

# The Bellows Bottom Line

AUG 2005

## Practical advice on expansion joints

by Greg Perkins

### This month - 'A Ply In Time...'

#### Single ply limitations

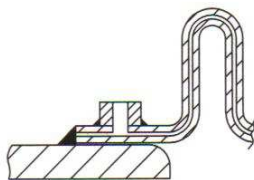
Metal bellows expansion joints should provide 10 to 20 years of good service before needing replacement. Unfortunately, the bellows do not give any early warnings before developing leaks and they are very difficult, if not impossible, to weld repair.

Field inspections are limited to just checking for obvious signs of external damage. Corrosion attack and fatigue cracking are rarely detected prior to a leak.

#### Two ply details

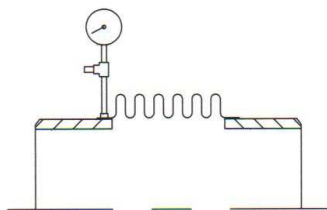
The expansion joint inspection problem is solved with a redundant ply testable bellows. A testable ply bellows has two plies, each designed to handle the operating conditions independent of the other. If one ply fails (almost always the inner) then the other provides the pressure containment.

Redundant ply testable bellows enable field maintenance to pressure test between the plies and inspect for leaks. This usually occurs during shutdown inspections but can also be performed on-line if conditions are safe and practical.



#### Testing and equipment

A low pressure gauge should be used as the test pressure should be limited to less than 15 psig. Bellows are typically designed for internal pressure but this type of test creates external pressure on the inner ply. Excessive pressure between the plies during a leak test can damage the inner ply, but those pressures are usually well above 15psig.



The test equipment includes a gauge, pipe tee, and a shut-off valve. A favorite tool of maintenance personnel is also a tire pump for regulating the low pressure between the plies during a test. Care should be taken not to introduce moisture between the plies. Trapped moisture can flash into steam upon start-up. Many users leave the tap-plug off in order to allow free venting should that occur.

#### Cost savings

The extra ply will add between 15% to 30% in the expansion joint cost - a real bargain when considering added life and predictability.

The end-user can truly appreciate the extension of equipment life, but it is the maintenance department who will really see the value in equipment failure prevention.