

NHP210 Series

Submerged Flat-sheet Membrane Bioreactor (MBR) for Biological Wastewater Treatment

The NHP series incorporates thin membrane sheets for improved flexibility, allowing for more space between the flat sheets. This feature increases the range of movement and vibrations during air scouring, helping to dislodge sludge and improve cleaning efficiency with less energy consumption.

Flat Sheet Element		Units	Value	
Model			TSP-50080	
Nominal Pore Size		μm	0.08	
Materials	Membrane		PVDF and PET non-woven fiber	
	Nozzle		PE	
Effective Membrane Area		m² (ft²)	0.7 (7.5)	
Dimensions (w x l x thk)		mm (in.)	480 x 800 x 1.8 (18.9 x 31.5 x 0.07)	
Weight: dry / wet (reference)		kg (lbs.)	0.25 / 0.5 (0.6 / 1.1)	



Pictured above: NHP210-300S

Module Characteristics

Model	No. of	Structure:	Total Membrane	Dimensions (w x l x h)*		
model	Elements	Cassette x Deck	Area m² (ft²)	Millimeters	Inches	
ECS035 (Cassette)	50	-	35 (377)	485 x 440 x 820	19.1 x 17.3 x 32.3	
NHP210-300S	300	3 x 2	210 (2,260)	770 x 1,635 x 2,175	30.3 x 64.4 x 85.6	
NHP210-600D	600	3 x 4	420 (4,521)	770 x 1,635 x 3,845	30.3 x 64.4 x 151.4	

*Measurements include filtrate header and air diffuser pipes.

Weight - kg (lbs.)	Aeration block (dry)	Cassette / Element block (dry)	Module (dry)
ECS035 (Cassette)	_	17 (37)	_
NHP210-300S	40 (88)	195 (430)	235 (518)
NHP210-600D	40 (88)	390 (860)	430 (948)

Scouring Air Flow Rate ¹	NL/min/Module ²
NHP210-300S	1,000-2,000
NHP210-600D	1,300–2,000

¹ The air supply equipment such as blower shall be designed based on the standard operating conditions.

² Air volume as being 0 degree C and 101.325 kPa (1 atm).

Applications

Sewage wastewater, Industrial wastewater, Food processing wastewater, Sludge thickening process



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Operating Range				
Temperature	5-40 °C (41-104 °F)			
pH of Liquid ³	5–10			
Mixed Liquor Suspended Solids	Not higher than 18,000 mg/L			
Transmembrane Pressure	Not higher than 20 kPa (2.9 psi)			
Cleaning Chemical Feed Pressure	Not higher than 10 kPa (1.45 psi)			
Cleaning Chemicals and Concentrations	Sodium hypochlorite: 2,000–6,000 mg/L (10 < pH < 12)			
Cleaning Chemicals and Concentrations	Oxalic acid: 0.5–1.0 wt% / Citric acid: 1.0–3.0 wt%			
Materials				
Frame	304 stainless steel (316 SS optional)			
Manifold	Polypropylene or ABS			
Air Diffuser	Polypropylene (SS optional)			
Connection ⁴				
Manifold	ANSI 11/2 inch flange or socket			
Air Diffuser	ANSI 1 1/2 inch flange			

³ Except when chemical cleaning with designated chemical agents.

⁴ UNI (ISO) flange is optional.

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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TORAY Innovation by Chemistry

Flat-sheet PVDF MBR Technology

NHP210-150S

Toray's NHP210-150S membrane bioreactor (MBR) module applies advanced flat-sheet PVDF membrane chemistry with consistent nominal pore size and uniform distribution of these pores that are densely packed into element block. This unique construction increases filtration efficiency and decreases energy use during aeration.

KEY ADVANTAGES OF FLAT-SHEET MBR

- Small footprint and elimination of a clarifier
- Consistent production of high-quality effluent to meet discharge regulations
- Can operate at high MLSS (ideal for sludge thickening)
- Flat-sheet membrane does not require a backwash system to operate reliably
- Fouling resistant and easy maintenance

NHP210-150S vs. TMR090-100S

U			
83 vs. 71	49.5 VS. 42.5	0.23 VS. 0.36	2.6 vs. 2.2
PACKING DENSITY (m ² membrane/m ² footprint)	OPERATION CAPACITY (m ³ /day/m ² module footprint)	ENERGY CONSUMPTION (kWh/m ³ filtrate)	CAPACITY (m³/hour)
Improved cleaning and fouling resistance	50% higher packing density per module	More permeate with less energy use	60% lighter as a module
2 VS. 6	150 vs. 100	105 vs. 90	185 vs. 460
ELEMENT THICKNESS (mm)	NO. OF ELEMENTS	MEMBRANE AREA (m ²)	DRY WEIGHT (kg)





