

Metallic Flexible Corrugated Hose Assemblies – Installation & Safety Guides

FlexEJ metallic flexible corrugated hose assemblies are designed to meet pre-defined parameters of maximum operating conditions. It is therefore important to ensure the flexible hose assembly meets the intended service conditions.

Prior to placing a metallic flexible hose assembly in to service, as a minimum, consideration should be given to ensuring the flexible hose assembly will meet all aspects of the application, in respect of pressure, temperature, materials compatible with intended service, bend radius requirement, flow velocity, end fitting specification and end fitting attachment method.

The known integrity of the flexible hose assembly is important to the safety of any application. **If in doubt ask.**

Pressure: Flexible metallic hose assemblies must not be used above their maximum design pressure.

Shock pressure: Pulsating, surge or shock pressure will affect the life of a flexible hose assembly. Such pressure conditions must not exceed 50% of the flexible hose assembly maximum rated design pressure.

Temperature: Metallic flexible corrugated hose assemblies generally provide a good design temperature range. FlexEJ stated maximum design pressures with weld (TIG) attached end fittings are based on ambient temperature condition. When using flexible metallic hose assemblies at temperatures above ambient condition it is important to take into consideration pressure/temperature de-rating factors – See overleaf.

Bend radius: Care should be taken to ensure the flexible hose assembly is not installed and working with a bend radius below its published minimum design bend radius. Published minimum bend radius figures cover both static and flexing installations. Failure to consider this can result in fatigue and premature failure. Avoid installations resulting in sharp bending immediately behind the flexible hose end fitting.

Flow Velocity: High velocities can lead to premature fatigue failure of a corrugated flexible hose assembly. A metallic stripwound interlocking liner should be considered and introduced if flow velocity exceeds:-

- Flexible corrugated hose assembly without external braid reinforcement if gas flow exceeds 30 metres/second or in the case of liquid 15 metres/second
- Flexible corrugated hose assembly with external braid reinforcement if gas flow exceeds 45 metres/second or in the case of liquid 22.5 metres/second

When a hose assembly is installed in a bend, these values should be reduced by 50% for a 90 degree bend, 25% for a 45 degree bend and appropriately in proportion to the angle of bend.

With higher velocity the next larger bore size should be used with a stripwound liner

End Fitting Specification: Selection of the correct specification of end fitting is important to a safe application. The end fitting should be suitable for the extremes of pressure and temperature.

End Fitting attachment: Ensure the end fitting attachment method is compatible with the application, particular the operating temperature. Most metallic flexible corrugated hose assemblies employ weld (TIG) attachment which will perform at the higher temperature range but other attachments are used, such as, brazing (silver solder) which have limitation on temperature performance.

Do not Torque: Flexible metallic corrugated hose assemblies must never be subjected to torque or twisting during installation and application.

- To avoid this condition during installation use as a minimum a swivel end fitting at one end of the flexible hose. The fixed end should always be connected first.
- For movement applications always install the flexible hose assembly so the movement occurs in one plane only, and in the plane of bending.

Failure to apply these rules will result in premature failure.

METALLIC FLEXIBLE CORRUGATED HOSE ASSEMBLIES – INSTALLATION & SAFETY GUIDES

Axial movement: Flexible corrugated hose assemblies are not designed for in-line axial movement and should not be subjected to compression or extension during application service.

Abrasion/rubbing: Do not allow flexible corrugated hose assemblies to rub on other objects or equipment. This can be particularly damaging if the hose assembly is installed on a flexing application or being used for vibration movement. Premature and catastrophic failure can occur especially if the pressure restraining braid is damaged and weakened.

Corrosion: Correct selection of materials is important when considering flexible corrugated hose assemblies for transferring chemicals or if used in a chemical environment.

Metallic flexible corrugated hose assemblies produced of commercial grade stainless steel materials, including 316L are not suitable for transferring seawater or seawater contact. Premature failure caused by pitting corrosion or fatigue cracking of the corrugated flexible tube will occur.

