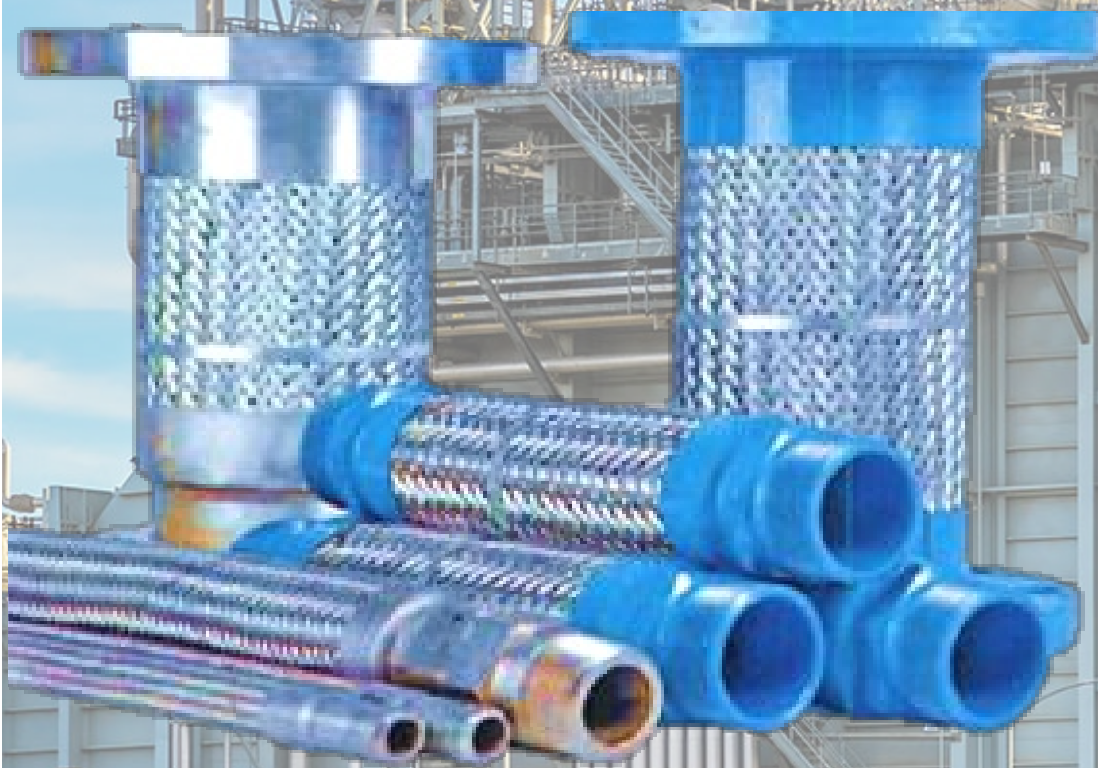


# LÍDER EN EL DISEÑO Y FABRICACIÓN DE MANGUERAS FLEXIBLES CORRUGADAS PARA LA INDUSTRIA



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## Descripción:

Las mangueras metálicas flexibles son desarrolladas y fabricadas para la conducción y/o transferencia de fluidos y a diversas temperaturas en un amplio campo de aplicaciones.

## Fabricación:

**Tubería:** Las opciones de la tubería corrugada para los ensambles son: **Tubería tipo N o tipo P** en acero inoxidable **AISI tipo serie 300**.

**Malla:** Fabricada con alambre de acero inoxidable **AISI tipo serie 300**; las opciones son una malla (R4) o doble malla (D4).

**Conexiones:** Hay una gran variedad de conexiones con las que se puede suministrar la manguera metálica flexible.

## Principales aplicaciones:

Las Mangueras Metálicas Flexibles son empleadas en una amplia gama de aplicaciones industriales y comerciales, en mercados como: la Industria termoeléctrica, petroquímica, procesamiento químico, aguas residuales, compensación y dilatación generadas por temperatura y/o presiones, industria de la pulpa y el papel, industria en general, etc.

## Criterios para selección de un ensamble de manguera:

Para determinar una manguera metálica flexible que sea requerida para una aplicación en particular se debe tomar en cuenta los siguientes y principales factores:

**Presión de operación:** Las presiones específicas para cada manguera están determinadas por el diámetro, tipo de malla, el fluido a conducir, condiciones de operación, temperatura, pulsaciones y tensiones de curvatura.

**Diámetro:** El diámetro de la manguera flexible se especifica basándose en el diámetro

nominal. La tubería existente normalmente determina el diámetro de la manguera metálica para una aplicación en específico; Otros factores que influyen para la selección del diámetro de la manguera son el caudal del flujo, la velocidad y la caída de presión.

**Fluido a conducir y medio ambiente:** el fluido a conducir es un factor importante para la selección de la manguera metálica flexible, ya que esta se encuentra sujeta a la corrosión por el fluido a conducir, así como el medio ambiente a la que está expuesta.

**Movimiento:** Las mangueras metálicas flexibles generalmente son empleadas en cuatro tipos de movimientos; para corregir problemas de desalineamiento, para brindar flexibilidad en operaciones manuales, para absorber vibración y en aplicaciones donde se tiene movimiento regular o constante.

**Conexiones o accesorios en los extremos:** El uso de una manguera metálica flexible se complementa con una amplia gama de conexiones y accesorios; las cuales pueden ser roscas para tubo macho o hembra, bridas, conexiones abocinadas y otros conectores especialmente diseñados. Las conexiones son unidas a la manguera mediante procesos de soldadura de proceso tig o autógena, esto depende del tipo de manguera y la aleación de la conexión.

**Temperatura de operación:** Las propiedades físicas de cualquier material varían con la temperatura y esta afecta directamente a los límites de presión durante la operación de la manguera.

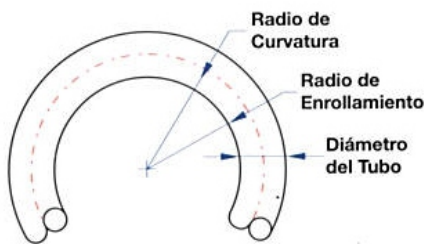


## Presiones de operación y factores de ajuste por temperatura



En la siguiente tabla se podrá determinar la clasificación de la presión máxima de operación de los diferentes diámetros de tubería y con respecto al número de mallas colocadas en la tubería.

**Tabla 1**

**SM:** SIN MALLA  
**R4:** MALLA REFORZADA  
**D4:** DOBLE MALLA  
**BB:** MALLA BRAIDED BRAID  
**N/A:** NO APLICA



## Tabla de especificaciones de tubería metálica flexible

Diámetro Nominal Pulgada	Tubería tipo "N" 		Tubería tipo "P" 		Malla	Presión máxima de operación @ 21°C	
	Estático	Dinámico	Estático	Dinámico		Inox 304	kg/cm <sup>2</sup>
3/8"	55	195	45	140	SM	16	227
					R4	135	1920
					D4	150	2133
1/2"	75	260	60	185	SM	12	170
					R4	130	1849
					D4	150	2133
3/4"	90	285	75	200	SM	5	71
					R4	76	1080
					D4	100	1422
1"	105	305	85	215	SM	4	56
					R4	57	810
					D4	75	1066
1 1/4"	135	325	115	230	SM	3	42
					R4	54	768
					D4	67	952
1 1/2"	170	390	140	280	SM	2	28
					R4	54	768
					D4	67	952
2"	190	470	160	335	SM	1.5	21
					R4	38	540
					D4	50	711
2 1/2"	230	590	190	420	SM	1	14
					R4	33	469
					D4	45	640
3"	260	700	220	500	SM	0.7	9
					R4	30	426
					D4	40	568
4"	410	965	340	690	SM	0.5	7
					R4	23	327
					D4	27	384
6"	600	1250	550	815	SM	0.2	2
					R4	13	184
					BB	18	256
8"	610	1626	N/A	N/A	SM	5	71
					R4	10	142
					BB	16	228
10"	686	2083	N/A	N/A	SM	4	56
					BB	16	228
12"	838	2515	N/A	N/A	SM	3	42
					BB	11	156

## Tabla: Factor de ajuste por temperatura

Si la temperatura de operación es mayor a 21°C, se deberá realizar un ajuste de presión por temperatura; esto es debido a que en términos generales y a medida que aumenta la temperatura operativa en una manguera metálica, disminuye la presión y resistencia máxima de operación.

La siguiente tabla nos ayuda a determinar el factor de ajuste de acuerdo al incremento de temperatura.

Temperatura		Factor de ajuste (malla inox 304)
21°C	70°F	1.00
66°C	150°F	0.95
93°C	200°F	0.91
121°C	250°F	0.88
149°C	300°F	0.85
177°C	350°F	0.81
204°C	400°F	0.78
232°C	450°F	0.77
260°C	500°F	0.77
316°C	600°F	0.76
371°C	700°F	0.74
427°C	800°F	0.73
482°C	900°F	0.68
538°C	1000°F	0.60
593°C	1100°F	0.58
649°C	1200°F	0.53
704°C	1300°F	0.44
760°C	1400°F	0.35
816°C	1500°F	0.26

**Por ejemplo;** Para calcular la presión máxima de trabajo para:

- Manguera corrugada de acero inoxidable de ¾" Ø
- Con una malla en acero inoxidable
- A una temperatura de operación de 482°

En la tabla de especificaciones de la tubería metálica corrugada indica que la presión máxima de operación es de 47 kg/cm<sup>2</sup>;

Multiplique 47 por 0.68, la presión máxima de operación para esta tubería es de 32 kg/cm<sup>2</sup> a 482°C

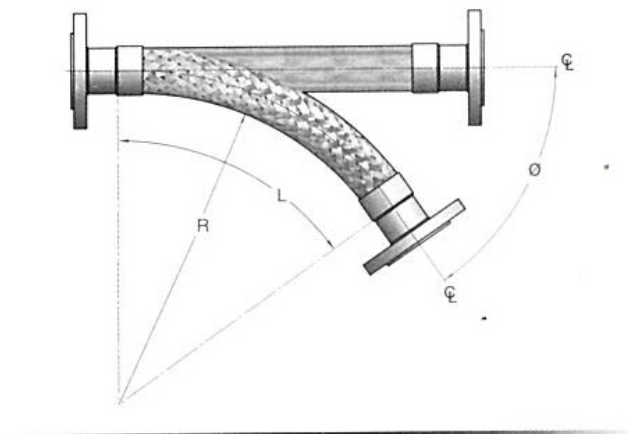
## Consideraciones importantes para determinar la longitud de la manguera

### Clasificación de movimientos

#### Movimiento angular:

Este movimiento ocurre cuando un extremo de la manguera es desviada con una curvatura simple de su eje longitudinal de tal modo que los extremos no quedan paralelos.

Por lo tanto para determinar la longitud de la manguera empleamos la siguiente formula:  $L = \pi R \theta / 180 + 2(s)$



#### Donde:

$\pi = 3.1416$

**R** = Radio de Curvatura Central Mínimo (dinámico en pulgadas)

**θ** = Ángulo de desviación

**S** = Diámetro externo de la manguera

#### Movimiento axial:

Este movimiento se produce cuando una manguera es comprimida o extendida a lo largo de su eje longitudinal y es aplicable en longitudes muy cortas y es únicamente para mangueras corrugas sin malla o fuelles diseñados específicamente para este fin.



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### Movimiento aleatorio:

Este movimiento no se puede prever y ocurre por la manipulación manual de la manguera, por ejemplo como una manguera de carga o descarga o una manguera de bomberos; la longitud de la manguera depende de los límites de las zonas o distancias a cubrir.

Se debe tener cuidado para no curvar en exceso la manguera y evitar daño en la malla de alambre o la tubería corrugada.

### Movimiento de desplazamiento:

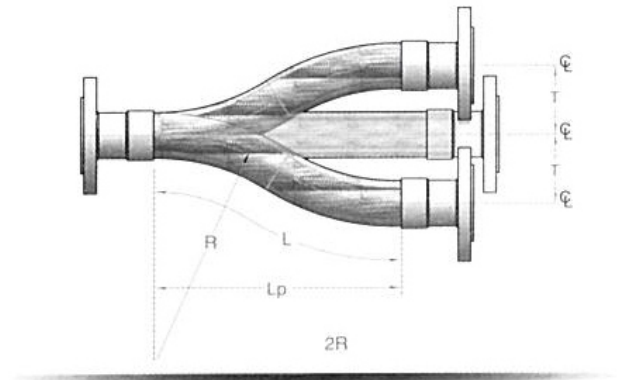
El movimiento de desplazamiento se genera cuando un extremo de la manguera es desplazado en forma paralela al eje longitudinal y los extremos también se mantiene paralelos.

La fórmula adecuada que se debe emplear para determinar la longitud de la manguera dependerá del estado del extremo en movimiento.

Cuando el movimiento de desplazamiento ocurre en ambos lados de la línea central de la manguera, use el recorrido total en la formula; por ejemplo  $2 \times T$

La distancia de desplazamiento "T" para flexión constante nunca debe superar el 25% del radio de curvatura central "R".

El radio de curvatura mínimo aplicable a esta fórmula, es cuando se encuentra un extremo del ensamble en su posición de desplazamiento.



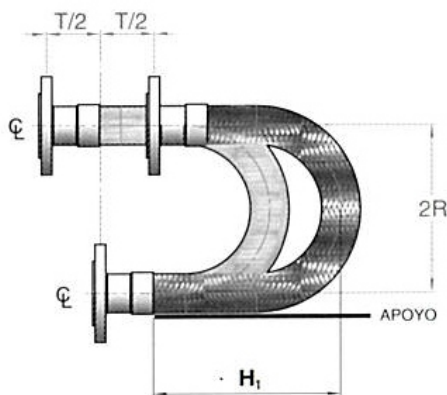
**Donde:**

- L = Longitud de la manguera (pulgadas)
- Lp = Longitud proyectada de la manguera
- R = Radio de curvatura central mínimo (dinámico en pulgadas)
- T = Movimiento de desplazamiento hacia un lado de la línea central (pulgadas)

### Movimiento de desplazamiento radial:

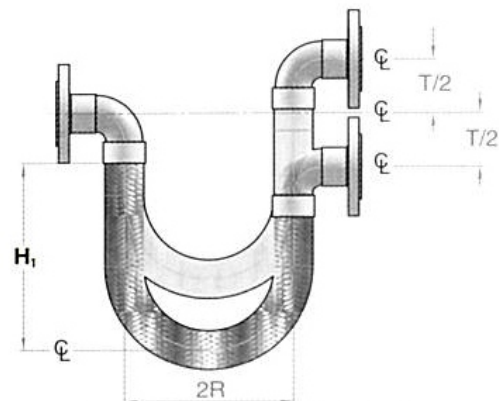
El movimiento de desplazamiento en "U" se genera cuando la línea central de la manguera se encorva en un arco circular.

