



## HOSE MANAGEMENT PROCEDURE

**Procedure Number: PR-250-HSE-06**

Date of First Issuance: Jul 2019

Approved by	Name	Yousuf Abdulla Rebeeh	
	Position	Chief Operations Officer	
	Date	30/09/2019	

Rev.	Date	Prepared by	Reviewed by					
00	21.7.2019		 HSES Manager	 GM HSSE	 TGM	 MGM (SC/PE) 25/9/19	 MGM (Vinyl) 26.09.2019	 CHSSEO 30/09/2019

 <b>QAPCO</b> شركة قطر البتروكيماويات QATAR PETROCHEMICAL COMPANY	<b>HOSE MANAGEMENT PROCEDURE</b>	Procedure No.	PR-250-HSE-06
		Revision	00
		Date	21 Jul-2019

**Revision / Modification History:**

Rev #	Date	Section No.	Reason for revision / modification
00	N/A	N/A	This Procedure will supersede PR-251-SF-34

**Development / Review Team**

Rev #	Date	Member	Department / Section / Group
0	10-August-2017	Head of LLDPE	LLDPE/ Manufacturing
0	10-August-2017	Sr. HSEQ Officer (Poly)	Polyolefins
0	10-August-2017	Sr. HSSE Officer	HSSE Group
0	10-August-2017	QC Officer	Operations
0	10 August-2017	Lead Mechanical Engineer	Reliability
0	10 August-2017	HSSE Manager ( Vinyl)	HSSE group
0	10 August-2017	CTO ( Vinyl)	Vinyl
0	27 <sup>th</sup> March-2019	Production Engineer	Chlorine
0	27 <sup>th</sup> March-2019	EDC/ VCM Production Engineer	EDC/ VCM
0	27- May-2019	Mechanical Engineer	Maintenance Planning
0	27 May-2019	Maintenance Planning Manager	Technical
0	27- March-2019	TA Manager	Technical
0	27- May-2019	Senior Inspector	Inspection

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## 1. OBJECTIVE

The purpose of this procedure is to establish a suitable practice for purchase, identification, inspection/testing, installation and use of hoses so as to prevent in-service failures and associated losses and injuries.

The document aims to provide the user with information to enable the development of a robust strategy for deployment of FHAs on such installations and to assist operators with maintaining integrity during service. This includes the assurance of personnel competency which is seen as key to the management of FHAs throughout their life cycle.

*HSE Principle: Temporary hoses are only be used for duties for which they are design & approved*

## 2. SCOPE

This procedure is applicable to all hoses used inside the QAPCO facilities (Mesaieed).

Following hoses are exempted from this instruction and will be followed its respective manufacturer guidelines.

1. Fire Service hoses
2. Welding and Acetylene hoses ( follow *Welding Safe Work Practices & Equipment manual*)
3. Non process equipment hoses (i.e. fork lift, crane, reach stacker etc.) (*Vehicle Maintenance Practices and related vehicle*).
4. Hoses used as a part of hydraulic tools/equipment as a package e.g. Hydraulic system, lifting equipment ( Follow the manufacturer guidelines & equipment manual)
5. Following hoses used for non-hazardous services:
  - i. For the purpose of draining of material at ambient pressure to safe locations-
  - ii. Pump (except vacuum pump) suction hose used for dewatering purpose (i.e. Sump/pit)
  - iii. Garden hose

## 3. PROCEDURE SUMMARY

The hoses are used daily throughout the Plant to transfer the fluid. Proper use and maintenance is must for safe use to avoid any undesirable events and to prevent premature failure of hoses while hoses are in use.

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The use of hard piping shall always be the primary option for temporary process connections. Hoses should be utilized only as a last option and after a thorough evaluation of the hazards associated with their use.

#### 4. Distribution / Target Audience

This Procedure will be distributed through ISO-Achiever plus document & available for all employees and access.

#### 5. ABBREVIATIONS / DEFINITIONS

#	Abbreviation / Key word	Definition summary
1	Braid	A continuous sleeve of interwoven single or multiple strands of material.
2	Continuity Check	Resistance verification to ensure the hose designed static bonding qualities are acceptable.
3	Coupling	A device at the end, or both ends of a length of hose that allows a connection to be made.
4	Coupling Joint	A leak-proof connection achieved by fastening together the mating surfaces of two couplings.
5	Cover	The outermost part of the hose. The main purpose for the hose cover is to protect the hose reinforcement from physical and environmental abuse. Covers can have materials (rubber compounds) that are blended to produce characteristics such as ozone resistance, abrasion resistance or oil resistance.
7	End User	The employee or contractor who uses the hose.
8	Hose	A flexible conduit consisting of a tube, reinforcement and an outer cover. A hose is used to convey liquids or gases, solid particles (Fluid) under pressure.
9	Hose Assembly	A length of hose with a fitting/coupling attached to one or both ends.
10	Hose Whip Check	A device attached to two joined hoses to prevent a hose from whipping around if accidentally disengaged under pressure.
11	Hydrostatic Testing	The use of water pressure to test the integrity of a hose by pressuring up the hose to its test pressure for a specific period of time.
12	PO	Purchase Order
13	PPE	Personal Protective Equipment
14	Reinforcement	The center part of the cross section of the hose that gives it strength. The hose working pressure is dependent upon the type and amount of reinforcement. Reinforcement types can be wire braid, helical wire, wire spiral, etc.
15	Static Bonding	A static charge eliminating technique used to neutralize static charges during product transfer.

