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TRILITE
삼양 트리라이트
Ion Exchange Resin

TRILITE®

SM300

Ready to use mixed bed resins for non-regenerable deionizing cartridges for RO/EDI

TRILITE SM300 is a high quality mixed resin with post-treatment of strongly acidic cation exchange resin in H-form (TRILITE SCR-BH) and strongly basic anion exchange resin, Type 1 in H-form (TRILITE SAR12OH). It produces high purity water with continuous exchange reaction of cations and anions. **TRILITE SM300** features extremely high whole bead count and low uniformity coefficient, excellent mechanical strength and superb chemical / physical stability.

TRILITE SM300 also features high exchange capacity by effective ion change reaction for large volume of raw water, excellent silica removal ability. The state of the art mix-facility assures the uniform, stable quality for water treatment.

TRILITE SM300 is widely used for post-RO, post-EDI polisher, and other polisher applications with its simplicity of use without the regeneration facility.

General Properties (Mixture)

Ionic form	H-form / OH-form
Color and appearance	Goldenrod / Beige translucent spherical bead
Shipping density	700 g/ℓ(approx.)
Whole bead count	95% ↑
Moisture retention	52~60%
Operating capacity	0.50eq/ℓ ↑ 1)Reference
Initial water purity	15.0 MΩcm ↑ 2)Guaranteed
Effective size	0.4 ㎜ ↑
Uniformity coefficient	1.6 ↓
Particle size	0.3~1.2mm
Operating temperature	60℃ ↓
Operating pH range	0~14

1) Na%=20%, Composition: $CaCO_3$ 400ppm + NaCl 100ppm, SV12, Break through point : 0.3 MΩcm

2) Feed: post-RO(conductivity: 10 ㎲/㎝), Servicing for 10minutes, SV36

General Properties (Components)

Grade		TRILITE SCR-BH	TRILITE SAR12OH
Matrix		Polystyrene + DVB	
Functional group		$-SO_3^-$ (Sulfonate)	$-N^+(CH_3)_3$ (TMA)
Ionic form		H	OH
Shipping weight, g/ℓ		770~800	630~670
Moisture retention, %		49~59	62~72
Total capacity, eq/ℓ		1.9 ↑	1.0 ↑
Effective size		0.4 ㎜ ↑	
Uniformity coefficient		1.6 ↓	
Particle size		300~1,200 (on 1,180 ㎛ < 5%, through 300 ㎛ < 1%)	
Operating temp.,℃		120 ↓	60 ↓
Operating pH range		0~14	
Ionic conversion rate	H^+(%)	99.0 ↑	-
	OH^-(%)	-	95.0 ↑

※ TMA : Trimethylammonium

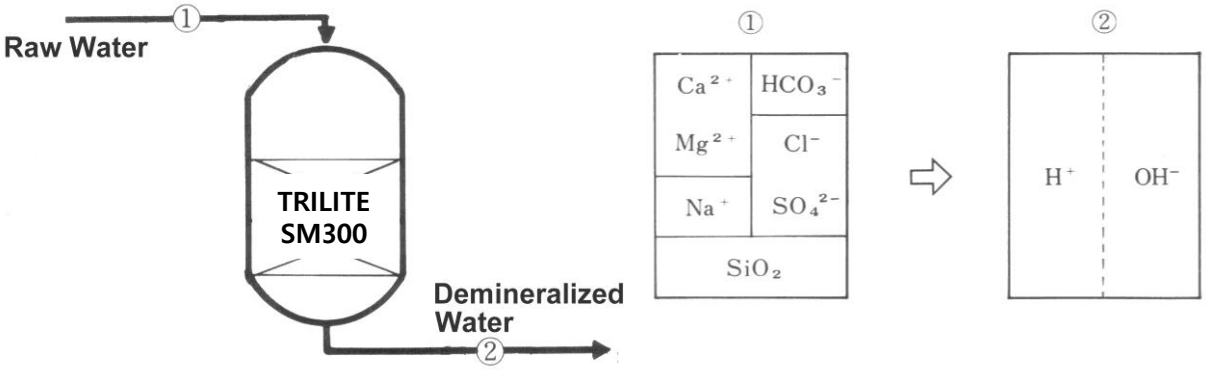
Reaction Mechanism

Cation exchanger(SCR-B)
$R\text{-}SO_3H + NaOH \rightarrow R\text{-}SO_3Na + H_2O$
$2R\text{-}SO_3H + Ca(HCO_3)_2 \rightarrow (R\text{-}SO_3)_2Ca + 2H_2CO_3$
$R\text{-}SO_3H + NaCl \rightarrow R\text{-}SO_3Na + HCl$