#### Desplazamiento en "U" con radio constante

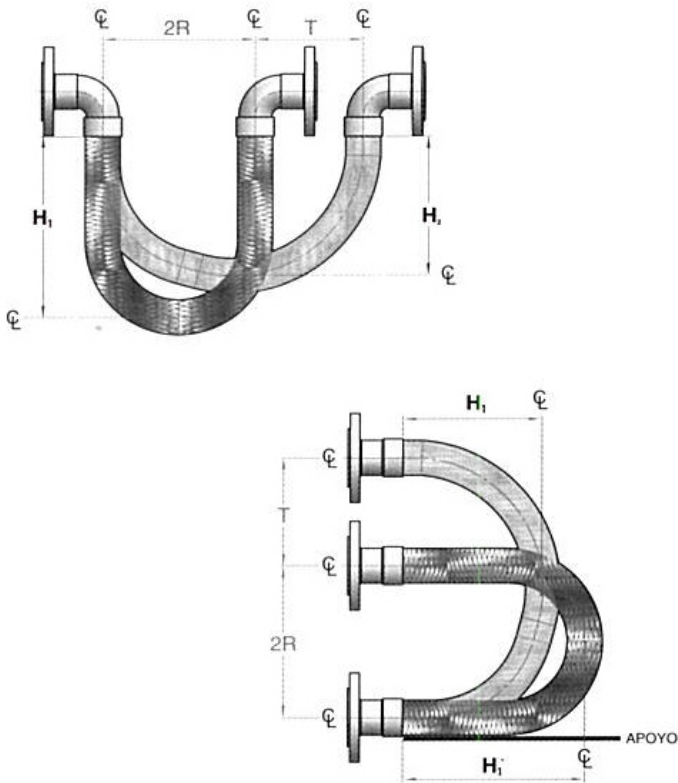


**Dónde:**

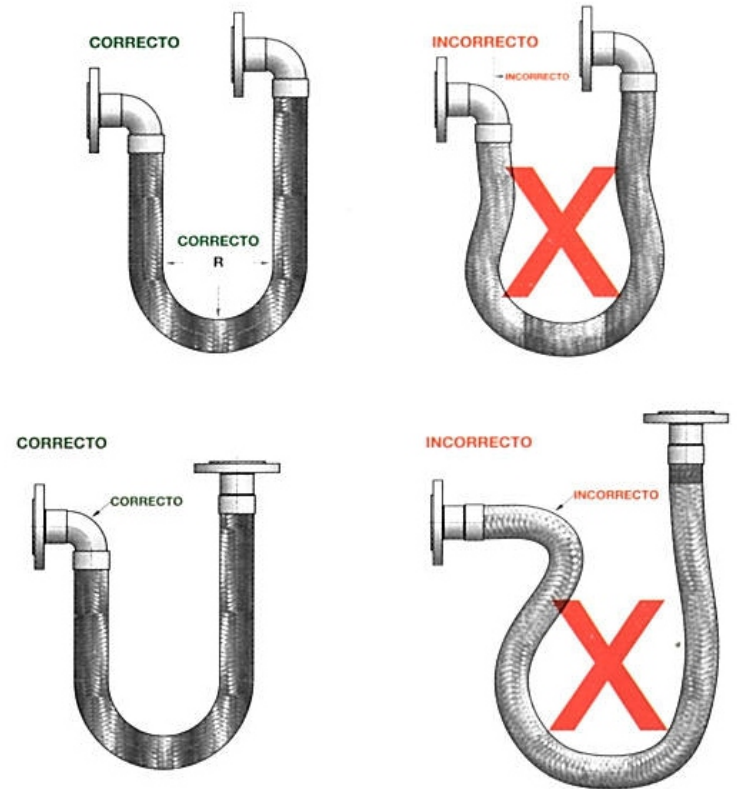
- L = Longitud de la manguera (pulgadas)
- R = Radio de curvatura central mínimo para flexión constante (pulgadas)
- T = Recorrido total (pulgadas)
- H = Longitud de Suspensión (pulgadas)



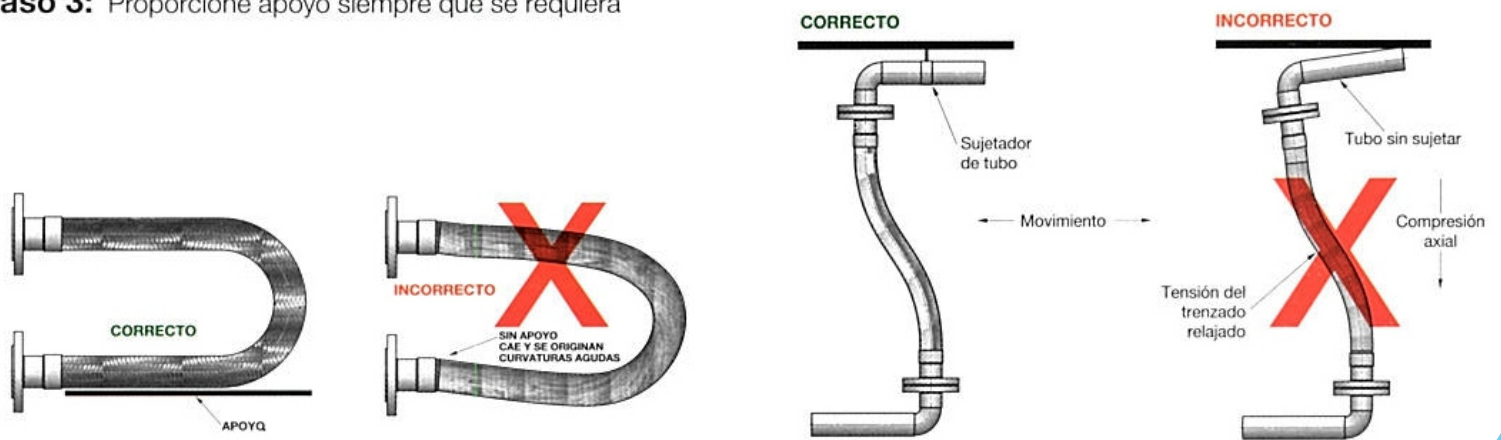
**Desplazamiento en "U" con radio variable**



**Caso 2:** Evite las curvaturas excesivas o agudas



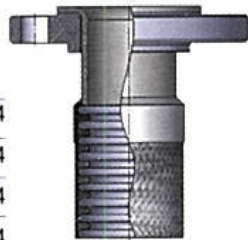
**Caso 3:** Proporcione apoyo siempre que se requiera



## Conexiones:

Algunas de las conexiones más comunes son ilustradas a continuación; cualquier otra conexión especial compatible con la tubería, puede ser diseñada y ensamblada.

### Brida giratoria



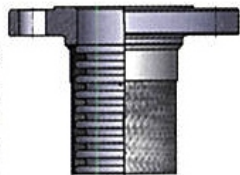
Brida forjada 150# a.c./Stub-end Inox-304

Brida forjada 150# inox 304/Stub-end Inox-304

Brida forjada 300# a.c./Stub-end Inox-304

Brida forjada 300# inox 304/Stub-end Inox-304

### Brida fija



Brida forjada 150# a.c.

Brida forjada 150# inox 304

Brida forjada 300# a.c.

Brida forjada 300# inox 304

### Cople hembra NPT



Cople 150# a.c.

Cople 150# inox-304

Cople 3000# a.c.

Cople 3000# inox-304

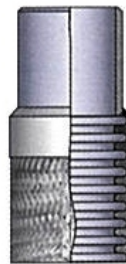
### Niple hexagonal NPT



Niple hexagonal NPT a.c.

Niple hexagonal NPT inox-304

### Niple macho NPT



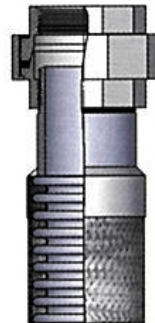
Niple NPT ced-40 a.c.

Niple NPT ced-40 inox-304

Niple NPT ced-80 a.c.

Niple NPT ced-80 inox-304

### Tuerca unión hembra



Tuerca unión 150# hierro maleable

Tuerca unión 150# inox-304

Tuerca unión forjada 3000# a.c.

Tuerca unión forjada 3000# inox-304

### Tuerca giratoria JIC 411 Flare 37"



Tuerca giratoria JIC 411 FLARE 37" en acero al carbón tropicalizado

Tuerca giratoria JIC 411 FLARE en inox-304



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**Niple uso soldable**

- 
- Niple liso soldable a.c. Ced-40**
- 
- Niple liso soldable a.c. Ced-80**
- 
- Niple liso soldable inox-304 Ced-40**
- 
- Niple liso soldable inox-304 Ced-80**



**Cople de cobre**



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**Cople cobre soldable**

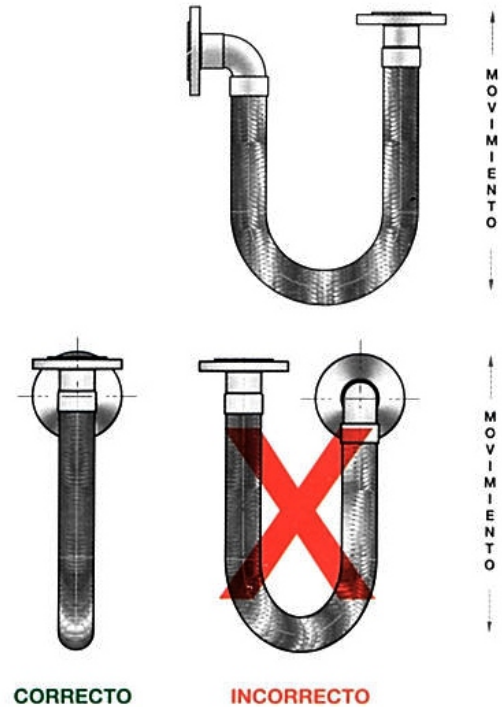
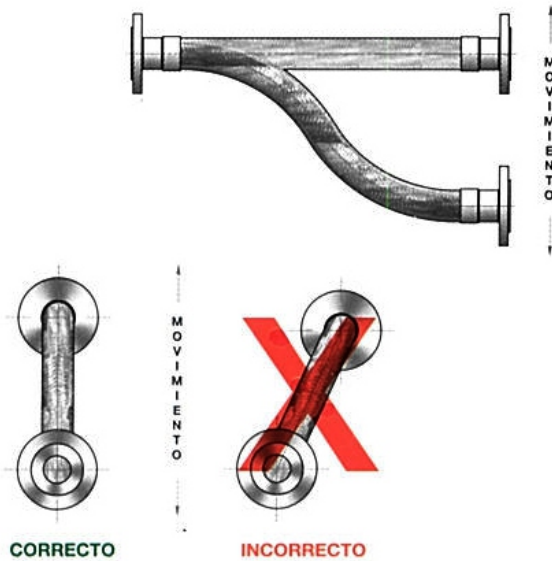
**Recomendaciones para una correcta instalación de la manguera**

La duración de la manguera metálica flexible dependerá, además de una adecuada selección, de una correcta instalación.

**Casos típicos de instalaciones:**

**Caso 1: Instalación lateral en plano:**

Procure que la flexión de la curvatura ocurra en un solo plano.



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## Compatibilidad de materiales

Esta tabla permite verificar, fácil y rápidamente la compatibilidad entre numerosos fluidos y los materiales con los cuales están en contacto.

Este documento de trabajo proporciona una información general, pero la resistencia de nuestras mangueras está sujeta siempre a un buen uso de ellas

Simbología:															
	Acero al carbón	Acero inoxidable	Acero inoxidable 304	Acero inoxidable 304L	Acero inoxidable 316L	Acero inoxidable 321	Acero semiduro	Fundición	Aluminio	Tumbaga	Asbesto	Neopreno	P.V.C.	Nitrilo	P.T.F.E.
<b>Conviene perfectamente.</b>															
<b>Conviene</b> pero la resistencia al envejecimiento varía según las concentraciones y/o temperaturas.															
<b>Desaconsejado.</b>															
<b>Estudiar las necesidades</b> al momento del pedido.															
tc/tt: Cualquier concentración / Cualquier temperatura. eb: Ebullición. Temperatura en grados centígrados.															
Aceites combustibles (Fuel-Oils)															
Aceites crudos con H <sub>2</sub> SO <sub>4</sub> /200°															
Aceites crudos sin H <sub>2</sub> SO <sub>4</sub> /200°															
Aceites de engrase (Lubricación)															
Aceites diesel (Gas-Oils)															
Aceites minerales / 50°															
Aceites vegetales / eb.															
Acetato de Al - Cu - Pb - K															
Acetato de celulosa 20 % / 20°															
Acetato de Etilo															
Acetileno 100 %															
Acetona															
Acido Acetico de 5 a 20 % / 20°															
Acido Acetico de 20 a 100 % / 20°															
Acido Acetico de 5 a 50 % / eb.															
Acido Borico saturado 20°															

**Simbología:**

-  **Conviene perfectamente.**
  -  **Conviene** pero la resistencia al envejecimiento varia según las concentraciones y/o temperaturas.
  -  **Desaconsejado.**
  -  **Estudiar las necesidades** al momento del pedido.
- tc/tt: Cualquier concentración / Cualquier temperatura.  
 eb: Ebullición.  
 Temperatura en grados centigrados.

	Acero al carbón	Acero inoxidable	Acero inoxidable 304	Acero inoxidable 304L	Acero inoxidable 316L	Acero inoxidable 321	Acero semiduro	Fundición	Aluminio	Tumbaga	Asbesto	Neopreno	P.V.C.	Nitrilo	P.T.F.E.
Acido Butírico															
Acido Cianhidrico saturado 20°															
Acido Citrico de 5 a 25% /20°															
Acido Citrico de 5 a 10% / eb. - SAT. 20°															
Acido Clorhidrico 0.5% /50° a 1% / 20°															
Acido Clorhidrico 1% /50° a 1.6% / 20°															
Acido Cromico 10% / 20°															
Acido Cromico 10% / eb. - 50 % / 20°															
Acido Cromico 50% / eb.															
Acido Fenico															
Acido Fluothidrico tc/tt															
Acido Formico tc / 20° 0 1 a 5% / eb.															
Acido Formico 10% / eb.- 10 a 90% / eb.															
Ácido Fosfórico 1 a 85% / 20°															
Ácido Fosfórico 50 a 90% / 20° a 80°															
Ácido Gálico tc/eb															
Ácido Nítrico 1 a 65% / 20°															
Ácido Nítrico < 65% / 60° - 65 a 98% / 20°															
Ácido Nítrico 1 a 50% / eb															
Ácido Oleico															
Ácido Oxálico 5% / 20°															
Ácido Oxálico 5% / eb															
Ácido Pítrico tc / 20° - 10% / eb															



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**Simbología:**

-  **Conviene perfectamente.**
-  **Conviene** pero la resistencia al envejecimiento varia según las concentraciones y/o temperaturas.
-  **Desaconsejado.**
-  **Estudiar las necesidades** al momento del pedido.

tc/tt: Cualquier concentración / Cualquier temperatura.  
 eb: Ebullición.  
 Temperatura en grados centigrados.