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16	Tube	The inner most part of the hose that contains the media being transported. Rubber compounds or plastics are usually blended to give the tube specific properties to be compatible with the media.
17	Type 1 Hose - Process Fixed Service Hose	Usually constructed of multi-braided corrugated stainless steel, PTFE lined stainless steel braided or chemical hose and is used primarily in place of permanent piping for transport of fluids. Usually both ends of Type 1 hoses are connected with equipment or piping. The hose shall be part of the basic design of the equipment which is shown in the document like equipment drawing, PID, etc.
18	Type 2 Hose – Process Transfer Hose	Usually constructed from a multi-braided corrugated stainless steel material or PTFE lined stainless steel braided or suitable rubber which is resistant to corrosive chemicals like acid, caustic, etc., (e.g. Flare drops, Vacuum truck/Tanker loading / unloading and is used for the temporary transfer of hydrocarbons and hazardous chemicals (i.e. acid, caustic, hydrocarbons).
19	Type 3 Hose – Non-Process Utility Hose	Generally constructed from rubber based material and these hoses are used primarily for transfer of steam, water, air and nitrogen.
20	FHA	Flexible hoses assembly
21	MOC	Management of Change
22	TGM	Technical Group Manager
23	MGM	Manufacturing Group Manager
24	CPGM	Corporate Planning Group Manager

## 6. DOCUMENT REFERENCES

#	Document ID	Document name	Summary of dependency or use
1	QAPCO Permit to work Procedure	PR-PSS-114	Permit requirement for repair or installation of Hoses
2		Hose Inspection Check Sheet	
3	PR-PSS-123	Waste Management Procedure	
4	BS 6501-1/2 BS EN 7369	Type 1 Hose Inspection Guidelines	Guidelines for the inspection Type-1 hoses
5	PR-QSS-128	HSE Training Matrix	Training requirement

## 7. IT SYSTEM REQUIREMENTS

#	IT system module name	Summary of IT system module use
1	NA	NA

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## 8. RASCI SUMMARY

#	Procedure Requirements	Procurement Manager	Maintenance Manager	Inventory Manager	User Department	ESDM	HSSE Division	Head of Inspection
9.1	Purchasing	A/R	I	I	I	C	-	I
9.2	Identification/Tagging-New Hoses	I	C	A/R	I	C	S	C
	-Existing hoses	I	R	C	A	C	S	C
9.3	Receiving and inspection	I	S	A/R	S	S	S	S
9.4	Installation & Connection	-	S	-	A/R	S	C	C
9.5	Disconnection	-	S	-	A/R	S	S	S
9.6	Hose Inspection & Testing	S	S	S	A	S	S	R
	-Type 1 Hoses							
	-Type 2 & 3 Hoses	C	S	C	A/R	S	S	S
9.7	Storage	-	S	R	S	S	S	S
9.9	Contractor Hoses	-	A	S	R	S	S	S
9.10	Training	I	S	I	S	S	A/R	S

### Legend:

R = Responsible (the class of people who are ultimately responsible for getting the work done)

A = Accountable (the position that is accountable to oversee that the work gets done)

S = Support (the person who supports by providing information and suggest any deviations from the Procedure)

C = Consulted (the person who can advise when needed)

I = Informed (concerned persons who are required to be informed or communicate to)

