



Guide for Evaluating Your Hose Assembly Supplier

Supplier Evaluation Checklist, and How to Clearly Define Application Requirements

Safe, reliable hose assemblies require appropriate specification work up front, and a quality supplier whose work is guided by NAHAD's Hose Assembly Guidelines.

This guide provides

- a checklist for evaluating your supplier
- a simple process based on the acronym STAMPED for determining the correct hose, coupling and attachment method that will satisfy the application's requirements; (please note a separate section is included on Critical Applications which may require special attention)

Directions

Working with hose assembly distributors/suppliers, make sure (1) they are clear about all aspects of the application for which you need a hose assembly, and (2) you get satisfactory answers to the check-list provided to ensure business and fabrication processes are in line with NAHAD's Hose Assembly best practices (as documented in the Hose Safety Institute Handbook©.)

Supplier Evaluation Checklist

Distributor _____

Date: _____

This Checklist reflects distributor/supplier capabilities and general commitment to quality.

Distributor/supplier:

- Fabricating personnel have been properly **trained and tested**
- Fabricates all hose assemblies in conformance with the appropriate NAHAD **Hose Assembly Guidelines Fabrication Guide**
- Possesses the ability to effectively conduct the appropriate hydrostatic, electrical conductivity, or other **tests** of the finished assembly as specified in the relevant Hose Assembly Guidelines manuals.
- Maintains an appropriate record of regularly scheduled **calibrations** for any associated testing equipment.
- Maintains a company **Quality Handbook** or manual that conforms to the standards listed in the Hose Assembly Guidelines Specification Manual for all Hose Assembly groups in which they do business.
- Maintains a well organized and environmentally controlled **hose inventory** that meets or exceeds requirements for inspections and storage of hose outlined in NAHAD's Hose Safety Institute Handbook. (Storage area, humidity and temperature, hose stacking methods, and general cleanliness of work environment).
- Utilizes **hose tagging** or identification methods in conformance with NAHAD's Hose Safety Institute Handbook
- Additional industry certifications (e.g., ISO 9000) held by the company; note which ones here: _____

Critical and Custom Applications

There are specific applications that require additional design, fabrication installation and maintenance considerations over and above the requirements set forth in NAHAD's Hose Assembly Guidelines. This includes applications where custom design, engineering, fabrication, testing, installation and maintenance are specified or required. Please see Appendix G of the *Hose Safety Institute Handbook for the Design and Specification of Hose Assemblies*© for additional information. The following is a non-inclusive list.

Chlorine

For hose assemblies used to transport chlorine, there are specific requirements set forth in the Chlorine Institute Pamphlet #6 (edition 15), "Piping Systems for Dry Chlorine", Appendix A, Section 9. Please note that Chlorine transfer hose (CTH) must be clearly and permanently marked as per [Chlorine Institute Pamphlet #6 \(edition 15\), Appendix A, Section 9](#). These permanent markings (e.g. stamping, stenciling or coding) should be utilized throughout the supply chain for purposes of continuous positive identification.

Anhydrous Ammonia – reference ARPM publication no. IP 11-2

Aircraft Fueling – see American Petroleum Institute

Welding Hose - reference ARPM publication no. IP 11-5

LP Gas - reference UL 21 and UL 569.

Water Blast and Hydroblast Hose

Water blast hoses are typically designed for very high pressure water applications. Typically used for paint removal, unplugging and cleaning exchanger tubes, off-shore deep water applications, and water blasting. Burst pressures may vary by manufacturer. Applications entail very high internal pressures. Consult manufacturer for safety factors.

Airless Paint Spraying. Available in 1000-10,000 psi. Contact hose manufacturer for more information.

Natural Gas - Natural Gas molecules will permeate through Rubber or PVC hose constructions and create potentially dangerous consequences. Contact hose manufacturer for information.

STAMPED Considerations/Discussion Points

The following list of special considerations may help to clarify application parameters:

1. Abrasion
2. Additional protections (need for guards or covers)
3. Electrical conductivity
4. Environment
5. Fitting orientation, flange alignment
6. Flammability
7. Flow rate
8. Fluid velocity – for metal hose, very high velocities may require the use of a liner
9. Movement (type, distance, frequency)
10. Ozone
11. Permeation (vapor conveying hose)
12. Routing (tight bend radius); physical space limitations
13. Salt water
14. Static electricity
15. Ultraviolet light
16. Vibration (frequency rate – Hz, amplitude – "G" load)
17. Special marking or branding requirements

Control Parameters

Information should include:

- Drawing or print if applicable and proper revision of drawing or print.
- Agency standard(s) as applicable.
- Any customer test requirements.
- Any customer documentation requirements.
- Special branding requirement and cover color.
- Information of past performance of present hose in place.
- Special cleaning procedure in use.

Contract Parameters

Information should include:

- Quantity
- Delivery schedule
- Cleaning requirements
- Packaging requirements
- Other items per manufacturer guidelines

Length Tolerances (see individual hose group chapters in the Handbook for specific guidance)

(See **STAMPED** Form on next page)

Customer Information:

Company: _____
 Contact: _____
 Address: _____
 Phone: _____

Fax: _____
 E-mail: _____
 P.O.#: _____
 Terms: _____

Size	I.D.	O.D.	Overall Length*	Tolerance

Temperature	Materials Conveyed		Environmental Temperature	
	Min.	Max	Min	Max
	°F/°C	°F/°C	°F/°C	°F/°C

Application	Type:
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Material/ Media	Material Conveyed		
	Internal Media		External Environment

