Softener System Estimated Flow Rates

Tank Diameter inches	8	9	10	12	13	14	16	18	20	22	24	30	36	42	48	63
Sqaure Foot Surface Area	0.34	0.4	0.54	0.78	0.92	1.06	1.39	1.76	2.18	2.63	3.14	4.9	7.06	9.62	12.6	16
Resin Cubic Feet	0.75	1	1.5	2	2.5	3	4	5	6	7	10	15	20	25	35	60
Suggested Peak GPM	6	8	10	15	18	21	27	35	43	52	62	98	141	192	252	318

Fleck / Pentair

Estimated Peak w/ 15 PSI drop

7000 w/ high flow piston	10	14	16	18	18	20	20	20	24	24						
5600	8	10	10	12												
5000 ProFlo, 5800SXT	10	11	11	13	13	13	13									
4650	10	10	10	12												
6700	8	10	10	12												
2510	9	9	9	11	11	11	11									
9000	10	13	13	15	15	15	15									
9100SXT	10	13	13	15	15	16	16									
9500SXT				23	25	26	29	30	32	35	35					
2750	10	13	16	18	18	19	20	20	22	22						
2850				23	27	30	33	35	37	40	41	44				
2850s				25	30	35	40	45	45	45	50	56	56			
2900s				23	27	31	41	50	55	65	68	84				
3150				23	27	31	41	50	55	65	68	72	78	78	80	80
3900											94	147	185	200	213	238

Clack Corporation

Estimated Peak w/ 15 PSI drop

WS1	10	13	16	18	18	19	20	20	20							
WS125	10	14	16	18	18	20	20	20	22							
WS1.5				25	30	35	40	45	45	45	45					
WS2				25	30	35	40	45	50	54	54					
WS2H											80	90	90	95	95	100
WS3											94	147	185	200	213	238

GE / Autotrol

Estimated Peak w/ 15 PSI drop

255	9	9	9	11	11	11										
268/Performa	10	13	15	16	16	16										
Magnum Cv						31	41	48	55	55	56	62	63			
Magnum Cv NHWBP						31	39	43	51	51	52	59	60			

Residential Water Softener Sizing Chart

NUMBER OF OCCUPANTS

HARDNESS GPG	2	3	4	5	6	7	8	9
50	2 cu. ft.	3 cu. ft.	4 cu. ft.	5 cu. ft.	1.5 cu. ft. twin	1.5 cu. ft. twin	3 cu. ft. twin	2 cu. ft. twin
45	2 cu. ft.	2.5 cu. ft.	4 cu. ft.	5 cu. ft.	1.5 cu. ft. twin	1.5 cu. ft. twin	3 cu. ft. twin	2 cu. ft. twin
40	1.5 cu. ft.	2.5 cu. ft.	3 cu. ft.	4 cu. ft.	5 cu. ft.	1.5 cu. ft. twin	3 cu. ft. twin	3 cu. ft. twin
35	1.5 cu. ft.	2 cu. ft.	3 cu. ft.	4 cu. ft.	4 cu. ft.	5 cu. ft.	3 cu. ft. twin	3 cu. ft. twin
30	1.5 cu. ft.	2 cu. ft.	2.5 cu. ft.	3 cu. ft.	4 cu. ft.	4 cu. ft.	5 cu. ft.	3 cu. ft. twin
25	1 cu. ft.	1.5 cu. ft.	2 cu. ft.	2.5 cu. ft.	3 cu. ft.	4 cu. ft.	4 cu. ft.	5 cu. ft.
20	1 cu. ft.	1.5 cu. ft.	1.5 cu. ft.	2 cu. ft.	2.5 cu. ft.	3 cu. ft.	3 cu. ft.	4 cu. ft.
15	1 cu. ft.	1 cu. ft.	1.5 cu. ft.	1.5 cu. ft.	2 cu. ft.	2 cu. ft.	2.5 cu. ft.	3 cu. ft.
10	1 cu. ft.	1 cu. ft.	1 cu. ft.	1 cu. ft.	1.5 cu. ft.	2 cu. ft.	1.5 cu. ft.	2 cu. ft.
5	1 cu. ft.	1 cu. ft.	1 cu. ft.	1 cu. ft.	1 cu. ft.	1 cu. ft.	1 cu. ft.	1 cu. ft.

This chart is based on 6#'s of salt per cu. ft and only considers hardness, not flow rates.
Single tank system should regenerate no less than every 5th day for maximum efficiency.
Twin tank systems should regenerate no more than once daily.
4 and 5 cu. Ft. systems can be replaced with a twin system at a similar cost.