	Acero al carbón	Acero inoxidable	Acero inoxidable 304	Acero inoxidable 304L	Acero inoxidable 316L	Acero inoxidable 321	Acero semiduro	Fundición	Aluminio	Tumbaga	Asbesto	Neopreno	P.V.C.	Nitrilo	P.T.F.E.
Ácido Salicílico 10% / 20° a 100°															
Ácido Sulfhídrico															
Ácido Sulfúrico 0 a 10% / 20° - 0 a 3% / 80°															
Ácido Sulfúrico 10 a 100% / 20°															
Ácido Sulfúrico tc y altas t°															
Ácido Sulfuroso 10 a 20% / 20°															
Ácido Tánico tc/eb															
Ácido Tartárico 0 a 50% / 20° - 20% / eb															
Ácido Úrico 20°															
Ácidos grasos tc / 20° - 150°															
Agua de mar 20°															
Agua de mar 60% / 100°															
Aire comprimido															
Alcanfor															
Alcoholes 20% eb (Metanol, Etanol, etc.)															
Alquitranes tt															
Amoniaco (gas)															
Amoniaco tc 20° a 100°															
Anhídrido Acético 20% / eb															
Anhídrido carbónico															
Anhídrido Sulfuroso															
Anilina															
Asfalto															

**Simbología:**

-  **Conviene perfectamente.**
  -  **Conviene** pero la resistencia al envejecimiento varia según las concentraciones y/o temperaturas.
  -  **Desaconsejado.**
  -  **Estudiar las necesidades** al momento del pedido.
- tc/tt: Cualquier concentración / Cualquier temperatura.  
 eb: Ebullición.  
 Temperatura en grados centigrados.

	Acero al carbón	Acero inoxidable	Acero inoxidable 304	Acero inoxidable 304L	Acero inoxidable 316L	Acero inoxidable 321	Acero semiduro	Fundición	Aluminio	Tumbaga	Asbesto	Neopreno	P.V.C.	Nitrilo	P.T.F.E.
Azúcar (soluciones – jarabes) tc/tt															
Azufre fundido <445°															
Barnices y solventes															
Benceno															
Bencina															
Benzol															
Bicarbonato de Amonio, K, Na tc/tt															
Bicromato de K, Na tc/tt															
Bisulfato de K, Na 10% / 20°															
Bisulfito de Calcio Conc. / 20° eb.															
Bisulfito de Na 5 a 40% / 20°															
Bisulfito de K 10% / 20% a 90°															
Borax 100%															
Bromo seco puro – húmedo 20%															
Butadieno															
Butano															
Butileno															
Cal															
Carbonato de amonio de Mg tc/tt															
Carbonato de K, Na tc/tt															
Carbonato de K, Na Fundido															
Ceras															
Cianuro de Potasio tc/tt															

**Simbología:**

-  **Conviene perfectamente.**
  -  **Conviene** pero la resistencia al envejecimiento varia según las concentraciones y/o temperaturas.
  -  **Desaconsejado.**
  -  **Estudiar las necesidades** al momento del pedido.
- tc/tt: Cualquier concentración / Cualquier temperatura.  
 eb: Ebullición.  
 Temperatura en grados centígrados.

	Acero al carbón	Acero inoxidable	Acero inoxidable 304	Acero inoxidable 304L	Acero inoxidable 316L	Acero inoxidable 321	Acero semiduro	Fundición	Aluminio	Tumbaga	Asbesto	Neopreno	P.V.C.	Nitrilo	P.T.F.E.
Glicerina / eb	✓	✓	✓	✓	✓	✓	✓	⚠	✓	✓	✓	✗	✗	✗	✗
Hexano	✓	✓	✓	✓	✓	✓	✓	✓	✓	⚠	✓	✓	⚠	✓	✓
Hidrogeno (gas)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	⚠	✓	✓
Hiposulfito de sodio	⚠	✓	✓	✓	✓	✓	⚠	⚠	✓	⚠	✓	✗	✗	✗	✓
Jabones	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Jugo de frutas	✓	✓	✓	✓	✓	✓	✓	✗	✓	✓	✓	✓	✓	⚠	✓
Melazas	✓	✓	✓	✓	✓	✓	✓	⚠	✓	✓	✓	✓	✓	⚠	✓
Mercurio 20°	✓	✓	✓	✓	✓	✓	✓	✓	✗	✗	✓	✓	✓	✓	✓
Metano	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	⚠	✓	✓
Metanol tc / 20° - eb	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	⚠	⚠	⚠	⚠
Naftalina	⚠	✓	✓	✓	✓	✓	⚠	⚠	✓	⚠	✓	⚠	⚠	⚠	⚠
Nitrato de Ca, Cu, Fe tc/tt	✓	✗	✓	✓	✓	✓	✓	✓	✓	⚠	✓	⚠	⚠	⚠	⚠
Nitrato de K, Na	✓	✗	✓	✓	✓	✓	✓	✓	✓	✓	✓	⚠	⚠	⚠	⚠
Oxigeno caliente	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✗	⚠	✗	✗
Oxigeno frio	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Ozono	⚠	⚠	⚠	⚠	⚠	⚠	✗	✗	⚠	✗	✓	✓	✓	✗	✓
Parafina fundida	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✗	⚠	⚠	⚠
Pentano	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	⚠	⚠	⚠
Perclorato de amonio 10% / eb	⚠	✗	✗	✗	✓	✗	⚠	⚠	✓	⚠	✓	✗	⚠	✗	⚠
Percloretileno y vapores / tt	⚠	✗	✗	✓	✓	✓	✓	✓	✓	✓	✓	✗	⚠	✗	✓
Permanganato de Potasio tc/tt	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	⚠	⚠	⚠	⚠
Peróxido de Sodio 10% / .100°	✓	✓	✓	✓	✓	✓	✓	⚠	✓	✗	✓	✗	✗	✗	✓
Petróleos crudos	✓	⚠	⚠	⚠	⚠	⚠	✓	⚠	✓	✗	✓	⚠	✗	⚠	⚠



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**Simbología:**

-  **Conviene perfectamente.**
  -  **Conviene** pero la resistencia al envejecimiento varia según las concentraciones y/o temperaturas.
  -  **Desaconsejado.**
  -  **Estudiar las necesidades** al momento del pedido.
- tc/tt: Cualquier concentración / Cualquier temperatura.  
 eb: Ebullición.  
 Temperatura en grados centígrados.

	Acero al carbón	Acero inoxidable	Acero inoxidable 304	Acero inoxidable 304L	Acero inoxidable 316L	Acero inoxidable 321	Acero semiduro	Fundición	Aluminio	Tumbaga	Asbesto	Neopreno	P.V.C.	Nitrilo	P.T.F.E.
Cianuro de Sodio tc/tt															
Ciclohexano															
Clorato de Potasio saturado / eb.															
Cloro (gas) seco de 20° a 100°															
Cloro húmedo 20°															
Cloroformo															
Colas															
Creosota															
Dietilen-Glicol															
Dow Therm															
Eteres															
Etilen - Glicol															
Fenol 20°															
Fluor															
Fluoruro de Aluminio 10% / 20°															
Fluoruro de Sodio 5% / 20° Formol tc / 20° a															
Formol tc / 20° a 100°															
Fosfato de Amonio puro tc/tt, Na Puro tc/tt															
Freon 12															
Freon 22															
Furfural															
Gas natural															
Gasolina															



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









































































































































































































































































































































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










**Simbología:**

-  **Conviene perfectamente.**
  -  **Conviene** pero la resistencia al envejecimiento varia según las concentraciones y/o temperaturas.
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 eb: Ebullición.  
 Temperatura en grados centígrados.

	Acero al carbón	Acero inoxidable	Acero inoxidable 304	Acero inoxidable 304L	Acero inoxidable 316L	Acero inoxidable 321	Acero semiduro	Fundición	Aluminio	Tumbaga	Asbesto	Neopreno	P.V.C.	Nitrilo	P.T.F.E.
Potasa 50% / 20°															
Potasa 50% / eb.															
Propano															
Silicato de Sodio tc/tt															
Sodio Fundido 780°															
Sosa 50% / 50°															
Sosa 70% / 60° - 50% / 110°															
Sulfato de Aluminio tc / 20°															
Sulfato de Aluminio 10% tc/eb															
Sulfato de Amonio tc/eb															
Sulfato de Ca, Cu tc/tt - Fe tc / 20°															
Sulfato de Zinc															
Sulfato de Magnesio															
Sulfato de Mn, Ni tc/tt															
Sulfato de K, Na tc/tt															
Sulfito de Amonio, Na 50% /eb															
Sulfuro de C puro / eb - Na SAT, / 20°															
Sulfuro de hidrogeno seco 200°															
Sulfuro de Na 50% / 90° - Saturado 100°															
Tetracloruro de C seco 20° / ab															
Tintas															
Tolueno															
Trementina (Gasolina DE)															

Simbología:

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 Temperatura en grados centígrados

	Acero al carbón	Acero inoxidable	Acero inoxidable 304	Acero inoxidable 304L	Acero inoxidable 316L	Acero inoxidable 321	Acero semiduro	Fundición	Aluminio	Tumbaga	Asbesto	Neopreno	P.V.C.	Nitrilo	P.T.F.E.
Tricloretileno y Vapores tt															
Urea 150°															
Vapor sobrecalentado															
Vapor saturado															
Vinagre															
Yodo seco 20°															
Xileno															



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*“Commitment to Excellence”*



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# Our Aspects



**MISSION**  
To excel and become a world leader in the field of stainless steel corrugated flexible hoses and assemblies by achieving the goal of total customer satisfaction based on the understanding and anticipation of the customer's need.

**VISION**  
To build and consolidate our leadership position through successful collaboration, market intelligence, and thorough research & development.



**VALUES**  
Aeroflex is a people-centric organization that strongly believes in empowering professionals with strong characters and ethics.

**PURPOSE**  
Commitment To Excellence.






## Core Values

- Every employee must be considered as an individual, and we must respect their dignity and recognize their merits.
- Equal opportunities for employee development and advancement should be available for all.
- Our suppliers and business associates must be given a fair and reasonable deal.
- We must protect the environment and our natural resources.
- We must make a sound profit by driving business ethically, using legitimate modern methods and techniques.
- Adequate reserves must be created to face adverse times. Stockholders should receive a fair return on their investments.
- Improve the effectiveness of the quality management system continuously by periodic review of quality objectives.
- Deliver the material in time to achieve customer satisfaction.
- Ensure consistency in quality by providing appropriate training to employees in their respective field.

## Our Strengths

- Aeroflex is an ISO 9001:2015 company.
- We are one of the leading manufacturers of stainless steel flexible hoses and assemblies in the organized sector of India.
- We are an established and reputed brand for flexible hoses in almost all industrial developed countries of the world.
- We currently export to more than 80 countries.
- We have a strong customer profile comprising of multinational and reputed domestic brands in India in all industrial segments.
- Due to its capability to handle high temperatures, shocks and vibrations, stainless steel hoses are fast taking over the use of rubber and other types of hoses across all industrial segments.
- As per European law, stainless steel hoses are considered to be food-grade hoses, and as such, it can be used in pharmaceutical and other food-related industries.
- Considering the upcoming new green-field projects, the demand for stainless steel hoses are going to increase by at least 50-60% in the next three years.

- 
- Due to the excellent quality of our hoses, compared to the hoses manufactured in China and other Southeast Asian countries, there is a global increase in the demand for the same. Thus, in the next 3 years, we expect the export business to increase substantially.

## Promoters

Aeroflex Industries Limited is a professionally managed company, which percolates the value systems down the hierarchy easier and faster. The operations of the company are controlled, supervised, and managed by the Board of Directors comprising of highly-qualified and experienced professionals with a rich background in their respective field.

Sat Industries Limited is the holding company of Aeroflex Industries Limited. Sat is a BSE listed company and has been in existence for more than 31 years. It is engaged in varied business activities such as manufacturing, education, leasing, finance, investments, domestic trading and import & export through its various subsidiaries and associates.

It has a presence in various international markets such as the Middle East, Europe, Asia, Africa and North & South America. Its group companies are exporting products to more than 100 countries. Its head office is in Mumbai. Sat Group's capabilities in management, finance, strategic and international operations is a great advantage to Aeroflex.

## TECHNICAL KNOW-HOW

### Metal Hose Terminology

#### Annular

A specially designed hose profile that ensures each convolution is a complete circle or ring.

#### Braid

A woven wire cover that is placed over the hose to prevent elongation of the hose under internal pressure and to permit higher working pressure.

#### Close Pitch

More corrugations per foot, which renders the longest fatigue life and minimum bend radius.

#### Open Pitch

Less corrugations per foot. This helps limit motions and bend radius.

#### Constant Flexing Bend Radius

The minimum radius to which a hose can be repeatedly bent and render satisfactory flexure life.

#### Constant Motion

Motion that occurs on a regular cyclic basis at constant travel.

### Temperature Correction Factor

When hoses are required to work at higher temperatures, the working pressure given in Table 1 should be multiplied by the correction factor. This will determine the pressure rating of the hoses for higher temperatures.

Example:

- Design Pressure of 50 NB hose is required at temperature of 200°C, if Hose material SS316L.
- Then specified pressure for 50 NB single wire braid hose, as per the table (Series A100), is 30 bar.
- The correction factor at 200°C is 0.60.

Thus, the permissible working pressure is  $30 \times 0.60 = 18.0$  bar.

