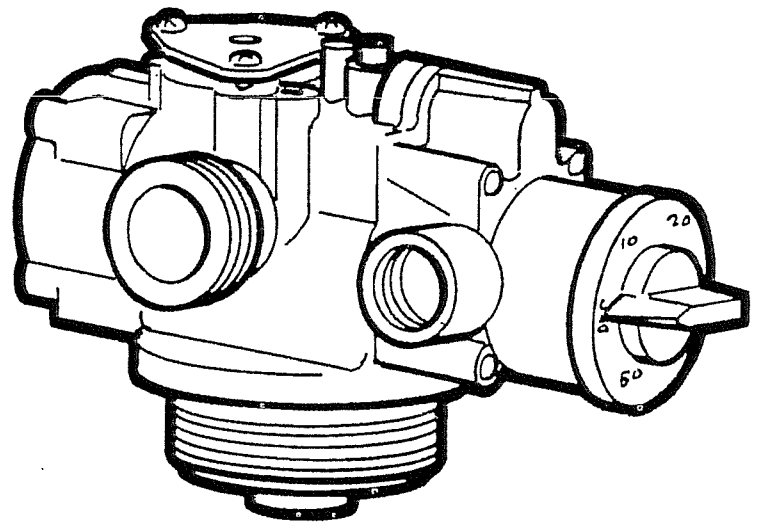
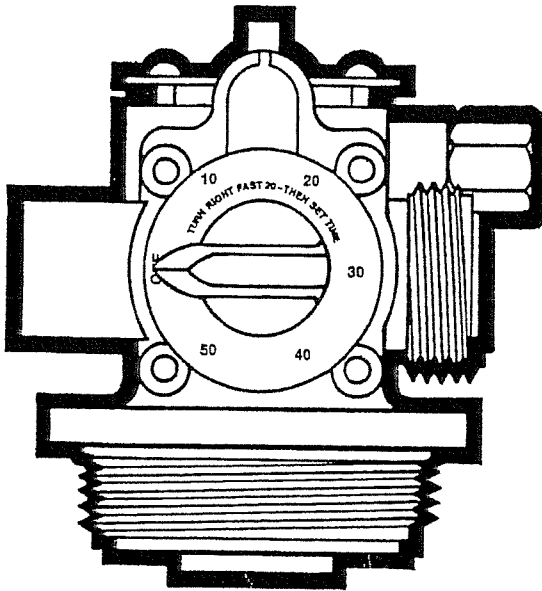


541-030 VALVE



SERVICE MANUAL

Assembly:

1. Cut the top of the distributor tube 1/2 inch below the top of the resin tank threads.
2. Chamfer the top of the tube to prepare it for insertion into the control valve.
3. Verify that the control is equipped with the proper tank o-ring and injector.
4. Install the control valve onto the distributor tube.
5. Grip the control valve body and turn control into the resin tank.

Installation:

General Information

1. When facing the front of the control the inlet is to the right and the outlet is to the left.
2. The system pressure must be between 20 psi and 120 psi.
3. If the system pressure is greater than 120 psi a pressure reducing valve must be installed.
4. The unit must be installed in accordance with local codes.
5. Do not over tighten connections.

Drain Line Connection

1. The drain line I.D. must be at least 1/2 inch.
2. Teflon tape should be used when installing the drain fitting into the control valve.
3. The drain line must be free of kinks.

Brine Line Connection

1. A safety float with an air check must be installed.
2. Insure all connections are tight.

Fitting Kit Connections

1. DO NOT use Teflon tape when connecting the fitting kits to the control valve.
2. If the fitting kit provides a sweat connection, care must be taken to prevent the Noryl nut from melting.

3. Place a wet rag over the copper tube and the Noryl nut prior to heating the tube.

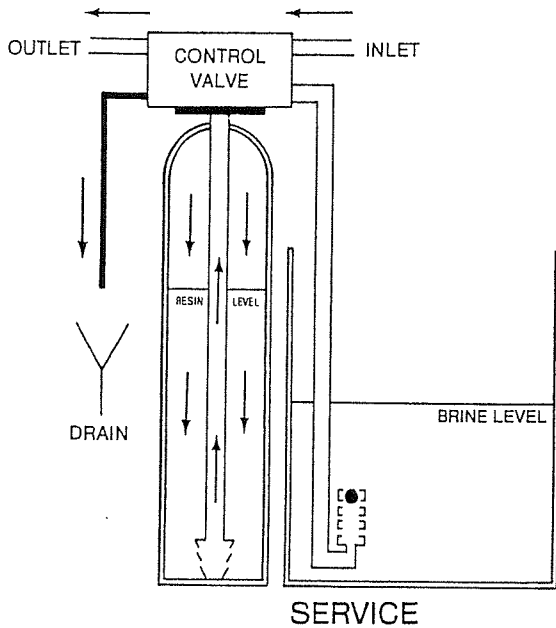
Start Up:

