

## **Metallic Flexible Corrugated & Braided Hose Assemblies Installation & Safety Guidelines**

Kinflex metallic flexible corrugated braided 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 braided hose assemblies generally provide a good design temperature range. Kinflex 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 Appendix

**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 braided hose assembly without external braid reinforcement if gas flow exceeds 30 metres/second or in the case of liquid 15 metres/second
- Flexible corrugated braided 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 strip wound 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 braided 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 braided 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.

**Axial movement:** Flexible corrugated braided 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 braided 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 braided hose assemblies for transferring chemicals or if used in a chemical environment.

Metallic flexible corrugated braided 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.