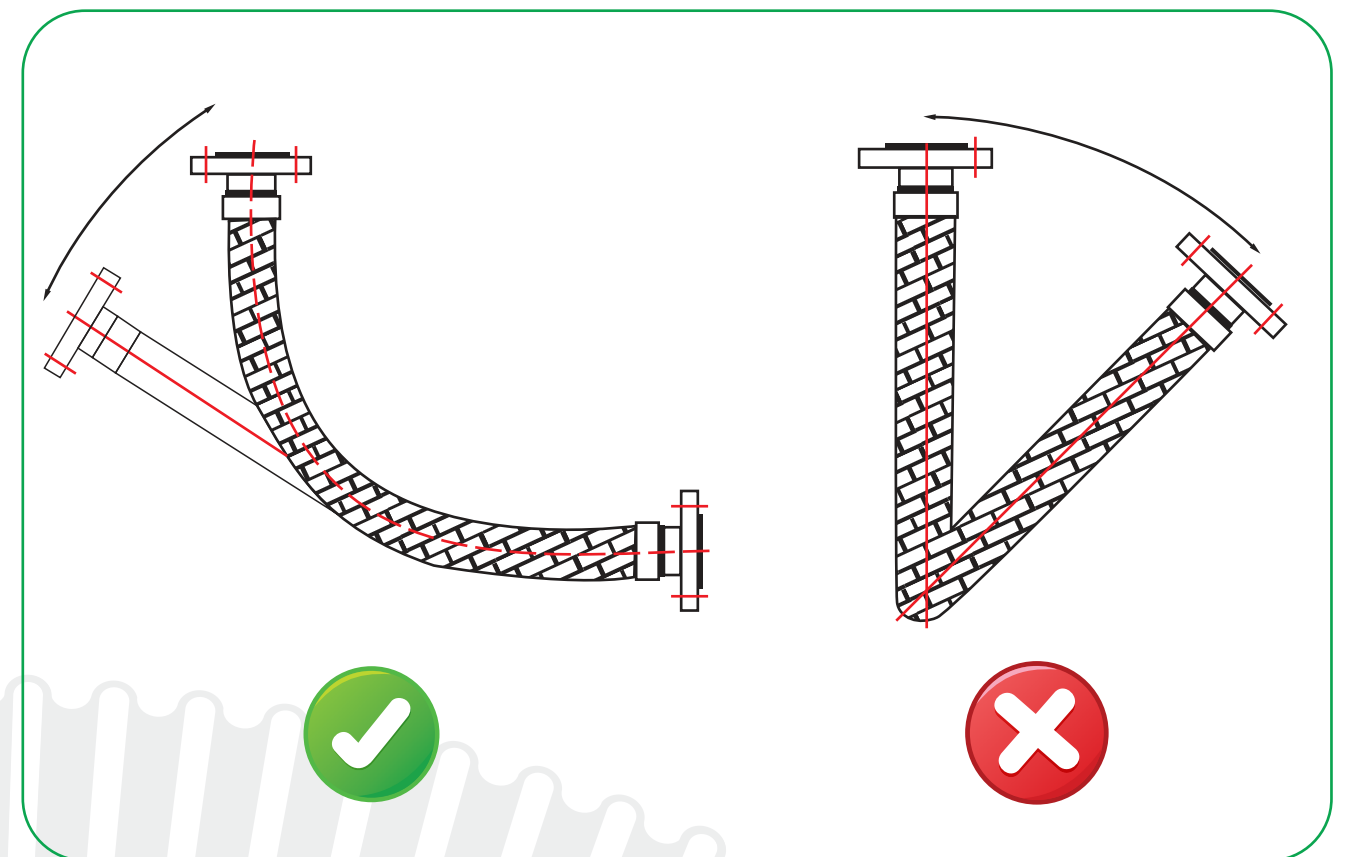
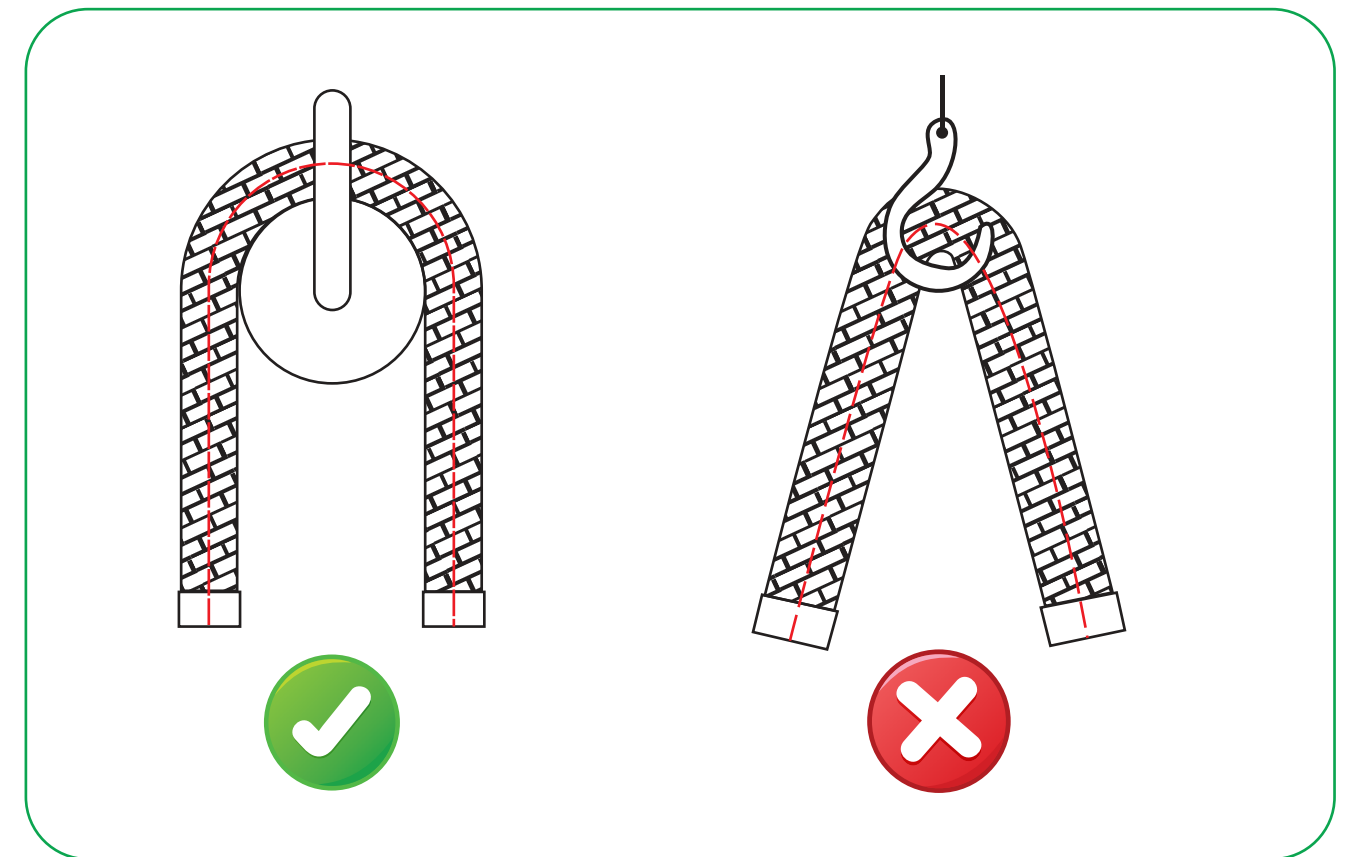
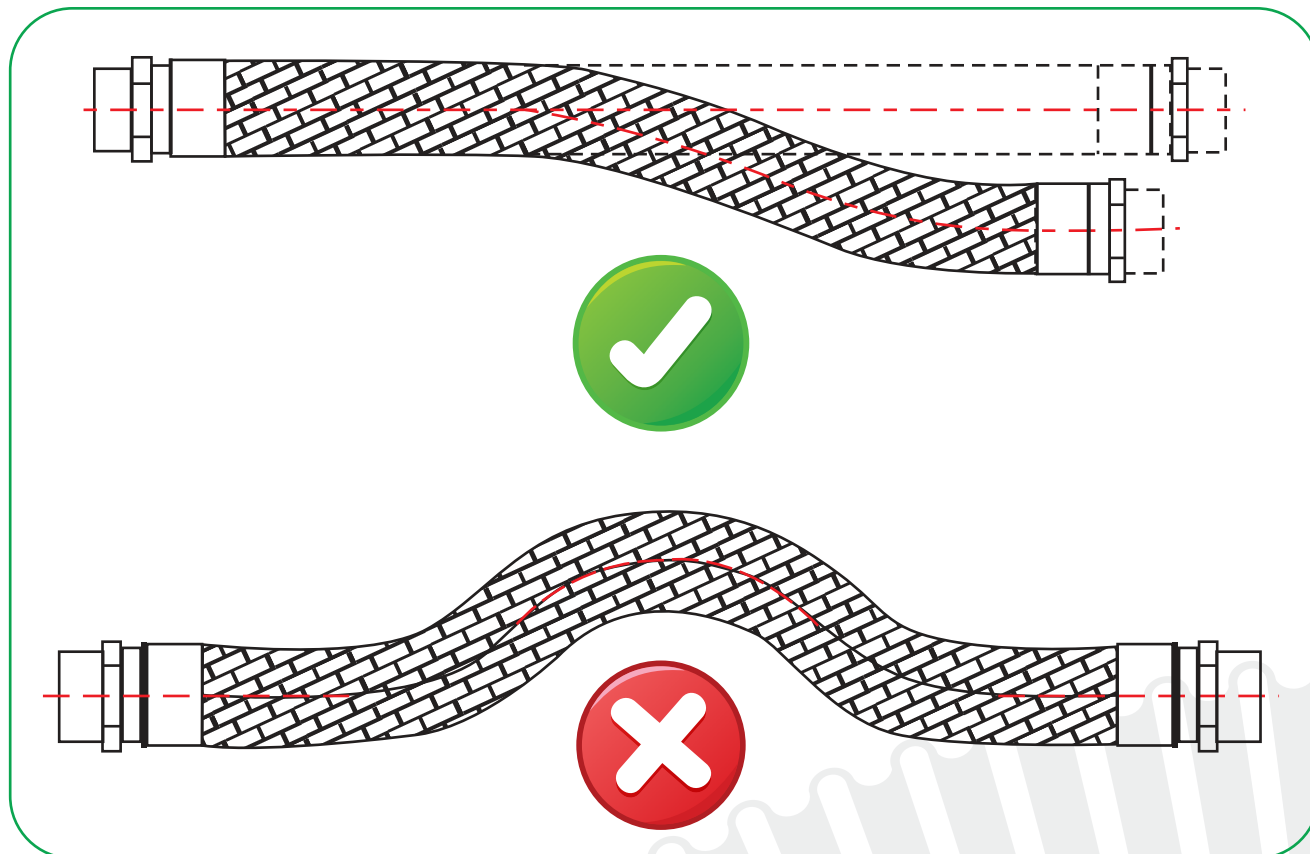
Recommended design pressure of SS316L DN50 Hose with single wire braiding at 200 degree Celsius will be 18.0 bar.