Water Velocity in Pipe in GPM

Pipe diameter in inches

Velocity Feet per Second	1/2	3/4	1	1-1/4	1-1/2	2	2-1/2	3	4	6
4	2.9	5.4	8.9	16	22	36	52	82	140	320
5	3.6	6.8	11	20	27	46	66	102	180	410
6	4.4	8.2	13	27	33	55	79	123	220	480
8	6	11	18	31	44	74	105	165	280	650
10	7.4	13	22	40	55	92	130	205	360	820

Note: Velocities exceeding 9 FPS can cause vibration, excessive noise, and loosen hanging hardware.

Maximum Recommended Velocity in GPM

Piping Material	Maximum Velocity in Ft/Sec
Copper tubing cold water	8
Copper tubing hot water	5
Galvanized Steel Pipe	8
CPVC Pipe	10
Pex Tubing	12

Flow Capacity of Pipe in GPM

Pipe diameter in inches

Water Pressure	3/4	1	1-1/4	1-1/2	2	2-1/2	3	4	6
10 psi	8	14	39	44	86	137	270	495	1450
20 psi	11	21	58	65	126	200	395	725	2125
40 psi	16	31	84	94	183	290	575	1070	3100
60 psi	20	38	104	117	227	360	715	1315	3850
80 psi	24	44	121	137	265	420	835	1535	4480
100 psi	28	50	137	155	300	480	945	1735	5075

Note: Water flow should never exceed 8-9 FPS unless the system is engineered for higher velocities

Brine Tank Volumes

Tank diameter in inches

	11	18	22	24	30	39	42	50	60
Gal./inch	0.41	1.1	1.65	1.96	3.05	5.18	6	8.5	12.26
Gal. w/salt	0.2	0.55	0.8	1	1.5	2.5	3	4.25	6

Note: Estimates only, salt type and condition will cause these numbers to vary

Media Backwash Rates By Vessel Diameter

Media	Backwash rate GPM per square foot	Pressure Vessel Diameter																	
		5"	6"	7"	8"	9"	10"	12"	13"	14"	16"	18"	21"	24"	30"	36"	42"	48"	63"
Softening resin	5	0.7	1	1.3	1.7	2.2	2.7	3.9	4.6	5.3	7	9	12	15	25	35	50	60	100
Anion Resin	3	0.4	0.6	0.8	1	1.3	1.6	2.4	2.8	3.2	4	5	7	9	15	20	30	40	60
Filox	20-30	3.4	5	6.5	9	11	15	20	25	25	35	45	60	80	125	175	250	315	550
Pyrolox	20-30	3.4	5	6.5	9	11	15	20	25	25	35	45	60	80	125	175	250	315	550
Birm	10-12	1.4	2	2.6	3.5	4.4	5.5	8	9	11	15	18	25	30	50	70	100	125	215
MTM	8-12	1.4	2	2.6	3.5	4.4	5.5	8	9	11	15	18	25	30	50	70	100	125	215
GreenSand	10-12	1.4	2	2.6	3.5	4.4	5.5	8	9	11	15	18	25	30	50	70	100	125	215
GreenSand +	12	1.6	2.4	3.2	4	5.3	6.5	9	11	13	17	20	30	40	60	85	115	150	260
NextSand	15-20	2.5	3.5	5	6	8	15	17	20	25	25	30	45	55	90	125	175	225	400
Turbidex`	15-21	2.5	3.5	5	6	8	15	17	20	25	25	30	45	55	90	125	175	225	400
Filter Ag+	15-20	2.5	3.5	5	6	8	15	17	20	25	25	30	45	55	90	125	175	225	400
Micro-Z	15-20	2.5	3.5	5	6	8	15	17	20	25	25	30	45	55	90	125	175	225	400
Zeolite	15-20	2.5	3.5	5	6	8	15	17	20	25	25	30	45	55	90	125	175	225	400
Filter Ag	8-10	1.4	2	2.6	3.5	4.4	5.5	8	9	11	15	18	25	30	50	70	100	125	215
KDF 55	25	3.4	5	6.5	9	11	15	20	25	25	35	45	60	80	125	175	250	315	550
KDF 85	25	3.4	5	6.5	9	11	15	20	25	25	35	45	60	80	125	175	250	315	550
Sand or gravel	15-20	2.5	3.5	5	6	8	15	17	20	25	25	30	45	55	90	125	175	225	400
GAC	10	1.4	2	2.6	3.5	4.4	5.5	8	9	11	15	18	25	30	50	70	100	125	215
Activated Alumina	8-10	1.4	2	2.6	3.5	4.4	5.5	8	9	11	15	18	25	30	50	70	100	125	215
Calcite	8-12	1.4	2	2.6	3.5	4.4	5.5	8	9	11	15	18	25	30	50	70	100	125	215
Corosex	10-12	1.4	2	2.6	3.5	4.4	5.5	8	9	11	15	18	25	30	50	70	100	125	215
Corosex II	10-12	1.4	2	2.6	3.5	4.4	5.5	8	9	11	15	18	25	30	50	70	100	125	215
#1 Anthracite	12-18	2	3	4	5	6.5	8	12	15	16	20	25	35	50	75	100	150	190	325
#1-1/2 Anthracite	18-25	2.7	4	5.3	7	9	11	15	20	25	30	35	50	65	100	150	200	250	430
#2 Anthracite	Air Scour	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Garnet	15-20	2.5	3.5	5	6	8	15	17	20	25	25	30	45	55	90	125	175	225	400
Titanium oxide	5	0.7	1	1.3	1.7	2.2	2.7	3.9	4.6	5.3	7	9	12	15	25	35	50	60	100
Multimedia	15	2	3	4	5	6.5	8	12	15	16	20	25	35	50	75	100	150	190	325
Bayoxide E33	10	1.4	2	2.6	3.5	4.4	5.5	8	9	11	15	18	25	30	50	70	100	125	215
GFH	10-12	1.4	2	2.6	3.5	4.4	5.5	8	9	11	15	18	25	30	50	70	100	125	215
Crushed Glass	12-18	2	3	4	5	6.5	8	12	15	16	20	25	35	50	75	100	150	190	325