Anion exchanger(SAR12OH)
$R\text{-}NOH + HCl \rightarrow R\text{-}NCl + H_2O$
$R\text{-}NOH + H_2SiO_3 \rightarrow R\text{-}NHSiO_3 + H_2O$
$R\text{-}NOH + H_2CO_3 \leftrightarrow R\text{-}NCO_3 + H_2O$
$R\text{-}NOH + NaCl \leftrightarrow R\text{-}NCl + NaOH$

As it is a uniformly mixed resin of SACER and SBAER, it can produce high purity water with the identical principal of water treatment system.
(Raw water → Cation exchanger → Anion exchanger → ... → Cation exchanger → Anion exchanger → Treated water)

Process



TRILITE SM300 can produce high purity water through the above mechanism, applied to post RO/EDI. It features high anion conversion rate and specific gravity and excellent SiO_2 removal capacity.

To produce high purity water from conventional water (potable water, ground water) in large volume, TRILITE SM210 is recommended.

Mixed Bed Exchange Resin Selection Guidance

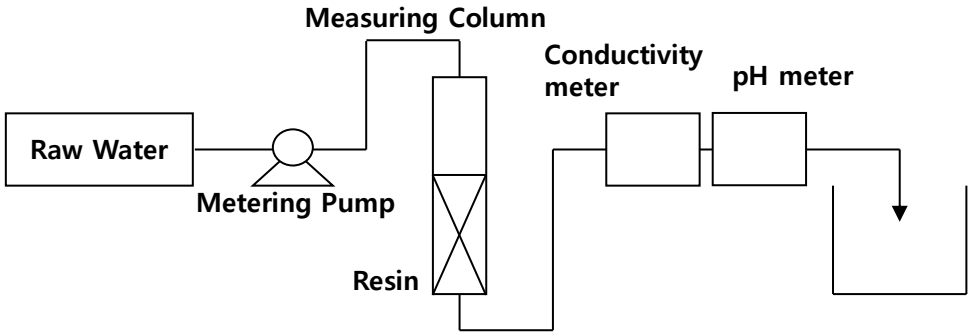
Grade	Feature & Application	Components	Treated Water Quality	
SM210	Simple production of pure water from tab water For Laboratories, Wire-cutting	SCR-BH(H^+ 99.0% ↑) SAR12OH(OH^- 95.0% ↑) Mixed ratio(Volume) : 45:55	Out	Resistivity > 10.0 MΩ.cm (in 10min.)
			Feed	Conductivity 150 μs/㎝ Potable water, SV36
SM300	High Resistivity and superb SiO2 removal ability MB for Post-RO and EDI	SCR-BH(H^+ 99.0% ↑) SAR12OH(OH^- 95.0% ↑) Mixed ratio(Volume) : 40:60	Out	Resistivity > 15.0 MΩ.cm (in 10min.)
			Feed	Conductivity 10 μs/㎝ RO outlet, SV36
UPRM100U (UPS grade)	Very high resistivity Electronics Grade Ultrapure water	UPRC100U(H^+ 99.0% ↑) UPRA100U(OH^- 95.0% ↑) Mixed ratio(Capacity) : 50:50	Out	Resistivity > 18.0 MΩ.cm (in 30min.)
			Feed	Resistivity >17.5 ㏁.㎝, TOC<2ppb, SV30
UPRM200U (UPS grade)	Very high resistivity, Low ΔTOC level LCD, OLED Ultrapure water Final polisher	UPRC200U(H^+ 99.0% ↑) UPRA200U(OH^- 95.0% ↑) Mixed ratio(Capacity) : 50:50	Out	Resistivity >18.1 ㏁.㎝ (in 30min.) △TOC<5ppb (in 120min.)
			Feed	Resistivity >17.5 ㏁.㎝, TOC<2ppb, SV30
UPRM300U (UPS grade)	Extremely high resistivity Extremely low ΔTOC level Metal ion < 0.1ppt Semiconductor Ultrapure water final polisher	UPRC300U(H^+ 99.9% ↑) UPRA300U(OH^- 97.0% ↑) Mixed ratio(Capacity) : 50:50	Out	Resistivity >18.2 ㏁.㎝ (in 30min.) △TOC<1ppb (in 180min.) Metal ion < 0.1ppt
			Feed	Resistivity >17.5 ㏁.㎝, TOC<2ppb, SV30

