

dairy HWS

dairy industry



hot water sanitization

Meeting Stringent Requirements

Without question, the dairy industry is faced with increasingly stringent sanitary regulations. To help meet these requirements, SUEZ introduces the Dairy HWS family. Ideal for applications with biologically active feeds, Dairy HWS elements are designed for hot water sanitization (pasteurization) by periodic exposure to temperatures up to 90°C (194°F). An innovative break-through, you can now sanitize the permeate side of a membrane element without risking membrane damage. Additional benefits of Dairy HWS elements include sanitization without the use of ineffective or harmful chemicals, as well as protection against detrimental bacterial growth on the membrane surface – thus limiting replacement costs.

Dairy HWS elements utilize polysulfone parts and unique element construction to meet the requirements for hot water sanitization. Comprised of high quality materials that meet 3A standards and conform to guidelines set by the Code of Federal Regulations,

Dairy HWS elements feature a patented Durasan* Cage protective sleeve that enhances element integrity by securing the spiral. In addition, the sleeve improves sanitizing effectiveness by maintaining a controlled by-pass between the element and pressure vessel wall without the use of traditional brine seals.

The Dairy HWS elements comply with:

- FDA Regulations relevant sections of 21CFR
- EU Framework 1935/2004/EC
- Halal & Kosher certification

membrane technology

A Valuable Solution

The use of spiral membrane technology in dairy applications allows plants to recover valuables, create saleable products, recycle water and reduce plant effluent. By utilizing Dairy HWS elements, spiral membrane systems can strategically concentrate:

- Sweet Whey
- Lactose
- Whole Milk
- Skim Milk

a market leader

SUEZ's Commitment to You

After over 30-years of innovation in membrane technology, SUEZ has become a market leader in developing new ways to solve even the most difficult industrial and commercial challenges. For sanitization specifications and protocols based on your unique dairy process, please consult a SUEZ representative.

Find a contact near you by visiting www.suezwatertechnologies.com and clicking on "Contact Us."

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Table 1: Element Specification

Membrane	Thin-film membrane (TFM*)		
Model	Spacer mil (mm)	Active area ft ² (m ²)	Part number
Dairy HWS R03840C30	30 (0.76)	77 (7.2)	1228223
Dairy HWS R08038C30	30 (0.76)	372 (34.6)	1206651
Dairy HWS NF3838C50 HR	50 (1.27)	55 (5.1)	1240430
Dairy HWS NF3838C65 HR	65 (1.65)	48 (4.5)	3167046
Dairy HWS NF3840C30 HR	30 (0.76)	77 (7.2)	1232322
Dairy HWS NF8038C50	50 (1.27)	282 (26.2)	3002372

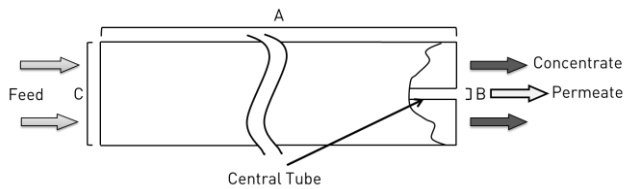


Figure 1: Element Dimensions Diagram - Female

Table 2: Dimensions and Weight

Model	Dimensions, inches (cm)			Boxed Weight lbs. (kg)
	A	B	C	
3838C	38.00 (96.5)	0.833 (2.12)	3.8 (9.6)	7 (3.2)
3840C	38.75 (98.4)	0.833 (2.12)	3.8 (9.6)	7 (3.2)
8038C	38.00 (96.52)	1.125 (2.86)	7.91 (20.1)	29 (13.2)

Table 3: Operating parameters

Do not exceed 20 GFD (33 LMH) or 2,000 Wagner units under any circumstance.

Typical Operating Pressure	200-500 psi (1,379-3,447 kPa)
Typical Operating Flux	5-20 GFD (8-34 LMH)
Clean Water Flux (1)	RO: 14 GFD (24 LMH) @ 225 psi NF: 14 GFD (24 LMH) @ 110 psi
Maximum Operating Pressure	600 psi (4,137 kPa) : 41 – 122°F (26 – 50°C)
Maximum Temperature	Continuous operation: 122°F (50°C) Hot Water Sanitization: 194°F (90°C)
pH Range	RO elements: 2.0 – 11.0 NF elements: 3.0 – 9.0
Chlorine Tolerance	500+ ppm hours, dechlorination recommended
Maximum Pressure Drop	Over an element: 15 psi (103 kPa) Per housing: 60 psi (414 kPa)

(1) Clean water flux (CWF) is the rate of water permeability through the membrane after cleaning (CIP) at reproducible temperature and pressure. It is important to monitor CWF after each cleaning cycle to determine if the system is being cleaned effectively. CWF can vary ±25%.

Table 4: CIP limits for RO elements

Temperature	pH minimum	pH maximum
50°C (122°F)	2.0	11.5
45°C (113°F)	1.5	11.5
35°C (95°F)	1.5	11.5
25°C (77°F)	1.0	12.0

Table 5: CIP limits for NF elements

Temperature	pH minimum	pH maximum
50°C (122°F)	3.0	10.0
45°C (113°F)	2.0	10.5
35°C (95°F)	1.5	11.5
25°C (77°F)	1.0	11.5

hot water sanitization recommendations

For optimal performance, Dairy HWS elements should always be cleaned using approved CIP procedures and flushed with fouling free water before the sanitization process. Feed pressure during sanitization should not exceed 40psi (275kPa) and the crossflow should not incur a pressure drop greater than 2psi (14kPa) per element. Heating rate to sanitizing temperature and cool down should not be faster than 5°C (41°F) per minute. Maximum sanitization temperature is 90°C (194°F).

loss of permeate flow after repeated 90°C sanitization cycles

It is almost impossible to exactly predict the percentage of permeate flow rate lost from the high temperature sanitations, which among other factors depends on:

- 1) Rate of temperature increase and decrease.
- 2) Presence of other species like organics, ionic and metallic compounds that could locally decrease or increase the temperature at the surface of the membrane.
- 3) Feed flow rate and specifically the heat transfer rate to the membrane surface.
- 4) The thickness and geometry of the feed spacer used.

At optimum conditions measured in controlled environment with deionized water, between 30% and 50% of the original permeate flow rate was lost before the element performance had stabilized after repeated heat treatments (over 90% of this flow reduction occurred during the first heat treatment). With the loss of permeate flow rate, the salt rejection increases. The rate of cooling and heating was not more than 5°C (41°F) per minute, and the differential pressure drop per element did not exceed 2 psi.

Pilot testing based on the criteria noted above will give the best operating parameters for any specific application.