#### Temperature Correction Factor for Hose System FT

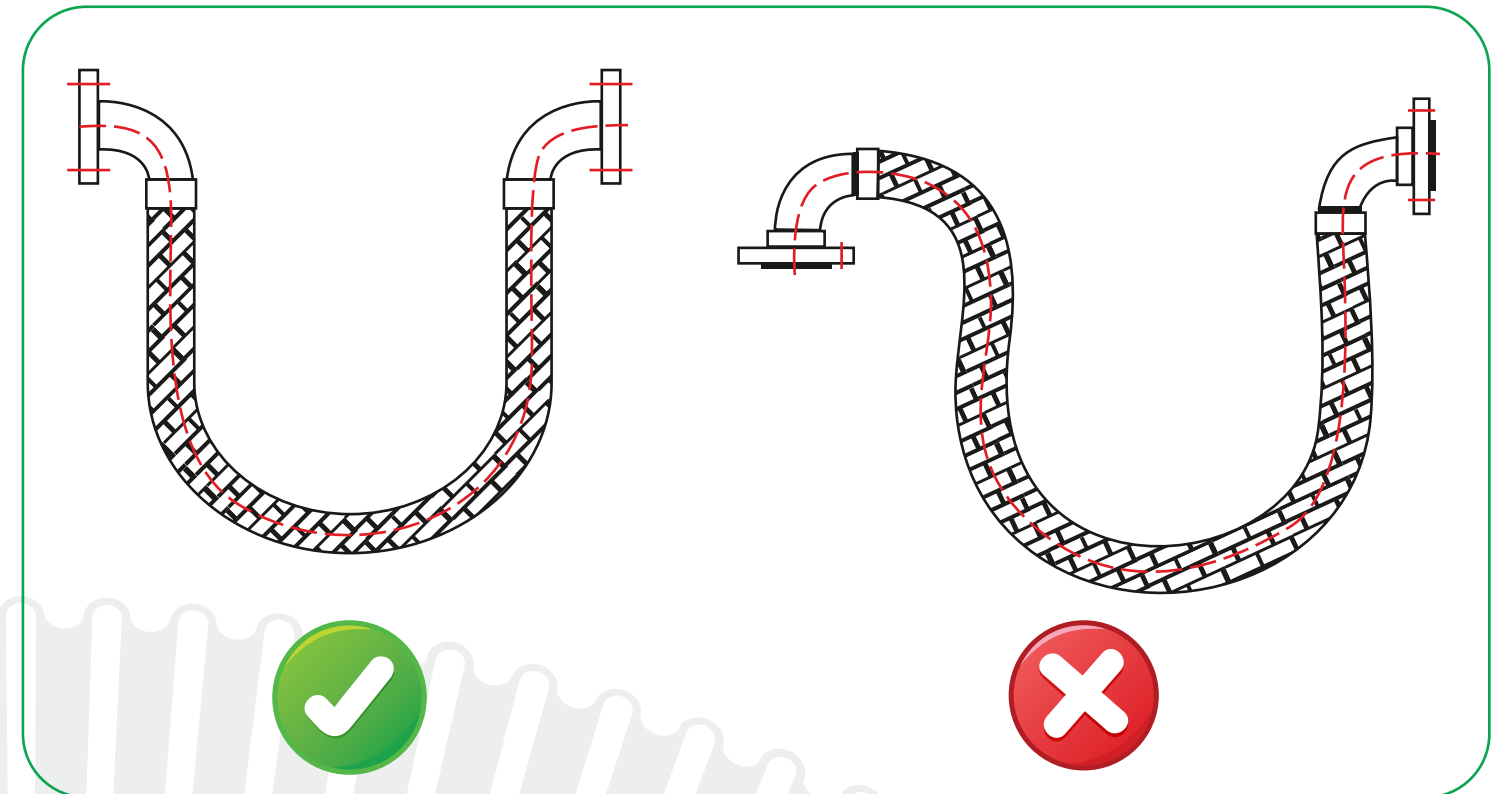
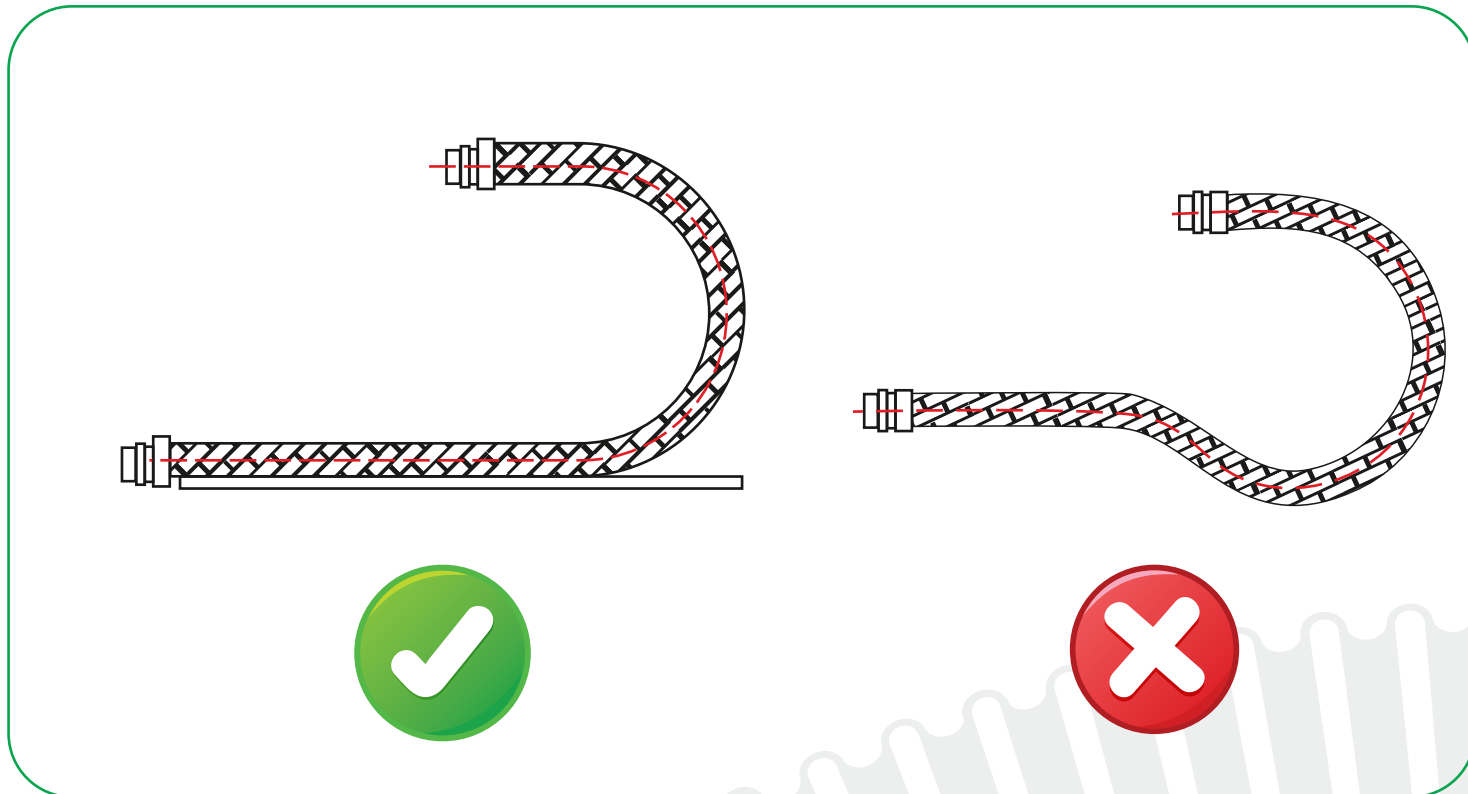
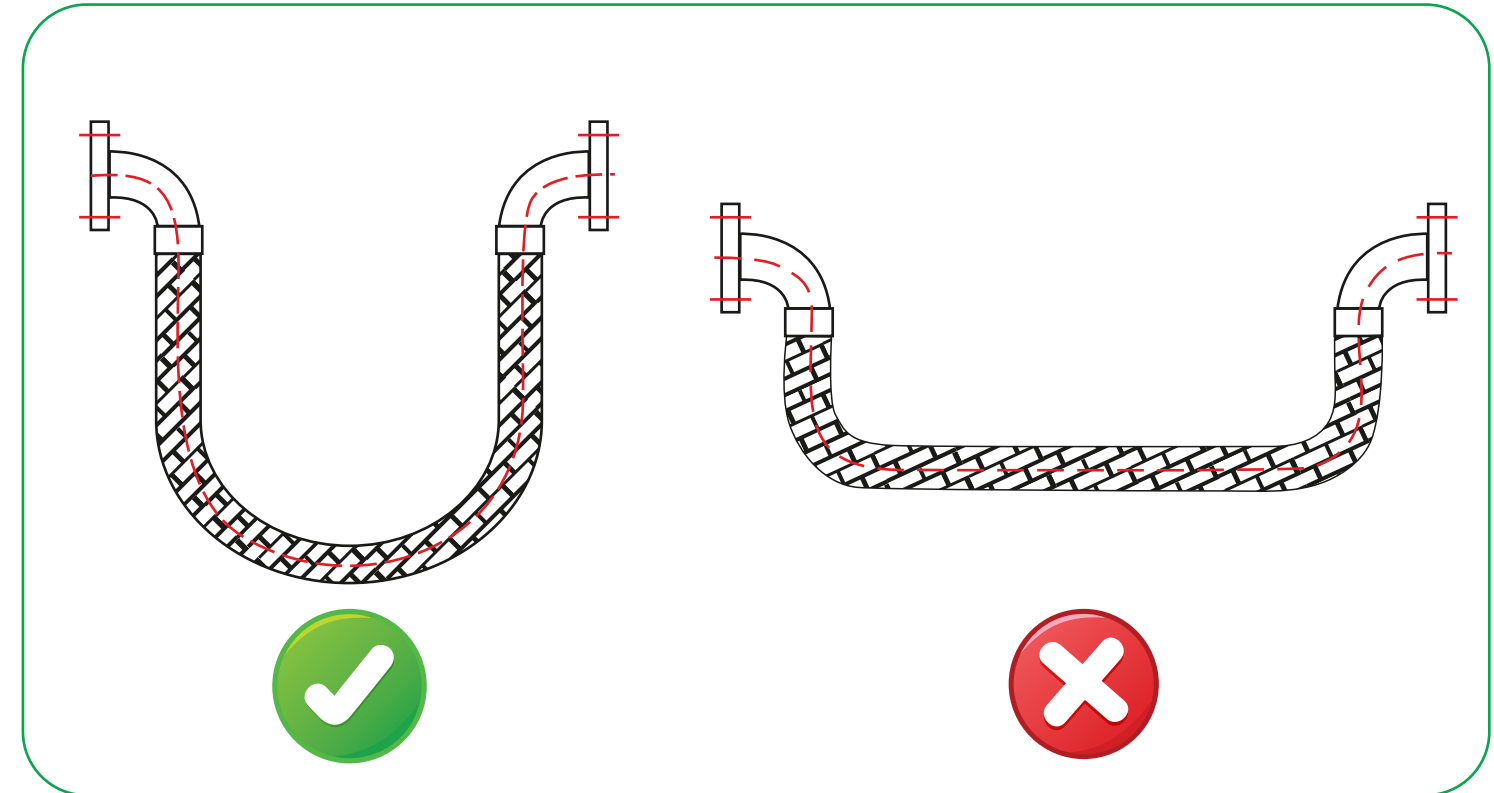
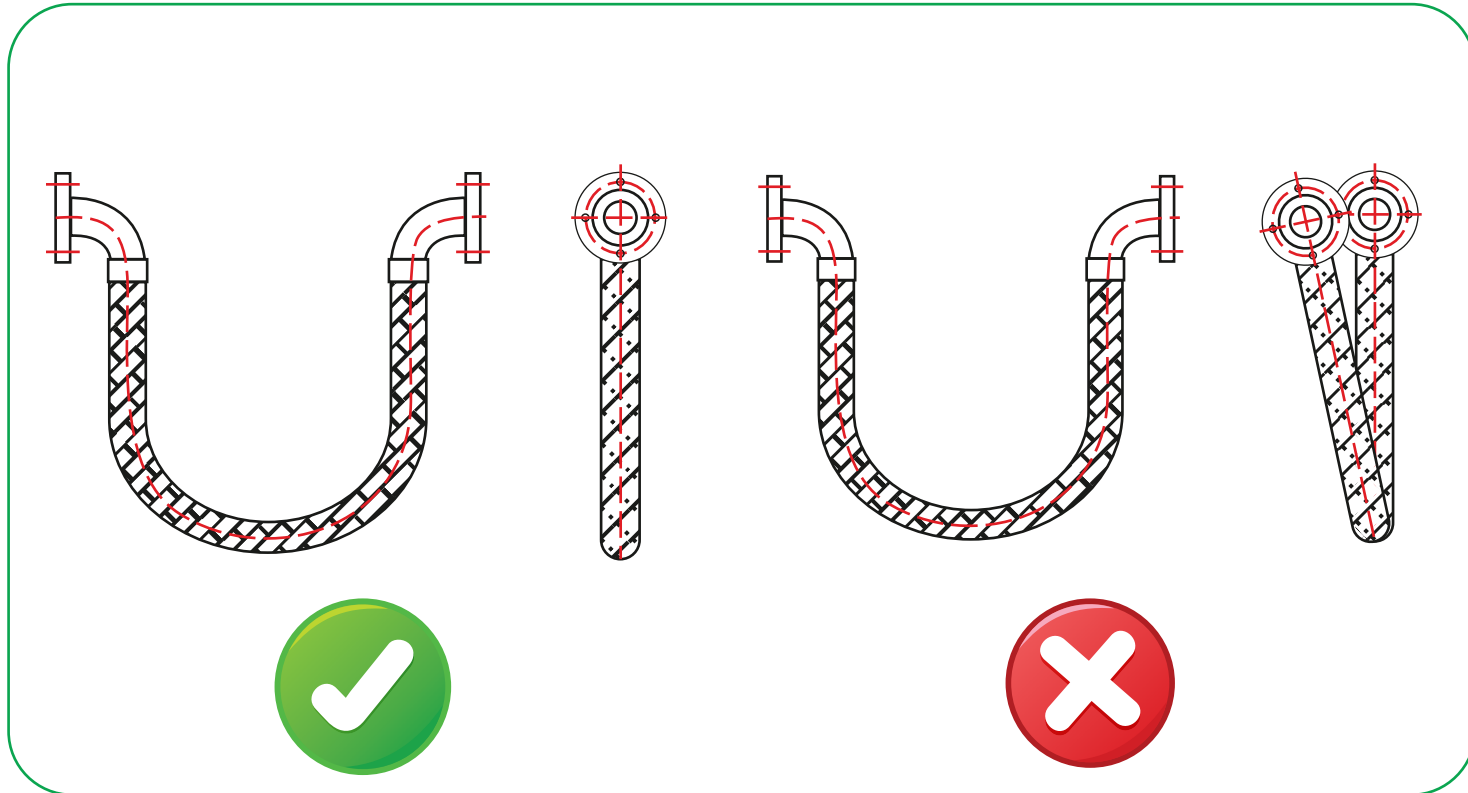
Material	Temperature											
	20	50	100	150	200	250	300	350	400	450	500	550
	De-rating factors											
SS304L	1	0.87	0.72	0.65	0.59	0.55	0.51	0.48	0.46	0.45	0.44	0.43
SS304	1	0.88	0.73	0.66	0.60	0.56	0.52	0.50	0.48	0.47	0.46	0.42
SS321	1	0.92	0.88	0.78	0.74	0.71	0.67	0.64	0.62	0.61	0.60	0.59
SS316L	1	0.88	0.74	0.67	0.62	0.58	0.54	0.52	0.50	0.48	0.47	0.47
SS316	1	0.90	0.78	0.71	0.66	0.62	0.58	0.56	0.53	0.52	0.51	0.51

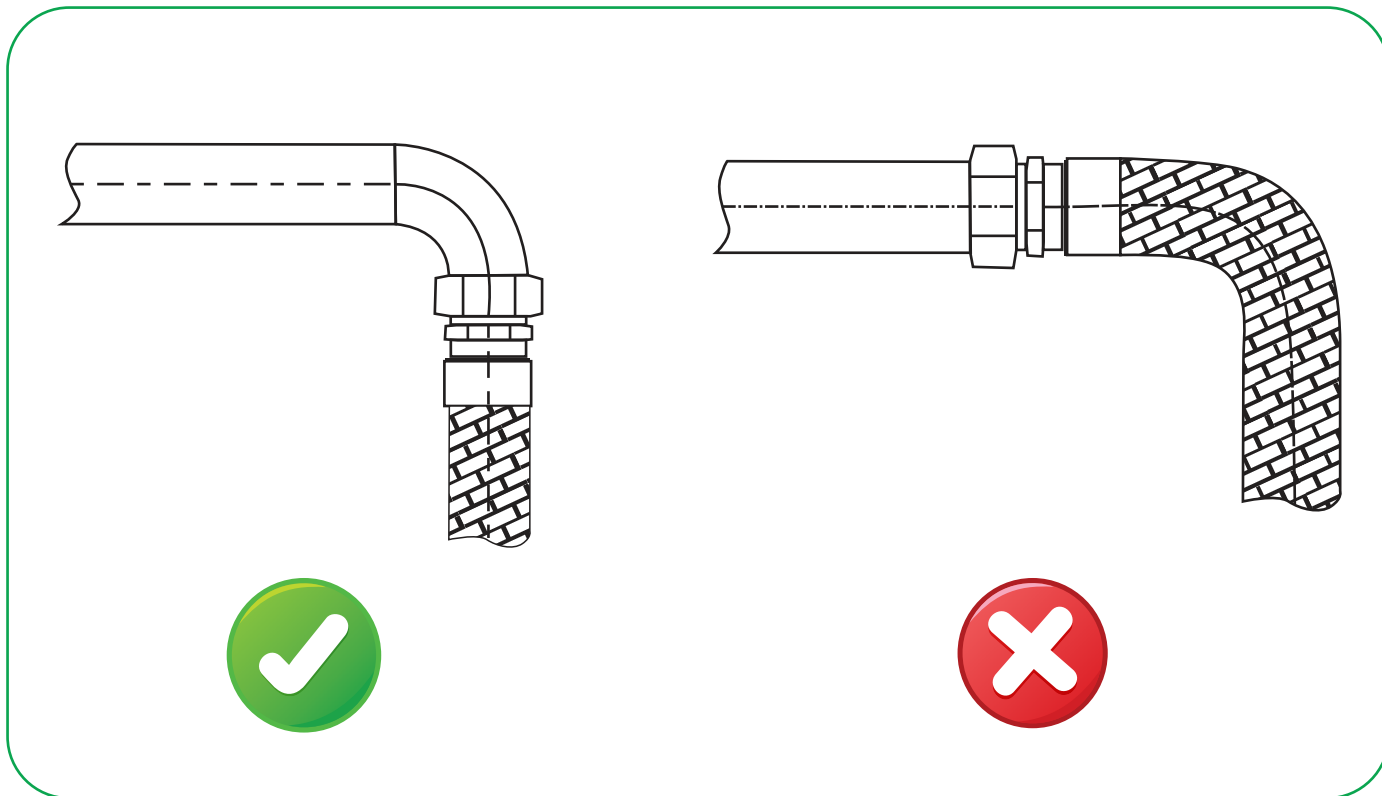
## Installation Precautions

- **Do not compress or extended axially:** Hose shall be installed in line with longitudinal axis of pipe system
- **Do not torque during installation:** Hose assembly should not be twist, use two wrenches to keep away the hose from twisting during tightening the fitting.
- Do not sharp bend during unwinding or installation.
- Maintain minimum bend radius to avoid premature failure.
- Do not allow hose movement in multiple plane.

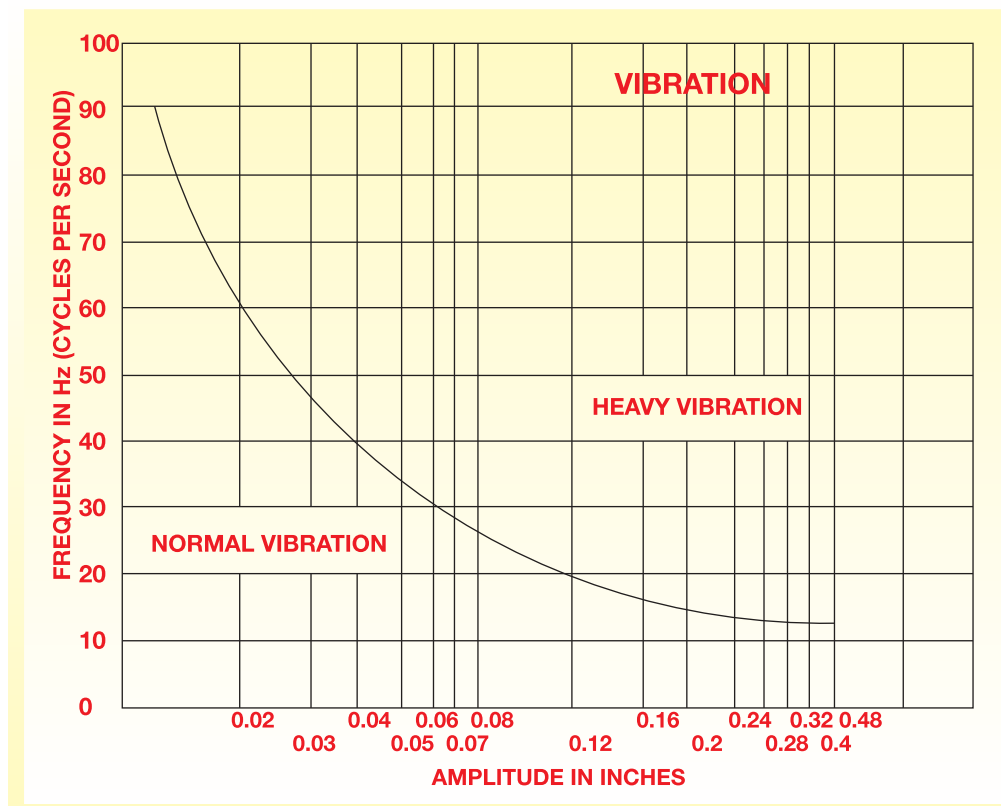








- **Fittings** : Parts attached to the ends of the metal hose, so that it can be connected to other components such as flanges, unions, nipples, etc.
- **Flow Velocity** : When the flow velocity exceeds 75 ft/second liquid, 150 ft/second gas in the braided hose, a flexible metal interlocked liner should be used.
- **Intermittent Motion** : Motion that occurs on a regular or irregular cyclic basis along a path of full travel.
- **Maximum Test Pressure** : Maximum pressure hose assemble should be subjected to testing, based on 150% of the maximum working pressure.
- **Media** : Material conveyed by a hose assembly such as gases, chemicals, or liquids.
- **NPT** : American Standard Tapered Pipe Thread.
- **Operating Conditions** : Temperature, Pressure, Media, Motion and Application involved.
- **PSIG** : Pounds per square inch gage.
- **Random Motion** : Uncontrolled motion that occurs usually from manual handling of the hose.
- **Rated Burst Pressure** : Pressure at which hose can be expected to fail. Braid will normally fail before core burst.
- **Safety Factor** : Difference between working pressure and rated burst pressure.
- **Shock or Pulsating Pressure** : Shock, pulsating or surge pressure can cause premature failure of hose, so the pressure should not exceed 50% of the maximum working pressure.