Most medias need periodic backwashing for proper operation. The chart above is for quick reference only. See each manufacturers media specifications for proper backwash rates. Water temperature and actual applications must be considered when determining a proper backwash rate.

How to Sanitize a Reverse Osmosis System

- Shut off RO inlet valve
- Open faucet and drain system completely, add pressure to the water storage tank until it reaches 7 PSI and all water has been expelled.
- Remove all filter cartridges including the membrane.
- Clean housings with a mild bleach and water solution, add 6 ounces of household bleach to the first filter housing and reassemble unit without the filter cartridges.
- Remove and bypass the post carbon filter.
- Turn on the RO inlet feed valve and allow the tank to fill, this should take 2-3 minutes.
- Open the drinking water faucet and allow water to run until it has a slight bleach odor, close faucet.
- Allow the system to soak for at least 5 minutes. If the systems has not been sanitized in a long time, or contamination is known, then a 1 hour soak may be required.
- After the soaking period is complete, allow the water to run out of the faucet for a few minutes to remove the bleach, turn off the inlet feed valve and allow system to drain.
- Install all new filters and membrane using proper sanitary procedures. Do not touch the filters, use sanitized gloves.
- Turn on the water feed.
- Follow standard system start up procedures
- Drain out first two tanks prior to drinking the RO water.

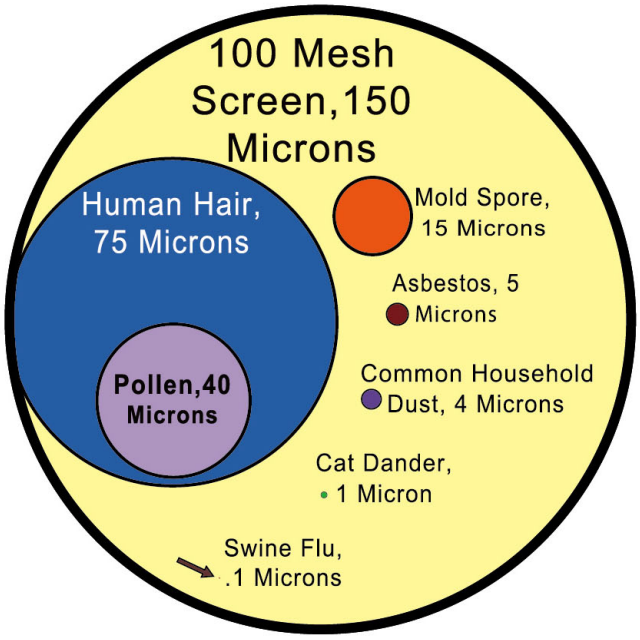
Reverse Osmosis Temperature & Pressure Correction Tables

Reverse Osmosis TFC membrane production rates are based on laboratory conditions. Water temperature, pressure, and TDS are key factors that must be considered to more accurately know the systems true production rate. The charts below will help you calculate the approximate production rates of most common membranes.

Temperature Correction	
Temperature F/C	**Correction Factor**
40° / 4°	0.34
50° / 10°	0.52
60° / 16°	0.70
70° / 21°	0.88
77° / 25°	1
80° / 27°	1.05
90° / 32°	1.23
100° / 38°	1.41

Pressure Correction (60 PSI Membrane)	
Pressure PSI	**Correction Factor**
10	0.17
20	0.33
30	0.5
40	0.67
50	0.83
60	1
70	1.17
80	1.33

A Micron is one- millionth of a meter or about 0.000039 inches. This chart shows the relative size of different particles.