1. Verify that the safety float is set at the desired height.
 2. Insure that the bypass is secured in the "bypass" position.
 3. Verify that the control valve is in the service position.
 4. Open all plumbing connections to allow the free flow of water to the unit.
 5. Slowly shift the bypass valve to the service position.
 6. Allow the water to completely fill the resin tank.
 7. Open a tap and allow softened water to run until all of the air is removed from the system.
 8. Once all of the air is removed, close the tap.
 9. Manually advance the control to the Brine/Slow rinse position.
- Note: The timer knob must be turned past the 20 minute selection on the time dial to ensure proper transfer to the Brine/Slow rinse cycle.**
10. Verify that the control valve will draw water from the brine tank.
 11. Manually return the control valve back to the service position, the control will now fill the brine tank until the safety float checks close.
 12. Add the appropriate amount of salt to the brine tank.

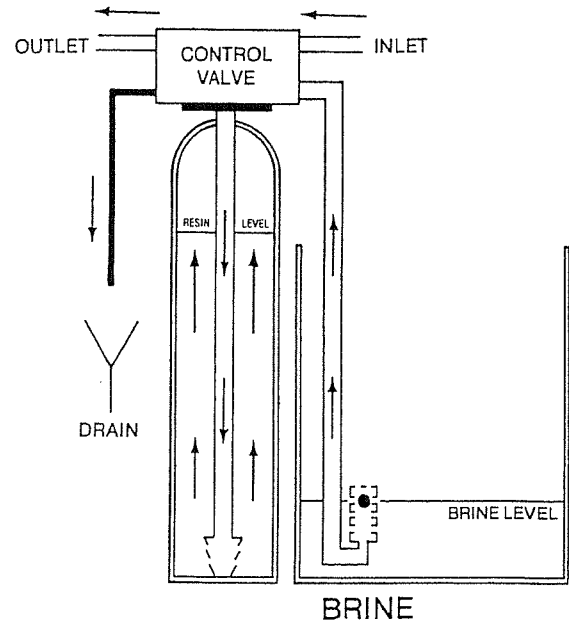
Operation:

1. To initiate a regeneration, turn the twist timer knob to the desired time for brine / slow rinse.
2. Be sure to turn the timer past the 20 minute mark.

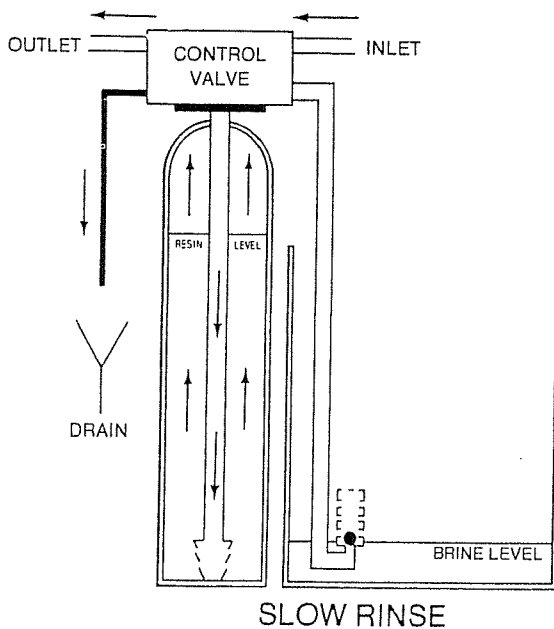
Cycle Flow Diagrams



The service cycle position directs untreated water to flow down through the resin bed in the mineral tank and up through the riser tube. The water is conditioned when passing through the resin.



In brine draw, concentrated salt brine is drawn from the brine tank and directed to flow down through the resin bed to the drain. Brine is drawn until the air check in the brine tank closes.

