

To: Lift-All Customer Date: 10/22/20
From: Lift-All Quality Assurance Department
Re: Supplemental Info for Hose / Pipe Restraint products, including *Hose Halter* restraints

Hose Halter Product Design Specifications

Lift-All *Hose Halter* webbing and *RoundOne* roundsling hose and pipe restraints are designed and manufactured in conformance with all ASME B30 and WSTDA standards. These specific products, however, are designed to restrain materials rather than to lift them, and therefore are rated accordingly. *Hose Halter* (HH) webbing type restraints have a design factor of 3, with an assigned working load limit equal to one-third their breaking strength. *RoundOne* (HHS) roundsling hose restraints are rated to a design factor of 5, based on their energy absorption capacity. As these products will be called upon to restrain dynamically released materials, rather than to simply become tensioned like a sling to a predictable force, it was appropriate to consider their ability to absorb energy in the form of dynamic impact applied by hoses and their pressurized fluids.

If an alternative rating method is specified by the customer to suit specific needs, please contact our customer service department for available design options.

Working Load Limits and Pressure Limit

Lift-All offers several styles of webbing *Hose Halter* hose restraints. The most common versions are a 1" single ply webbing style that carries a Working Load Limit of 1,300 Lbs., and a 1" two ply webbing style that has a WLL of 2,600 Lbs.

Other versions are also available, including several Heavy Duty webbing and High Capacity Roundsling versions.

Assignment of Pressure Ratings to assist typical users

In an effort to assist *Hose Halter* restraint users in selecting suitable restraints, Lift-All has assigned allowable hose pressure ratings to limit the amount of force that will be applied to the *Hose Halter* in the event of a hose separation. Each hose diameter is assigned a maximum pressure value such that the force exerted by the hose will not exceed the WLL of the restraint.

Alternative Product Ratings and tagging options for OEM manufacturers:

Alternatively, LiftAll is willing to offer special product tags for OEM applications. For these OEM tags, Lift-All will simply replace the listed pressure rating values with the appropriate restraint WLL in Lbs. Examples of available tags are shown in the following:

These are offered because it is understood that hose pressures within specific pressurized equipment systems can drop off rapidly when a hose separation occurs. Thus, in many instances, hose halters may be appropriate for use on equipment operating at pressure values that are higher than those shown in the pressure tables. The applicability will depend on the particular pressure loss characteristics of the equipment when a hose separation does occur.

Table 1. Web Hose Halter Example Tags

<p style="text-align: center;">WS-HH1S REV 3-2011 1 PLY</p> <p style="text-align: center;">HOSE HALTER™ STRAP</p> <table border="1" style="width:100%; border-collapse: collapse; text-align: center;"> <thead> <tr> <th>Part No.</th> <th>Hose I.D.</th> <th>Strap Length</th> </tr> </thead> <tbody> <tr> <td>HH1-30</td> <td>1/4" to 2"</td> <td>30"</td> </tr> <tr> <td>HH1-40</td> <td>1" to 4"</td> <td>40"</td> </tr> <tr> <td>HH1-SP</td> <td>NA</td> <td></td> </tr> </tbody> </table> <p style="text-align: center;">WARNING</p> <table border="1" style="width:100%; border-collapse: collapse; text-align: center;"> <thead> <tr> <th colspan="4">Max. Internal Pressure</th> </tr> <tr> <th>Max Hose I.D. (in.)</th> <th>PSI</th> <th>Max Hose I.D. 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ABOVE 200° F DO NOT USE FOR LIFTING PURPOSES</p> <p style="text-align: center;">WORKING LOAD LIMIT 2600 LBS</p> <p style="text-align: center;"><i>Figure 4 - Alternative 2-Ply OEM tag showing rating using the appropriate Working Load Limit</i></p>	Part No.	Hose I.D.	Strap Length	HH2-30	1/4" to 2"	30"	HH2-44	1" to 4"	44"	HH2-64	2" to 6"	64"	HH2-SP	NA	
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Special Tagging

Some special capacity or inspect tags may be available. Advise Lift-All customer service department of any special requests.

Hose Halter Length Selection - How does one determine the proper length or distance between choke points for a *Hose Halter* application? Several *Hose Halter* products carry a minimum length of 20", 30" or more depending on the design. Lengths of between 24" and 30" are commonly chosen for hose/pipes having an OD of less than 2". The trial fitting of *Hose Halters* on hose/piping is often a good practice for verifying their suitability.