- **Static Bend** : Minimum centre bend radius to which flexible metal hose may be bent for installation.
- **Vibration** : Rapid application of motion.
- **Working Temperature** : Temperature to which hose will be subjected to during operation.

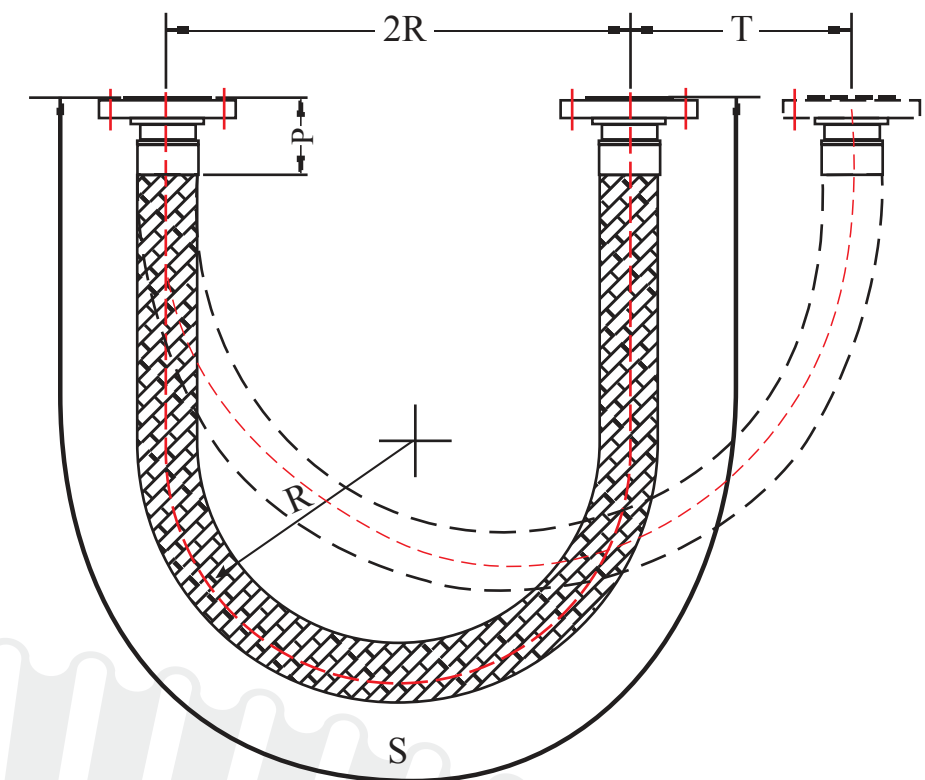
## Flow Velocity

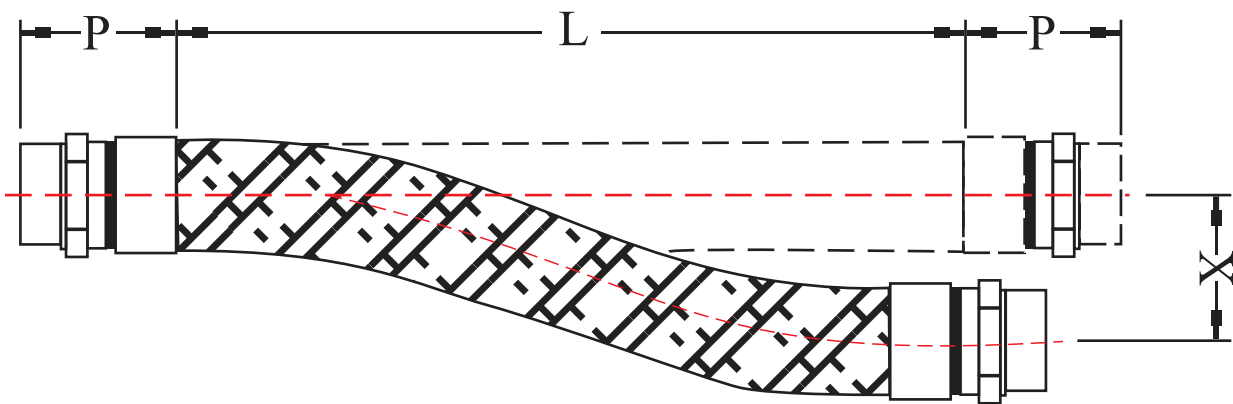
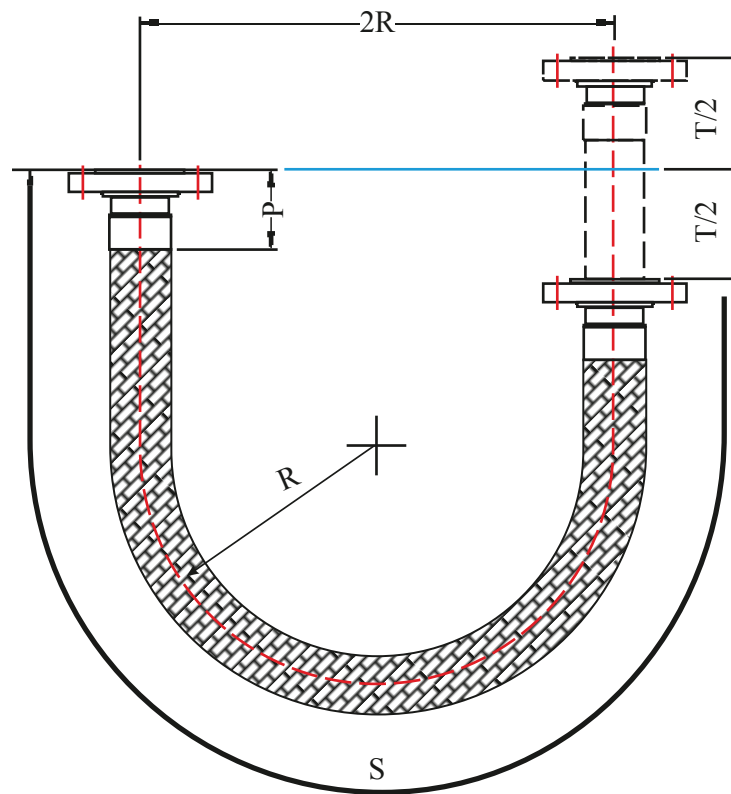
Corrugated metal flexible hoses have limitations in case of fluids with high-flow velocities. This is because high-velocity causes resonant vibrations, resulting in premature failure of the assembly. Whenever flow velocity exceeds 50 m/sec for gas and 25 m/sec for liquids, an interlock hose liner should be used in the hose assemblies. The above flow velocity values get reduced to 50% for 90 bends and 25% for 45 bends.

## Modes of Movements

- **Lateral Offset Motion** : This motion occurs when the hose centreline is moved in a plan perpendicular to the longitudinal axis with and remain parallel.
- **Angular Offset Motion** : Angular movement is the bending of the hose so that the end is no longer parallel. Amount of movement is measured in degree from centre line.
- **Axial Movement** : This movement is compression or elongation along the longitudinal axis.

- **Torsional Movement** : This movement occurs when one end of hose is twisted and other remain fixed, for eliminating this twisting use two spanner with proper method of tightening.
- **Radial Movement** : This type of movement means hose is bent in 180 degree arc in vertical or horizontal travelling. Horizontal loops must have the bottom support to avoid extra stress on the hose.
- **Random Motion** : This is non-predictable motion due to manual handling. Hose must be prevent from sharp bending/ abrasion of wire braid.
- **Frequency of Motion** : The rate of flexing of hose is subjected to in a given time period. These are three basic type of motion vibration motion, dynamic motion and continuous motion.



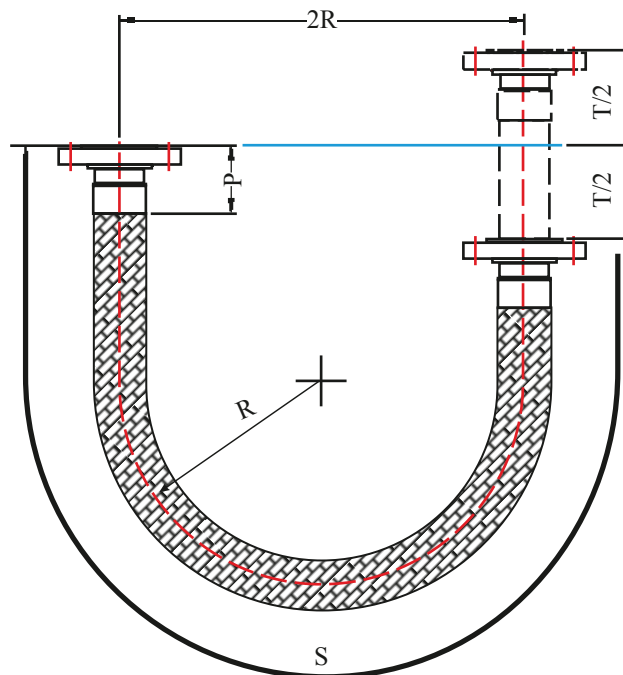


## Calculation of Minimum Hose Length for Flexing Installation

### Length calculations

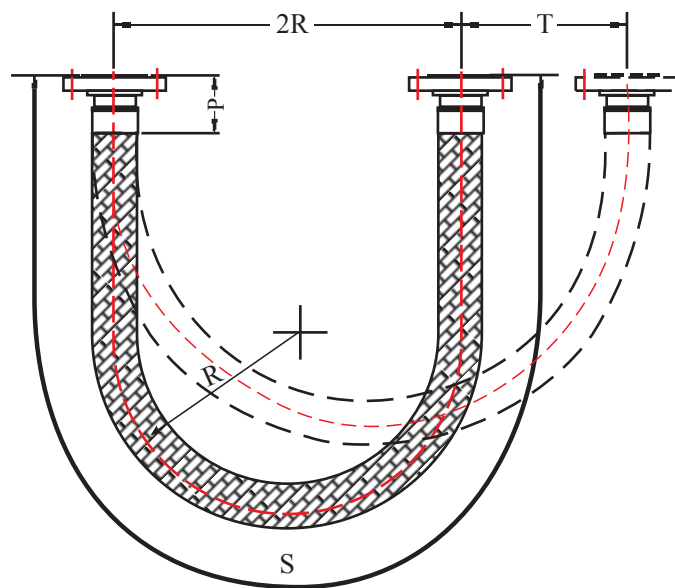
- For the following formula:  
 $S$  = live length of hose  
 $T$  = travel/offset  
 $R$  = Installed radius must be greater than dynamic minimum bend radius

SIZE	BEND RADIUS	DISPLACEMENT 'T'											
		15	25	35	50	75	100	125	150	175	200	225	250
6	85	160	206	244	292	357	412	461	505	545	583	618	652
8	125	194	250	296	354	433	500	559	612	661	707	750	791
10	140	205	265	313	374	458	529	592	648	700	748	794	837
12	140	205	262	313	374	458	529	592	648	700	748	794	837
16	160	219	283	335	400	490	566	632	693	748	800	849	894
20	170	226	292	345	412	505	583	652	714	771	825	875	922
25	190	239	308	365	436	534	616	689	755	815	872	925	975
32	260	279	361	427	510	624	721	806	883	954	1020	1082	1140
40	300	300	387	458	548	671	775	866	949	1025	1095	1162	1225
50	320	310	400	473	566	693	800	894	980	1058	1131	1200	1265
65	410	351	453	536	640	784	906	1012	1109	1198	1281	1358	1432
80	450	367	474	561	671	822	949	1061	1162	1255	1342	1423	1500
100	560	410	529	626	748	917	1058	1183	1296	1400	1497	1587	1673
125	710	462	596	705	843	1032	1192	1332	1459	1576	1685	1787	1884
150	815	494	638	755	903	1106	1277	1427	1564	1689	1806	1915	2019
200	1015	552	712	843	1007	1234	1425	1593	1745	1885	2015	2137	2253
250	1270	617	797	943	1127	1380	1594	1782	1952	2108	2254	2391	2520
300	1525	676	873	1033	1235	1512	1746	1953	2139	2310	2470	2620	2761



**RADIAL MOVEMENT IN VERTICAL LOOP**

FORMULA:  $S = 4R + \frac{1}{2} T + 2P$

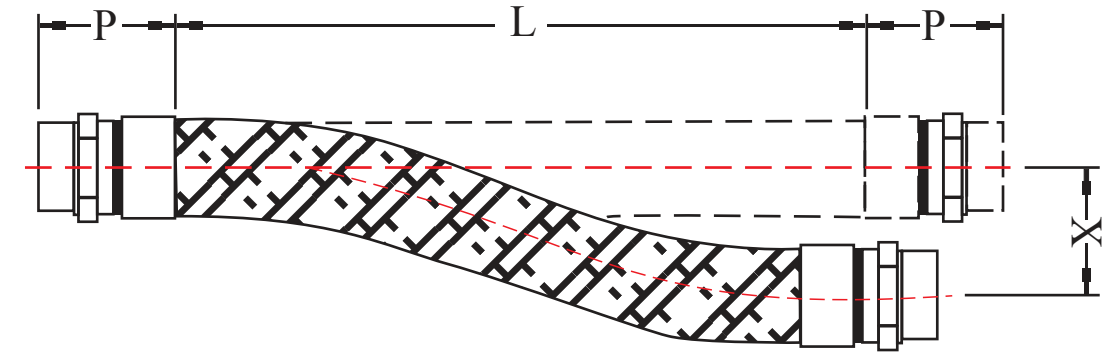


**RADIAL MOVEMENT IN HORIZONTAL LOOP**

FORMULA:  $S = 4R + 1.57 T + 2P$

DROP HEIGHT (BEFORE STRETCH) =  $1.43R + 0.785 T$

DROP HEIGHT (AFTER STRETCH) =  $1.43R + 0.5 T$



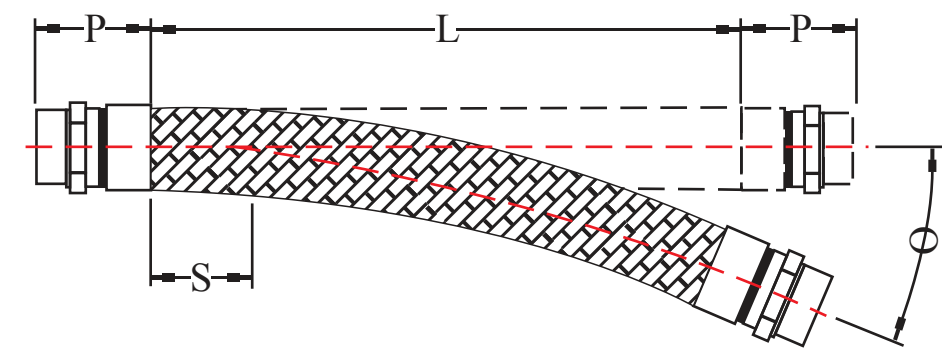
**LATRAL OFFSET**

FORMULA:  $L = \sqrt{20R \times T}$

$L_p = \sqrt{L^2 - T^2}$

R – Minimum dynamic bend radius

Quick Calculation of T as per table



**ANGULAR DEFLECTION / OFFSET**

FORMULA:  $L = 2S + (\theta/57.3)R$

$\theta$  = Deflection angle

## **BOILER HOSE**



For more detail of these Solar hoses you can study our hose Series A302.

