

HOSE MASTER

# Do's and Don'ts for Lined Metal Hose Assemblies

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### Is there a liner in that hose? Great! But remember...

In Hose Master University, we discuss how adding a stripwound (interlocked) hose liner to a corrugated hose assembly can provide protection from the effects of excessively high flow velocities or abrasive media. The liner's interlocked construction provides a relatively smooth, abrasion-resistant barrier that protects the corrugations from premature metal fatigue or wear. Adding this liner permits the hose assembly to function without any reduction in either the flexibility or the pressure rating of the corrugated hose in which it is installed. Nonetheless, we need to be aware of situations where special attention is required to prevent damage to the liner, so it can perform effectively and safely.

#### Liners are directional!

Historically, product training for stripwound hose taught us that roughbore stripwound hose (like our Interflex) was "bi-directional" (meaning that the product flow could travel in either direction through the hose), and that smoothbore stripwound hose (like our Ultraflex) could only accommodate flow in one direction, because the inner liner could be damaged if product were traveling the wrong way. In fact, we have found that even roughbore stripwound hose will last longer if the media flows in one specific direction. This is due to the way media interacts with the liner as it travels through the

hose. Let's take a look at the following diagram:

The above corrugated assembly has a standard

(roughbore) interlocked hose liner. Although the liner permits flow in either direction, the liner will last longer if flow is dedicated to one direction only: in this diagram the recommended direction of flow is from right to left.

If the media is moving right-to-left, then it impacts the shoulder inside the liner and bounces back towards the center of the hose

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Recommended flow direction through a lined corrugated hose assembly

However, if the media is moving left-to-right, the media tries to wedge itself down into the interlocking profile. This can lead to loosening of the interlock and evential degradation of the liner:



# Reversing the flow through a lined assembly could shorten assembly life

It is important to note that if a liner is installed in a corrugated hose assembly, the exterior of the assembly should be marked with <u>flow arrows</u> to indicate the preferred direction of flow. Because of this, we will ask you to specify the inlet and outlet fittings when we quote a lined assembly with different fittings on each end. Knowing the proper end fitting configuration when requesting a quote enables us to quote quickly and accurately.

## Testing considerations for lined assemblies

If an application requires a liner in the hose, here are some recommended testing considerations. When fabricating a lined assembly, it is good practice to complete any testing *before* installing the liner inside the corrugated hose, for several reasons. First, standard leak testing is more efficient and accurate without the liner in the hose. Second, if hydrostatic (high-pressure) testing is required, the hose should be completely drained of the testing medium (typically water) prior to liner installation. This would not be possible if the assembly is tested after the liner is installed, as some of the testing media remains outside of the liner.





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This trapped water can create a pressure differential that could damage the liner: if a lined assembly is pressure tested followed by rapid depressurization, the high-pressure water trapped on the outside of the liner could cause the liner to collapse. To prevent this, it is recommended that – if a hose with an installed liner must be tested – the test pressure should be very gradually reduced in order to minimize the pressure differential between the I.D. and the O.D. of the liner. In an attempt to prevent liner damage, some fabricators will drill small holes in the liner to act as pressure relief vents. Although this may seem like a good idea, these holes change their diameter and shape as the hose is flexed, and they are prone to plugging. This inhibits the ability of the vent holes function as desired, they are not sufficient to completely drain all residual liquids from the O.D. of the liner after hydrostatic testing, which can be problematic. A high-pressure gas test might be preferred over a hydrostatic test in order to prevent water from getting trapped outside of the liner.

#### Lined hoses for steam service

If a lined corrugated assembly will be used for steam service, large temperature swings could also cause similar problems with the liner. If steam condensate is allowed to permeate past the liner and collect in the space between the hose and the liner, a sudden burst of live steam through the hose could cause the condensate to flash back into steam, creating a momentary blast of pressure that could cause the liner to collapse. Preventing any rapid pressure changes through proper plumbing, insulation, and accessories (steam traps, drains, etc.) can greatly reduce any potential issues caused by extreme temperature swings.

## Yeah, we make that...

Whatever potential problems you might encounter in the field, we've probably seen it and solved it. Liners must fit snugly into the corrugated hoses they are meant to protect, to prevent them from flopping around inside the assembly. Because we make both the corrugated hose and the interlock liner, a perfect fit is ensured. Additionally, the interlock profile must be well-balanced, which gives the liner outstanding durability while maintaining the required flexibility. In certain applications, a smooth-bore interlocked hose may be used as a liner instead of standard rough bore hose. We also have novel interlock constructions and special fabrication techniques that can accommodate a wide variety of service conditions. If the application can't be solved using a flexible hose, a metal expansion joint may be the best solution. Expansion joint liners can include special features, to prevent condensate build-up and to accommodate pressure testing in the field. Whatever the service conditions, we can custom-design expansion joints to handle extreme movements, pressures, temperatures, and other system dynamics.



Not sure which option is best? Our sales team can provide on-site assistance and share our application expertise to help you handle the toughest requirements.