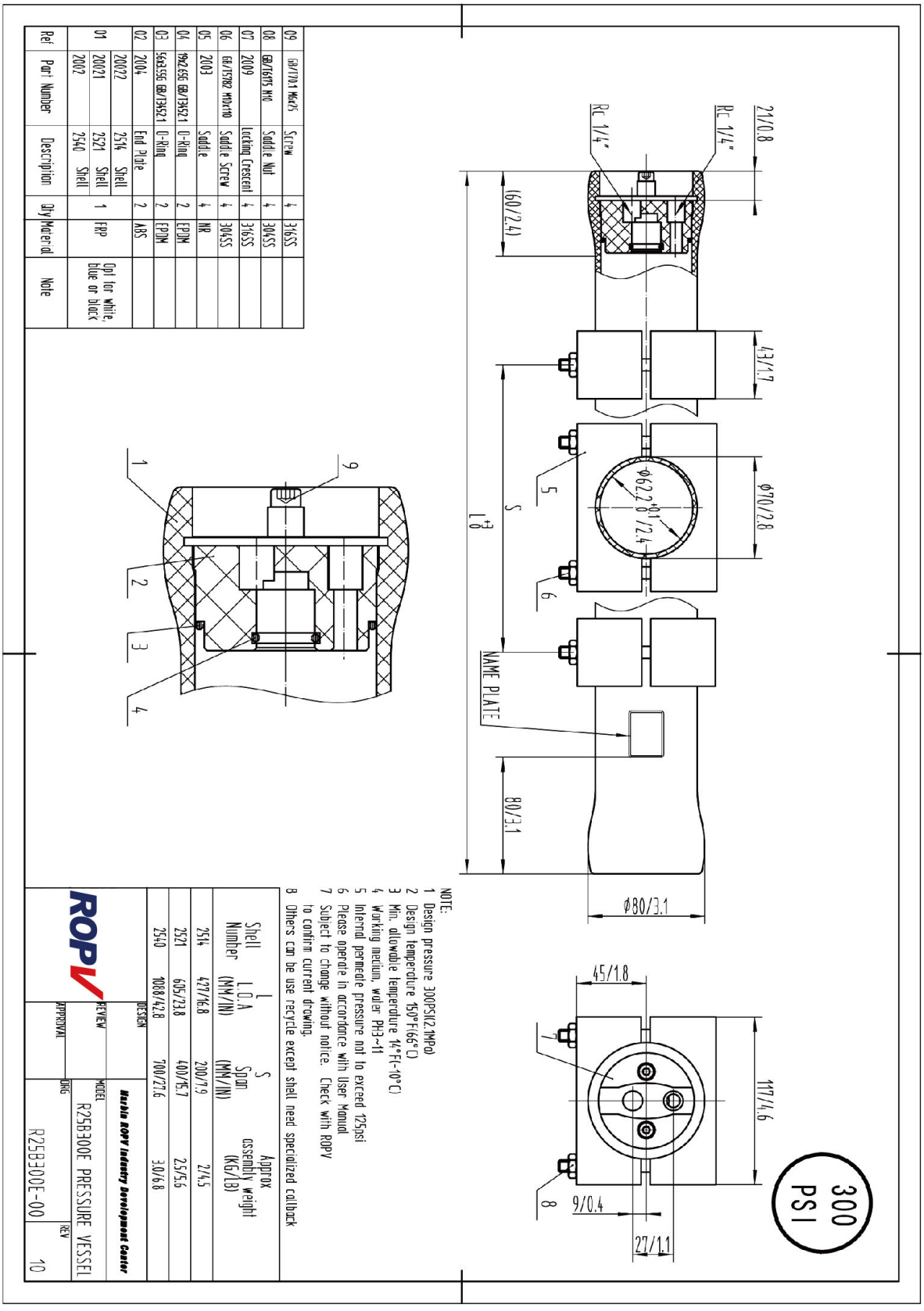


Estimated Reverse Osmosis Rejection Percentages

The reverse osmosis process uses a semi-permeable membrane to reject a wide variety of impurities. Here is a partial list.

Aluminum	97-98%	Nickel	97-99%
Ammonium	85-95%	Nitrate	93-96%
Arsenic	94-96%	Phosphate	99+%
Bacteria	99+%	Polyphosphate	98-99%
Bicarbonate	95-96%	Potassium	92%
Boron	50-70%	Pyrogen	99+%
Bromide	93-96%	Radioactivity	95-98%
Cadmium	96-98%	Radium	97%
Calcium	96-98%	Selenium	97%
Chloride	94-95%	Silica	85-90%
Chromate	90-98%	Silicate	95-97%
Chromium	96-98%	Silver	95-97%
Copper	97-99%	Sodium	92-98%
Cyanide	90-95%	Sulphate	99+%
Ferrocyanide	98-99%	Sulphite	96-98%
Fluoride	94-96%	Zinc	98-99%
Iron	98-99%	Insecticides	97%
Lead	96-98%	Detergents	97%
Magnesium	96-98%	Herbicides	97%
Manganese	96-98%	Virus	99+%
Mercury	96-98%	Hardness	93-97%
TDS (Total Dissolved Solids)	95-99%		

