

FREQUENTLY ASKED QUESTIONS ABOUT *iLEC*TM



Water Solutions

General Information

- Q: Is *iLEC*TM technology patented, and do other manufacturers have a similar device?
A: Dow has patented the *iLEC* technology and is currently the only manufacturer worldwide.
- Q: Do Interlocking Endcaps (*iLEC*) have regulatory approval?
A: Interlocking Endcaps (*iLEC*) rely upon the same materials of construction used in standard FILMTECTM endcaps. Consequently, no special regulatory approvals are required.
- Q: What material are the Interlocking Endcaps (*iLEC*) made from?
A: As with standard endcaps on FILMTEC elements, Interlocking Endcaps (*iLEC*) are made from high-impact ABS plastic.
- Q: Are both ends of a FILMTEC element with *iLEC* the same?
A: No. The upstream (feed) endcap holds the brine seal and the o-ring for sealing the permeate tubes of adjacent elements. The downstream endcap has features that impart a firm "snap" when two elements are connected.
- Q: Are *iLEC* elements the same dimensions as standard elements?
A: FILMTEC elements featuring *iLEC* technology have the same 8-inch diameter and 40-inch net length of standard elements. However, the upstream (feed end) of an element that has *iLEC* includes a 0.5-inch extension for collaring the downstream (concentrate end) endcap of the adjacent element. Therefore, while the elements measure 40.5 inches in length, the net length of the connected elements is 40 inches. These elements have been designed to fit into standard pressure vessels and are interchangeable with standard elements.

Element Handling

- Q: Are special tools required for installation of FILMTECTM elements with *iLEC*TM technology?
A: No, special tools are not required. For added convenience during installation and removal, however, Dow has made available a ratcheting band clamp (P/N 245831) and element pulling tool. The band clamp is helpful for keeping one element from turning while the next is attached. The pulling tool provides a membrane-friendly method of extracting an element from a pressure vessel.
- Q: Do I need extra manpower for loading *iLEC* elements vs. standard elements?
A: No, you need the same manpower. *iLEC* elements can even be installed by one person.
- Q: How much rotation is required to connect two elements made with *iLEC* technology?
A: Approximately 10 degrees.
- Q: Will the rotation required for installation of elements with *iLEC* technology cause problems by abrading the o-ring?
A: No. The abrasion is insignificant because the relative movement is small, parallel to the plane of the o-ring, and only happens once during installation rather than repeatedly during operation.
- Q: In case of mechanical damage — such as accidental drop of an element during installation — will interlocking endcaps lose their seal integrity?
A: *iLEC* technology has been designed so that the chance of damage to the critical sealing surface and locking mechanism is minimized. As with any reverse osmosis element, operating with damaged elements should only be regarded as an emergency measure. When in doubt, a standard sliding coupler should be used as a secondary barrier against leakage.

Element Installation

- Q: Does the brine seal of an element using **iLEC**[™] technology still need to be lubricated?
 A: Yes. As with standard endcaps, the brine seal should be lubricated with an approved lubricant, such as Dow Corning 111, for easier loading and unloading.
- Q: Does the o-ring seal on the **iLEC** at the permeate collection tube need to be lubricated?
 A: No. The o-ring that seals adjacent permeate tubes does not have to be lubricated. This saves time and is beneficial, especially for ultra-pure water installations and those applications where TOC (Total Organic Carbon) in the product water is of high concern.
- Q: FILMTEC[™] elements with **iLEC** technology are labeled with an arrow showing the feed flow direction. Can they be reversed?
 A: The arrow ensures that the element stack will be properly supported at the downstream end by the vessel thrust ring. Reversing the elements will cause the elements to be improperly supported and subject to telescoping. It will also increase the effective length of the element stack by 0.5 inch (1.25 cm) and may permit feed bypass around the backward-facing brine seals.
- Q: Is it necessary to shim elements with **iLEC** technology upon installation into a pressure vessel?
 A: Yes. Shimming is still recommended to minimize movement of the sliding connections inside the vessel permeate ports.