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Role	Responsibilities
End User ( Type 2 & 3)	<ul style="list-style-type: none"> <li>• Conducts the pre-use inspection of hose prior to each use.</li> <li>• Promptly removes the defective hose from the service, tag and store appropriate location.</li> <li>• Ensures sufficient quantities of required hoses are available in the unit.</li> <li>• Installs; uses and stores the hose as outlined in this procedure.</li> <li>• Reports any hose failure to identify the cause of failure.</li> <li>• Develop Specification for type 2 &amp; 3 based on this procedure and get verified from process.</li> <li>• Do not use the hose with missing inspection tag(s).</li> <li>• Type 3 hose to be dispose-off after 3 year of its installation.</li> <li>• Coordinates with Maintenance to ensure all Type 2 and Type 3 hoses are inspected as per the schedule.</li> <li>• Maintains the current list of hoses in their respective area and ensures all hoses are inspected as per the scheduled frequencies. (Refer to End User Hose Maintenance Tracking Sheet appendix-10.5</li> <li>• Perform the Audit at least once a year and maintained the record.</li> <li>• <b>CONNECTION OR INSTALLATION OF HOSE</b></li> </ul> <p>When a new hose is connected to an equipment, system end user has to update the Hose tracking sheet (appendix 11.5): with following information (hoses expected be more than one day).</p> <ul style="list-style-type: none"> <li>❖ Date of Installation</li> <li>❖ Tag Number</li> <li>❖ Location of Hoses ( equipment, Unit , plant)</li> <li>❖ Type of Hoses</li> <li>❖ Specifications of Hoses</li> <li>❖ Condition</li> </ul> <ul style="list-style-type: none"> <li>• <b>DISCONNECTING THE HOSE</b></li> <li>❖ On disconnection or removal of hoses end user shall update the Hose tracking sheet. ( Appendix 11.5)</li> <li>• <b>RESUME IN SERVICE</b></li> </ul>

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	<ul style="list-style-type: none"> <li>❖ The equipment cannot be put under service and lined up to the process until the absence of a connected hose check has been made, checking both on the field and on the hose tracking sheet.</li> </ul>
Maintenance Department	<ul style="list-style-type: none"> <li>• The maintenance department shall prepare &amp; maintain the type 2 &amp; type 3 QAPCO flexible hoses list and associated links to the individual Hose Specification Data Sheet in sharing folder.</li> <li>• <b>Inspection and pressure testing of hose:</b> <ul style="list-style-type: none"> <li>❖ All newly purchased hoses shall be tested and certified by supplier.</li> <li>❖ Inspect and verify the specifications (For new Type 1 hoses).</li> <li>❖ Follow up end user inspection recommendations for type 2 &amp; 3 hoses.</li> </ul> </li> <li>• Conduct the pressure testing (as required) and maintaining metal identification tag on hose.</li> <li>• Maintains documentation of inspection and testing.</li> <li>• Supports to provide tag number to all hoses based on end user request.</li> <li>• Locally assembled hose assembly / connections shall be inspected and tested by a competent person.</li> </ul>
Engineering/ Process	<ul style="list-style-type: none"> <li>• Engineering with consultation of process department will prepare and approve technical specification data sheets for type-1 hoses.</li> </ul>
Inspection Section	<ul style="list-style-type: none"> <li>• Inspection section shall maintain the inspection and test records for Type 1 Hoses as per defined frequency in inspection guidelines.</li> <li>• Inspection section shall analyze the hose Type 1 failure and provide advice accordingly.</li> <li>• Shall witness hydro testing whenever required.</li> </ul>
Procurement Division	<ul style="list-style-type: none"> <li>• The Buyer shall ensure that hoses are purchased only after verifying and attaching the approved QAPCO Hose Specification Data Sheet to all Purchase Orders.</li> <li>• Sets the expectation for hose specification/standard to Contractors.</li> <li>• Maintains the QAPCO Approved Hose Manufacturers/Suppliers List.</li> <li>• Ensures that procurement of all the hoses shall be from Approved Manufacturers/ supplier List and as per QAPCO Hose Specification Data Sheet along with original test certificates/records confirming the data sheet requirements.</li> </ul>

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Manufacturing	<ul style="list-style-type: none"> <li>For type 2, 3 hoses, perform annual visual inspection of hoses, hose assembly and report and damage/ or abnormality &amp; get corrected from maintenance/ inspection(Refer Appendix 11.2)</li> <li>Maintain the list of hoses (appendix 11.5) type wise in their respective area with location.</li> <li>Based on defined specifications (appendix-11.3), each plant will specify the hoses requirements.</li> <li>Tag &amp; paint utility points at plant utility stations.</li> </ul>
HSE Division	<ul style="list-style-type: none"> <li>Conducts periodic field walk down to ensure compliance with instructions</li> <li>Owens the procedure and reviews as per the 'Document Revision, Update and Track as per QAPCO control of document &amp; Record procedure (PR-PSS-88)</li> <li>Provide training and awareness session for this procedure.</li> </ul>
Inventory	<ul style="list-style-type: none"> <li>Maintain the stock of Hoses as per specifications</li> <li>On receiving the new hoses, it shall be tagged.</li> <li>Verify the document and specification against the purchase order</li> <li>Shall notify to end user for initial inspection for all hoses after verification of material and documentations hoses are accepted.</li> </ul>
Learning & Development	<ul style="list-style-type: none"> <li>Facilitate training to affected personnel within the organization as per the HSE Training Matrix.</li> </ul>

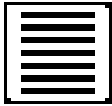
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## 9. PROCEDURE