Spec sheets/drawings



Ref	Part Number	Description	Qty	Material	Note
09	GB/T70.1 M6x25	Screw	4	316SS	
08	GB/T6175 M16	Saddle Nut	4	304SS	
07	2009	Locking Crescent	4	316SS	
06	GB/T5782 M8x110	Saddle Screw	4	304SS	
05	2003	Saddle	4	MR	
04	1962.65G GB/T3452.1	O-Ring	2	EPDM	
03	5603.55G GB/T3452.1	O-Ring	2	EPDM	
02	2004	End Plate	2	ABS	
01	20022	2514 Shell	1	FRP	Opt for white, blue or black
	20021	2521 Shell			
	2002	2540 Shell			

NOTE:
1 Design pressure 300PSI(2.1MPa)
2 Design temperature 150°F(66°C)
3 Min. allowable temperature 14°F(-10°C)
4 Working medium, water PH3~11
5 Internal permeate pressure not to exceed 125psi
6 Please operate in accordance with User Manual
7 Subject to change without notice. Check with ROPV to confirm current drawing.
8 Others can be use recycle except shell need specialized callback

Shell Number	L O.A (MM/IN)	S Span (MM/IN)	Approx assembly weight (KG/LB)
2514	427/16.8	200/7.9	274.5
2521	605/23.8	400/15.7	253.5
2540	1008/42.8	700/27.6	330.8