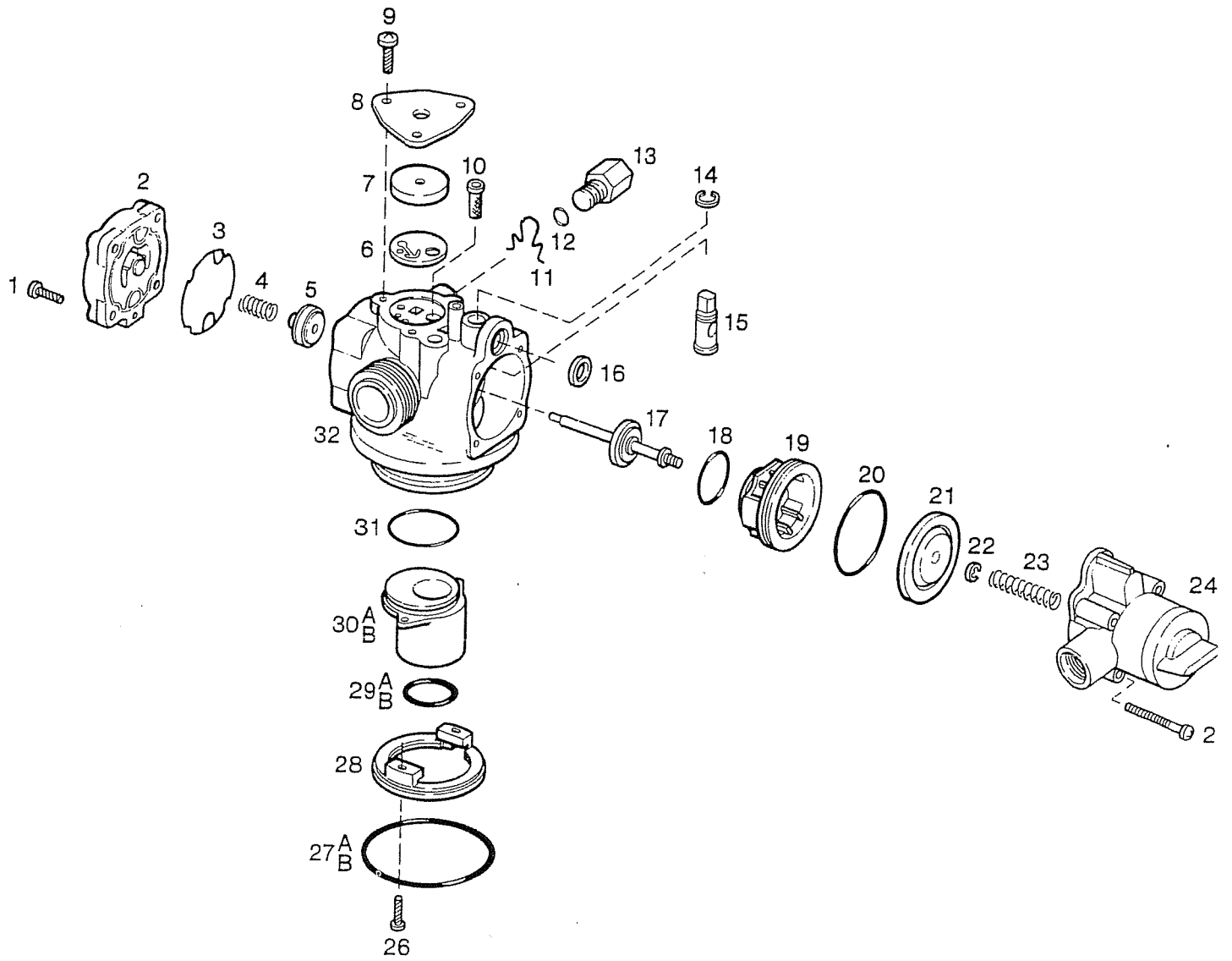


The slow rinse cycle position directs a slow flow of water down through the riser tube and up through the resin bed to drain. This slow flow of water pushes the brine solution through the resin bed

NOTE: THIS CONTROL VALVE FUNCTIONS WITH A PRESSURIZED BRINE LINE. THE USE OF A SAFETY FLOAT IN CONJUNCTION WITH THE AIR CHECK IS REQUIRED.