Compatibility

- Q: Can standard elements and elements with **iLEC**[™] technology be mixed inside a pressure vessel?
 A: Compatibility with existing hardware is maintained. The smooth inner bore located at each end of the permeate collection tube is unchanged, permitting insertion of sliding couplers and existing vessel adapters. The net length of the elements, when connected, remains 40 inches, allowing them to fit inside existing vessels. Because standard and **iLEC** elements can be mixed inside a pressure vessel, the installation and use of a "dead man" or spacer tube is the same as with standard elements. (See Installing an Element Spacer at www.filmtec.com.)
- Q: Are FILMTEC[™] elements with **iLEC** technology and vessel adapters compatible with my pressure vessels?
 A: Compatibility with vessels from major manufacturers has been confirmed at installations around the world. Because the diameter and net length of the elements with **iLEC** technology are unchanged relative to standard FILMTEC products, no compatibility problems are anticipated. To capture the full benefits of FILMTEC elements using **iLEC** technology, Dow recommends the use of special vessel adapters featuring **iLEC** technology. Please contact your Dow representative or your vessel supplier for further details.
- Q: Do elements with **iLEC** technology require **iLEC** vessel adapters?
 A: No. While Dow recommends the use of special adapters featuring **iLEC** to capture the full benefits of FILMTEC elements using **iLEC** technology, these elements are compatible with vessel manufacturer's standard vessel adapters.

Pressure Vessel Interactions

- Q: Pressure vessels and elements are known to change in length in response to temperature and pressure. How does **iLEC**[™] technology allow for these changes?
 A: As with standard elements and adapters, sliding o-ring connections are maintained at both ends of the vessel where the vessel adapters connect to the vessel permeate ports. These connections allow for small changes in the relative lengths of the elements and vessel.
- Q: Pressure vessels sag in the middle when filled with water and elements. Do elements with **iLEC** technology allow for this?
 A: **iLEC** validation activities involved a thin-walled six-element pressure vessel filled with water and elements and supported only near the ends. The sagging of the vessel, even with 150 pounds (68 kg) additional load applied to the midpoint (comparable to the weight of another six elements), did not approach that needed to damage the elements with **iLEC** or cause a loss of sealing between elements.

Performance Concepts

- Q: What is the difference between the axial o-ring seal used on **iLEC**[™] technology and the radial o-ring seals used on standard element couplers?
- A: The terms axial and radial refer to the direction of o-ring squeeze. Axial or face seals are common in high-pressure industrial applications where the assembled parts remain stationary. Radial seals are used primarily when relative motion is required. The sliding radial seal is typically designed with less o-ring compression and relies upon careful lubrication to prolong seal life.
- Q: Why is the seal on **iLEC** better than the usual sliding seal for reverse osmosis applications?
- A: If properly installed, both seals will be leak-free when new. Unfortunately, the sliding seal is prone to damage due to o-ring pinching and rolling during installation, and suffers from wear and tear over time of operation due to the sliding action of start-up and shutdown.
- Q: Are elements with **iLEC** technology as strong as standard elements?
- A: Field experience showed **iLEC** element strength to be either unchanged or improved due to the permanent connection of the endcap to the permeate collection tube. Certain details are provided in "Say 'Good-Bye' to the Weakest Link," (www.dow.com/PublishedLiterature/dh_0084/0901b80380084e19.pdf?filepath=liquidseps/pdfs/noreg/609-00447.pdf&fromPage=GetDoc) and case histories available at www.dowwatersolutions.com/ilec.

Additional Information:

iLEC[™] technology – www.dowwatersolutions.com/ilec

FILMTEC[™] 8-inch Elements – www.dow.com/liquidseps/prod/8inch.htm

iLEC[™] Technology Makes Seawater Desalination Processing Easier, Less Expensive – www.dow.com/PublishedLiterature/dh_0037/0901b80380037527.pdf?filepath=liquidseps/pdfs/noreg/609-00466.pdf&fromPage=GetDoc

iLEC[™] Technology Withstands Severe Treatment at Reverse Osmosis Facility – www.dow.com/PublishedLiterature/dh_0042/0901b803800424e7.pdf?filepath=liquidseps/pdfs/noreg/609-00468.pdf&fromPage=GetDoc

iLEC[™] Technology Solves Leakage Problems and Improves Energy Efficiency in Semiconductor Plant – www.dow.com/PublishedLiterature/dh_0042/0901b803800424f8.pdf?filepath=liquidseps/pdfs/noreg/609-00467.pdf&fromPage=GetDoc

LENNTECH

info@lennotech.com Tel. +31-152-610-900
www.lennotech.com Fax. +31-152-616-289



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