



**ECHELON**<sup>TM</sup>  
SUPPLY AND SERVICE



## Industrial Metal Hose & Expansion Joints

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## Expert Metal Hose Assemblies

Echelon Supply and Service has been a leading supplier of hose, fittings, and hose assemblies since 1977. Echelon Supply and Service will not only help you decide *when to use metal hose* products but we will also help you select the *correct metal hose* for your application. Our multiple locations can provide in-field technical support, and assure timely delivery of your assemblies.

## OIL REFINING

Metal Hose and expansion joints are ideal for the processing of crude oil into fuel products such as gasoline, kerosene, diesel fuel, etc. Metal hose can be used for steam lines, petro transfer, along with the transfer of additives and by-products. For applications that require heat, corrosion, or severity resistance, corrugated metal hoses are excellent.

### **Oil Refining Industry Applications for metal hose and expansion joints:**

- Gas Burner Connections –
- Process Line Connections –
- Connections on Hydraulic Slide Valve of Cat Crackers –
- Metering System Flex Lines –
- Lube Lines to Pumps/Bearings –
- Lube Oil & Grease Plant Process Lines –
- Oil Burner Connections –
- Stand Pipe Connections on Cat Crackers –
- Steam Hose for Cleaning Tank Cars/Ships –
- Steam Hoses –
- Dock Hose –

*\* Hydrocarbon drain hoses for turnarounds are available on request*

# STEEL

Metal Hose and expansion joints can be used for many applications in the steel manufacturing industry, such as for steam lines, spray chamber cooling lines, furnace door cooling lines, tap hole drills, lubrication lines, oxygen lance hose assemblies on BOF's (basic oxygen furnaces), cut-off torches and gas lines.

Metal hose is ideal here because of the high heat and corrosive gas generated in the manufacture of steel.

## **Steel Industry Applications for metal hose and expansion joints:**

- Blast Furnace – (with or without liner),
- BOF Furnace – (with or without liner),
- Boiler & Generation Units – (with or without liner),
- Coke Oven & Coke By-Products – (w/guard),
  
- Cooling Water Hoses – (lined),
- High Temperature Lubricating Lines –
- Oxygen Lance Hose –
- Vacuum Degasser –
- Lime Injection –
- Liner and Guard –
- Caster Cutoff Torch –



# CHEMICAL

From industrial gases to the manufacture of makeup, corrugated metal hose can provide corrosion resistance for any application.

## **Chemical Applications that use metal hose and metal expansion joints:**

Connections to Weigh Scales –

Loading/Unloading Tank Cars/Trucks –

Process Piping – (when self draining is required)

Steam Lines –

Dry Bulk Pneumatic Conveying –

Chlorine Transfer –

Severe Chemical Corrosion Applications –

Cryogenic transfer lines –

# PETROCHEMICAL

Metal hose and expansion joints can be used for steam lines, dry bulk material handling, dock hoses, and chemical transfer in the petrochemical industry.

## **Petrochemical Applications that use metal hose and metal expansion joints:**

Chemical Process Lines –

Chlorine Transfer Lines –

Liquid Plastic Resin Transfer –

Process Piping –

Steam Lines –

Dry Bulk Pneumatic Conveying –

Dock Hose –

# CRYOGENICS & LNG TRANSFER

The ability to manufacture corrugated metal hose to withstand extreme low temperatures as low as -325°F, makes this hose ideal for LNG and Cryogenics transfer.

## **Applications that use metal hose and metal expansion joints:**

Liquid Gas Transfer –

Freeze Drying –

# PULP & PAPER

Metal hose is ideal in an industry that uses high amounts of chemicals and steam in manufacturing. Metal hose is also well suited to handle highly corrosive material by-products produced by the Pulp & Paper Industry.

## **Pulp & Paper Applications that use metal hose and metal expansion joints:**

Compressed Gas Lines –

De-inking Process –

Pneumatic Transfer of Sawdust –

Boiler Water Pre-Treatment Lines –

Lubricating Lines –

Steam Connections –

Rail Car Unloading –

Connections for White/Black Liquor –

Connections on Rotary Joints to Dryer Rolls –

# UTILITIES & POWER GEN

Metal hose and expansion joints are used in **Nuclear Power Plants** for critical & severe service applications.