### 9.1 Purchasing

- i. Procurement of any hose (Type 1) shall be based on a QAPCO Hose Specification Data Sheet.
- ii. Procurement of any hose (Type 2 &3) shall be based on a QAPCO Hose Specification Data Sheet approved by end user.
- iii. When end users want to purchase new Type 2 hoses, which does not have approved Hose Specification Data Sheet, end user shall prepare hose specification and get approved from process.
  - a) QAPCO Type 1 Hose Specification Data Sheets shall be provided by engineering.
- iv. When end users need new hose to replace existing hose they shall reserve in SAP and receive them from warehouse. Stock shall be maintained by warehouse based on the min/max levels already approved by the end users. All the required certificates shall be shared with end user.
- v. The hose manufacturer shall supply the hoses as per QAPCO Hose Specification Data Sheet along with original manufacturers' Material/Test Certificates/records confirming the data sheet requirements.
- vi. Procurement of all the hoses shall be from the QAPCO Approved Vendors List.

	<b>NOTE 1- Purchasing Principle</b>
	<p>The list is based on QAPCO Procurement/Technical evaluation (Which includes vendor prequalification, verification of manufacturer and/or supplier testing and certification processes which includes inspection of local testing facilities and conducting of actual testing as well as obtain the original manufacturer's technical specifications for hose and attachments (i.e. clamps, fittings, crimps) as a part of technical review process).</p>

### 9.2 Identification/Tagging

- i. The color of Type 3 hoses shall be as per Appendix 11.3
- ii. New hoses received at Inventory Warehouse shall be provided with two tags by inventory (one at each end) having the below information. (The tag shall be made of stainless steel tied/fixed to the hoses firmly by stainless steel ties/strips so that they won't get missed during handling the hoses)
  - a) PO Number (with unique number for each hose) and Tag Number-
  - b) Design Pressure.

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- c) Date of Pressure Test; (All new hoses to be purchased shall be vendors certified and tested at 1.5 times of the max. working pressure).
- d) Date of Manufacture of Hose.
- iii. **Existing hoses** with no information of PO Number and Year of Manufacturer may be used only after getting it inspected and pressure tested through the Maintenance Department. After successful inspection/test, Maintenance shall provide two tags (one on each end) with below information.
  - a) Design Pressure;
  - b) Date of Pressure Test.
  - c) Tag Number.
- iv. Hose with only one identification tag is to be tagged 'DO NOT USE', removed from the unit and taken to the Maintenance Department for tagging as applicable.
- v. Do not use the hoses that have both tags missing. Discard these hoses for future use.

### 9.3 Receiving and inspection

- i. Upon receiving new hose and applicable documents, the inventory Warehouse shall verify material received against the Purchase Order (PO) and required documentation.
- ii. Inventory Warehouse shall notify to end user for initial inspection for Type 2 and Type 3 hoses after verification of material and documentations hoses are accepted.
- iii. For type-1 hoses engineering or maintenance will be notified for verification.
- iv. After the initial inspection is complete, the hose shall be returned to the Inventory Warehouse for stocking or issuing.
- v. Hose crimped at maintenance workshop shall be inspected and tested by competent person.


### 9.4 Installation & Connection

- i. Hard piping should be the primary option for temporary process connections. Always determine if use of hard piping is not possible for the intended application prior to using hoses.
- ii. Good practices as outlined in Appendix 10.1 should be followed in installing/connection and use of hoses.
- iii. Always wear the right PPE for the hose being handled.
- iv. Handle chemical and hydrocarbon hoses with appropriate level of protection
- v. Hoses shall be visually inspected for defects before each use and/or before returning to service.


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- vi. Use the correct type of hose and end fitting for the service intended and ensure the hose is designed for the job and meets the approved specification as outlined in the QAPCO Hose Specification Data Sheet. Refer to Appendix 11.3 for the proper end fittings for different type of hoses.
- vii. All air entrapment shall be properly vented/eliminated and the system pressurized to the maximum system pressure (at or below the hose maximum working pressure). Check for proper function and freedom from leaks.

	<b>DANGER</b>
	<ul style="list-style-type: none"> <li>❖ Do not use UTILITY HOSE (Type 3 hose) in fixed process services</li> <li>❖ Do not use UTILITY HOSE (Type 3 hose) for transfer of hydrocarbons and hazardous chemicals</li> </ul>

- viii. In many applications, it may be necessary to restrain, protect, or guide the hose to protect it from damage by unnecessary flexing, pressure surges, and contact with other mechanical components. Care shall be taken to ensure such restraints do not introduce additional stress or wear points.

	<b>WARNING</b>
	Potable water system lines <u>SHALL NEVER</u> be connected to process or utility system.

- a. Proper consideration of how to de-pressurize the hose shall be incorporated in the installation
- b. Spring loaded check valves are preferred to allow either horizontal or vertical installation.
- c. The piping specification break shall be made on the inlet side of the check valve.
- d. By installing a check valve which meets the process piping specifications and installing it at the process connection, the integrity of the hose between the check valve and the utility source can be maintained.
- e. It is sometimes impossible to meet all piping specifications when the only available connection is a block valve with a threaded end connection. In this case, the connection between the process valve and the temporary check valve can remain threaded.
- f. All efforts should be made to meet the piping specifications and to minimize threaded connections.