PARTS LIST

<u>ITEM</u>	<u>P/N</u>	<u>DESCRIPTION</u>	<u>QTY</u>
1.	15-88	Screw, Backcap	4
2.	541-207	Backcap, 3 Cycle	1
3.	541-206	Seal, Backcap	1
4.	541-239	Return Spring, Check Disc	1
5.	541-246	Check Disc	1
6.	541-325	Gasket, Injector	1
7.	428-__	Injector (Specify Size)	1
8.	541-221	Cover Plate, Injector	1
9.	15-89	Screw, Injector Mount	3
10.	413-13	Filter Screen, Injector	1
11.	541-254	Spring Clip	1
12.	186-111-N	O-Ring, Brine Fitting	1
13.	541-250-1	Brine Fitting	1
14.	19-19	C-Clip, Backwash Flow Adjuster	1
15.	541-243	Rinse Flow Adjuster w/o-rings	1
16.	529-244	Gasket, Cross Over Port	1
17.	541-244	Body Stem Assembly	1
18.	185-024-1	O-Ring (Small), Seat Insert	1
19.	541-204	Seat Insert	1
20.	185-028-12	O-Ring (Large), Seat Insert	1
21.	541-256	Main Diaphragm	1
22.	19-3	C-Clip, Main Diaphragm	1
23.	516-221	Return Spring, Main Diaphragm	1
24.	541-290-11	1 Hr. Timer Assembly	1
25.	15-87	Screw, Timer Mount	4
26.	19-90	Screw, Adapter Ring	2
27A.	185-231-1	O-Ring, Structural Tank	1
27B.	186-105	O-Ring, Park Tank	1
28.	541-232	Adapter Ring	1
29A.	185-211-1	O-Ring, 13/16" Riser Adapter	1
29B.	185-214-1	O-Ring, 1.050" Riser Adapter	1
30A.	541-205	13/16" Riser Adapter	1
30B.	541-218	1.050" Riser Adapter	1
31.	185-029-1	O-Ring(Outside), Riser Adapter	1
32.	541-257-1	Valve Body & Seal	1



Troubleshooting Guide:

Symptom / Cause	Solution
1. Unit Fails To Regenerate A. Low inlet pressure. B. Drain line is restricted. C. The brine injector is plugged. D. Main diaphragm is torn. E. Regeneration length too short.	A. Verify that the service inlet pressure is a minimum of 20 psi. B. Insure that the drain line is free of kinks. C. Clean or replace injector. D. Replace diaphragm. E. Insure that the length of regeneration exceeds 20 minutes.
2. Hard Water To Service A. The bypass valve is open or faulty. B. No salt in the storage tank. C. Not enough water in the storage tank. D. Unit fails to draw brine. E. Excessive water usage. F. Unit not regenerating. G. Loss of resin. H. Change in raw water hardness. I. Leak at the distributor tube.	A. Close bypass valve. B. Add salt. C. Verify that the safety float is properly set. D. See Symptom/Cause #6. E. Check regeneration frequency. F. See Symptom/Cause #1. G. See Symptom/Cause #4. H. Test water hardness. I. Verify that the distributor tube is seated correctly and is not cracked.
3. Excessive Salt Usage A. Excessive water in storage tank. B. Regeneration is taking place too frequently. C. Faulty safety float.	A. Verify that the safety float is properly set. B. Verify water usage matches system size and salt dosage. C. Replace safety float.
4. Loss Of Resin A. Faulty air check in storage tank. B. Leak at the distributor tube.	A. Clean or replace air check. B. Verify that the distributor tube is seated correctly and is not cracked.
5. Salt Water To Service A. Brine/Slow Rinse cycle time set too short. B. Excessive water in the storage tank. C. Brine injector undersized.	A. Verify cycle time. B. Verify that the safety float is adjusted correctly and operating properly. C. Verify proper injector selection.

Symptom / Cause

Solution

6. Control Fails To Draw Brine

- A. Brine injector is plugged.
- B. Filter screen plugged.
- C. Loose brine line connection.
- D. Drain line is restricted.
- E. Low inlet pressure.
- F. Main diaphragm is torn.

- A. Clean or replace injector. Follow the procedure detailed in the Parts Replacement section of this manual.
- B. Clean or replace screen.
- C. Verify that all the brine line connections are tight.
- D. Insure that the drain line is not kinked or plugged.
- E. Verify that the service inlet pressure is a minimum of 20 psi.
- F. Replace diaphragm.

7. Continuous Flow To Drain

- A. Defective clock assembly.

- A. Replace clock assembly.

8. Loss Of Water Pressure

- A. Iron build up in mineral tank.
- B. Lower distributor basket crushed.