Metal hose and expansion joints are used for fuel delivery lines and steam piping systems by **Power Plants** and **Utilities**.

Metal Hose is used for high pressure lubrication lines by **Steam Turbine Manufacturers** and metal expansion joints are used in various piping systems.

## **Utilities & Power Applications that use metal hose and metal expansion joints:**

Piping Systems –

Fuel Delivery Lines –

High Pressure Lubrication Lines –

Cooling Water Lines –

Steam Lines –

# MARINE & SHIPBUILDING

Metal hose is used in the Marine & Shipbuilding Industries for steam, hydraulic lines, and water to prevent catastrophic failure. Expansion joints and metal bellows are used for the exhaust on a ship's engines.

## **Marine & Shipbuilding Applications that use metal hose and metal expansion joints:**

Piping Systems –

Marine Exhaust Bellows –

Fuel Lines –

Dock Material Handling Hoses –

Steam & Water Lines –

Compressed Gas Transfer Lines –

Hydraulic Lines –

# BULK MATERIAL HANDLING

In low pressure or vacuum conveying systems metal hose is superior due to its abrasion resistance and decreased loading times. Metal hose is advantageous for dilute-phase or dense-phase pressure transfer applications that require higher pressures to transfer materials while decreasing damage to the media. It is ideal for transportation equipment and loading/unloading facilities.

## **Bulk Material Handling Applications that use metal hose and metal expansion joints:**

Pneumatic Dry Bulk Conveying –

Air Blowers –

# WATER TREATMENT

Chlorine is used in water treatment plants for purification. ChlorSafe™ hose assemblies are engineered specifically to meet the stringent demands of this application. ChlorSafe™ assemblies are manufactured in compliance with the Chlorine Institute Pamphlet 6, Appendix A, latest edition and offer several distinct advantages over existing products.

The piping systems in Water Treatment Plants also use metal expansion joints.

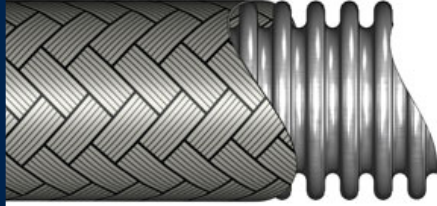
## **Water Treatment Applications that use metal hose and metal expansion joints:**

Chlorine Transfer –

Piping Systems –



## ANNUFLEX™



Materials:  
T321 Stainless Steel  
T316L Stainless Steel  
T304L Stainless Steel

Braids:  
Unbraided  
T304 Single Braid  
T304 Double Braid  
*\*T316 Braid available upon request.*

Annuflex™ is the standard of high performance annular *corrugated* stainless steel hose. Proprietary Stress-Lite™ technology ensures the excellent cycle life of the hose, with minimum effort to flex or bend the hose.

Hose ID'S range from 1/4" to 30"

\* ANNUFLEX is a STRESS-LITE™ CORRUGATED METAL HOSE

## PRESSUREFLEX HP®



Materials:  
T321 Stainless Steel  
T316L Stainless Steel

Braids:  
Unbraided  
T304 Single Braid  
T304 Double Braid  
T316 Single Braid  
T316 Double Braid  
T321 Single Braid  
T321 Double Braid

Pressureflex HP® is high pressure high pressure metal hose, with an annular corrugated configuration. Pressureflex HP® is made from heavy-wall stainless steel, and offers flexibility and dependability when higher pressures are a factor.

Hose ID'S range from 1/4" to 6"

\* PRESSUREMAX HP® is a STRESS-LITE™ CORRUGATED METAL HOSE

## PRESSUREMAX HP®



Materials:  
T321 Stainless Steel  
T316L Stainless Steel

Braids:  
Unbraided  
T321 Single Braid  
T321 Double Braid  
T321 Triple Braid  
T321 Quad Braid

PressureMax HP® is ultra high pressure metal hose, with an annular, heavy-wall corrugated construction. It is designed for ULTRA high-pressure applications. PressureMax HP® offers superior flexibility and is made from heavy wall T321 or T316L stainless steel.