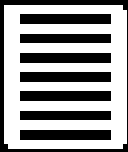
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- ix. Quick connection hoses shall have a secondary fastener outside of the metal coupling for safety by means of a hose whip check device.
- x. Use safety clips or pins on hose couplings (if applicable) to prevent twisting and premature disconnection.
  - a. Wire or other similar item cannot be used as safety pins or hose couplings.

### 9.5 Disconnection


- i. The following sequence shall be followed when disconnecting hose:
  - a. Block process side;
  - b. Block the supply side;
  - c. Bleed pressure from hose;
  - d. Remove coupling clip pins, flange bolts or other connection hardware;
  - e. Break coupling;
  - f. Reinstall bleeder plug / end blind on process piping connection.



**Note:1**

Hoses put into hydrocarbon, hazardous chemicals, nitrogen, air, steam and any other pressurized fluid service shall be equipped with a bleeding facility/valve to ensure safe system de-pressurization.

- ii. Check-valves and hoses shall be disconnected and removed before the system is placed in hydrocarbon service.
- iii. All Type 2 and 3 hoses, when not in service, shall be disconnected from their source and service ends.



**NOTE 2**

Situations in which regular connection/disconnection of hose present additional risk (e.g. Type 2 hose used for toxic loading and unloading); the hose may be left connected to the service end after use if an end blind with a bleeder is put at the source end.

- iv. After each use, hoses shall be drained and rolled up before storing in a dry location. Hoses shall be stored specified location.

### 9.6 Hose Inspection & Testing

- i. A test certificate shall be provided by the original manufacturer/supplier certifying its conformity to the QAPCO Hose Specification Data Sheet.

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ii. Hoses shall be pressure tested after performance of any repair, alteration, or replacement of hose parts or hose couplings.

**iii. Type 1 Hoses**

- a. Visual inspection and integrity check by inspection based on piping specifications and testing schedules.
- b. Hose defects observed during routine piping system inspections shall be noted on piping inspection reports communicate to operations and appropriate actions shall be taken.

**iv. Type 2 & 3 Hoses**

- a. Maximum life of Type 3 hoses are 3 years from the date of manufacturing for hoses.
- b. Maximum life of Type 2 hoses are 6 years from the date of manufacturing for hoses.
- c. Every year during the first half, individual plant shall conduct an annual audit to prepare a list of hoses which are already expired or going to be due within the next six months (including the hoses which are not in use and stored in the plant, a work request shall be raised for testing or replacing of these hoses.
- d. The End User - Hose Inspection Check Sheet should be referenced as a guideline for audit.
- e. Hose may be pressure tested when the integrity of a particular hose is suspected during pre-use inspection at the operating pressure of supply fluid by the end-user. Or hose may be discarded and replaced.
- f. Type 2 and Type 3 hoses shall be visually inspected by end user prior to each use for following sign of defects:
  - Abrasions blisters or lumps;
  - Cuts, tears, cracking, puncture, or gouges in the outside of the hoses which expose the reinforcement wire, inner tubing, etc.;
  - Kinked, crushed, flattened or twisted hose;
  - End connections of couplings that have worn threads, gaskets, or corrosion; or any other abnormality, etc. as applicable;
  - Flattened or kinked areas which have damaged the hose;
  - Loose couplings of missing safety pins.
  - Loose end connections hose clamps.
  - Anti-whip lash, condition & length
  - Hard, stiff, heat cracked, or charred hose;
  - Fitting slippage on hose.

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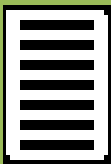
- Collapsed interiors;
- Contamination from previous use and other deficiencies, which may become apparent

### 9.7 Storage

- i. Hoses should be stored on a permanent rack, tray, or in other approved means, as appropriate. Try to avoid storage in direct sunlight.
- ii. Never store heavy materials on hoses.
- iii. Do not hang hose on nails, hooks, or other devices that could cut or damage the hose.
- iv. Hose shall be made free of hazardous chemicals, hydrocarbons or other fluids before storage.

### 9.8 Non-conforming of procedure

- i. Hoses that fail the pre-use inspection or while in service or during periodic audit shall be tagged with information tag 'DO NOT USE', removed from service. Such hoses shall be made free of hazardous chemicals, hydrocarbons or other fluids.
- ii. An in-service failure of a Type 1 hose shall be reported to maintenance/ inspection for evaluation.
- iii. Any failure of hose shall be reported near miss in SAP- EHS.

	NOTE 3
Connection leaks are not considered as failure.	

- iv. Hoses that cannot be repaired shall be cut into pieces and disposed as per the *Waste Management Procedure* (PR-PSS-123).