Resistivity and Service Output Test Method

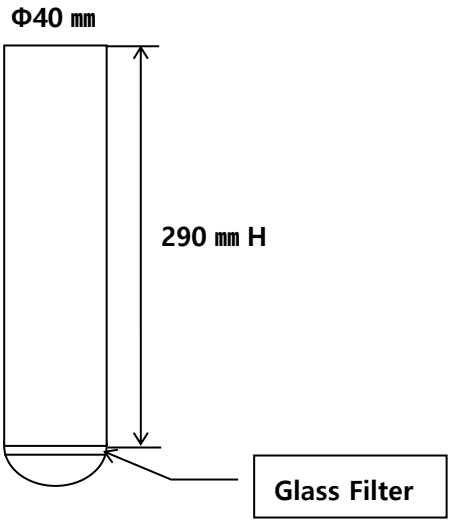
Item		Test contents and conditions
Service test condition	Sample quantity	500 ㎖
	Column	Φ40mm × 290 mmH
	Flow rate	18ℓ/hr (SV 36)
Feed water		Post RO, Conductivity 10 ㎲/㎝
Service end point		2.0 ㎲/㎝(0.5 MΩ㎝)
Test system		Auto pilot system

※ SV : Space Velocity, Service volume per hour(m^3/hr) divided by the volume of IER(m^3). There is no unit for SV.