Refer attached illustration guide for correct installation recommendations.

Maintenance, inspection and testing: Having placed in to service a well designed, manufactured and tested flexible hose assembly, consideration should be given to on-going maintenance, inspection and testing. Depending upon the severity of the application the life expectancy of a flexible hose assembly will be effected. Users should ensure all flexible hose assemblies are subject to periodic inspection. As a minimum this should include a regular periodic visual inspection to check for any wear or damage to the flexible hose that may affect its continuing service. Re-testing of hose assemblies is recommended at least annually. The test pressure should be 1.5 times the maximum working or design pressure. When used in arduous or safety critical applications a planned maintenance replacement programme is recommended.

Temperature de-rating factors:

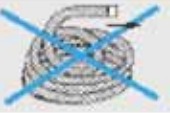










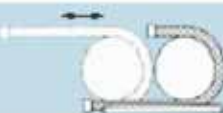

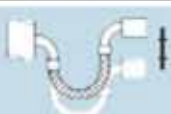








Material	Temperature ° C														
	-200 to -20	20	50	100	150	200	250	300	350	400	450	500	550	600	650
	Derating Factors														
1.4306 SS304L	1	1	0.89	0.72	0.64	0.58	0.54	0.5	0.48	0.46	0.44	0.43	0.43	A	—
1.4301 SS304	1	1	0.9	0.73	0.66	0.6	0.55	0.51	0.49	0.48	0.46	0.46	0.46	A	A
1.4541 SS321	1	1	0.93	0.83	0.78	0.74	0.7	0.66	0.64	0.62	0.6	0.59	0.58	A	A
1.4404 SS316L	1	1	0.9	0.73	0.67	0.61	0.58	0.53	0.51	0.5	0.49	0.47	0.47	A	—
1.4401 SS316	1	1	0.91	0.78	0.7	0.65	0.61	0.57	0.55	0.53	0.52	0.51	0.5	A	A
1.4571 SS316Ti	1	1	0.92	0.8	0.76	0.72	0.68	0.64	0.62	0.6	0.59	0.58	0.58	A	—

NB: "A" – Refer to FlexEJ

Section
6

Typical Installation and Operating Instructions

Correct and incorrect installation modes are shown in the following charts:

NOT Correct		Correct
	Don't pull the hose off - uncoil it	
	Don't twist the hose - install it torsion free	
	Dimension the hose adequately - take care that the flexible length is not too short	
	Avoid excessive bending of the hose - use pipe bends	
	Don't move the hose obliquely to the installation plane, move it in hose axis only	
	Avoid sagging of the hose - use a support	
	If larger axial movement has to be absorbed don't install the hose in a straight line - install in a U shape	
	Avoid torsional twist when fittings are not in line - install in one plane only	
	Avoid over bending when suspending the hose - use a support roll	
	Avoid excessive bending of the hose at the end - use pipe bends	
	Don't absorb vibrations in the axial direction - install the hose perpendicular to the direction of movement	

TYPICAL INSTALLATION AND OPERATING INSTRUCTIONS

NOT Correct		Correct
	Don't absorb vibrations in several directions in a single hose - install two or more hoses	
	Don't allow the hose to move in one direction only - centre it to allow movement in both directions	
	Don't permit axial movements - install the hose perpendicular to the direction of movement	
	Avoid large lateral movement - install the hose in a 90° bend	
	Avoid torsion - the hose bend and the direction of movement must be in the same plane	
	Avoid excessive bending of the hoses at their ends - use pipe bends	
	Don't use any length - dimension the exact length	
	Take care that the flexible length is not too long - dimension the correct length	
	Avoid torsion due to angular movements - all movements in hose axis only	
	Keep welding torches away from the hose - cool the connection of the hose to the fitting	
	Don't drag the hose on the ground without any protection, use a cover	