Pressure	Max Working Pressure	Spikes	Vacuum
	PSI/kPa	PSI/kPa	Inches of Hg/kPa

Ends	End	Style/ Material	Size	Threads/Bolts Hole Alignment	Orientation	Attachment Methods	Capped
	1						Y N
	2						Y N

Delivery	Quantity Required:		Date Required:	
	Package Type:			
	Pick Up Date:		Ship Via:	
	Testing Required:	Y N	Type:	
	Certification Required:	Y N	Type:	

*see Handbook glossary for specific definitions

Special Requirements

Additional Notes

The STAMPED acronym stands for the 7 major information areas required to provide a quality hose assembly, as follows:

S stands for **SIZE**; I.D. and length; any O.D. constraints

- overall length should be specified to include fittings
- tolerances need to be specified if special requirements exist

I.D., O.D. and overall length of the assembly

- To determine the replacement hose I.D., read the layline printing on the side of the original hose. If the original hose layline is painted over or worn off, the original hose must be cut and inside diameter measured for size.
- The inside diameter of the hose must be adequate to keep pressure loss to a minimum, maintain adequate flow, and avoid damage to the hose due to heat generation or excessive turbulence. The hose should be sized according to the nomographic chart in appendix D of the *Handbook*.
- Length tolerances should be considered for all types of hose assemblies. See individual hose sections for specifics.
- **Flow Rate / Fluid Velocity** - The flow rate of the system in conjunction with the inside diameter of the hose will dictate the fluid velocity through the hose. Typical fluid velocities can be seen in the nomographic chart in Appendix D. Please consult your hose supplier for specific recommended velocity ranges. Please note that suction line recommendations are different than pressure lines.

T stands for **TEMPERATURE** of the material conveyed and environmental conditions

- Are there factors such as heat sources in the environment in which the hose will be used
- Continuous (average) and minimum and maximum temperatures have to be specified for both the environment and material conveyed
- Note if flame resistance or flammability will be an issue
- Sub-zero exposure
- Care must be taken when routing near hot manifolds and in extreme cases a heat shield may be advisable.
- Other things to consider: maximum intermittent ambient temperature, fluid temperature, ambient temperature and maximum temperature.
- Temperature cycling – exposure of the assembly to changing temperatures over time

A stands for the **APPLICATION**, the conditions of use

- Configuration/routing (add a sketch or drawing if applicable)
 - is the hose hanging, laying horizontally, supported, unsupported (orientation and aspect of the hose)
 - what else is attached to the hose, any external load on the hose
 - bend radius requirements, flexibility
 - elongation considerations with working pressure
- Quantify anticipated movement and geometry of use requirements
- Intermittent or continuous service
- Indoor and outdoor use
- Unusual mechanical loads
- Excessive abrasion
- Electrical conductivity requirements
- Equipment type
- External conditions – abrasion, oil (specify type), solvents (specify type), acid (specify type and concentration), ozone, salt water
- Hose now in use
 - Type of hose
 - Service life being obtained and description of failure or source of customer dissatisfaction
- strength and frequency of impulsing or pressure spikes
- non-flexing applications (static), flexing applications (dynamic)
- vacuum requirements
- Can also refer to Alloy when working with Metal Hose

M stands for the **MATERIAL or MEDIA** being conveyed, type and concentration

- Are there special requirements for this hose tube
 - Any special specifications (or agency requirements) that need to be considered (e.g., FDA, API)
 - Will the material be continuously flowing, or sit in the hose for long periods of time (specify)
- Media velocity, flow rate
- Chemical name/concentration (MSDS)
- Solids, description and size
- Fluid Compatibility - Some applications require specialized oils or chemicals to be conveyed through the system. Hose selection must assure compatibility of the hose tube. In addition to the hose materials, all other components, which make up the hose assembly (hose ends, o-rings, etc...), must also be compatible with fluid being used. Depending on the fluid, your hose supplier may lower the maximum temperature or pressure rating of the assembly. When selecting any hose assembly, always consult your hose supplier's recommendations.
- Can also refer to Motion when working with Metal Hose

P stands for the **PRESSURE** to which the assembly will be exposed

- System pressure, including pressure spikes. Hose assembly working pressures must be equal to or greater than the system pressure. Pressure spikes greater than the maximum working pressure will shorten hose life and must be taken into consideration.
- Temperature implications
- Vacuum considerations
- **Maximum Operating Pressure** - This is the maximum pressure that the system should be exposed to in normal operating conditions. For hydraulic hose assemblies, this pressure should be dictated by the relief setting of the system. Both the hose and hose end should not be rated to a pressure less than the maximum operating pressure of the system.
- **Pressure Spikes** - When a hydraulic system is subjected to a large load in a short period of time, the system pressure can overshoot the relief setting and exceed the maximum operating pressure. Frequent pressure spikes can reduce the life of hydraulic hose assemblies. In general, spiral hose constructions are better suited to high impulse applications, which involve flexing and large pressure spikes. However, there are specialized braided hoses available from various manufacturers. Please consult your hose supplier if there are multiple constructions which meet your application needs.
- Impulsing – exposure of the assembly to changing pressures over time

E stands for **ENDS**; style, type, orientation, attachment methods, etc.

- Uncoupled or coupled hose; hose with built-in fittings
- Specify end style (see charts and pictures in Section 5)
- Materials and dimensions (steel, stainless, etc.)
- Conductivity requirements

D stands for **DELIVERY**

- Specific to customer requirements
- Testing requirements
 - certification requirements (e.g., Coast Guard)
- any special packaging requirements
- any special shipping requirements
- tagging requirements
- can also refer to Determined Overall Length when working with Metal Hose

Notes

Diagrams