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	COMPANY POLICY / PROCEDURE		
	Filling and Starting a Crystallizer	Page : 1 of 4	Revision : 04 Date : 7/8/2009
	Author: Patrick Owen	Job Specific Instruction	

Personnel responsible:

1. Lead Operator, Material Handler

Safety:

Safety shoes and safety glasses are required when working in, on, or around the crystallizers.

Summary:

To start a crystallizer, it is emptied of any water, filled from the bottom, and slowly brought to operating condition for production.

Procedure:

A. Fill the Crystallizer

1. [Drain the elbow with the elbow drain and close it.](#)
2. Note: Condensation can form in elbow and make it look like the seal is bad – only verify seal if the crystallizer is completely empty
3. Open the bottom valve on the crystallizer to ensure it has been drained.
4. Connect a hose from the Brine Tank #2 discharge valve to the Liquid Load Pump.
5. Connect the outlet of the Liquid Load Pump to the bottom of the crystallizer.
6. Open the Brine Tank #2 discharge valve and start the Liquid Load Pump.
7. Begin filling the crystallizer with brine.
8. [When the level goes above the elbow,](#) (about 120 inches) [start the elbow pump \(#1-47Hz, #2-43Hz, #3-60Hz\)](#)
9. When the liquid again reaches 120 inches, close the bottom valve.
10. Stop the Liquid Load Pump and close the Brine Tank #2 discharge valve.
11. Uncouple the hoses and clean up.
12. Using the Mother Liquor feed, fill the Crystallizer up to 165 inches.

B. Start Cooling

1. Ensure the small condenser pump is running.
2. Start the large condenser water pump and the mass flow pump.
3. Start the vacuum pump,
4. Ensure the steam is on the steam jet.
5. Put the vacuum set point on 0.85 “ Hg.
6. The temperature should begin to drop. When it gets to 30 deg C., (temperature reading from mass flow meter and/or production screen) crystals will appear in the sight glass.
7. Ensure the elbow pump (53 Hz on #1, [47 Hz on #2, 60 Hz on #3](#)) is at the proper speed
8. The crystallizer is now ready for start up.

C. Using the Heat Exchanger

1. Ensure Crystallizer discharge is set to go to Mother Liquor Pot.
2. Set the set point on the discharge control to 14 gpm.
3. At the heat exchanger, connect Crystallizer discharge to exchanger feed (open feed valve).
4. Close the exchanger sample and drain valves.



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5. Open the heat exchanger discharge valve to the Mother Liquor Tank.
6. Open Crystallizer discharge valve (and close Crystallizer Solids Sample valve) and let flow stabilize.
7. At exchanger, verify flow by opening the exchanger's sample valve.
8. Ensure the condensate valve is fully open.
9. Open manual steam valve completely.
10. Watch the controller screen and feel the pipe to ensure discharge is heating up.
11. Put the crystallizer level control set point on 165 inches.
12. Start Brine into Crystallizer and note the time.
13. Watch the crystallizer and exchanger, adjust set points as necessary.
14. When the density in the Crystallizer reaches 1.40, close the crystallizer discharge valve and wash water completely through the system.
15. Go to the exchanger, close the valve to the Mother Liquor tank, and open the valve to the Brine Feed Tank (middle valve).
16. Close the wash water and open the crystallizer discharge valve
17. Add about 4 gpm of Mother Liquor and make sure the level control is working.
18. Every 2 hours check the solids and crystal size by sampling - the crystals should start to feel bigger after 6 hours through the heat exchanger.
19. Continue running at least the initial 6 hours and until crystals are large enough to dry well. You can compare crystallizer samples to get an idea.
20. When ready for dryer, stop crystallizer discharge and open washout.
21. Wash completely into the brine tank.
22. Close the manual steam valve for the heat exchanger.
23. Ensure washout and sample valves on the heat exchanger are open to drain the system.

D. Start Drying the Crystals

1. Open Solids sample valve into ML Pot and close feed valve (to centrifuge but still connected to exchanger at this point).
2. Open the crystallizer discharge.
3. Ensure flow is going into Mother Liquor Pot.
4. Swap hose to Centrifuge.
5. Close the sample and open the feed to centrifuge.
6. Check to ensure feed to centrifuge.
7. Adjust the discharge set point to the centrifuge to about 15 gpm to begin with because the crystals will still be fine. After another 8 to 12 hours the crystals will grow enough to increase the discharge rate as required for production needs.

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TRAINING DOCUMENTATION

	EMPLOYEE	TITLE	SIGNATURE	DATE
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REVISION HISTORY

Revision Number	Revision Date	Revision Author	Revision Description
00	12/5/2005	PLO	Original Procedure
01	12/7/2007	N/A	Unknown – Undocumented Changes
02	9/30/2008	PLO	Updated for using brine to fill crystallizer
03	1/15/2009	PLO	Added note about condensation in elbow appearing as seal problem (section A step 2)
04	7/8/2009	PLO	Incorporated heat exchanger procedure into filling and starting for greater clarity