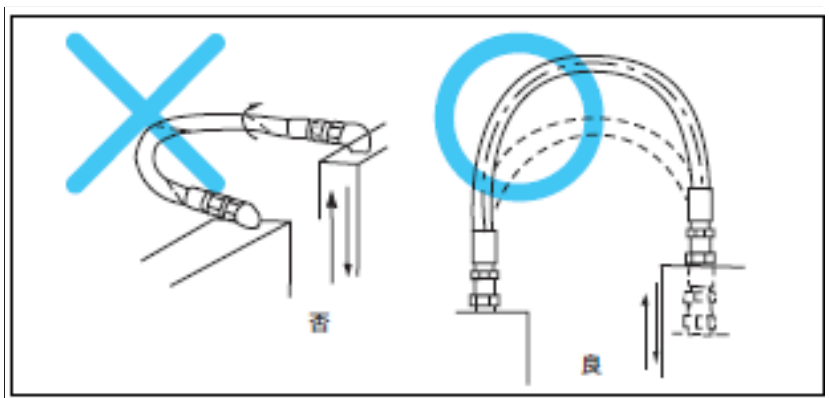
5.2 Routing:Torsion/Twisting

WARNING

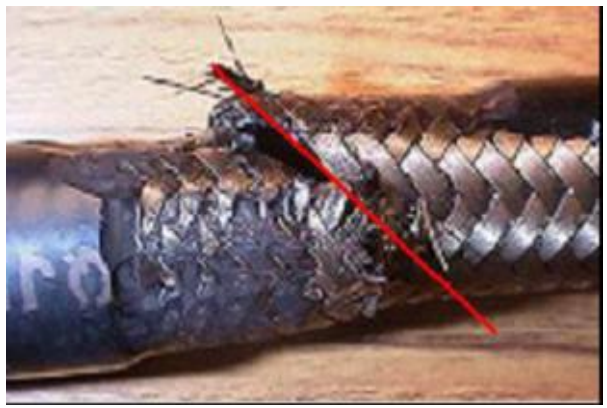
Avoid applications where the hose will be torsioned or tensioned.

Torsion or tensioning a hydraulic hose under pressure may result in a catastrophic failure



To prevent torsion and distortion, hose should be curved in the same plane as the motion of the manifold to which the hose is connected.

