



SUBJECT:

PREPARATION OF DEIONIZED WATER  
 Process Specification

SUPERSEDED DATE

SCHEDULE NO. 1

This specification initially applies to Lancaster Powerhouse preparation of W60A for use in settling fluorescent screens.

1. EQUIPMENT

- a. Cyanamid FILTER-STIL, Model L-1000.  
 Nominal flow rate - 1000 gal./hr.  
 Rated capacity per cycle - 160,000 grains CaCO<sub>3</sub>.  
 Minimum operating pressure - 35 psi.  
 Designed operating pressure - 75 psi.

2. MATERIALS

- Tap Water - City water supply.
- Common Salt - NaCl, Tech.
- A24 Sulfuric Acid, 66° Be, Tech.
- S30 Caustic Soda Flake - NaOH, Tech.



SULFURIC ACID SAFETY PRECAUTIONS:

See 33-2-7

CAUSTIC SODA (SODIUM HYDROXIDE) SAFETY PRECAUTIONS: See 33-2-8

3. GENERAL OPERATION

- a. The deionizer is first backwashed with water to classify the resin particles and to remove large insoluble material. The acid columns 1 and 3 are then washed with brine and water rinsed, then washed with acid followed by a water rinse. The caustic columns are washed with caustic then water rinsed. Dials are then set to run.
- b. The deionizer shall not be connected to service if the water is not within specifications.
- c. Samples of effluent shall be taken as specified in the material handling specifications.
- d. The delivery of water from the deionizer to service shall be stopped whenever C. & P. Lab. reports indicate improper operation of the unit.
- e. The Meter Lab. shall maintain a standard resistivity meter which shall be used to calibrate the Powerhouse instruments at weekly intervals.

4. ORDER OF OPERATION

- a. Preparation of Regenerant Solutions.
  - 1. Rubber gloves and goggles must be worn while regenerant solutions are being made. All personal contact with both caustic soda and sulfuric acid must be avoided, and containers of these chemicals should be handled carefully.
  - 2. Always make sure that water has been added to the tank before adding acid. Always add acid to water. Never add water to acid.
  - 3. Regenerant solutions should be mixed as indicated following:
    - a. The solutions should be thoroughly mixed with a wood paddle until chemicals are completely dissolved.

Caution: Stir carefully to avoid scraping the side of the regenerant tank and damaging its special corrosion resistant lining.

(Cont. on page 1a).

SCALE—

DIMENSIONS IN

UNLESS OTHERWISE SHOWN.

DIMENSIONS SHOWN WITHOUT TOLERANCES ARE DESIGN CENTERS

1-5212-18-62

PCL19661-126LM

\* CHANGE  
 \*\* ADDITION  
 \*\*\* DELETION

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SUBJECT:

4. ORDER OF OPERATION (Cont.)

Regenerants	Lb.	Depth of Water, Inches Up	Total Depth	Inches of Water, Level from Tank Top
Common Salt	24	22	26	2
Sulfuric Acid	80	19	24	4
Caustic Soda- Col. 2	20	18	24	4
Caustic Soda- Col. 4	20	18	24	4

b. Sequence Operation of Controls

1. Backwash: (Dial BW-2-4) - Control at 10 gpm. for 15 min.  
 (Dial BW-1-3) - Control at 10 gpm. for 15 min.

On backwashing always have glass jars under drains. Usable resin must not be lost. Start at slow rate and gradually increase flow.

2. Regeneration:

Brine (Dial Reg. 1-3) - Open brine valve wide. Control at 12 gpm. for 10 min. Close brine valve when liquid is 2 in. from bottom.

§ Brine Rinse (Dial Rinse 1-3) - Control at 12 gpm. for 2 min.

Acid (Dial Reg. 1-3) - Open acid valves to Col. 1 and 3. Control 12 gpm. for 15 min. Close acid valves when liquid level is 2 in. from bottom

Acid Rinse (Dial Rinse 1-3) - Control at 15 gpm. for 15 min. (240 gal.).