1) Measuring Column and System

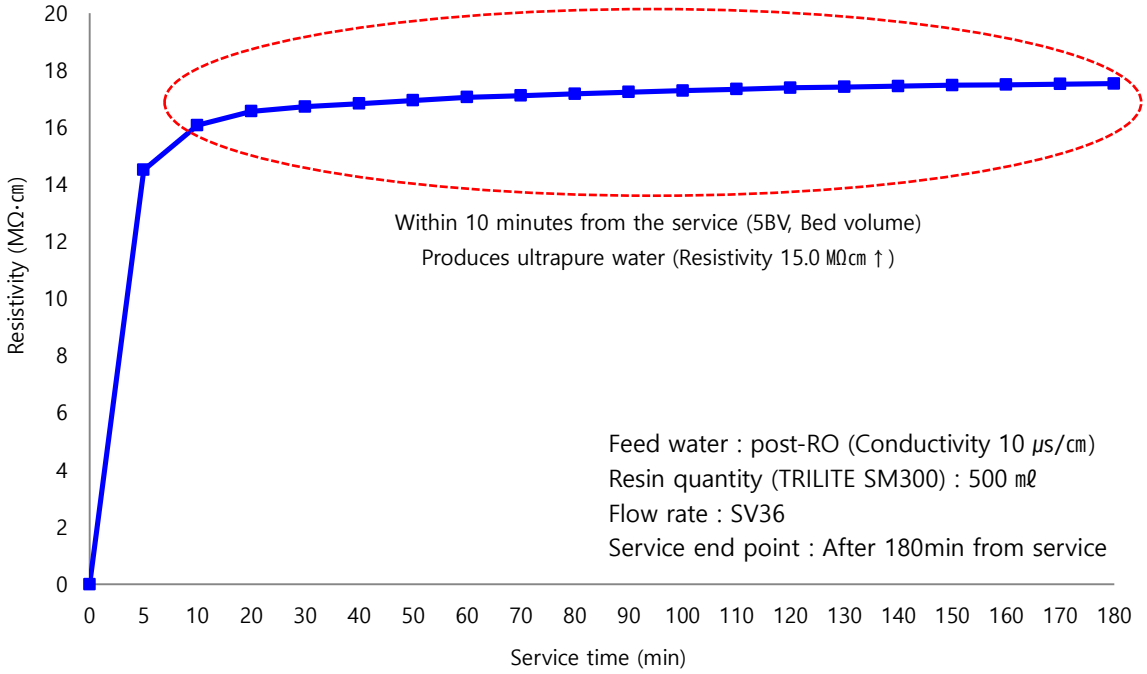


2) Measuring Column



3) Auto Pilot System

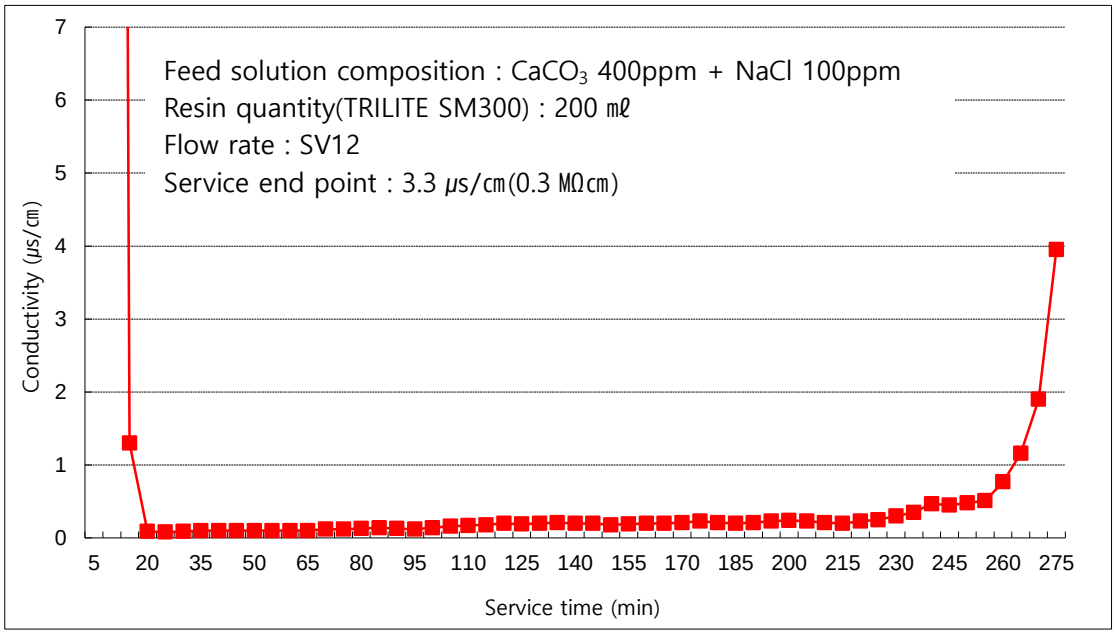
Resistivity and Service Output Test Result (Guaranteed)



Operating Capacity Performance Test Method (For reference)

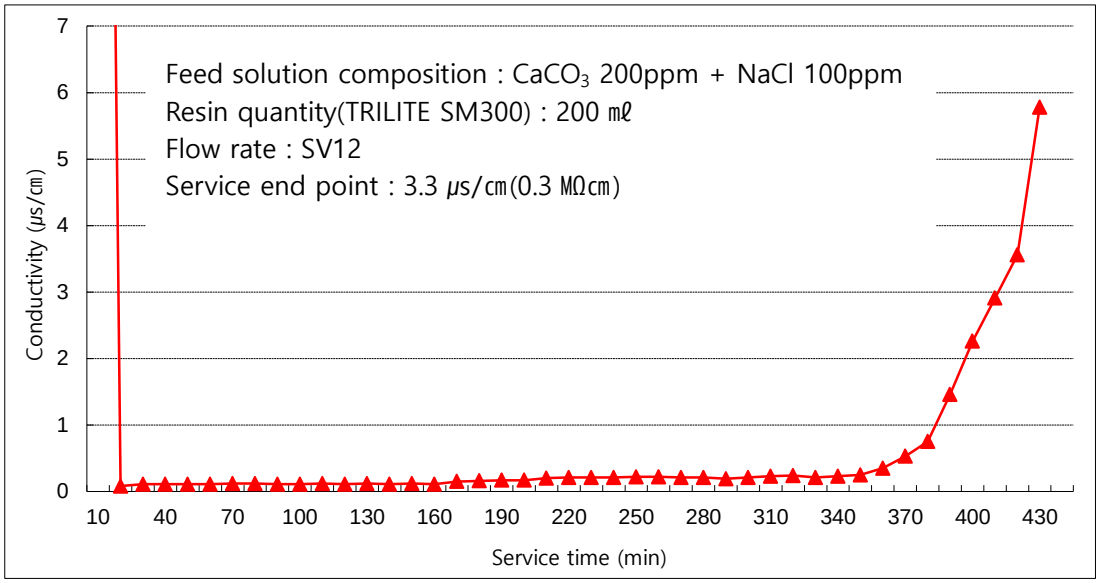
Item		Test content and conditions
Service test condition	Sample quantity	200 ㎖
	Column	Φ40mm × 290 mmH
	Flow rate	2.4ℓ/hr (SV 12)
Feed water (Case1, Na%=20%)		$CaCO_3$ 400ppm + NaCl 100ppm Solution (Conductivity: Approx. 1,000 μs/㎝)
Feed water (Case2 Na%=33%)		$CaCO_3$ 200ppm + NaCl 100ppm Solution (Conductivity: Approx. 600 μs/㎝)
Service end point		3.3 μs/㎝(0.3 MΩ㎝)
Test system		Auto pilot system