### 9.9 Contractor Hoses

- i. Hose requirement shall be specify in detail scope of services when intending to use contractor hoses.
- ii. Materials/Contract Department shall set the expectation on hose specification including end fittings/clamps by sending a copy of QAPCO procedure/ Hose Specification Data Sheet at the time of contract award if the job involves use of hoses.
- iii. QAPCO contractor focal point shall ensure that contractor supplied hoses to be used in Plant including end fittings/clamps are as per QAPCO Hose Specification Data Sheet.

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- iv. Contractor's hose shall have unique identification number which match with test Certificate.
- v. Ensure that the third party certificate for the hose includes pressure test along with fittings.
- vi. QAPCO contractor focal point shall ensure that the contractor visually inspects the hose as per QAPCO "End User - Hose Inspection Check Sheet appendix-11.2" prior to use at site.
- vii. If contractor uses their own hose on their own equipment or contractor hose connected to downstream of pressure manifold, it is allowed to use fitting and hose color coding as per their equipment requirements.
- viii. Contractor are not allowed to connect the hose for steam and nitrogen connection. The connection of steam and nitrogen hoses in the plant shall be carried out by Operation Field Operator to avoid any wrong installation.
- ix. Contractors are not allowed to operate any valves in the plant without presence of operator.
- x. Any deviation from this procedures shall be properly evaluated.

### 9.10 Training

- a) Provides basic training to affected personnel within the organization
- b) Provides refresher training as per QAPCO Training Matrix.

ID	Activity	Risk <sup>1</sup>	Risk register reference	Supporting IT system module	Document reference	Responsible org. position
9.1	Purchasing	No	NA	NA	NA	NA
9.2	Identification/Tagging	No	NA	NA	NA	NA
9.3	Receiving and inspection	No	NA	NA	NA	NA
9.4	Installation & Connection	Yes	Specific JSA PTW	NA	Method of statement	DSR
9.5	Disconnection	Yes	Specific JSA PTW	NA	NA	NA
9.6	Hose Inspection & Testing	Yes	Specific JSA PTW	NA	NA	NA
9.7	Storage	Yes	Maint. RR	NA	NA	NA
9.8	Non-conforming hoses	No	NA	NA	NA	NA
9.9	Contractor Hoses	Yes	Specific JSA PTW	NA	NA	NA

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ID	Activity	Risk <sup>1</sup>	Risk register reference	Supporting IT system module	Document reference	Responsible org. position
9.10	Training	No	NA	NA	NA	NA

## 10. RECORDS

- xi. Maintain the original manufacturer's hose certificates in the receiving Purchase order file.
- xii. Inspection integrity shall maintain periodic inspection and testing records for Type 1 hose.
- xiii. Manufacturing shall maintain the inspection record for type-2 & 3 hoses.

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## 11. APPENDIX

- 11.1 Do's and don'ts for Hose Management
- 11.2 End user Hose inspection check list
- 11.3 Colors and coupling standards for Type-3 hoses.
- 11.4 Typical Utility Hose Connection to Process Equipment
- 11.5 End user hose maintenance tracking sheet

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## Appendix 11.1: Do's and Don'ts for Hose Management

### HOSE DO's:

- Use hose designed and recommended for the service intended (use the right hose for the job)
- Always inspect the hose before using it.
- Route hoses so as to protect personnel from tripping hazards. Avoid laying hoses across walkways, staircases, or common paths. When necessary, barricade or erect stands to maintain area unobstructed.
- Tag and remove hose from service when it fails the pre-use inspection.
- Store hoses away from high heat sources like steam pipes, radiators, hot equipment etc.
- Always attach hoses so that they do not bend sharply at their end connections. Hoses not in use shall be coiled and hung or stored to specified area.
- Avoid using hoses where they can be damaged by other tools, people or equipment.
- Always wear the right PPE when using hoses with hydrocarbons, hazardous chemicals, or when the fluid is under high temperature.
- Always ensure that that the mating couplings are completely free from foreign matter, burrs etc.
- Avoid laying hoses across roadways. When it is necessary to lay hose across roadways, hoses should be protected from the crossing of passing vehicles by mean of boards, earth mounds, ramps or other method. Closing the road may be warranted if no other means of protection is available.
- Make the hose chemical free prior to storage.
- Ensure that and appropriate size "Hose Whip Check" is attached to both ends of the quick hoses.
- Compressed Air use for cleaning shall be equipped with approved safety air gun with dead man switch.
- To avoid failure of hose due to vibration from pump and rubbing with hard surface provide soft support (i.e. wooden support) underneath the hose or if possible use appropriate length of hose.
- Hoses connected to process equipment shall be provided with a check valve downstream in order to prevent / avoid back pressure.
- Preferably, wherever possible Hose shall only be connected to vessel or piping where a drain valve or vent exists to relieve pressure after use.