Caustic (Dial Reg. 2-4) - Open caustic valves to Col. 2 and 4. Control at 11-1/2 to 12 gpm. for about 10 min. Close caustic valves when liquid levels are 2 in. from bottom.

Rinse Col. 2 and 4 (Dial Rinse 2-4) - Control at 16 gpm. for 15 min. (240 gal.).

Rinse Col. 4 (Dial Rinse 4) - Toggle switch off. Control switch on. Control at 16 gpm. until green light shows.

Run (Dial Run) - Toggle switch on. Control at desired rate.

§ A brine regeneration of Col 1 is advisable, prior to standard regeneration, if the raw tap water is excessively hard; i.e., if the hardness cations constitute more than one-fourth of the total cations present.

When redlight shows permanently, unit is exhausted; start at backwash above.

c. Special Conditions

1. Shut-down (Dial Stop) - Close control valve. Controller switch off.
2. Start up after shut-down (Dial Rinse 4) - Toggle switch off. Control switch on. Open control valve. Control at 16 gpm. until green light shows, then:
3. Run (Dial Run) - Toggle switch on. Control at desired rate.

d. Regeneration Tanks Refill.

(Dial Stop) - Open regenerant valves. Open control valves. Fill to desired height.

e. Remove resins, when occasion arises, as follows:

1. Working with one column at a time, close all valves and move the Solo Valve to wash position.
2. Unbolt and remove the top flange.

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(Cont. on pg. 1b)

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SUBJECT:

4. ORDER OF OPERATION (Cont.)

- e. Remove resins, when occasion arises, as follows: (Cont.)
3. Insert a 3/4 in. hose through top of the column, open the tap water valve, slowly, and siphon out the resins. Care should be taken to avoid damaging the lining of the column. If resins are to be used again, they should be collected separately from the columns in labelled containers. Settling room shall be advised when new resin has been added.
- f. Add resins, when occasion arises, as follows:
1. Close all the regenerant and tap water valves, and the valve governing the flow of water from the Unit to the service or storage tank.
  2. Unbolt and remove the top flange from each of the four columns.
  3. Move all four Solo valves to the Wash position.
  4. Open the influent valve slowly. When each column is slightly more than half full of water, close the influent valve.
  5. Taking care to add the right resin to the right column, slowly pour resins into each of the columns. The resins should gradually settle; if any resin rises and floats, stir carefully with a wooden paddle, avoiding damage to the lining of the column.
  6. Replace flange and tighten bolts.
  7. Allow resins to soak for at least 8 hours before the unit is put into operation.
  8. Advise all users of water when resins have been added.
- Cation Resin is "Ionac" Resin C 200.  
Anion Resin is "Ionac" Resin A 300.
- g. If any of the Solo valves show a pronounced drip over an extended period the rubber grommet should be replaced. (See page 5 of manufacturer's operating instructions for precautions in reassembling a Solo valve.) All other valves should be reground as necessary.
- h. Columns should be always full of water. Every effort should be made to keep air out of the columns. Air in columns is indicated by short runs to exhaustion. Air causes channeling. Resin will regain strength after air is eliminated from column and resin has been backwashed in next cycle.
- i. If run time is shorter than usual:
1. Check the quality of the tap water; a decided increase in the dissolved solids content of the tap water will exhaust the resins more quickly than usual.
  2. Check the flow rate; an excessive flow rate may cause incomplete deionization, and will always cause a shorter cycle.
  3. Check all valves, particularly regenerant valves, for leaks.
  4. Check setting on the controller.
  5. Check the regeneration and backwash procedures in succeeding cycles. Repeatedly excessive backwash rates may cause a decrease in capacity of the unit. In that event lost resins should be replaced. Excessive backwash may also prevent attainment of the maximum quality of water.

ENGINEERING SECTION  
STANDARDIZING

SCALE—

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