TORAY Submerged Flat-Sheet Membrane Bioreactor Module Specifications

Flat-Sheet Element			NHP (NEW HIGH PERFORMANCE)		
Model			TSP-50080		
Effective Membrane Area			7.5 ft ² (0.7 m ²)		
Nominal Pore	e Size		0.08 µm		
Dimensions:	(w) x (l) x (thickn	ess)	18.9" x 31.5" x 0.07" (480 mm x 800 mm x 1.8 mm)		
Weight: dry /	wet		0.6 lbs. / 1.1 lbs. (0.25 kg / 0.5 kg)		
Membrane m	laterial		Polyvinylidene fluoride (PVDF) and Polyethylene terephthalate (PET) non-woven fiber		
Nozzle mate	rial		Polyester (PE)		
NHP MBR M	odule		NHP210-150S		
No. of Memb	rane Elements		150		
Cassette stru	icture		3 cassettes x 1 deck		
Total Membra	ane Area		1,130 ft ² (105 m ²)		
Dimensions (w) x (l) x (h)			30.2" x 64.3" x 56.0" / 770 mm x 1,635 mm x 1,422 mm		
Aeration block weight — dry			143 lbs. (65 kg)		
Cassette / element block weight — dry		ight — dry	185 lbs. (84 kg)		
Cassette / element block weight — sludge clogging ¹		ight — sludge clogging ¹	1,097 lbs. (498 kg)		
Module — dry			328 lbs. (148 kg)		
Frame material			304 stainless steel (316 SS optional)		
Permeated water manifold material		aterial	Polypropylene		
Air diffuser material			Polypropylene (SS optional)		
Manifold con	nection		ANSI 1 1/2 inch flange		
Air diffuser c	onnection		Two ANSI 11/2 inch FNPT connections		
	Temperature		41–104 °F (5–40 °C)		
	pH³ of liquid		5–10		
	Mixed Liquor Suspended Solids (MLSS)		Not higher than 18,000 mg/L		
Operating Range	Trans-membrane Pressure		Not higher than 2.9 psi (20 kPa)		
	Cleaning chemical feed pressure		Not higher than 1.45 psi (10 kPa)		
	Cleaning chemicals and concentrations		Sodium hypochlorite (effective chlorine concentration): 2,000–6,000 mg/L (pH around 12)		
			Oxalic acid: 0.5–1.0 wt% / Citric acid: 1.0–3.0 wt%		
	Scouring air flow rate	Cubic feet/min/Module	35–71		
		NL/min/Module	1,000–2,000		

Contact a Toray representative for additional product information and technical support in optimizing your plant's performance.



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Toray MBR NHP Series — Product Specifications

TORAY MEMBRANE USA, INC.

SERIES		NHP (NEW HIGH PERFORMANCE)							
Flat Sheet Element Specifications	Model		TSP-50080						
	Effective Membrane Area — ft² (m²)		7.5 (0.7)						
	Nominal Pore S	Size (μm)	0.08						
	Dimensions: w	x l x thickness — in. (mm)		18.9	9 x 31.5 x 0.07 (480 x 800 x	1.8)			
	Weight: dry / w	et — lbs. (kg)	0.6 / 1.1 (0.25 / 0.5)						
		Membrane	Polyvinylidene fluoride (PVDF) and Polyethylene terephthalate (PET) non-woven fiber						
	Waterial	Nozzle	Polyester (PE)						
Model			ECS035 (Cassette)	ECS035 (Cassette) NHP210-300S NHP210-600D NHP210-600W NHP210-1200DW					
No. of Membrane	e Elements		50	300	600	600	1,200		
Cassette structur	re		_	3 cassettes x 2 decks	3 cassettes x 4 decks	6 cassettes x 2 decks	6 cassettes x 4 decks		
Total Membrane	Area — ft² (m²)		377 (35)	2,260 (210)	4,521 (420)	4,521 (420)	9,042 (840)		
Dimensions:	inches		19.1 x 17.3 x 32.3	57.5 x 22.2 x 82.3	57.5 x 22.2 x 148.0	121.3 x 22.2 x 90.1	121.3 x 22.2 x 160.3		
(w) × (l) × (h)	millimeters		485 x 440 x 815	1,460 x 565 x 2,090	1,460 x 565 x 3,760	3,080 x 565 x 2,288	3,080 x 565 x 4,072		
	Aeration block — dry		_	143 (65)	143 (65)	287 (130)	287 (130)		
Weight	Cassette / Element block — dry		40 (18)	485 (220)	970 (440)	970 (440)	1,940 (880)		
lbs. (kg)	Cassette / Element block — sludge clogging ¹		320 (145)	2,194 (995)	4,321 (1,960)	4,387 (1,990)	8,774 (3,980)		
	Module — dry		_	628 (285)	1,113 (505)	1,257 (570)	2,227 (1,010)		
	Frame		- 304 stainless steel (316 SS optional)						
Material	Permeated Water Manifold		Polypropylene						
	Air diffuser		_	– Polypropylene (SS optional)					
Connection ²	Manifold		ANSI 1 ½ inch flange	ANSI 1 ½ inch flange or socket					
Connection	Air Diffuser		-	ANSI 1 ½ inch flange ANSI 2-inch flange			nch flange		
	Temperature		41–104 °F (5–40 °C)						
	pH ³ of liquid		5–10						
	Mixed Liquor S	uspended Solids (MLSS)	Not higher than 18,000 mg/L						
	Trans-membrai	ne Pressure	Not higher than 2.9 psi (20 kPa)						
Operating Range	Cleaning chem	ical feed pressure	Not higher than 1.45 psi (10 kPa)						
Kange	Cleaning, share	icale and concentrations	Sodium hypochlorite (effective chlorine concentration): 2,000–6,000 mg/L (pH around 12)						
	Cleaning chemicals and concentrations		Oxalic acid: 0.5–1.0 wt% / Citric acid: 1.0–3.0 wt%						
	Scouring air flow rate⁴	Cubic feet/min/Module ⁵	12–24	35–71	46–71	71–141	92–141		
		NL/min/Module ⁵	330–670	1,000–2,000	1,300–2,000	2,000-4,000	2,600–4,000		

1. The weight assumed in the case of sludge clogging between elements.

2. UNI (ISO) flange is optional.

3. Except when chemical cleaning with designated chemical agents.

4. The air supply equipment such as blower shall be designed based on the standard operating conditions.

5. Air volume as being 0 degree C and 101.325 kPa (1 atm).

Specifications subject to change without notice. MC-MB2NHPDSTMUS-EN-2010