Common Practices for Selecting Hose Halter Length

Hose Halter (HH) Webbing Hose and Pipe Restraints

The following practices are commonly followed for determining a suitable length when using *Hose Halter Restraints*:

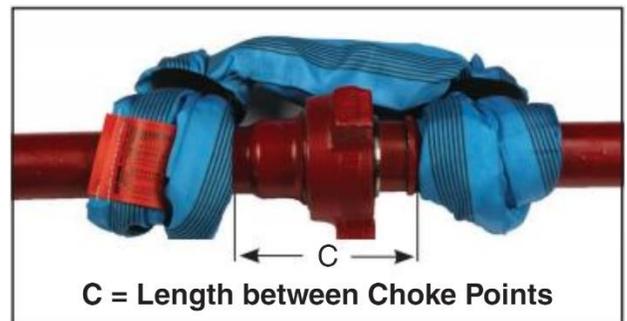
- *Part 1 - Length for the Span Section* - Length of $8 \times OD$ (8 times the Hose OD) – This length is the sum of two span values:
 - *4xOD (4 times the Hose OD) to Span Across the Hose Connection Fittings* – While the length and size of hose connection fittings may vary greatly, a distance equal to roughly 3 to 5 times the hose diameter will often be adequate to span across /over the hose/pipe connection hardware.
 - *4xOD (4 times the Hose OD) to Provide Some Clearance Distance from the Hose/Pipe Fittings to the Choke Point* - A distance equal to roughly 2 times the hose diameter will often be adequate on each end to provide adequate clearance from the hose fittings.
- *Part 2 - Length for the Choke Connection Sections* - of $8 \times OD$ (8 times the Hose OD) to Cover the Length need to Choke / Encircle the Hose at the Choke Points - A section length distance equal to 4 times the hose OD diameter on each end will generally be adequate to form the choke hitch around the hose/piping.
- *Total Length of the Hose Halter* – Summing Parts 1 and 2 from the above, a total of between $16 \times OD$ and $18 \times OD$, are Commonly Chosen Length (Measure Flat) for Hose Halters – When we cumulate the above values, we find the expected requested length to commonly range between 14 and 20 times the OD of the hose / pipe depending on the length of the connection hardware and the desired clearance from the connection. **For Hose ODs of 2" and larger, Hose Halter flat length values of between 16 times and 18 times the OD are common.**

RoundOne (HHS) Roundsling Hose and Pipe Restraints

The practices commonly followed for determining a suitable length when using *RoundOne* roundsling restraints is similar to that of web type restraints, with the same span section calculations, but the base length for forming the choke connection are adjusted to account for the larger bulkiness of the product.

The following practices are commonly followed:

- *Part 1 - Length for the Span Section (C)* :
= Length of $8 \times OD$ (8 times the Hose OD)
This length is the sum of two span values:
 - *4xOD (4 times the Hose OD) to Span Across the Hose Connection Fittings* – While the length and size of hose connection fittings may vary greatly, a distance equal to roughly 3 to 5 times the hose diameter will often be adequate to span across /over the hose/pipe connection hardware.
 - *4xOD (4 times the Hose OD) to Provide Some Clearance Distance from the Hose/Pipe Fittings to the Choke Point* - A distance equal to roughly 2 times the hose diameter will often be adequate on each end to provide adequate clearance from the hose fittings.



- **Part 2 - Length for the Choke Connection Sections** – To cover the length needed to choke / encircle the hose at the choke points, add the hose diameter (OD) to the length adder (per chart) and then multiply by 7. Again, a value of 7 x (The Hose OD + Length Adder) will generally be adequate to form the choke hitched around both ends the hose/piping. If only one end is connected to the hose then multiply by 3.5 rather than 7 to account for the one end connection.

PART NO.	HHS3	HHS6	HHS9	HHS12	HHS15	HHS18	HHS24	HHS28	HHS36
Minimum Length	20"	20"	24"	36"	36"	36"	36"	36"	36"
Length Adder	.3	.6	0.9	1.2	1.5	1.8	2.4	2.8	3.6

- **Total Length of the Hose Halter** – Summing Parts 1 and 2 from the above yields a total for the Commonly Chosen Length (Measure Flat) for RoundOne restraints

$$\text{Minimum Length} = (\text{Hose OD} + \text{Length Adder}) \times 7 + C$$



Other Considerations

Additionally, the desired *Hose Halter* length can be influenced by a variety of factors. Consider the following steps in this process.

Step 1 of Length Selection – Determine the location of the connection points

Choosing the Location of the Connection / Choke Points :

- **Initial Movement of the Connection Point** – When practical, allow a spacing gap equal to approximately one to two hose diameters between the hose end and the connection point to allow some movement of the HH until the choke point does tighten following a hose separation.
- **Minimize Hose End Flailing** – Otherwise, the *Hose Halter* connections points should generally be located as close as is practical to their end connections. As this distance between the separated hose end and the HH connection point is increased, the tendency of hose ends to flail following a hose separation will also increase, along with increased amount of stresses on the hose and hose halter. Allowance of an excessive gap distance can also increase the likelihood that a flailing hose may strike nearby workers.
- **The Anchor Point** – Hose Halters are commonly connected across the connection of two hoses. However, if two hose ends are not being interconnected or it is simply not practical to do so, then one of the hose ends will need to be secured to an anchor point. The chosen anchor point should be strong enough to sustain a force amount equal to the WLL of the HH.