In all solar heating systems, there is a horizontal heating tank combined with a collector or an independent vertical solar heating boiler, where the domestic water is heated. The water which keeps circling between the collectors and heating tank transfer its temperature to the system, and provides the required heating.

The most important feature of this hose is heavier sheet thickness which contributes to trace the heat from hot water coming from solar panel and the heat transfer into the tank.

### **Applications:**

- Corrugated structure of the hose provides almost doubled surface area in comparison with rigid pipe applications. Greater surface area means better heat transfer capacity and higher efficiency.
- Boiler-flex systems are economical, energy saving applications.
- Hose corrugations keep moving as a result of constant thermal expansion and compression, this movement prevents the lime and residue formation on the hose surface and provides longer service life.
- Stainless steel (AISI 316L) hose is suitable for drinking water application and highly resistant to corrosion.
- With the help of flexibility and low bending radius, the hose can be formed in any form required for various applications. This hose is suitable for the extreme conditions (-270°C to 550°C).
- Design of hose and type approval is according to EN ISO10380.

### **Different end connection use in the Boiler hose assemblies**



## **VIBRATION ELIMINATORS PUMP CONNECTORS**



Pump connectors are normally provided for vibration and noise isolation between the piping and the vibration equipment.

A standard pump connector consists of a stainless steel braided hose with fitting. These fittings either have a flange type or threaded type pipe end or a plain pipe end.

Pump connectors of longer lengths accommodate additional lateral deflection. Excessive vibration are also made to meet specific customer requirement.

### **Stainless Steel Vibration Eliminator**

(Copper Pipe End: Series A1500-2)

Aeroflex Vibration Eliminator is specially designed to absorb mechanical vibration and destructive force of noise which is transmitted by compressors, and also eliminate the stresses linked with piping thermal expansion in refrigeration and air condition installation.

These connectors are TIG welded stainless steel hose with copper pipe. Due to this, there is no brazing and these connectors are able to bear more temperature as compared to brazed fitting.

The main function of vibration eliminator is to absorb compressor vibration and stop its transition into pipe network. By isolating the vibration, the risk of damage to pipe work and related component is reduced.

### **Pump connectors - (Flange Type, Series-1503)**

Pump connectors are normally provided for vibration and noise isolation between the piping and the vibration equipment.

A standard pump connector consists of a stainless steel braided hose with fitting, these fittings are either a flange type, threaded type pipe end, only pipe end in carbon steel and stainless steel in SS304/SS316.

Pump connectors of longer lengths accommodate additional lateral deflection. Excessive vibration are also made to meet specific customer requirement.

Standard paints on C.S Flanges Azure blue (RAL 5009) or as per customer requirement.

### **Pump connectors - (Flange Type, Series-1503)**

Metal braided pump connectors are normally in BSPT (DIN 2999) and NPT treaded pipe ends which are designed to absorb pump vibration, noise and reduce piping stresses due minor misalignment. These are available in carbon steel/stainless steel pipes.

Standard paints on C.S pipe end is Azure blue (RAL 5009) or as per customer's requirement.

Stainless steel braided flexible pump connectors, which are designed with high performance in holding higher pressure and temperature, can absorb pump vibrations, minimize engine noise and minor misalignment to reduce stress of pipe system. It is extensively used in industries.



## Pump Connectors

(Pipe End/Butt Welded Type, Series-1505)

Metal braided pump connectors are normally in BSPT (DIN 2999) and NPT treaded pipe ends but in some applications, these stainless steel connectors are directly brazed over the copper/bronze pipe for this application. The copper pipe of standard ASTM B88 can be inserted into the carbon steel pipe that can be easily brazed.



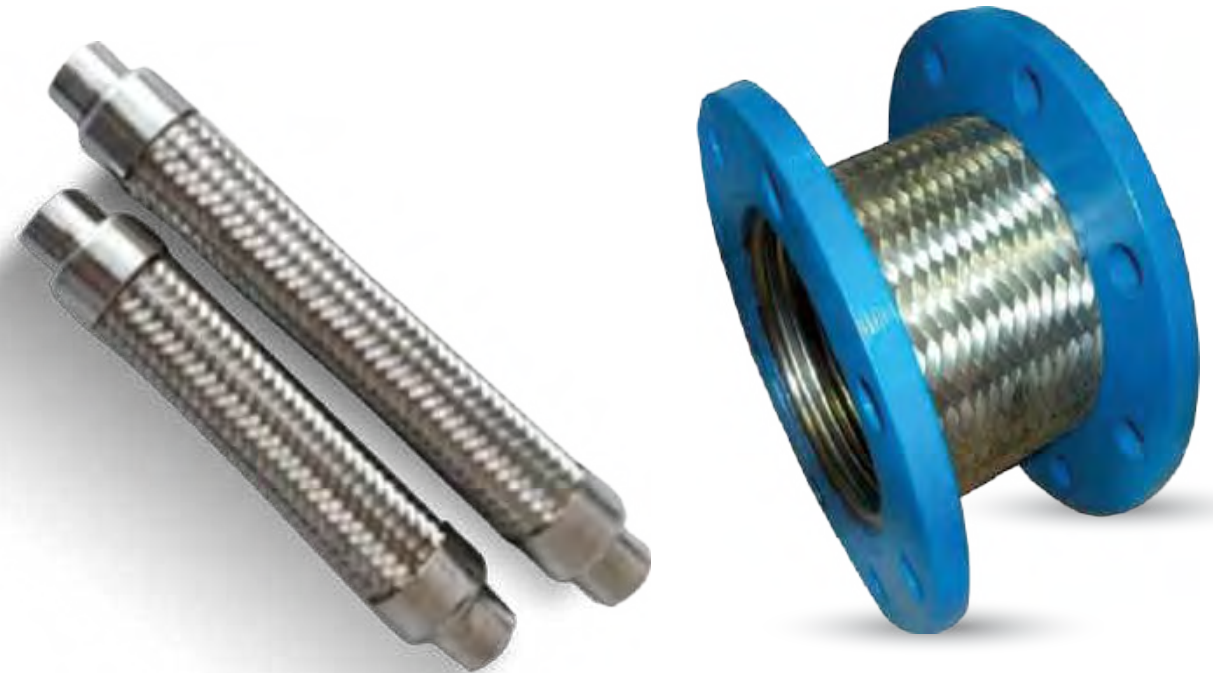
These pump connectors are designed to absorb pump vibration, noise and reduce piping stresses due to minor misalignment. These are available in carbon steel/stainless steel pipes.

Standard paints on C.S. flanges Azure Blue (RAL 5009) or as per customer requirement.

## Pump Connectors - (Flange Type Short Length, Series-1506)

In all the pump connectors, only hydro formed hoses are used with up to 98-99% braid coverage which gives excellent vibration damping capability and gives better flexibility.

These connectors are specially designed in minimum length to get maximum flexibility. This means, it can bear more misalignment between short gap of connections. Standard paints on C.S Flanges Azure Blue (RAL 5009) or as per customer requirement.





# INDUSTRIAL HOSE ASSEMBLIES



Aeroflex metal hoses assemblies are recognized throughout the industry as a leading solution provider to customers, specializing in fluid handling requirement.

Our aim is to work closely with the customer, build quality products that meet or exceed the functional requirement, safety and environment standard. Our world class quality products are present in 80 countries all over the globe and supply the same.

## Product Specifications:

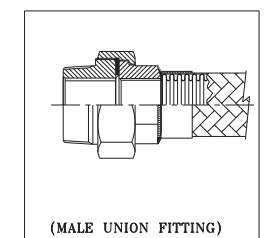
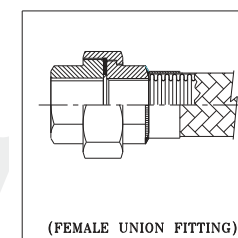
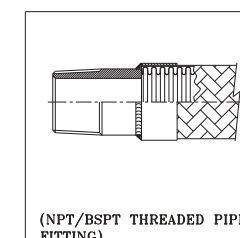
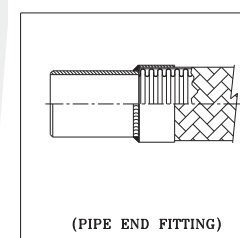
Sr. No.	Product	Type
a.	Industrial Hose Assemblies	Type A1500-01
b.	Vibration Eliminator	Type A1500-02
c.	Pump Connector Flange Type	Type A1500-03
d.	Pump Connector Threaded Pipe	Type A1500-04
e.	Pump Connectors Butt Welded	Type A1500-05
f.	Pump Connectors Short Length	Type A1500-06
g.	Solar Hose Assemblies	Type A1500-07
h.	Boiler Hose Assemblies	Type A1500-08
i.	Gas Hose Assemblies	Type A1500-09
j.	Vacuum Hose Assemblies	Type A1500-10
k.	Fire Sprinkler Hose Assemblies	Type A1500-11
l.	Jacketed Hose Assembly	Type A1500-12
m.	Lancing Hose Assemblies	Type A1500-13
n.	PTFE Hose Assembly	Type A1500-14

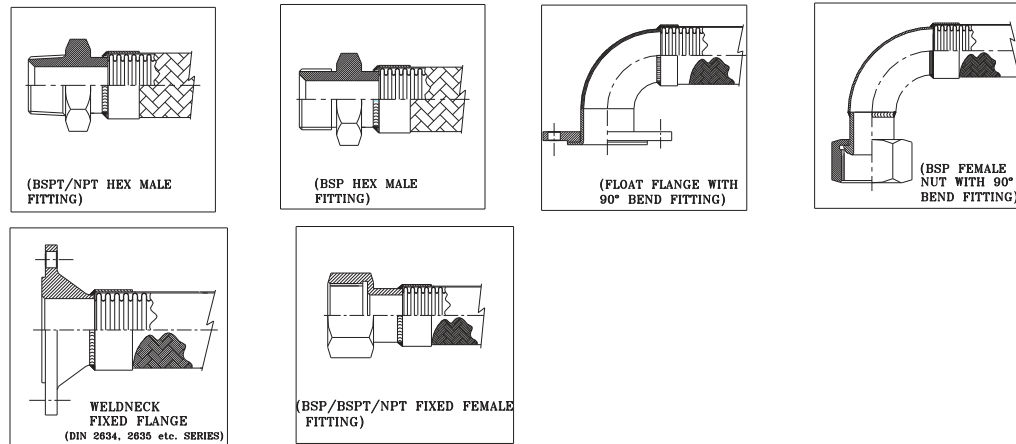
### A. Industrial Hose Assemblies (Type A1500-01)

We have in-house design facilities and we regularly manufacture hoses for highly critical applications. Generally assemblies are tailor made to meet the individual requirement. There are different kinds of standard end fittings that are connected to the hose and braids to specific need.

The process consists of assembling the hose and braid of specific length followed by connecting the end fitting by TIG welding.

#### A.1 Assemblies Weld With Standard End Fitting:





These fittings are available in carbon steel, stainless steel SS-304, SS-316 etc. Male and female end fittings are also available in rolled bronze, gun metal and also as per requirements. Flange connections with fixed and floating flanges to meet the BS DIN, ANSI, JIS, IS etc.

### A.1 Assembly With Internal Liner:

When the velocity of fluid which is transferred through the stainless steel corrugated hose is more than 25 meter/second for liquid and 50 meter/second for gases then more turbulent flow may create the abrasion, extra pressure drop, and result damage of hose. To prevent these types of problems we use a flexible interlock liner inside the stainless-steel corrugated hose assemblies.



### A.2 Assembly With External Guard:

Use of external flexible armor/guard (Interlock hose) protects the stainless steel flexible hose from abuse due to rough handling, sharp bending, abrasion, etc. Sometime asbestos, ceramic covering or any other insulation materials are used in external guard and armoring.

These external guards are made by SS-304, SS-316L, galvanized steel etc.

## i. Gas Hose Assemblies (Type A1500-09)



Gas hose assembly/gas connector is a flexible connection between the gas valve of appliances and main transmitting pipe or (in between branch line and main transmitting pipe line).

Aeroflex produces a wide variety of flexible gas hoses which are suitable for gases (natural gas, LPG, Propane gas etc.) and water heater, radiator etc.

These hoses are annular corrugated in shape, which are available in SS304 & SS316L grade steel, with end fitting SS304 & SS316L. Gas connectors are also available with PVC, & Polyolefin heat shrinkable film.

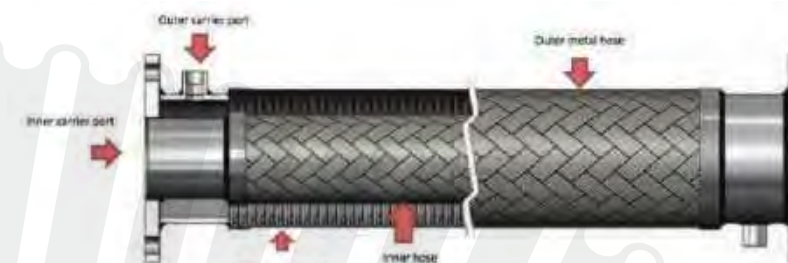
These hoses are corrosion resistant, vibration resistant, leak proof and have very good mechanical and hydrostatic strength.

## I. Jacketed Hose Assembly (Series 1500-12)

Jacketed hose assemblies are manufactured from stainless steel SS-304, SS-316L & SS-321. Core size ranges starts from 1/4"NB to 6"NB. Flexible jacketed hose starts from 1"NB to 10"NB.