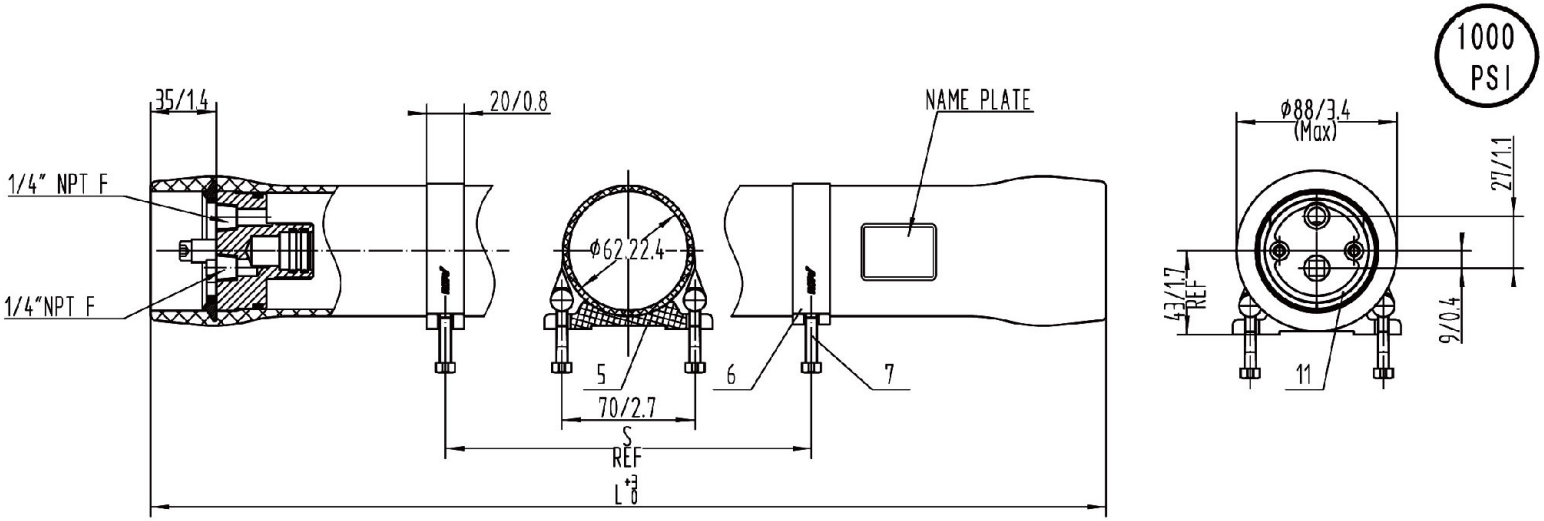
ROPV

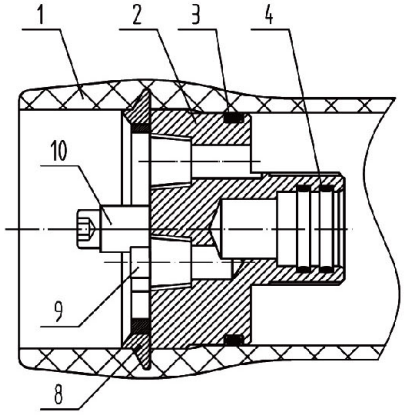
DESIGN
REVIEW
APPROVAL

Harbin ROPV Industry Development Center

MODEL: R25B300E PRESSURE VESSEL
DRG: R25B300E-00
REV: 10

Spec sheets/drawings





Ref	Part Number	Description	Qty	Material	Note
11	2012	Securing Ring	2	316SS	
10	2010	Screw	4	316SS	M6x25
09	2011	Plug	1	ABS	
08	2009.1	Locking Kit Segment	2 Set	316SS	
07	2008	Strap Screw	4	304SS	M6x60
06	2007	Strap	4	316SS-Brass and Rubber	
05	2003	Saddle	4	NR	
04	4007	O-Ring	2	EPDM	19x2.65
03	2005	O-Ring	2	EPDM	56x3.55
02	20041	End Plate	2	2507SS	
01	20022	2514 Shell	1	FRP	Opt for white, blue
	20021	2521 Shell			
	2002	2540 Shell			

1 DESIGN PRESSURE 1000PSI(6.9MPa).
2 DESIGN TEMPERATURE 150°F(66°C).
3 MIN ALLOWABLE TEMPERATURE 20°F(-7°C).
4 WORKING MEDIUM,WATER pH RANGE 3~11.
5 DIMENSIONS IN MM(INCHES APPROX).
6 INTERNAL PERMEATE PRESSURE NOT TO EXCEED 125PSI(0.88Mpa).
7 PLEASE OPERATE IN ACCORDANCE WITH USER MANUAL.
8 FOR REFERENCE ONLY,NOT FOR CONSTRUCTION UNLESS CERTIFIED.
9 SPARE PARTS FORM JUST FOR REFERENCE,SPECIFIC FORM OF THE SPARE PART DRAWING PREVAIL,SUBJECT TO CHANGE WITHOUT NOTICE.
10 ALL PARTS CAN BE RECYCLED EXCEPT FRP SHELL.

Shell Number	L O.A (MM/IN)	S Span (MM/IN)	Approx assembly weight (KG/LB)
2514	482/19	200/7.9	2/4.5
2521	660/26	400/15.7	2.2/5
2540	1143/45	700/27.6	3/6.8