Hose ID'S range from 1/4" to 4"

\* PRESSUREMAX HP® is a STRESS-LITE™ CORRUGATED METAL HOSE

## MASTERFLEX™



Materials:  
T321 Stainless Steel  
T316L Stainless Steel  
T304L Stainless Steel

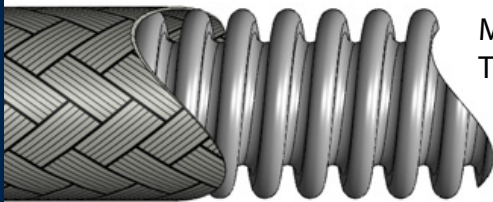
Braids:  
Unbraided  
T304 Single Braid  
T304 Double Braid  
*\*T316 Braid available upon request.*

Masterflex™ is a close pitch metal hose. It is manufactured using the same high quality process used to make Annuflex™ hose, but the number of corrugations per foot is increased to allow for greater flexibility.

Hose ID'S range from 1/4" to 6"

\* MASTERFLEX is a STRESS-LITE™ CORRUGATED METAL HOSE

## EXTRAFLEX™



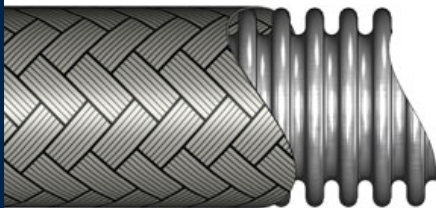
Materials:  
T321 Stainless Steel

Braids:  
Unbraided  
T304 Single Braid  
T304 Double Braid  
*\*T316 Braid available upon request.*

Extraflex™ is T321 spirally-welded, helical corrugated hose specifically designed to achieve extreme flexibility while maintaining good pressure ratings. The helical design facilitates draining and reduces in-line turbulence.

Hose ID'S range from 1/4" to 2"

## CHEMKING®



Materials:  
T316 Stainless Steel

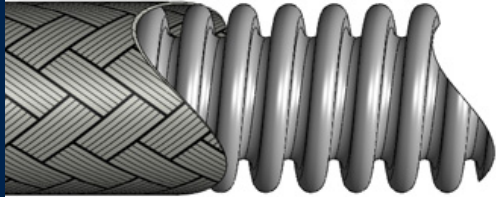
Braids:  
*Unbraided*  
*T316 Single Braid*  
*T316 Double Braid*  
*C276 Single Braid*  
*C276 Double Braid*

ChemKing® is chemical transfer hose. Chemking™ offers excellent corrosion resistance to many of the most severe applications found in chemical processing.

Hose ID'S range from 1/2" to 6"

\* CHEMKING is a STRESS-LITE™ CORRUGATED METAL HOSE

## HYDRAFLEX™



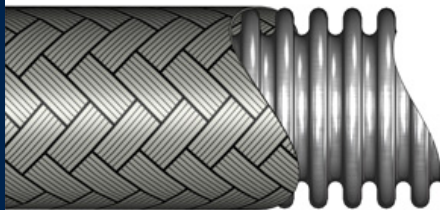
Material:  
T316 Stainless Steel

Braids:  
T304 Single Braid  
T304 Double Braid  
*\*T316 Braid available upon request.*

Hydraflex™ is T316 double-walled, spirally-welded *corrugated* metal hose. Specially designed to maintain extreme pressure and flexibility, Hydraflex™ is self-draining and generates minimal in-line turbulence.

Hose ID'S range from 1/4" to 1-1/2"

## CHLORSAFE™



Materials:  
C276

Braids:  
*Single Braid*  
*Double Braid*

ChlorSafe™ annular corrugated metal hose is specifically designed, produced, and tested to meet the strict demands of both wet and dry chlorine transfer applications. These assemblies are the safest available. ChlorSafe™ assemblies are manufactured in compliance with the Chlorine Institute Pamphlet 6, Appendix A, latest edition.