Jacketed hose assemblies consist of hose with inner core. Primary hose convey the fluid in enclosed jacketed hose. Jacketed hose has hot/cold media which helps to maintain the fluidity of high viscous fluids too.

Design of Jacketed Hose Assemblies



### m. Lancing Hose Assembly (Series-1500-13)

A heavy duty version of hydraulic formed hose with double/triple wire braiding with special end fitting used in blast furnace steel mill. These hoses are ultrasonically cleaned and degreases hoses are pressure seal, leak proof under vacuum conditions, high flow of oxygen and water a interlock liner is also used.



We have successfully supplied water lancing as well oxygen lancing hoses to almost all steel plants in India like Bokaro, Rourkela, Ispat.

### n. PTFE (Teflon) Hose Assemblies (Type A1500-14)

Teflon hoses are one of the most chemically resistant substances known, capable to handle almost all chemicals. It is widely used in chemical, petrochemicals, food, and pharmaceutical industries, specially for bulk transfer of oil, lubricant, paints, food products and wide range of highly corrosive chemicals. Due to high resistance to thermal cycling this hose is used in various steam services where on-off operating cycles cause wide temperature fluctuations inside the hose. This hose can withstand severe conditions of continuous flexing and vibration without failure.

There are two types of hoses:

- a. Plain bore PTFE hoses (-54°C to 232°C)
- b. Convolute PTFE hoses (-54°C to 232°C)

### a. Plain Bore PTFE Hoses

**Construction:** Smooth bore core of PTFE tube with external stainless steel wire normal/high tession wire braid.

**Temperature Range:** -54°C to 232°C

**Weather Resistance:** Teflon is resistant to ozone, UV rays and oxidation.

Normal Size		Nominal OD mm	Operator Pressure	Minimum Bend Radius (in mm)
Inches	mm			
3/16"	5	5.95	210	50
1/4"	6	8.0	210	50
5/16"	8	9.5	210	76
3/8"	10	11.3	176	102
1/2"	12	14.0	140	132
5/8"	16	16.5	105	165
3/4"	20	19.8	85	195
1"	25	26.2	70	230

### Convolute Bore PTFE Hoses

**Construction:** Inner core of corrugated PTFE tube with external stainless steel wire braid.

**Temperature Range:** -54°C to 204°C

Normal Size		Nominal OD mm	Operator Pressure	Minimum Bend Radius (in mm)
Inches	mm			
1/2"	12	20	70	25
3/4"	20	27.7	70	50
1"	25	33	70	76
1 1/4"	32	39.6	70	160
1 1/2"	40	45.5	53	190
2"	50	59.2	35	267
3"	76	93.5	17.5	394
4"	100	123.2	10.5	625

## INTERLOCK METAL HOSE



Interlock metal hose are manufacture by helically winding metal strip over a sizing mandrel, this strip already has a minor folding which are interlocked together and form an interlock convolution, like this continuous process a hose length is formed. The limit of axial elongation and contraction are established when the convolution are all fully open or closed.

Like this minimum bending radius will be achieved when the convolution outside of the bend are fully open and inside of the bend is fully close.

A packing material may be inserted in to the profile to make the hose pressure tight, this packing may be of copper wire, asbestos chord, glass wool chord etc.

On the bases of internal diameter interlock hose has two types of interlock hoses.

1. Internal diameter in round shape
2. Internal polygon shape

Depends upon the manufacturing method and application interlock hose are the following types.

Sr. No.	Interlock hose Series	Series1200
a.	Interlock hose (Double lock without packing)	Series 1201
b.	Interlock hose (Double lock loose lock)	Series 1202
c.	Interlock hose (Double lock polygon cross section)	Series 1203
d.	Interlock hose (Double lock with stainless-steel braid)	Series 1205

### 1. Double Interlock Hose Without Seal: Series -1201

This is high quality, general purpose interlock hose constructed from a single strip of metal that is profiled and locked onto itself, the interlock, or overlapped sections of strip are able to slide back and forth result provide the flexibility.



**Application:**

These hoses are used as liner in metal hose/exhaust flue gases/anti kink segment for metal hoses. Protection cover of electric cables and rubber hoses etc.

**2. Double interlock loose type hose: Series -1202**

Depending upon the design and profile, this is very flexible and used as conduit hoses, electrical cabling.



**Application:**

These hoses are used for armoring/protection.

**3. Polygonal Interlock hose: Series -1203**

This is the flexible hose which have double interlock profile with the polygonal cross section. Due to their polygon cross section this design hose robust resistance to torsion without sacrificing the flexibility.



**Application:**

These hoses are mostly use in hose liner in automotive, and exhaust flue gases.

**4. Double interlock hose loose type with stainless steel braid: Series -1205**

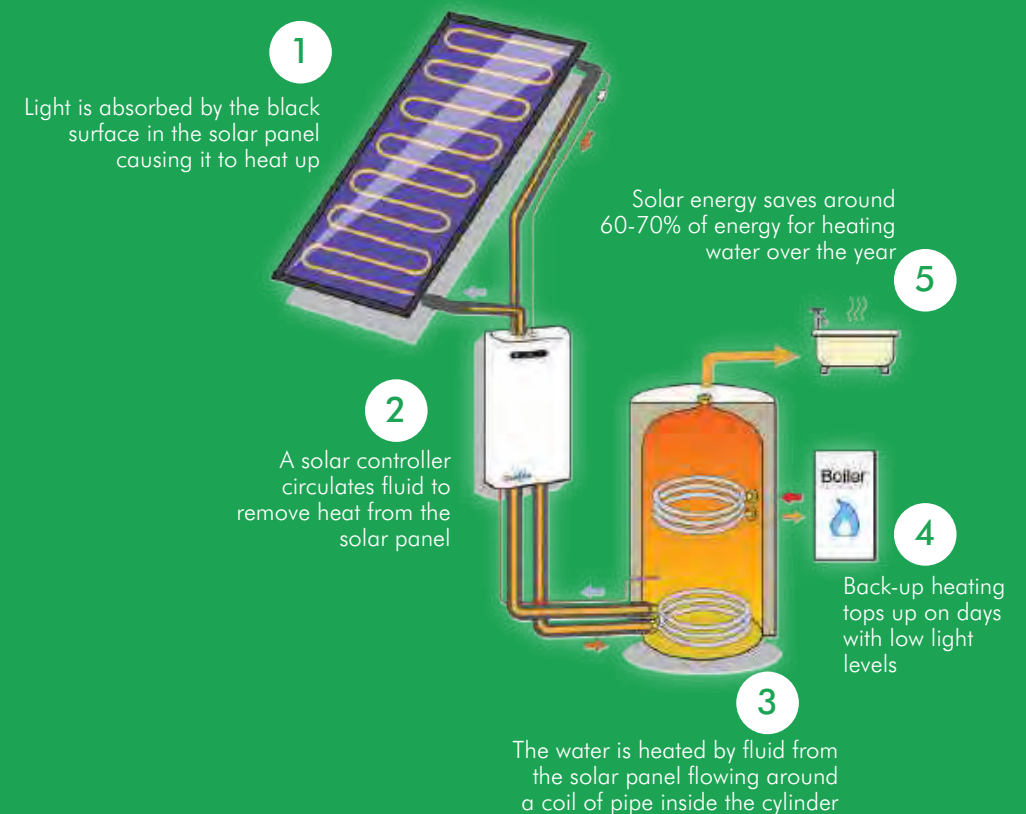
This is the flexible hose which have double interlock profile loose type with stainless steel braiding.

**Application:**

These hoses are use as conduit of high tension cable, in blast proof hose assemblies.

# SOLAR HOSES

## HOW THEY WORK



For more detail of these Solar hoses you can study our hose series A300.

These are mechanically formed stainless steel hoses that have wide pitch convolution. This specific design of convolution helps to reduce the primary and secondary vortices which are generated in the convolution during the turbulence flow, which create the pressure loss in the metal hose.

This specific profile of convolution prevents deposits of scale/lime/mineral which accumulate due to hot water.

These hoses are ideal against thermal expansions and prevent the transmission of vibration from one panel to another panel.

Nowadays these solar hoses are used in under floor heating/cooling which lies under the floor/walls for room heating.

These hoses are quick to install with no need for welding. That's the reason its assemblies can be made at the site as per practical length requirement.

The mill length of hoses are available in 20, 30, 50, 100 meter. 500/1000 meter single length also available on request.

#### Applications:

Solar hose is the metallic flexible part that is used in the below applications:

- Between solar panels
- Solar panel to boiler
- Room heating application
- Flexible piping in domestic as well as commercial application for hot water/gas
- Mostly solar hoses are used after insulation to prevent energy and heat losses which are extremely important for whole system.



## COMPOSITE HOSES



Composite hoses are designed to meet the most demanding application in hydro carbon, chemical & cryogenic transfer application. These hoses have good strength, light weight, good flexibility and versatile for variation in pressure rating, temperature and product conveyance compatibility.

These hoses are manufactured by multi-layered, non-vulcanized, thermoplastic hose assemblies suitable for hydrocarbon products, aromatic hydrocarbons, solvents, cryogenic hydrocarbons and chemicals with nominal diameters from 1 to 12 inches (25.4mm to 304.8mm.)

Composite hose, consisting of thermoplastics and wire reinforcement, can be used in selective petroleum and chemical service where flexibility combined with strength is required.

We manufacture following types of composite hoses:

## 1. GGE (Application- Hydrocarbon/ Petrol)

Aeroflex recommends GGE hose for the use of delivery and/or suction of fuels, oils, and lubricants in cistern trucks, railcars or foxed deposits.

### Construction:

a.	Inner Wire Spiral	Galvanize Steel (G)
b.	Outer Wire Spiral	Galvanize Steel (G)
c.	Inner Lining	Poly Propylene (E)
d.	Cover	PVC (PP on request)

### Features:

a.	Comply Norms	EN 13765:2010
b.	Temperature Range	-30°C - +100°C
c.	Safety Factor	5:1
d.	Vaccum	0.9 bar
e.	Length	10 Meter (maximum)

GGE	Standard Duty					Heavy Duty				
	1"	1 1/2"	2"	2 1/2"	3"	4"	6"	8"	10"	
ID										
Bend Radius		105	190	225	290	320	497	740	920	
Weight kg/m		1.8	2.06	2.7	3.5	5.44	11.9	21.5	25	
Working Pr.	14 bar/203 Psig	do	do	do	do	do	do	do	do	
CODE 14										
Working Pr.	10 bar/145 Psig				do	do	do			
CODE 10										

## 2. SST (Application - Chemical)

Aeroflex recommends SST hose for the use of delivery and/or aspiration of a large variety of highly corrosive and compatible with PTFE and stainless steel such as phosphoric acid, Naphtha, Nitric acid in low concentration among other. It is suitable for use in loading and unloading of tank trucks, wagons in plants and marine application.

### Construction:

a.	Inner Wire Spiral	Stainless Steel (S)
b.	Outer Wire Spiral	Stainless Steel (S)
c.	Inner Lining	PTFE/TEFLON (T)
d.	Cover	PVC coated polyester cloth

### Features:

a.	Comply Norms	EN 13765:2010
b.	Temperature Range	-30°C - +100°C
c.	Safety Factor	5:1
d.	Vaccum	0.9 bar
e.	Length	10 Meter (maximum)

SST	Standard Duty					Heavy Duty				
	1"	1 1/2"	2"	2 1/2"	3"	4"	6"	8"	10"	
ID										
Bend Radius		68	105	190	225	290	320	497	740	
Weight kg/m		1.22	1.89	2.16	2.83	3.67	5.71	12.49	22.3	
Working Pr.	14 bar/203 Ps/g	do	do	do	do	do	do	do	do	
CODE 14										
Working Pr.	10 bar/145 Ps/g				do	do	do			
CODE 10										

### 3. LPG (Application - Chemical)

Aeroflex LPG hose is design with combination of multilayers of different polymers and spirals in stainless steel SS316L with the latest manufacturing technology that makes it an excellent and safe solution to support cryogenic products with temperature up to -50°C and working pressure up to 25 bar.

In typical application such as charge discharge of liquified petroleum gas or ammonia gas both in trucks, wagons, and marine applications included bunkering operation ship to ship.

Construction:		
a.	Inner Wire Spiral	Stainless Steel 316L (S)
b.	Outer Wire Spiral	Stainless Steel 316L (S)
c.	Inner Lining	Polyamide/BPPO
d.	Cover	PVC coated polyster cloth

Features:		
a.	Comply Norms	EN 13765:2010
b.	Temperature Range	-30°C - +50°C
c.	Safety Factor	5:1
d.	Vaccum	0.9 bar
e.	Length	10 Meter (maximum)

LPG	Standard Duty					Heavy Duty				
	ID	1"	1 1/2"	2"	2 1/2"	3"	4"	6"	8"	10"
Bend Radius		150	200	200	200	250	500	670	930	2550
Weight kg/m		1.60	1.80	2.20	2.65	3.80	5.70	16.4	28.7	31.0
Working Pr.	25 bar/362 Psig	do	do	do	do	do	do	do	do	do
CODE 25										
Working Pr.	21 bar/304 Psig	do	do	do	do	do	do	do	do	do
CODE 21										

## STAINLESS STEEL CORRUGATED HOSES



Corrugated hoses are thin-walled, cylindrical components with a corrugated structure in their surface area. The type of corrugation differentiates annularly corrugated and helical corrugated hoses. The annular corrugation has a large number of equally-spaced parallel corrugations, whose main plane is perpendicular to the hose axis. The helical corrugation is mostly right-handed helix with constant pitch runs the whole length of the hose. Annularly corrugated hoses are technically superior to helically corrugated hoses.



Their profile direction perpendicular to the hose axis. In addition, annularly corrugated hoses do not produce torsion loads with increased pressure or pressure shocks. Thus, today annularly corrugated hoses are generally preferred.

Annular corrugated hoses are also classified as per normal pitch of convolution (standard hoses), close pitch (highly flexible hoses), heavy duty hoses and extra heavy duty hoses are related to use of their higher pressure applications. Detail of hoses are in the catalogue.

We have wide range of hoses:

Mechanical formed hoses (Series A100, A101, A102, A300, A302)

Hydro formed hoses (Series A200, A400, A700, A800)

Hose are leakproof, temperature and corrosion resistant as well as torsional rigid and are used in the following applications:

- a. For transport of liquids and gases under pressure
- b. Vacuum application
- c. Hoses for absorbing movements, heat expansion and/or vibrations.

The elastic behaviour of the corrugated profile determines the flexibility of the corrugated hose. Profile height and with the reduction in the pitch, and at the same time the pressure resistance reduces. A reduction of the ply thickness also a parameter to increase the flexibility.



For the heavy duty and extra heavy-duty hoses, we use higher thickness of sheet and thicker wire braiding. The design of these critical hoses complied all the International standards.

Standard material for metal hoses is austenitic stainless SS304/SS304L/SS316L/SS321. It features high corrosion resistance, good mechanical strength, high fatigue resistance, excellent workability. The preferred braid material is austenitic stainless steel SS304/ 304L and other stainless steel SS316L/SS321 braiding are also available as per request.

In critical application high Nickel steel (Inconel 625 / 825) is also available as per customer request. These hoses are use in feed gas hose in steel plant.