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- Hose, when appropriate, shall have electrical continuity between the couplings on the two ends to reduce the probability of static electrical discharge that could be the ignition source for a fire.
- Utility valve shall be opened first to avoid back flow of process fluid.
- Hoses shall be depressurized before disconnecting from service.

#### HOSE DONT's:

- Crush hose or kink it.
- Repeatedly bend hose in one place – this may eventually break the reinforcement.
- Hoses should not be installed in a twisted condition, since this puts unbalanced tension on the hose and reduces the working life of the assembly.
- Use a hose that failed the pre-use inspection.
- Use a hose beyond the temperature and pressure it is designed to be used for.
- Use damaged or worn fittings.
- Store the hose without first rinsing, draining and drying out hazardous chemicals, hydrocarbons.
- Place heavy loads on hose.
- Use of quick coupling without Whip check.
- Use air hoses to clean clothing or body parts.
- Never pull a hose by its coupling.
- The permanent or long-term use of hoses instead of fixed piping is to be avoided. Hoses will not be used for process flows; their main use is for special utility requirements.

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**Appendix 11.2: End User Hose inspection check list:**

<b>Service :</b>		<b>Hose type :</b>		<b>Type 1</b> <input type="checkbox"/>		<b>Type 2</b> <input type="checkbox"/>		<b>Type 3</b> <input type="checkbox"/>	
S #	Inspection item	Yes	No	NA	Remarks				
1	Do hose has tags and unique ID?								
2	Is hose within Validity period?								
3	Is hose suitable for intended use?								
4	Is Pressure rating of hose visible?								
5	Are sign of weakness or corrosion of end connection?								
6	Are end connection seals in place and good condition?								
7	Are there sign of cracks, cuts, abrasion or other damage in hose body?								
8	Is any part of hose kinked?								
9	Is there any sharp bends immediately behind the coupling, twist or blisters in hose assembly?								
10	Check couplings for any slippage which is evidenced by misalignment of the coupling or scored/exposed areas on the hose cover next to the coupling which indicates movement of the coupling.								
11	Check couplings for worn threads, loose clamps or bands, worn gaskets, worn or broken handles, cam-arms and pins.								
12	Is there any blockage or damage inside hose coupling?								
13	Is the hose color Ok not faded, if its faded that may be due to chemical exposure/ attack								
14	Is proper support is provided for hose near flange connections and free from any sharp object								
15	Is proper protective planks are provided when crossing a roadway to avoid damage								
16	An appropriate anti-whip-lash is installed.								
17	Pneumatic equipment/ tools connections are safe and away from worker body.								
<b><u>Correction actions Taken:</u></b>									

<b>Inspected By:</b>	<b>Date:</b>
<b>Supervisor</b>	<b>Date:</b>

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**Appendix 11.3: Colors and coupling standard for Type-3 hoses**

<u>Service</u>	<u>Hose Color</u>	<u>Coupling Type ( Qapco)</u>	<u>Coupling type ( vinyl)</u>	<u>Clamp Type</u>	<u>Material</u>	<u>Max workin g Press.</u>	<u>Size ( Vinyl)</u>
Water	Black	"Crow Foot"	"Crow Foot"	hydraulic crimping	Steel	20 bar	3/4"
Water (Cleaning )	Black	"Crow Foot"	"Crow Foot"	Hydraulic Crimping	Steel	10 bar	3/4"
Demi-Water	Black	NA	"Crow Foot"	Hydraulic Crimping	Steel	10 bar	(1")
Steam	Red	Boss	Flange	Hydraulic Crimping	Steel	17 bar/ 235 °C	3/4" ( 1")
Air	Yellow	Cam & Grove	Crow foot	Hydraulic Crimping	Steel	20 bar	3/4"
Nitrogen	Blue	"Quick Release"	Flange	Hydraulic Crimping	Steel	20 bar	3/4" ( 1")

**Example of "Crow Foot" coupling with hydraulic crimping for water hose**



**Example of "Boss" and Flange couplings with hydraulic crimping for Steam Hose**



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**Example of “Cam & Groove” & Crow foot couplings with hydraulic crimping for Air Hose**



**Example of “quick release” & Flange coupling and crimp style fitting clamp for Nitrogen Hose**



**Note:1**

Contractors are not allowed to connect nitrogen hoses, only field operator shall connect hose with nitrogen system at utility station.