Hose ID'S range from 1/2" to 2"

\* CHLORSAFE is a STRESS-LITE™ CORRUGATED METAL HOSE

### **ChlorSafe™ assemblies are available in three different configurations:**

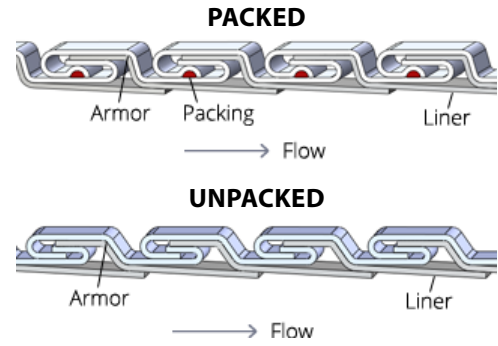
- 276 alloy Schedule 80 Male NPT x 276 alloy Schedule 80 Male NPT
- 276 alloy Schedule 80 Male NPT x 276 alloy "A" Stub with a 300# Carbon Steel Lap Joint Flange (Floating)
- 276 alloy "A" Stub with a Carbon Steel 300# Lap Joint Flange (Floating) x 276 alloy "A" Stub with a Carbon Steel 300# Lap Joint Flange (Floating)

### **All ChlorSafe™ assemblies are etched with:**

- Unique Serial Number
- Company Name
- Date of Fabrication
- Minimum Bend Radius
- Compliance with Chlorine Institute Pamphlet 6, Appendix A

## ULTRAFLEX™

Armor Materials:	Armor Strips:	Liners:
Aluminum	Light Weight	Stainless Steel
Galvanized Steel	Medium Weight	Carbon Steel
T304 Stainless Steel	Heavy Weight	Heavy Weight Stainless Steel
T316 Stainless Steel		
T201 Stainless Steel		Magnetic Liner*

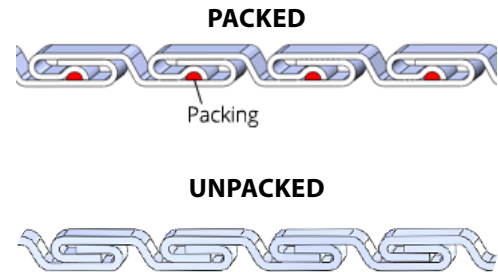


Ultraflex™ is a smoothbore metal hose ideally suited for dry bulk pneumatic conveyance. This hose is produced with a durable armor and a highly abrasion-resistant liner. This precision manufacturing process makes Ultraflex™ unequalled in strength and flexibility.

Hose ID'S range from 1-1/2" to 16"

## INTERFLEX™

Material:	Strip Thickness:
Aluminum	Extra Light Weight
Galvanized Steel	Light Weight
T304 Stainless Steel	Medium Weight
T316 Stainless Steel	<i>Medium Weight (AL only)</i>
T201 Stainless Steel	<i>Heavy Weight</i>
	<i>Extra Heavy Weight</i>



INTERFLEX™ (Roughbore) is a high-quality, general-purpose stripwound metal hose, constructed from a single strip of metal that is profiled and locked onto itself. The interlocked, or overlapping, sections of strip are able to slide back and forth, providing the ability to flex.

Hose ID'S range from 1-3/8" to 16"

## When to Consider Packing:

Interlocked metal hose, by the nature of its construction, is not pressure tight. However, pressure and media infiltration through the interlocked wall can be minimized by the insertion of one of a variety of packings into the wall during hose manufacturing. Packing consists of a continuous cord or strand of elastomer, or other material which is locked into a special channel between the interlocked hose wall layers. The choice of packing material is tailored to the demands of the specific application.

Packing Type	Features	Max Temp.
Low-Temp Elastomeric	Max Pressure and Vacuum	200° F
High-Temp Elastomeric	Max Pressure and Vacuum	500° F
Low-temp Fiber	Economical	180° F
High-Temp Fiber	Elevated Temperature	1000° F
Metal	Extreme Temp.	800° F – 1200° F

# EXPANSION JOINTS

## Expansion Joint vs. Metal Hose

Braided metal hose assemblies and expansion joints share many similar attributes, but it is their differences in construction that determine which is best for a specific application. Braided metal hose assemblies are constructed from flexible, corrugated hose typically formed using a single layer of strip. The number of corrugations per foot dictates the flexibility of the hose, while the outer braid layer provides its pressure bearing capability. Braided metal hoses are designed to accommodate one plane of movement: either lateral (side to side), or angular (one end moving, or bending, relative to the other). Axial movement (compression or extension) is to be avoided, as it can cause the braid to loosen from the hose, thus reducing its pressure bearing capability and leaving the hose susceptible to squirm.

