ZY-SW Swing Flat-Sheet MBR Module

Chemical Cleaning (CIP) Data Sheet

Models ZY-SW8 and ZY-SW9 (Swing) | PVDF flat sheet | Doc. ZY-SW-CIP-DS Rev 01

Cleaning overview

Zyramic Swing modules are cleaned in place (CIP) by feeding chemical in reverse flow into the membrane sheets, by gravity or with the backwash pump, at no more than 8.7 psi (60 kPa). Three cleaning levels are used:

- **Maintenance CIP**: short, frequent clean that holds permeability. Run automatically from the control cabinet.
- **Recovery CIP**: longer in-place clean that restores permeability after TMP has risen, or on a 6-month schedule.
- **Offline / in-situ chemical bath**: used when CIP no longer recovers permeability.

1. Maintenance CIP

Application: industrial wastewater, or municipal wastewater with insufficient pretreatment. Not normally required for well-pretreated municipal wastewater.

Chemical	Concentration	Dose (per membrane area)	Soak	Frequency / Trigger
Sodium hypochlorite (NaOCl)	300–500 ppm (mg/L)	0.049 gal/ft² (2.0 L/m²)	30–40 min	Every 7–10 days
Citric acid	500–1,000 ppm (mg/L)	0.049 gal/ft² (2.0 L/m²)	30–40 min	Every 7–10 days, or as set by hardness and raw-water quality

Procedure (automated from the control cabinet)

1. Pause filtration.
2. Inject the chemical in reverse flow into the sheets (gravity or backwash pump, max 8.7 psi / 60 kPa).
3. Soak for 30–40 min.
4. Restart filtration. RAS restarts about 10 min later.
5. Return the first 1–2 filtrate cycles (~16 min) to the EQ basin, or reuse them.

When both chemicals are used, purge the NaOCl before the citric acid step. Never mix chlorine and acid.

2. Recovery CIP (in place)

Trigger: TMP rises 2.9 psi (20 kPa) above the initial value, or every 6 months.

Step / Chemical	Concentration	Dose (per membrane area)	Soak	Frequency / Trigger
1. Sodium hypochlorite (NaOCl)	Municipal: 3,000–5,000 ppm (mg/L) Industrial: 5,000 ppm (mg/L)	0.061 gal/ft² (2.5 L/m²)	≥ 4 h	TMP +2.9 psi (+20 kPa) above initial value, or every 6 months
2. Citric acid	Municipal: 1–2% Industrial: 2%	0.061 gal/ft² (2.5 L/m²)	≥ 4 h	

Procedure

1. Pause filtration.
2. Inject NaOCl in reverse flow into the sheets (gravity or backwash pump, max 8.7 psi / 60 kPa). Soak ≥ 4 h.
3. **Purge residual chlorine** from the sheets and lines.
4. Inject citric acid in reverse flow into the sheets. Soak ≥ 4 h.
5. Restart filtration. Return the first 1–2 filtrate cycles (~16 min) to the EQ basin, or reuse them.

3. Offline / In-Situ Chemical Bath

When to use: when CIP no longer recovers permeability.

Step / Chemical	Concentration	Dose	Soak	Frequency / Trigger
1. Sodium hypochlorite (NaOCl)	3,000–5,000 ppm (mg/L)	Full tank volume	≥ 6 h	When CIP no longer recovers permeability
2. Citric acid	1–2%	Full tank volume	≥ 6 h	

For heavy inorganic scaling, hydrochloric acid (HCl) or sulfamic acid may be used as a stronger acid, within the membrane pH tolerance of 2–12.

Chemical bath procedure

1. Soak the modules in NaOCl, 3,000–5,000 ppm (mg/L), for ≥ 6 h.
2. Drain and rinse. Make sure no chlorine remains.
3. Soak in citric acid, 1–2%, for ≥ 6 h.
4. Drain, rinse and return to service.

In-situ tank-fill option

1. Fill the membrane tank with NaOCl, 3,000–5,000 ppm (mg/L).
2. Mix for 20 min.
3. Soak ≥ 5 h, with air scour during the last hour.
4. Drain and rinse.
5. Repeat steps 1–4 with citric acid, 1–2%.

After any clean, return the first 1–2 filtrate cycles (~16 min) to the EQ basin, or reuse them.

Operating limits and precautions

Max backwash / CIP pressure	8.7 psi (60 kPa)
Membrane pH tolerance	pH 2–12
Mixed liquor pH	Keep at pH 3–11
Max temperature	113°F (45°C). Do not freeze.
Chlorine and acid	**Never mix.** Always purge NaOCl before any acid step.
Oxalic acid	**Do not use.** It can form calcium oxalate, which blocks the sheet channels.
Filtrate after cleaning	Return the first 1–2 filtrate cycles (~16 min) to the EQ basin, or reuse them.
Alternative oxidant	Hydrogen peroxide may be used in place of NaOCl.
Safety	Wear PPE and follow each chemical's Safety Data Sheet (SDS).

4. Shutdown and storage

Condition	Chemical	Concentration	Action
Shutdown longer than 30 days	Sodium hypochlorite (NaOCl)	0.5%	Backwash for 3 h before restart
Long-term storage in the tank	Sodium metabisulfite	200–300 ppm (mg/L)	Keep modules in storage solution
Long-term storage in the tank (alternative)	Sodium hypochlorite (NaOCl)	500 ppm (mg/L)	Keep modules in storage solution

Unit reference: US units first, metric in parentheses. 1 ppm = 1 mg/L (in water) · 1 L/m² = 0.02454 gal/ft² (US gal) · 1 kPa = 0.145 psi · °F = °C × 9/5 + 32 · Percentages (%) are the same in both systems.

Note: Figures on this data sheet are guidelines. Chemicals, concentrations, soak times and frequencies depend on site conditions, feed water and operating history, and may vary. Contact Zyramic at tom@zyramic.com or +1 845 402 6318 for site-specific cleaning recommendations.