturer's Hose Number _____
Hose Size _____ Dia. _____ Length _____
Type of End Connection _____

I. HOSE HANDLING CARE

1. Never drag hoses over abrasive surfaces, i.e. concrete, asphalt, shell.
2. Do not pull on end connections.
3. Do not roll hose by the end.
4. Support hose every 10' when lifting. Never lift hose from the middle with ends hanging down. Use rope or web type slings.
5. Limit curvature of hose to 6" per inch of hose diameter. Examples: 6" hose and 3' minimum bend radius

II. VISUAL INSPECTION OF HOSES

Hose should be laid out full length and examined for the following defects which are all cause for hose rejection.

NON METAL HOSES		METAL HOSES	
YES	NO	YES	NO
Outer cover blistered or loose	☐	Soft Spots Check for soft spots by pressing with the thumb the area adjacent to the end connection for about two feet.	☐
Outer cover excessively abraded exposing reinforcement	☐	End Connection Damaged	☐
Outer cover cut	☐	METAL HOSES	
Small cuts in the outer cover can be tolerated unless the cover in the immediate area is loose or the reinforcement is exposed).	☐	Metal Braid Broken	☐
Kinks For evidence of weak spot or kink, pick up hose every two feet. A weak spot will let the hose partially collapse when picked up in this manner.	☐	Kinks or Permanent Deformation	☐
Bulges	☐	Overweaving Damage Metal braid pattern is elongated or corrugations of tube have expanded.	☐
		End Connection Damaged Strands broken or braid loose at end connections.	☐

NOTE: Any "Yes" to above should immediately cause hose to be rejected as defective. Supervisor before proceeding to Hydrostatic Test.

III. HYDROSTATIC TEST

A. SAFETY — READ THIS FIRST

1. Hose must be loosely strapped down to prevent "whiplash" should it rupture.
2. End connections must be bulwarked or chained so that a blown out end will be stopped.
3. Air or any compressible gas must never be used as the test media due to the explosive action of hose if failure occurs. Only water should be used as the test liquid.
4. All air must be removed by bleeding through high point vent of far end of hose from ill point; bleed until no air bubbles are noticed in discharge.
5. Never stand in front or back of the hose while it is under pressure.

B. TEST PROCEDURE

1. Lay the hose out full length on test platform and position on rollers to permit easy movement under test pressure.
2. Fill hose with water and bleed all air by raising vent end of hose.
3. Raise pressure slowly in hose (avoiding pulsation) to 1½ times manufacturer's working pressure (specified by owning unit).
4. Hold this pressure for 5 minutes. For large loading hoses hold pressure for 30 minutes due to the greater tube wall thickness.
5. With hose under pressure examine hose for leaks, especially near the couplings. Also inspect for any bulging or swollen areas.
6. Any hose with leaks or bulging spots is to be discarded.

IV. "HOSE TEST TAG" with Test Date will be installed by maintenance on hoses passing test.

Hoses which are found to be defective should not be repaired but should be discarded.

Hose Inspected and tested by: _____

Date: _____

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APPENDIX C
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HOSE IDENTIFICATION TAG

Monsanto Co. - Texas City	
Hose No.:	Manuf:
Date of Installation:	Service:
Working Pressure:	Test Pressure:

HOSE TEST TAG

Monsanto Co. - Texas City	
Hose Test Tag	
Date:	By:

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