ROPV

DESIGN — Harbin ROPV Industry Development Center

REVIEW

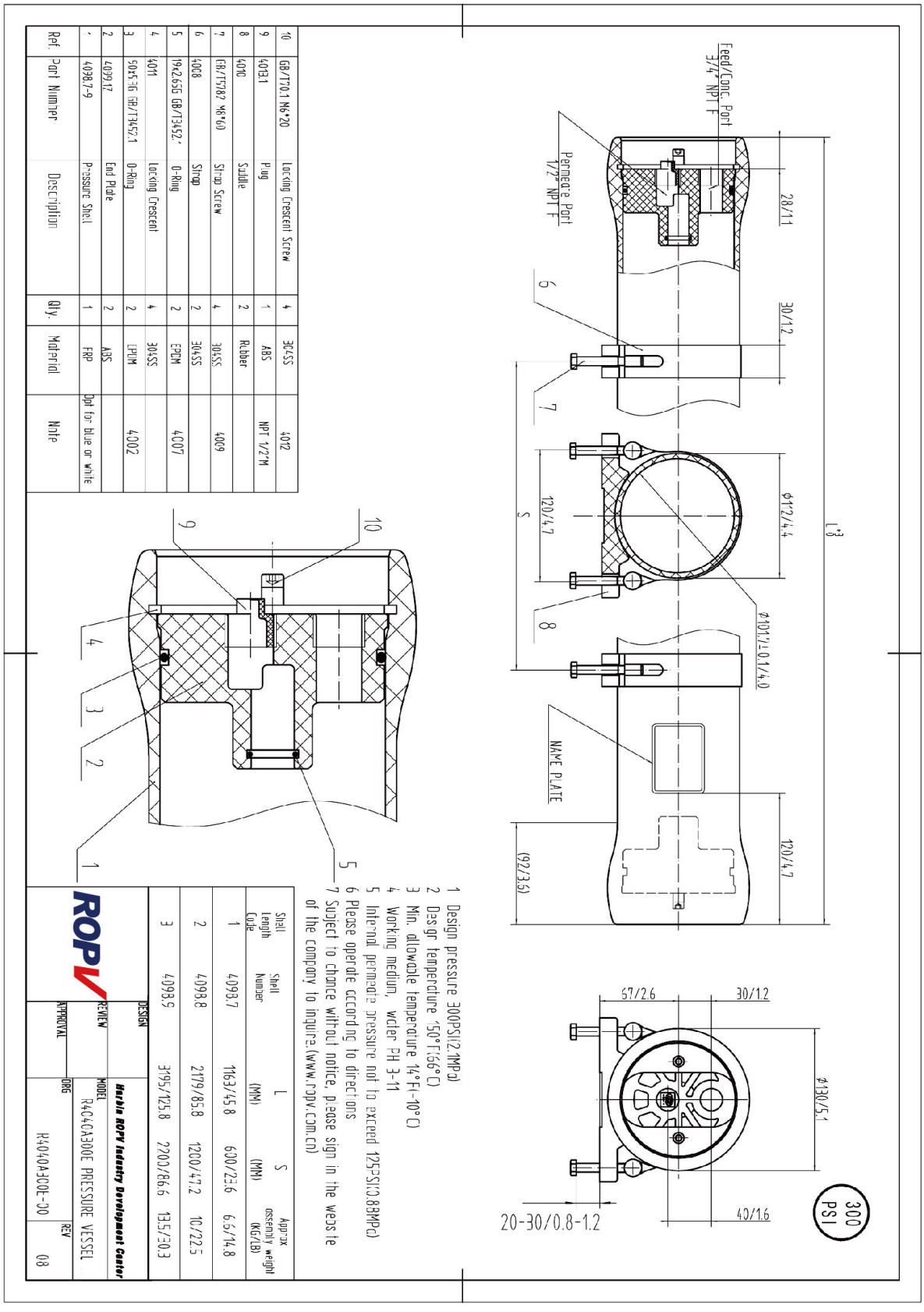
APPROVAL

MODEL: R25C1000E PRESSURE VESSEL

DRG: R25C1000E-00

REV: 12

Spec sheets/drawings



Ref.	Part Number	Description	Qty.	Material	Note
10	GB/T70.1 M6*20	Locking Crescent Screw	4	304SS	4012
9	4013.1	Plug	1	ABS	NPT 1/2"M
8	4010	Saddle	2	Rubber	
7	GB/T5782 M6*60	Strap Screw	4	304SS	4009
6	4008	Strap	2	304SS	
5	19x2.65G GB/T3452.1	O-Ring	2	EPDM	4007
4	4011	Locking Crescent	4	304SS	
3	50x5.3G GB/T3452.1	O-Ring	2	EPDM	4002
2	4009.17	End Plate	2	ABS	
1	4038.7-9	Pressure Shell	1	FRP	Opt for blue or white

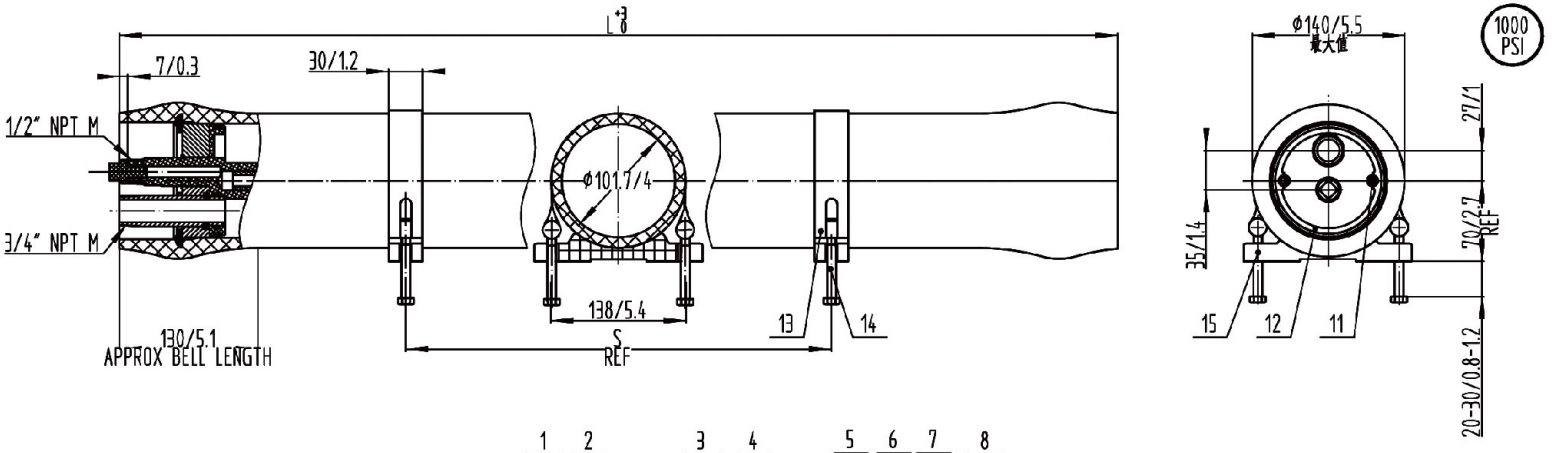
1 Design pressure 300PSI(2.1MPa)
2 Design temperature 50°F(66°C)
3 Min. allowable temperature 14°F(-10°C)
4 Working medium, water PH 3-11
5 Internal permeate pressure not to exceed 125PSI(0.88MPa)
6 Please operate according to directions
7 Subject to change without notice, please sign in the website of the company to inquire.(www.ropv.com.cn)