Because expansion joints are designed to accommodate pressure and movements without the need for braid, they are capable of handling all three planes of movement: lateral, angular, and axial. Expansion joint movement and pressure bearing capabilities are determined by the number of convolutions, as well as material thickness, number of plies, and wall height specified by the product's individual design.

Multi-ply expansion joints are ideally suited for applications where vibration may be present. Additionally, multi-ply designs feature lower spring rates which reduces stress on piping components, and increases cycle life for a given installation.

### Size Range

- From 2" - 120" nominal diameter (tube sizes also available), single and multi-ply

### Alloys

- Stainless steels - T304, T304L, T309, T310, T321, T316, T316L
- Nickel - 400, 600, 625, 625LCF, 800, 800H, Nickel 200, C276
- Other alloys available upon request

### Pressure

- From full vacuum to 3000 psi

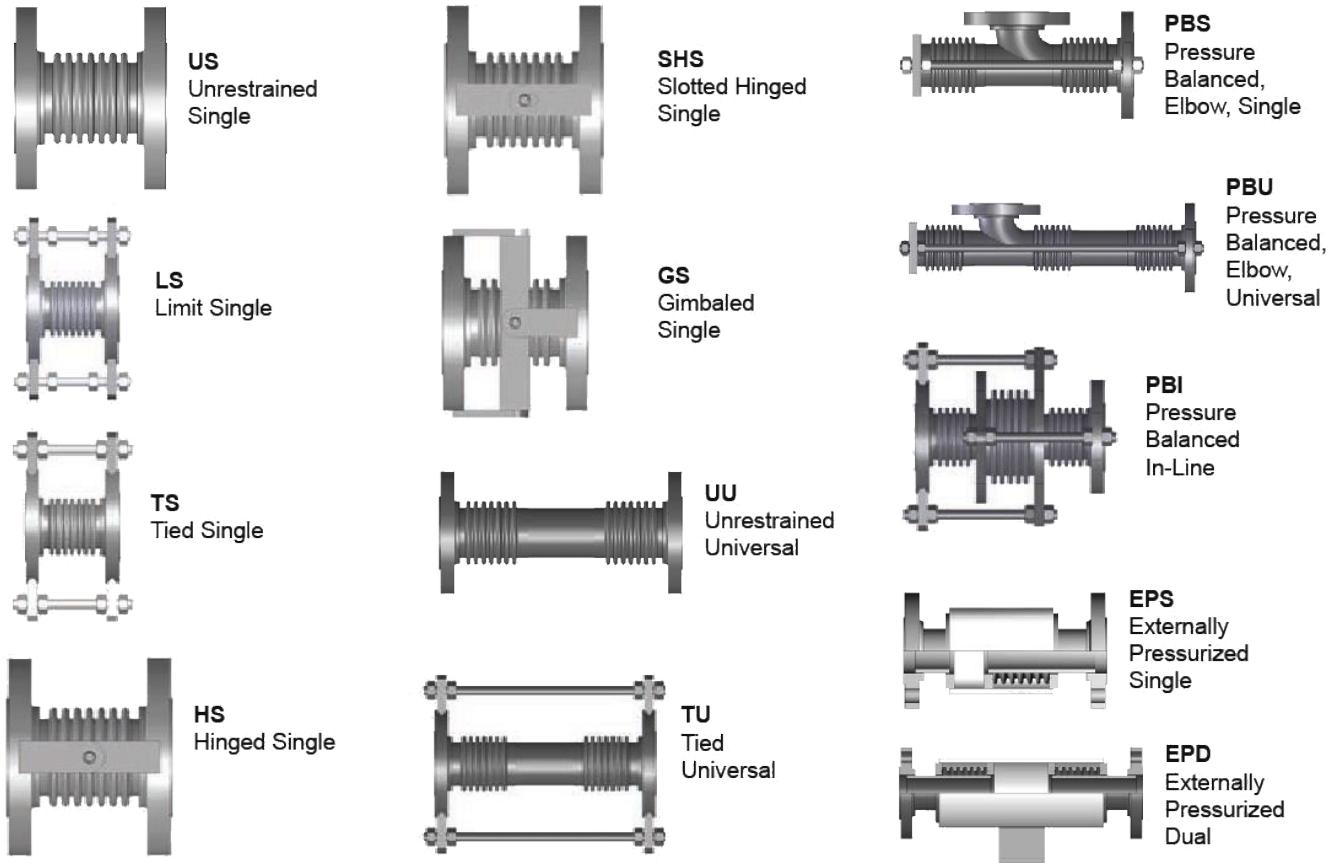
### Temperature

- Range from -450° F to 2000° F

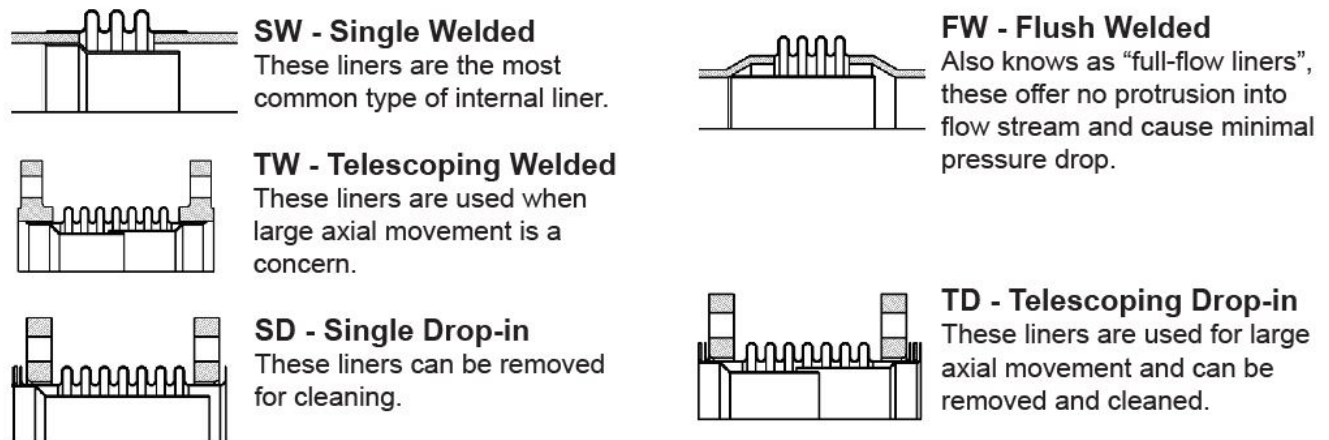




# Types of Expansion joints:



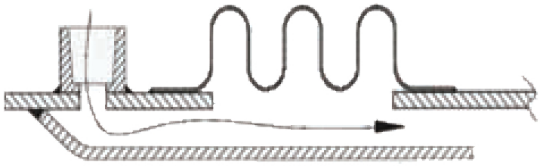
# Expansion Joint Internal Liners:



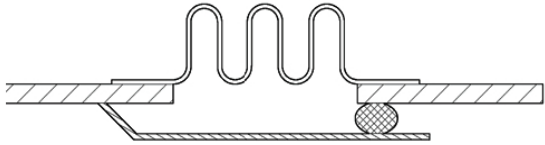


# Expansion Joint Options:

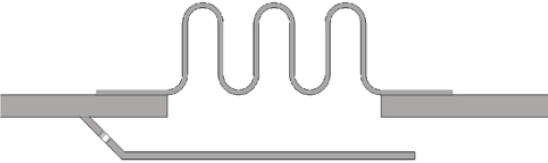
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**Purge Ports**



**Packed Bellows**



**Self Draining Liner**





- **INDUSTRIAL**

- **COMMERCIAL**

- **HYDRAULIC**

- **MILITARY**

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