Operating Capacity Test Result(Case1, Na%=20%)



Initial pH	6.2	Final pH	5.6
Initial conductivity	0.09 μs/cm(11.1 MΩcm)	Treated Volume	10.9ℓ (54.5BV)
Operating capacity	27.25g as $CaCO_3$/ℓ-Resin (0.55eq/ℓ-Resin)		

Operating Capacity Test Result(Case2, Na%=33%)



Initial pH	6.5	Final pH	5.9
Initial conductivity	0.08 μs/cm(12.5 MΩcm)	Treated volume	17.0ℓ (85BV)
Operating capacity	25.5g as $CaCO_3$/ℓ-Resin (0.51eq/ℓ-Resin)		

Characteristics of TRILITE SM300

① Easily produce high purity water (Ultrapure water grade, 15.0 MΩcm ↑) applied to post-RO/EDI

② Controlled particle size enables excellent servicing and a very low portion of fine particles.

③ The state of the art mix-facility assures stable production of high purity water from the initial service stage.

④ Excellent conversion rate of component and the lowered Na ion and Silica Leakage

⑤ Stable quality assurance with CoA for every Lot produced

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Certificate of Analysis Report for Ion Exchange Resin

1. Grade: TRILITE SM300 (Lot.No.)
2. Quantity: ℓ
3. Servicing Test Condition

Item		Unit
Servicing condition	Quantity	500 mℓ
	Column	Φ40mm × 290 mmH
	Flow rate	18.0ℓ/ hr (SV 36)
Feed water		Conductivity 10 μs/cm post-RO
Service end point		2.0 μs/cm(0.5 MΩcm)
Test system		Auto pilot system

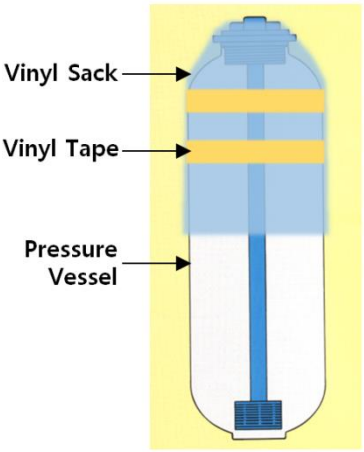
4. Test Result

Item	Specification	Result
Resistivity (in 10min)	15.0 MΩcm ↑	

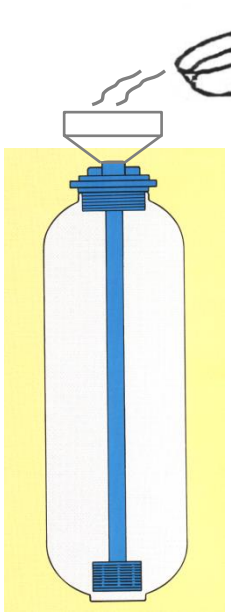
Pressure Vessel Filling Method

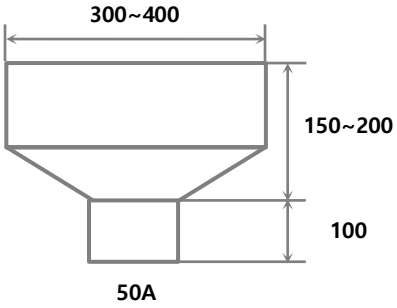
When filling the pressure vessel with IER, the conventional filling method using influent water should not be used. The mixed resins can partially separate while moving into the vessel with influent water due to the difference in the specific density of cation exchange resin and anion exchange resin, lowering the purity of treated water. Also, the vessel should be empty when filling the resin into it. .

