

# TS SUL Type

## Heat-Sanitized Brackish Water Reverse Osmosis Membrane Element with Outer Permeate Tube Connection

Toray's Heat-sanitized RO membrane elements provide superior permeate quality for applications requiring hot water sanitization. Using heat-sanitized RO elements eliminates the need for chemical sanitization, further reducing maintenance costs. RO elements use cross-linked fully aromatic polyamide composite membranes.



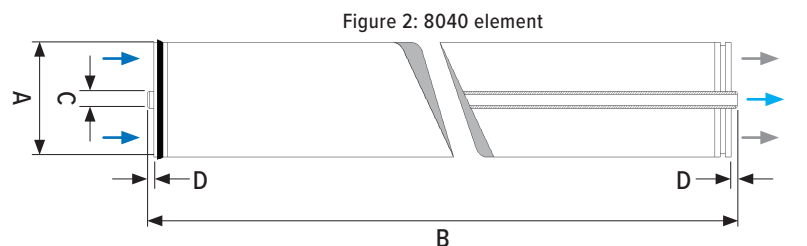
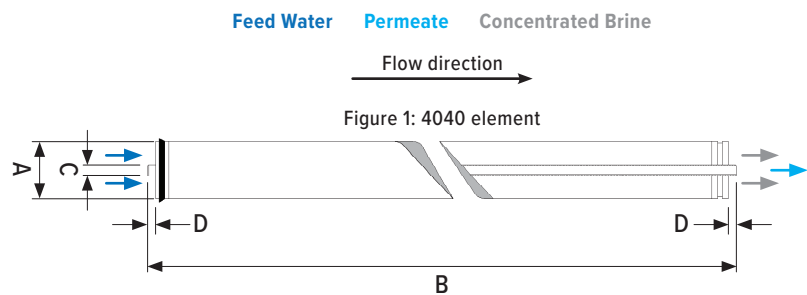
Product Specifications	Unit	SUL-G10TS	SUL-G20TS	SUL-G20FTS
Size		4040	8040	8040
Membrane Area	m <sup>2</sup>	7	34	38
Nominal Salt Rejection	%	99.5	99.5	99.5
Min. Salt Rejection	%	99.0	99.0	99.0
Nominal Product Flow Rate	gpd (m <sup>3</sup> /d)	1,300 (5.0)	7,900 (30.0)	9,500 (36.0)
Min. Product Flow Rate	gpd (m <sup>3</sup> /d)	1,100 (4.3)	6,320 (24.0)	7,660 (29.0)
Feed spacer thickness	mil	37	34	28

**Test Conditions:** Feed water pressure 110 psi (0.75 MPa); Feed water temperature 25°C (77 °F); Feed water concentration 500 mg/L as NaCl; Brine flow rate 20 l/min (5.3 gpm) for SUL-G10TS, 80 l/min (21.1 gpm) for SUL-G20TS and SUL-G20FTS; Feed water pH 6.5

### Applications

Municipal drinking water, Industrial process water

Dimensions in. (mm)		
Size	4040	8040
A	4.0 (101)	7.9 (201)
B	40 (1,016)	40 (1,016)
C	0.83 (21)	1.26 (32)
D	0.59 (15)	0.43 (11)



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Design Conditions	Unit	Recommended <sup>1</sup>		
Model		SUL-G10TS	SUL-G20TS	SUL-G20FTS
Feed water pressure <sup>2,3</sup>	MPa (psi)	< 1.0 (150)		
Feed water temperature <sup>4</sup>	°C (°F)	< 35 (95)		
Feed water turbidity (SDI) <sup>2,5</sup>		< 4		
Feed water pH range	Continuous operation <sup>6</sup>	3–9		
	Chemical cleaning <sup>7</sup>	2–11		
Feed flow rate per vessel	l/min (gpm)	<50 (13)	<200 (52.8)	
Brine flow rate per vessel <sup>9</sup>	l/min (gpm)	>10 (2.6)	>40 (10.6)	
Brine/Permeate flow ratio <sup>8,9</sup>		> 6		
Pressure drop per element <sup>10</sup>	MPa (psi)	< 0.1 (14)		
Pressure drop per vessel <sup>10</sup>	MPa (psi)	< 0.2 (29)		

- The recommended design range is operational and design conditions under not so much fouling and scaling. If the SUL-series element are operated outside of the recommended design range, the effective membrane life may be reduced. Refer to Toray's membrane manuals on our website ([www.water.toray](http://www.water.toray)), or contact Toray or a local distributor for design guidelines and further information.
- High flux operation (under high permeate flow rate per single element) on feed water turbidity greater than 3 or 4 SDI generally results in frequent cleaning requirements. Select the operating pressure to maintain the flux or permeate flow rates per single element.
- The maximum Feed Water Pressure is 4.1 MPa (600 psi)
- The maximum Sanitization Temperature is 85 °C (185 °F).
- SDI = Silt Density Index measured according to ASTM D4189.
- Feed and brine water must meet these ranges.
- Only use cleaning chemicals that adhere to Toray's technical bulletins.
- The ratio at last element.
- This figure is reducible when there is less possibility of fouling and scaling.
- Element(s) must be cleaned when the pressure drop increases to 1.5 times of initial value.

**Sanitization must follow guidances in Toray's membrane manuals on our website ([www.water.toray](http://www.water.toray))**

Toray accepts no responsibility for results obtained by the application of this information or the safety or suitability of Toray's products, either alone or in combination with other products. Users are advised to make their own tests to determine the safety and suitability of each product combination for their own purposes.

All data may change without prior notice, due to technical modifications or production changes. Please be sure to inquire about the latest product specifications.

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