5.2 Routing: Torsion/Twisting



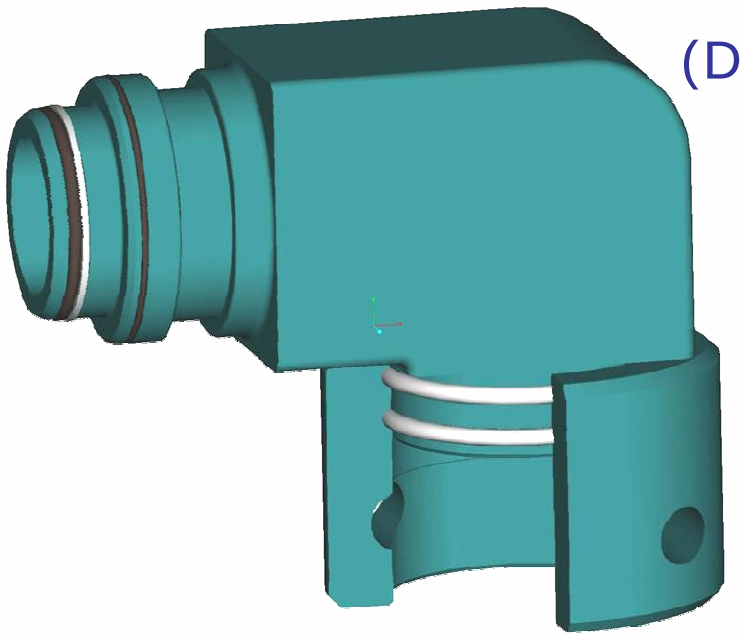
* burst section opens diagonally

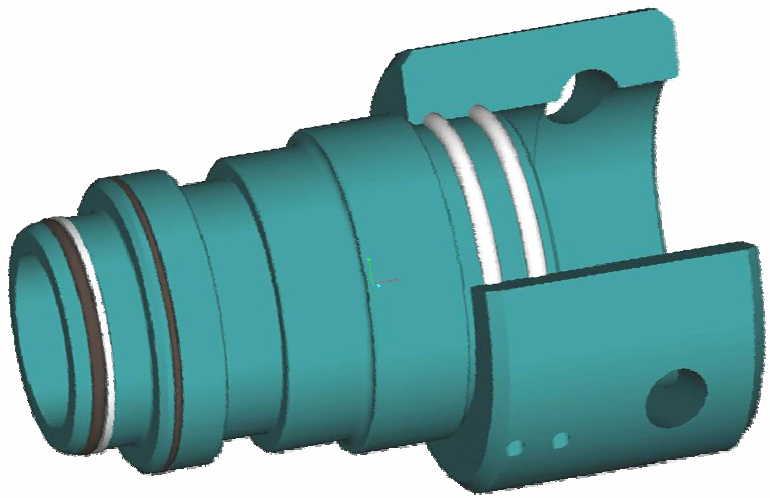
Hoses subjected to torsion will fail in this mode.

Wires separate in one defined direction. The burst section opens diagonally.

5.2 Routing: Torsion/Twisting

Swivel Adaptor
(Double thrust Wire)

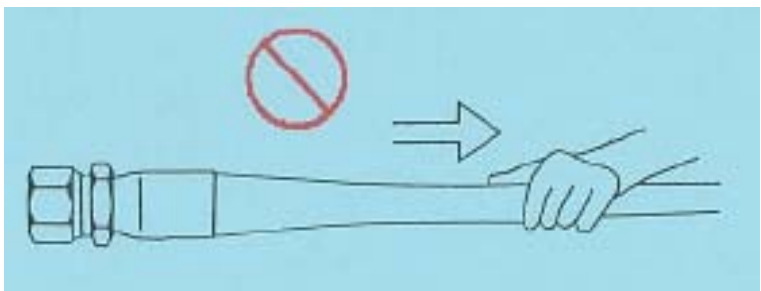




5.2. Routing:Fitting failure due to Torsion/Twisting

5.3 Routing – Tensioning assembly

Correct routing is required to ensure pulling / tensioning of assembly does not occur



5.3 Routing – Tensioning the assembly

This effect is typically found when the hose assemblies are tensioned in service.

Stretching a hydraulic hose under pressure may lead to the inner liner cracking near the coupling.

Hoses are not tow ropes.

5.4 Routing – Kinked Assembly

*burst behind the fitting

*inner liner cracks at kinked part

This type of effect is found when hoses are kinked behind the fitting whilst under pressure.

The effect of kinking the hose deforms the wire, which causes it to eventually break and bursting the hose.

6.0 Change-out procedure

Blistered hoses, due to air permeation

6.0 Change-out procedure

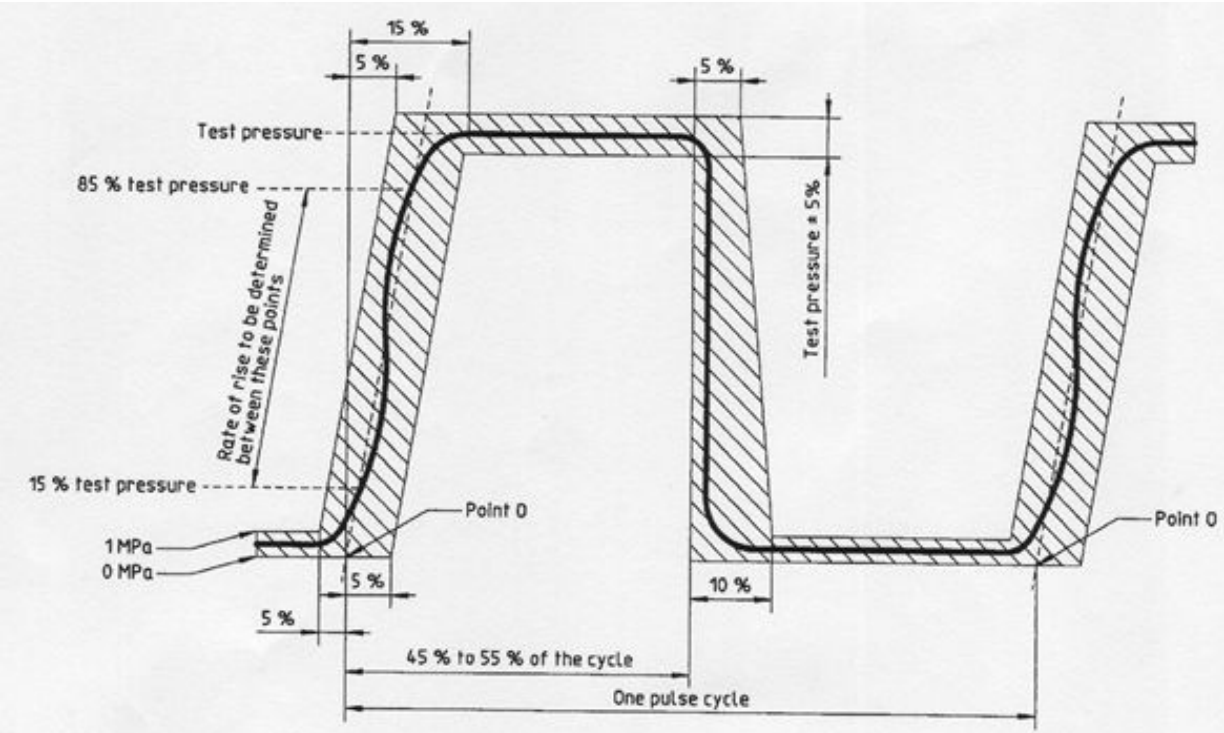
Pirtek has a recommended installation and commissioning instruction reducing risk of damage from air or hard particle contaminate.