Step 2 of Length Selection – Determine the Span Between the connection points

Choosing the Span or Gap to Place Between the Connection / Choke Points :

- *The Amount of Span in the HH between the Connection points* – Measure or otherwise determine the length of span to be chosen for use between the HH connection points. In general, the span distance should be minimized as much as practical to again minimize the amount of hose flailing, but not too short that it makes installation difficult. During the initial attachment of the *Hose Halters* some slack in the product is often needed in order to complete the initial connection process.

Step 3 of Length Selection – Determine the addition length needed to complete the connection

Accounting for the Length Needed to Choke / Wrap the Connection / Choke Points :

- *The Size of the Connection* – Obviously, larger size hoses or connections will require longer HH to complete the connection. **Consider that HH lengths are based on their flat length and not their length after the choker hitch is formed.** Thus, some length will be consumed just to form the choke configuration at each end of the restraint.

RoundOne (HHS) Connection Example

As one example, when Lift-All performed an in-house destructive, dynamic pull test in 2015 of a sample 1-1/2 ID hose assembly, we elected to choose a *Tuflex Hose Halter* length of 30". This equated to a value of 16 times the measure hose OD of 1-7/8".



Product Inspection Requirements

The inspection procedures for these products should follow

Inspect Restraint for Damage

Damage to a restraints can significantly reduce its capacity to hold or lift loads and increases the chance that the restraint will fail during use. If you are not sure if a restraint is damaged, DO NOT USE IT.

How to inspect restraints

Perform a visual inspection of the entire restraint and feel along its entire length for any of the types of conditions listed in the Removal from Service Listing.

Removal from service

Remove restraint from service immediately if **ANY** of the listed types of damage are detected. Never ignore damage or attempt to perform temporary repairs of damaged restraints.

Removal from service criteria for webbing type restraints:

- Holes, tears, cuts, snags or embedded materials.
- Excessive abrasive wear
- Exposed red core warning yarn if provided.
- Broken or worn stitches in the load bearing splices.
- Identification tag is missing or not readable.
- Restraint has been tied into one or more knots.
- Signs of ultraviolet (UV) light degradation.
- Any heat or chemical damage, i.e. acid or alkali burns, melting or weld spatter.
- Any conditions which cause doubt as to the strength of the restraint.

Removal from service criteria for roundsling type restraints:

- Any damage to the restraint cover that exposes the red striped core yarns of the roundsling, such as excessive abrasive wear, holes, tears, cuts, snags, or embedded materials.
- Broken or worn stitches in the cover exposing the core yarns.
- Identification tag is missing or not readable.
- Restraints that have been tied into knots.
- Any heat or chemical damage, i.e. acid or alkali burns, melting or weld spatter.
- Any conditions which cause doubt as to the strength of the restraint.

Inspection Frequency

Initial Inspection – Each new restraint must be inspected by a designated person to help ensure that the correct product has been received, is undamaged, and meets applicable requirements for its intended use.

Frequent Inspection - The restraint must be inspected by a designated person prior to each application of the restraint.

Periodic Inspection - Every restraint must be inspected "periodically". The designated person should be someone other than the person performing the frequent inspection.

The frequency of periodic inspections should be based on the restraint's actual or expected use, severity of service, and experience gained during the inspection of other restraints used in similar circumstances, but must not exceed a one year interval. General guidelines for the frequency of periodic inspections are:

- *Normal service*— Monthly to quarterly

Restraints are commonly used in applications where they will remain idle for extended periods of time. However, for applications where they are exposed to dynamic conditions that may cause a high rate of wear or other damage then the restraints should be inspected weekly or even more frequently if any signs of damage to the restraint are being experienced.

Product Testing

Product Quality Verification Testing

Each lot of webbing is destructively tested to verify the integrity and quality materials. For roundsling restraints, sample products are periodically tested to a prescribed sampling rate to assure uniform product quality.

Other Available Product Testing Practices

For a nominal fee, other product testing is available upon customer request.

- *Proof Testing* - New or used samples may be proof tested to 1-1/2 times their designated working load limit.
- *Sample Destructive Pull Testing* - New or used samples may be destructively pull tested to failure to monitor retained strength of products.

Periodic testing of used products is not required, however, when restraints are used in environments where they may be degraded, by factors such as UV or chemical exposure, periodic testing practices can be used as effective tools to assist in managing the ability of these products to perform properly.

We hope this information fully addresses your inquiry. Please contact me or any customer service agent if you have any further questions.

Sincerely,



Greg Babinchak
Manager of Technical Services