- A. Increase salt dosage or regenerate more frequently.
- B. Replace basket and verify that the distributor is cut 1/2 inch below the top of the tank threads.

Parts Replacement:

General Information

Familiarize yourself with the parts replacement procedures and component parts thoroughly before attempting any repair.

Insure that the unit is in the bypass position and relieve the system pressure before attempting any repair procedure.

Required Tools

The following tools are required to perform routine maintenance on this control valve.

- Phillips Screwdriver
- Needle Nose Pliers
- Adjustable Wrench
- Small Standard Screwdriver

Timer Assembly Replacement

1. Place the bypass valve into the "bypass" position.
2. Relieve the system pressure.
3. Remove the four (4) head mounting screws.
4. Lift the timer assembly away from the valve body.
5. Follow these steps in reverse to reinstall the timer assembly.

Note: Prior to re-installment insure that the main return spring is centered over the main diaphragm.

Main Diaphragm Replacement

1. Place the bypass valve into the "bypass" position.
2. Relieve the system pressure. Remove the four (4) head mounting screws.
3. Lift the timer assembly away from the valve body.
4. Remove the c-clip from the center of the diaphragm.
5. Lift the diaphragm away from the body stem assembly.
6. Follow these steps in reverse to reinstall the main diaphragm.

Note: Prior to reinstallation insure that the main return spring is centered over the main diaphragm and that the outside edges of the main diaphragm are tucked into the valve body.

Rinse Adjustment Valve Replacement

1. Place the bypass valve into the "bypass" position.
2. Relieve the system pressure. Remove the four (4) head mounting screws.
4. Lift the timer assembly away from the valve body.
5. Remove the c-clip from the center of the diaphragm.
6. Lift the diaphragm away from the body stem assembly.
7. Remove the seat assembly.
8. Disconnect the large c-clip located on top of the rinse adjustment valve.
9. Press the rinse adjustment valve down and out through the valve body assembly.
10. Inspect the o-rings on the valve for wear. Clean or replace the valve assembly if necessary.
11. Lightly lubricate the o-rings with a Dow 111 Silicone based lubricant.
12. Follow these steps in reverse to re-install the rinse adjustment valve.

Drain Seat Replacement

1. Place the bypass valve into the "bypass" position.
2. Relieve the system pressure.
3. Disconnect the drain fitting from the control valve drain outlet.
4. Use a large standard screwdriver to remove the drain seat. Turn out counter-clockwise.
5. Prior to installing the drain seat, lubricate the o-ring(s) with dish soap.
6. Turn in the drain seat, until the fitting becomes bottoms out.
7. To properly align the drain seat with the drain paddle back out seat four (4) full turns.
8. Pressurize the system and check drain for leaks.

Note: After backing out the drain seat the seat may still require minor adjustment to eliminate leaks. Turn the seat in or out the until the leak to drain stops.

Injector and Filter Screen Replacement

1. Place the bypass valve into the "bypass" position.
2. Relieve the system pressure.
3. Remove the three (3) screws from the triangular cover plate.
4. Lift away the cover plate.
5. Remove the injector from the valve body and separate the gasket from the injector.
6. Inspect the injector cavities for blockage.
7. Remove the filter screen from the valve body and inspect the screen for dirt. Replace if necessary.
8. Follow these steps in reverse to re-install the injector and filter screen.

Note: Prior to re-installing the injector gasket, insure that the side marked "OUT" is facing the injector.

Riser Replacement

1. Place the bypass valve into the "bypass" position.
2. Relieve the system pressure.
3. Disconnect the unit from the bypass connections.
4. Remove the unit from the resin tank.
5. Turn out the upper distributor basket from the unit adapter ring.
6. Remove the two (2) adapter hold down screws, and lift away the adapter ring.
7. Separate riser assembly from valve body.
8. Clean the riser o-rings and wipe out the valve body cavity.
9. Use a Dow 111 Silicone based lubricant to lightly lubricate the riser o-rings and the valve body cavity.
11. Follow these steps in reverse to re-install the riser assembly.

Check Disc Replacement

1. Place the bypass valve into the "bypass" position.
2. Relieve system pressure.
3. Remove the four (4) screws from the backcap.
4. Place a hand under the backcap and remove the backcap. The check disc return spring will fall into your hand.
5. Remove the check disc from the back of the body stem assembly.
6. Inspect the rubber seal on the check disc for wear. Clean or replace if necessary.