7. Analysing impulses rather than just analysing age

A common question is “What is the Life Expectancy of a hose assembly” ?

7. Analysing impulses rather than just analysing age

ISO6805-1994 states up to 133% of the nominated working pressure, a hose assembly shall withstand a minimum number of impulse cycles as follows:



7. Analysing impulses rather than just analysing age

In ideal conditions, ISO6805-1994 categorises the following hoses and nominates the minimum number of impulse cycles as follows:

Type 1:	200 000 cycles
Types 2 and 4:	100 000 cycles
Types 3 and 5:	400 000 cycles
Type 6:	500 000 cycles

Specialty hoses can withstand 1 million impulse cycles

7. Analysing impulses rather than just analysing age

A simple guide to determining life expectancy of a hose assembly is to:

(a) measure the number of impulses per hour of a hydraulic circuit for a defined period of time

(b) record this information

(c) Calculate the impulse limit

(eg) 300 impulses per day x 7 p/week = 2100

Assume a 200 000 cycle rated hose is being used, then the calculation is (200 000 ÷ 2100 = 95 weeks approximate rated impulse life span)

7. Analysing impulses rather than just analysing age

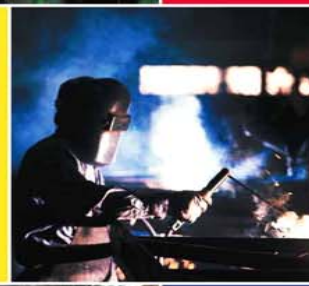
Other factors attributing to life cycle but not limited to are:

Water, Temperature, Ozone, Wear characteristics, Mechanical damage, Hose routing

Life cycle of hose assemblies is proportional to the number of impulses and environment conditions the assembly has been subjected to.

8. Improve Adaptor practices

Multiple adaptor connections are to be kept to a minimum where possible.



8. Improve Adaptor practices

In general adaptors must be supported. ie have no weight hanging off the ends.

Remember, you do not want to excessively tension or load the assembly, as otherwise failure will result.




9. Preventative Maintenance and Storage

Ideal Storage and good practices

-Cap and plug hose and all hose assemblies (Heat shrink also to be considered)

-Keep out of direct sunlight

-Environment to be considered (Some gases / chemicals may attack the outer cover, hence deteriorating the rubber and exposing the wires)

-Ideal conditions are in a temperature range of -10°C to +40°C

-Inappropriate piling of hoses (one on top of the other)

9. Preventative Maintenance in Service

Conduct regular inspections with accurate record keeping of assemblies in service

Look out for:
-Obvious physical damage to hose
-Swelling of hose
-Exposure of reinforcement
-Kinks in hose
-Leakage around fitting




10. Summary

Hose and fitting reliability is improved when the following is conducted

1. Select the type of hose and cover
2. Consider the other forms of protection
3. Keep the assemblies clean (internally)
4. Improve routing practices

-Respect the bend radius
-Do not torsion. Do not tension
-Do not kink

5. Analyse impulses rather than just age of hose assemblies
6. Improve adaptor practices
7. Look for obvious condition indicators in the assembly