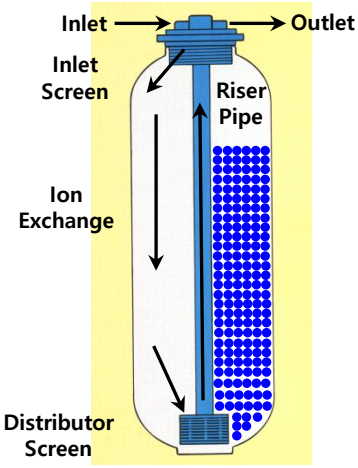
① Referring to the diagram on the right, place a vinyl sack on the top of vessel and firmly fix it with vinyl tape.



② Prepare a funnel and a ladle.







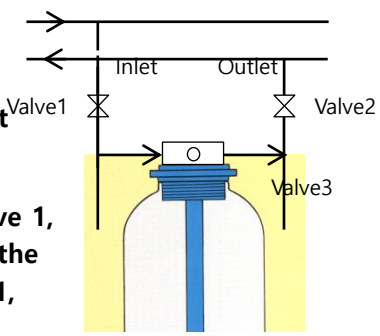
③ Set the lower strainer vertically and the riser pipe inside the pressure vessel and put the resins into.

④ When the resins are filled about 50%, check the poition of riser pipe (to place it at the inner center) and pay caution to the displacement.

⑤ After filling the vessel, completely remove the residuals on the nozzle, remove the covered vinyl and fix the bolts. Put some pure water to the O-Ring to smoothen the assembly of head bolts.

Pressure vessel trial-run method

① Assembly of Pressure vessel
Close the valve 1, 2 and 3 and connect to right In and Out



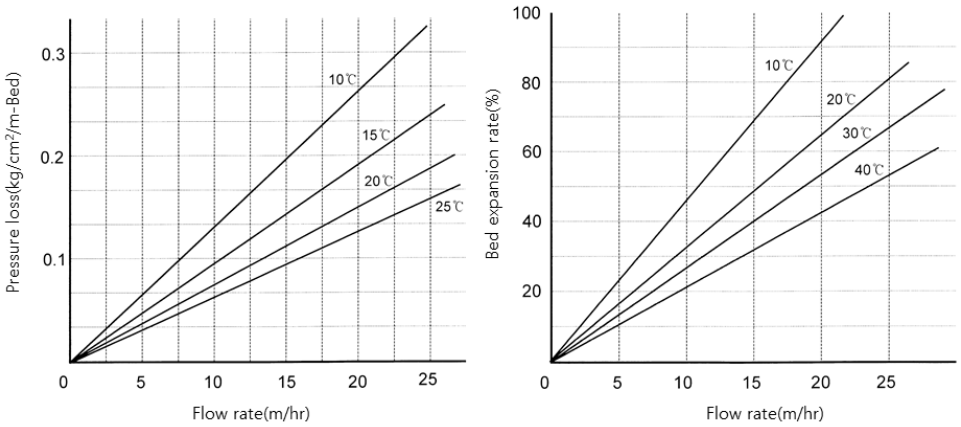
② Air evacuation and servicing
Completely close the valve 2 and slightly open up the valve 1, then evacuate the air through valve 3. When the most of the air is evacuated, close the valve 3 and open up the valve 1, and open up the valve 2 and conduct servicing.

③ End of service and water evacuation

To end the service, close the Valve 2 and then close Valve 1. Connect a pipe to Valve 3 then evacuate the water. After then disassemble the inlet part, eliminate the inner moistures by compressed air.

Package

Hydraulic Characteristics



Samyang's TRILITE Ion exchange resins are produced based on the ISO 9001, ISO 14001 certification.
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