7. Re-install the check disc on body stem assembly.
8. Place a small amount of Dow 111 Silicone based lubricant on the back cap center post.
9. Insure that the back cap gasket is properly seated in backcap.
10. Install check disc return spring onto center post.
11. Align the mark on top of the back cap with the mark on valve body and carefully direct open end of return spring onto the center post of the check disc.
12. Install the four (4) back cap screws.
13. Pressurize system and check for leaks.

Body Stem Assembly Replacement

1. Place the bypass valve into the "bypass" position.
2. Relieve the system pressure.
3. Remove the four (4) head mounting screws.
4. Lift the timer assembly away from the valve body.
5. Remove the c-clip from the center of the diaphragm.
6. Lift the diaphragm away from the body stem assembly.
7. Remove the Seat Assembly.
8. Lift out the body stem assembly.
9. Inspect the center check disc rubber seal for wear. Clean or replace if necessary.
10. Re-install the body stem assembly.
11. Lightly lubricate the seat assembly o-rings with a Dow 111 Silicone based lubricant.
12. Re-install the seat assembly, insure that one of the two (2) flats is facing towards the top of the valve body.
13. Re-install the main diaphragm and the timer assembly.
14. It is now necessary to reseal the rear check disc. Refer to the Check Disc Replacement procedure.

Units of Hardness:

1 French Degree	= 10 mg CaCO ₃ (Calcium Carbonate) per liter of water
1 German Degree	= 10 mg CaO (Calcium Oxide) per liter of water
1 Clark Degree	= 1 grain CaCO ₃ (Calcium Carbonate) per Imperial Gallon of water
1 grain/US Gallon	= 1 grain CaCO ₃ (Calcium Carbonate) per U.S. Gallon of Water
1 New US & UK unit	= 1 mg CaCO ₃ (Calcium Carbonate) per 1000 grams of water
1 Russian Degree	= 1 mg Ca (Calcium) per liter of water
1 part per million (ppm)	= 1 mg CaCO ₃ (Calcium Carbonate) per 1000 grams of water
1 grain/US Gallon	= 17.1 ppm

	French (°F)	German (°G)	Clark (°C)	Grain (GPG)	US/UK	Russian (°R)	ppm
1 French Degree	1.00	0.560	0.70	0.583	10.0	4.0	10.0
1 German Degree	1.78	1.000	1.25	1.040	17.8	7.2	17.8
1 Clark Degree	1.43	0.800	1.00	0.833	14.3	5.7	14.3
1 grain/US Gallon	1.71	0.958	1.20	1.000	17.1	6.8	17.1
1 New US & UK Unit	0.10	0.056	0.07	0.058	1.0	0.4	1.0
1 Russian Degree	0.25	0.140	0.18	0.150	2.5	1.0	2.5
1 part per million	0.10	0.056	0.07	0.058	1.0	0.4	1.0

Conversion Information:

Length:

1 mile	= 1609 m
1 yd	= 0.9144 m
1 ft	= 0.308 m
1 in	= 25.4 mm
1 mil	= 0.0254 mm

1 km	= 0.621 miles
1 m	= 1.093 yd
1 m	= 3.28 ft
1 cm	= 0.3937 in
1 mm	= 39.37 mil

Area:

1 yd ²	= 0.8361 m ²
1 ft ²	= 0.0929 m ²
1 in ²	= 6.45 cm ²

1 m ²	= 1.196 yd ²
1 m ²	= 10.764 ft ²

Temperature:

1 Degree Celcius = ((°F-32)*5)/9

1 Degree Farenheit = ((9*°C)/5)+32

Volume:

1 ft ³	= 28.318 liters
1 liter	= 0.03532 ft ³

1 Gal. US	= 3.785 liters
1 liter	= 0.2642 Gal. US

Pressure:

1 psi	= 6894.76 Pa
1 psi	= 0.06895 bar
1 psi	= 51.715 mm Hg

1 Pa	= .000145 psi
1 bar	= 14.504 psi
1 mm Hg	= 0.0193 psi

Velocity:

1 US Gal/min.	= 3.785 liters/min.
1 US Gal/min.	= 227.1 liters/hr
1 US Gal/min.	= 0.227 m ³ /hr

1 m ³ /hr	= 4.403 US Gal/min.
1 liter/hr	= 0.0044 US Gal/min.

Weight:

1 lb.	= 0.4536 kg
1 kg	= 2.2046 lb.