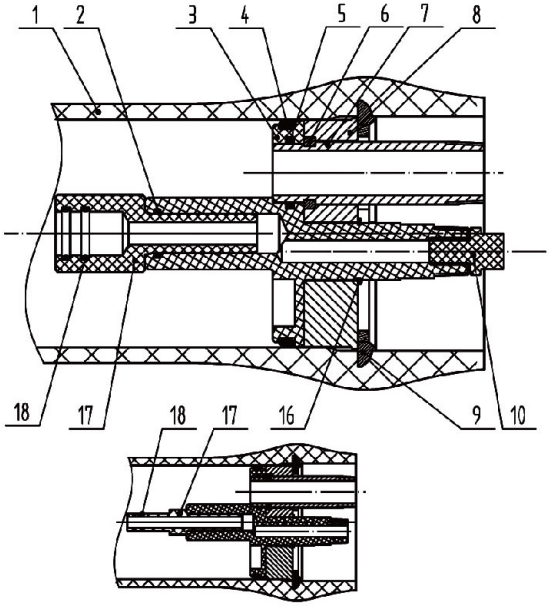
Shell Length Code	Shell Number	L (MM)	S (MM)	Approx assembly weight (KG/LB)
1	4093.7	1163/45.8	600/23.6	6.5/14.8
2	4093.8	2179/85.8	1200/47.2	10/22.5
3	4093.9	3195/125.8	2700/86.6	13.5/30.3

ROPV

DESIGN	Harbin ROPV Industry Development Center	
REVIEW	MODEL	
APPROVAL	R4040A300E PRESSURE VESSEL	
	DRG	REV
	R4040A300E-00	08

Spec sheets/drawings





For Interal Flat Membrane

1 Design pressure 1000PSI(6.9MPa)
2 Design temperature 150°F(66°C)
3 Min. allowable temperature 14°F(-10°C)
4 Working medium, sea water or brackishwater
5 Internal permeate pressure not to exceed 125PSI(0.88MPa)
6 Please operate according to directions
7 Subject to chance without notice, please sign in the website of the company to inquire.(www.ropv.com.cn)
8 Others can be use recycle except shell need specialized callback

Ref	Part Number	Description	Qty	Material	Note
18	12.5x1.8G GB/T3452.1 19x2.65G GB/T3452.1	O-Ring	4	EPDM	
17	4021.1 4021	Adapter	2	Engineering Thermoplastic	Interal Adapter
16	4015	Retaining Ring	2	316SS	
15	4010	Saddle	2-3	Rubber	
14	GB/T5782 M8x60	Strap Screw	4-6	316SS	
13	4008.2	Strap	2-3	316SS	
12	A4025	Securing Ring	2	316SS	
11	GB/T70.1 M6x15	Securing Ring Screw	4	316SS	
10	4013	Plug	1	Engineering Thermoplastic	M12
09	A4024	Locking Kit Segment	2 set	316SS	
08	A4036	Bearing Plate	2	Aluminum Alloy-Hard anodized	
07	A4038	Feed/Conc.Port	2	Super Duplex Stainless Steel	
06	4039	Feed/Conc.Port Fixed Ring	4	316SS	
05	25.8x3.55G GB/T3452.1	O-Ring	2	EPDM	
04	90x5.3G GB/T3452.1	O-Ring	2	EPDM	
03	A4068.2 A4068.1	Sealing Plate	2	Engineering Thermoplastic	For Flat Membrane
02	14x2.65G GB/T3452.1 17x2.65G GB/T3452.1	O-Ring	2	EPDM	
01	A4031.13-18	Pressure Shell	1	FRP	Opt for blue or white

Shell Length Code	Shell Number	L L.O.A (MM/IN)	S Span (MM/IN)	Approx assembly weight (KG/LB)
1	A4031.13	1350/53	600/23.6	11/24.2
2	A4031.14	2366/93	1200/47.2	17/37.5
3	A4031.15	3382/133	2200/86.6	23/50.7
4	A4031.16	4398/173	1600/63.0x2	29/64
5	A4031.17	5414/213	2300/90.6x2	35/77.1
6	A4031.18	6430/253	2700/106.3x2	41/90.4

ROPV

DESIGN
REVIEW
APPROVAL

Hoerbin ROPV Industry Development Center

MODEL R4040C1000E PRESSURE VESSEL

DRG R4040C1000E-00 版次 12