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**TYPE-3 UTILITY HOSE CROSS USAGE AVOIDANCE MATRIX**

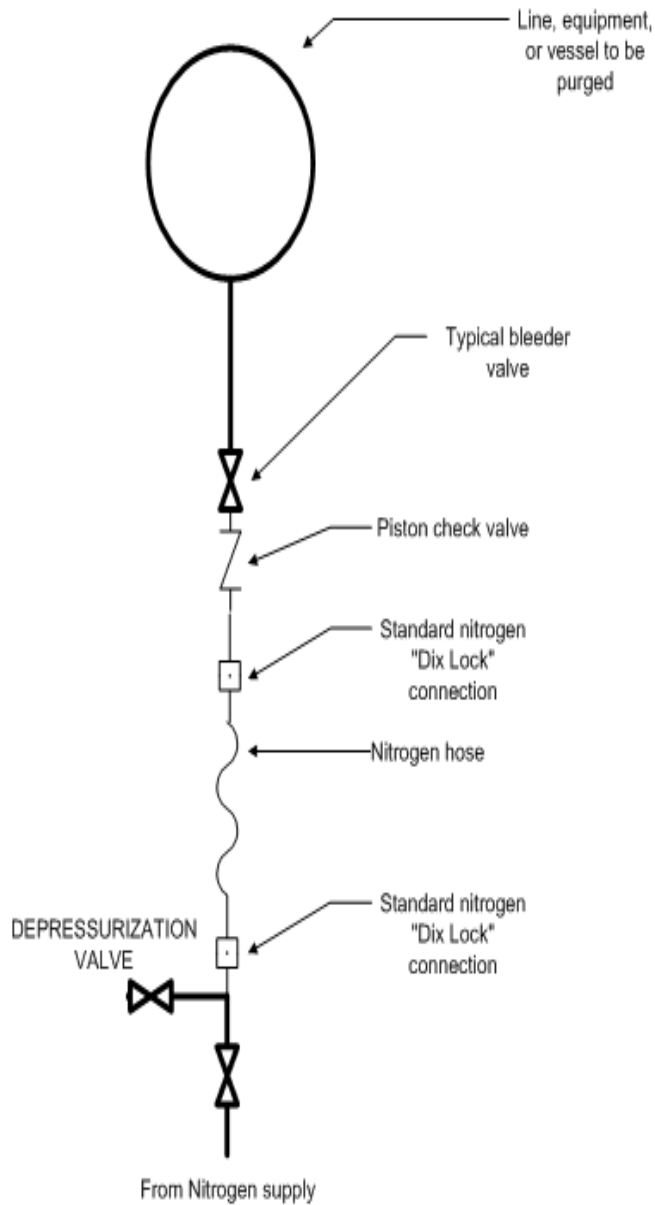
QAPCO	Utility Stations ->	Air	Water	Steam	Nitrogen
		Utility Hoses	Configuration	Yellow	Black
		Cam & Grove	Crow Foot	Boss	Quick Release
		3/4"	3/4"	3/4"	3/4"
Air	Yellow	MATCH	NO MATCH	NO MATCH	NO MATCH
	Cam & Grove	MATCH	NO MATCH	NO MATCH	NO MATCH
	3/4"	MATCH	MATCH	MATCH	MATCH
Water	Black	NO MATCH	MATCH	NO MATCH	NO MATCH
	Crow Foot	NO MATCH	MATCH	NO MATCH	NO MATCH
	3/4"	MATCH	MATCH	MATCH	MATCH
Steam	RED	NO MATCH	NO MATCH	MATCH	NO MATCH
	Boss	NO MATCH	NO MATCH	MATCH	NO MATCH
	3/4"	MATCH	MATCH	MATCH	MATCH
Nitrogen	BLUE	NO MATCH	NO MATCH	NO MATCH	MATCH
	Quick Release	NO MATCH	NO MATCH	NO MATCH	MATCH
	3/4"	MATCH	MATCH	MATCH	MATCH

VINYL	Utility Stations ->	Air	Water	Steam	Nitrogen
		Utility Hoses	Configuration	Yellow	Black
		Crow foot	Crow Foot	Flange	Flange
		3/4"	3/4"	1"	1"
Air	Yellow	MATCH	NO MATCH	NO MATCH	NO MATCH
	Crow foot	MATCH	MATCH	NO MATCH	NO MATCH
	3/4"	MATCH	MATCH	NO MATCH	NO MATCH
Water	Black	NO MATCH	MATCH	NO MATCH	NO MATCH
	Crow Foot	MATCH	MATCH	NO MATCH	NO MATCH
	3/4"	MATCH	MATCH	NO MATCH	NO MATCH
Steam	RED	NO MATCH	NO MATCH	MATCH	NO MATCH
	Flange	NO MATCH	NO MATCH	MATCH	MATCH
	1"	NO MATCH	NO MATCH	MATCH	MATCH
Nitrogen	BLUE	NO MATCH	NO MATCH	NO MATCH	MATCH
	Flange	NO MATCH	NO MATCH	MATCH	MATCH
	1"	NO MATCH	NO MATCH	MATCH	MATCH

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**Appendix: 11.4.** Typical Utility hose connection to process equipment

**TYPICAL NITROGEN PURGE ASSEMBLY**



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Appendix 11.5: HOSE MONITORING MAINTENANCE TRACKING LIST:



End user Hose  
Maintenance Tracking

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