

# UNISOL Heat Sanitizable RO Elements

## Heat Sanitizable RO Spiral Wound Elements

### UHS RO Series

**Description** UNISOL UHS RO Series membrane elements is specially designed to maximize the benefits of hot water sanitization for industries relying on chemical free sanitization for product quality and industry compliance standard. It is applied for food & Beverage, Biopharmaceutical, Electronics and chemical etc.

<b>Specification</b>	Membrane	BW3042	
	Material	Polyamide	
	Outer wrap	Net wrap	
	Permeate Flow <sup>(1) (2)</sup>	UHS RO 2521	160 (0.6)
	GPD (m <sup>3</sup> /d)	UHS RO 2540	460 (1.7)
		UHS RO 4012	540 (2.0)
		UHS RO 4021	920 (3.5)
		UHS RO 4040	1900 (7.2)
		UHS RO 8038	5900 (22.5)
		UHS RO 8040	8990 (34.0)
	Salt Rejection(1)	99.0%	

<b>Limits</b>	Max Operating Pressure	40 bar (580psi)
	Max Pressure Drop	1 bar (14.5 psi) for individual element
	Max Operating Temperature	50 °C (122 °F)
	Max. Sanitization Temperature	90 °C (194 °F)
	pH Range	2 – 11
	Chlorine Concentration	< 0,1 ppm
	Feed water SDI	< 5

<b>Area</b>	2521	2540	4012	4021	4040	8038	8040
ft <sup>2</sup> (m <sup>2</sup> )	10 (1.0)	24 (2.2)	24.7 (2.3)	43 (4.0)	90 (8.4)	290 (27)	400 (37)

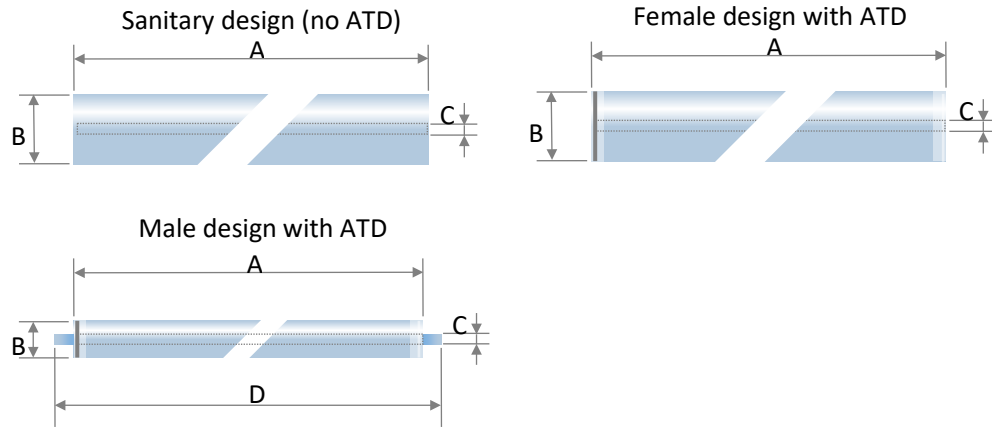
<sup>(1)</sup> Test condition: 2000ppm NaCl solution, 150psi (10.3bar), 77 °F (25 °C), pH 8;

<sup>(2)</sup> Permeate flow for individual elements may vary ± 20%

<sup>(3)</sup> For the purpose of improvement, specifications may be updated periodically

<sup>(4)</sup> Performance shown are after heat sanitization.

**Dimensions**



mm (inch)	A <sup>[1]</sup>	∅B <sup>[2]</sup>	∅C <sup>[3]</sup>	D
UHS RO 2521	472 (18.6)	62 (2.4)	19 (0.748)	533 (21)
UHS RO 2540	965 (38)	62 (2.4)	19 (0.748)	1016 (40)
UHS RO 4012 (Female)	305 (12.0)	99 (3.9)	16 (0.629)	305 (12.0)
UHS RO 4021	472 (18.6)	99 (3.9)	19 (0.748)	533 (21)
UHS RO 4040 (Female)	1016 (40)	99.4 (3.9)	16 (0.629)	1016 (40)
UHS RO 8038	965 (38)	200.5 (7.9)	28.9 (1.138)	965 (38)
UHS RO 8040	1016 (40)	200.5 (7.9)	28.9 (1.138)	1016 (40)

<sup>[1]</sup> Tolerance: -2~0 mm

<sup>[2]</sup> Tolerance: -2~0 mm

<sup>[3]</sup> 2540/4021 tolerance: 0~+0.1mm, 4012/4040-F tolerance: ±0.1mm  
8038/8040 tolerance: -0.2~0mm

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**Handling**

**Operation.** Stated operational conditions are valid and the rules for installation, cleaning, water and preservation have to be adhered. UNISOL approved cleaning detergent, anti-foam, polymers, other chemicals and filter-aids lubricants can be applied only. For further questions, do not hesitate to contact our service engineer.

**Lubricants.** During installation, use only water or glycerin to lubricate seals. The use of petroleum or vegetable-based oils or solvents may damage the element and void any warranty.

**Preservation and Storage.** Plan ahead to use new membranes. The element should be stored in a sealed bag, at 4 – 30 °C (39 – 86 °F). Storage solutions should be made with: 1 % w/w sodium metabisulfite.

**Cleaning.** UNISOL modules may be put into production after having gone through the first cleaning prescribed by UNISOL on product packing notes or given differently by UNISOL.

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**Heat sanitization**

**Water for Heat Sanitization.** Suitable quality water must be used during all pre-conditioning steps. This water is chlorine-free, non-scaling/fouling water. RO permeate is preferred, but pre-filtered feed water may be used.

**Procedure.** As the following:

1. Flush to drain with suitable quality water (for ~30 min) at low pressure and low permeate flow rate.
2. Recycle warm water until the system warms up (45°C or less) at very low pressure (< 25 psig (1.7 bar), trans-membrane pressure with a maximum feed pressure of 45 psi (3 bar)). Maximum pressure drop through a single element is 1.5 psi (0.1 bar).
3. Introduce hot water to the system to increase temperature to 80°C (176°F). Ramp temperature up at a rate no faster than 1-2 °C /min (max 4°C /min).
4. Keep trans-membrane pressure below 25 psi (1.7 bar) when warm or hot water (45°C or higher) is being fed to the membranes.
5. Maintain temperature for 60 - 90 minutes.
6. Allow system to cool to 45°C or below. Ramp temperature down at a rate no faster than 1-2 °C /min (max 4°C /min).
7. Flush to drain with suitable water quality (for ~30 min) at very low pressure (< 25psi (1.7 bar), trans-membrane pressure with maximum feed pressure of 45 psi (3 bar)).

**Factors** effect flow rate lost from high temperature sanitization

1. Rate of temperature increase and decrease
  2. Presence of other species could decrease or increase the temperature at the surface of the membrane.
  3. Feed flow rate and heat transfer rate to the membrane surface.
  4. The thickness and geometry of the feed spacer.
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