

## Filter Facts #3

### *Why use tubular style membranes for filtration?*

The three main types of membrane construction found in micro and ultra filtration systems are: Spiral Wound, Hollow Fibre and Tubular.

- **Spiral Wound:**
  - Similar construction type to RO (reverse osmosis) membranes
  - Cannot be back-flushed (most)
  - Can be CIP'ed (clean in place)
  - Unable to handle high solids loading feeds – requires a pre-filter
  - Usually run in cross-flow configuration
  - Has temperature limitations
  - Has pH limitations
  - Small foot-print for large membrane surface area
  
- **Hollow Fibre:**
  - Can be back-flushed – usually using filtrate retained in a tank. Back-flush frequency and volume will vary with application. Back-flushing can utilise from 0.5% to 20% of filter operating time
  - Can be CIP'ed (clean in place)
  - Able to handle a higher solids loading than spiral wound, but still very limited– requires a pre-filter
  - Originally mainly used in dead-end configuration, but now also common to be used in a cross-flow configuration
  - Has temperature limitations
  - Has pH limitations
  - Small foot-print for large membrane surface area
  
- **Tubular:**
  - Can be back-flushed. Dependant upon design, this can be via retained filtrate or with clean water and if required a cleaning agent
  - Can be CIP'ed (clean in place) –dependant upon construction material, can be hot and/or steam CIP'ed
  - Easiest system to clean back to “original” or “day 1” condition
  - Able to handle high solids loadings, usually without a pre-filter
  - Usually run in cross-flow configuration
  - Dependant upon membrane material – can withstand high temperatures and ranges of pH (eg: metallic and/or ceramic membranes)
  - Has the largest footprint per membrane surface area
  - Usually has the highest flux rates per unit surface area of membrane

Hence tubular membranes offer the best performance when needed to filter liquid streams with high solids loadings which can cause blockages and reduced membrane life in other constructions. It is also typical of tubular membranes to be constructed of more robust materials and hence used where feed stream temperature and chemical composition is an issue. Tubular membranes should also be strongly considered where strict cleaning regimes are dictated.