



## FILMTEC™ Membranes

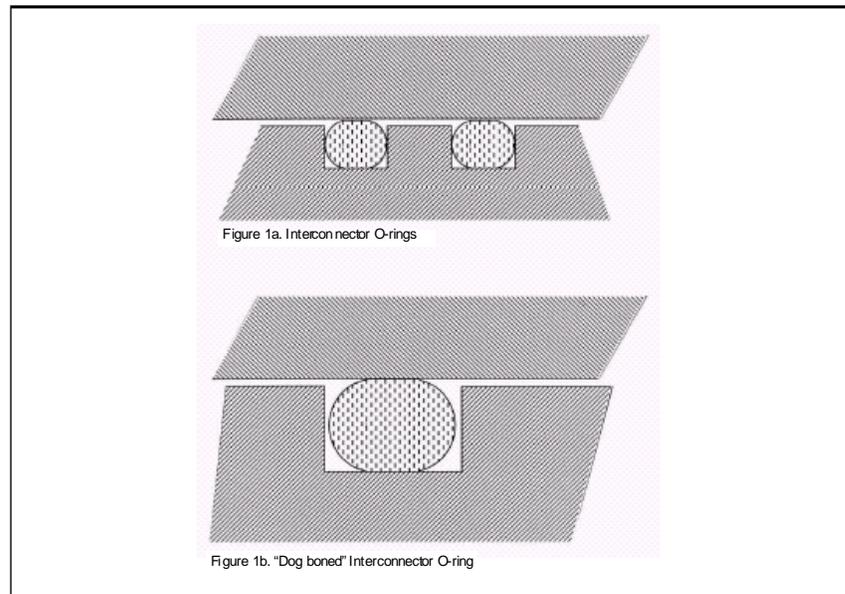
### Loading of Pressure Vessels: Interconnector Technology for 8-inch Diameter FILMTEC Elements

The interconnector between two membrane elements is a critical item in the overall performance of a reverse osmosis or nanofiltration system. The interconnector conducts the low pressure product water from element to element and ultimately out of a pressure vessel while keeping it separate from the high pressure feed and brine solutions. The interconnector must therefore be strong enough to withstand the pressure of the feed as well as provide a perfect seal between the feed and product water.

#### Interconnector Advantages

The “dog bone” interconnector offers three advantages over previous generations of interconnectors. The first advantage is that total seal area of the dog bone interconnector is the same as the old 4 o-ring interconnector. It is the same because the o-rings used are twice the cross-sectional diameter and the groove proportions are the same. Additionally, because the seal footprint is larger with one large o-ring, the seal is more likely to bridge defects in the sealing surface. Having one large footprint seal is an advantage over two small footprint seals. Figure 4.2 is a scaled drawing of two smaller o-rings and one larger o-ring having twice the cross-sectional diameter.

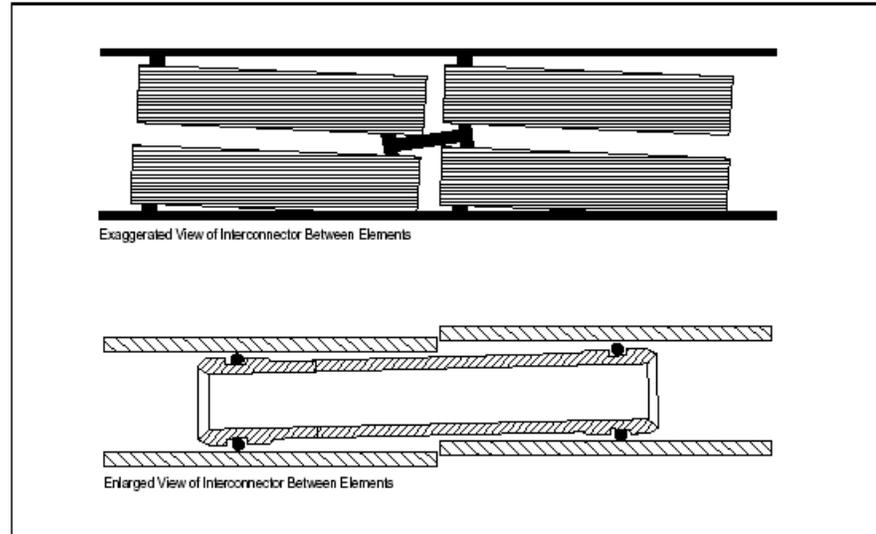
**Figure 4.2 O-ring cross-section of 2 o-ring and “dog bone” interconnector ends**



## Interconnector Advantages (cont.)

The second advantage of the “dog boned” interconnector is that it allows for misalignment of the product water tubes of elements. Even though great effort is expended to make elements with the product water tube in the center, tolerances sufficient for sealing cannot be maintained. Furthermore, the product water tube ends do not naturally line up because one end of the element has a brine seal while the other does not. The brine seal naturally centers one end of the element in the pressure vessel while the end without the brine seal sags in relation. Figure 4.3 illustrates the potential misalignment of two elements and shows the enlargement of the interconnector alone. Because the interconnector has only one o-ring on each end and is narrow in the middle, it is free to pivot and correct for misalignment of product water tubes.

Figure 4.3 Product water tube misalignment



A third advantage of the “dog boned” interconnector is that the larger cross-section o-ring has less of a chance of “rolling out” of the o-ring groove. When o-ring sealed parts slide back and forth, the o-ring has a tendency to extrude into the gap between the two parts. In both interconnector designs, the gap between the parts is the same. But since the ratio of the o-ring diameter to the gap width is much larger for the dog-boned interconnector, there is much less chance of the o-ring coming out of the groove and the seal being damaged or lost.

## Summary of Large Element Interconnectors

Table 4.1 summarizes the range of interconnectors used by FilmTec for 8-inch-diameter elements. It shows both the part number of the interconnector and the part number and equivalence for the o-rings should they need replacement during system maintenance.

**Table 4.1 FILMTEC™ interconnector (coupler) summary**

Interconnector	Interconnector part number	Replacement o-rings
<b>Interconnector</b>	<b>FilmTec 313198</b>	
	<ul style="list-style-type: none"> <li>Used in BW30-365, BW30-400, LE-400, BW30-365-FR, BW30-400-FR, SG30-400, SW30HRLE-400, SW30HR-380, SW30HR-320, SW30HR-320, NF-400 and Maple Sap MARK I elements</li> </ul>	<ul style="list-style-type: none"> <li>Each interconnector includes two 3-912 EPR o-rings (FilmTec part number 151705)</li> </ul>
<b>Low energy interconnector</b>	<b>FilmTec 259171</b>	
	<ul style="list-style-type: none"> <li>Used in BW30LE-440, XLE-440, SG30-430, NF90-400, NF270-400, and NF200-400 elements</li> <li>Injection molded high impact ABS</li> </ul>	<ul style="list-style-type: none"> <li>Each interconnector includes two 2-218 EPR o-rings (FilmTec part number 216370)</li> </ul>
<b>Full fit interconnector</b>	<b>FilmTec 255289</b>	
	<ul style="list-style-type: none"> <li>Used in RO-390-FF, HSRO-390-FF, and NF-390-FF elements</li> <li>Polysulfone</li> </ul>	<ul style="list-style-type: none"> <li>Each interconnector includes two 3-912 EPR o-rings (FilmTec part number 151705)</li> </ul>

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