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STANDARD PROCEDURE

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Plant Springfield

Number SDP 88-632B

92-632B

Department Vinyl Chloride Polymerization

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TITLE Standard Operating Procedures For Opalon Suspension Polymerization

Section 632.0 Process Details for Opalon 600-Series Homopolymers

632.01 Summary

This procedure describes polymerization of
Opalon 600 Series PVC homopolymers in 3700-
gallon glass-lined reactors. Summary of
polymerization conditions is attached.

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BY *A. O. Ericksberg*

632.01 Summary of Polymerization Conditions

	660	650	630	610	600
*A. Formulation & Measuring Technique					
1. VCM	Meter	11,000 lbs.	11,000 lbs.	11,000 lbs.	11,000 lbs.
2. Water-kettle charge	Meter	1700 gal.	1700 gal.	1700 gal.	1700 gal.
Water-B 1 charge	vol. & meter	130 gal.	130 gal.	130 gal.	130 gal.
Water-L2O2 charge	Meter	200 gal.	200 gal.	200 gal.	200 gal.
3. B-1	Weigh	7 lbs. 8 oz.	7 lbs.	4 lbs.	3 lbs.
4. C-1	Weigh	30 lbs. 2 oz.	30 lbs. 2 oz.	27 lbs. 8 oz.	22 lbs.
5. L2O2	Weigh	25 lbs. 5 oz.	25 lbs. 5 oz.	16 lbs. 8 oz.	21 lbs.
6. DAM	Volume	1000 ml.	None	None	None
7. TCE	Weigh	None	None	50 lbs.	185 lbs.
8. Antifoam	Volume	Sterox 110 4 qts. max.	Sterox 110 4 qts. max.	Hallco CPH -35N 3 qts. max.	Nopco NXZ 4 qts. max.
B. Water Temp. During Purge		54-61°C	54-61°C	58-61°C	58-61°C
C. Vacuum Purge, Minutes @ Boil		5	5	10	10
D. Batch Temp. During L2O2 Addition		49-52°C	49-52°C	Below 57°C	Below 57°C
*E. Reaction Temperature		53-1/2°C	54-1/2°C	59-1/2°C	59-1/2°C
F. Maximum Heat Kick		64°C	64°C	66°C	66°C
1. Full Cold Water-Temp. rise		+ 1°C	+ 1°C	+ 1°C	+ 1°C
2. Water Injection		57°C	57°C	62°C	62°C
G. Final Vent		50 psig or 20 minutes after 75psig	Same as 660	50 psig or 45 minutes after 100psig	Same as 630
H. Agitator Speed, RPM	1. 88 Bldg. 2. 92 Bldg.	92 86	92 86	92 86	92 86

*The exact batch formulation and reaction temperature for each kettle are specified daily by the Operating Supervisor, on a daily instruction card.

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632.10 Raw Materials

632.11 Description and Hazards of Raw Materials

The raw materials normally encountered in the polymerization area are listed below with a brief description of the hazards. A more complete definition is written in Section 1160, Safety.

- | | |
|--|---|
| 1. TCE + high heat
(open flame) | phosgene
(highly toxic) |
| 2. TCE + caustic | explosive mixture
(dichloroacetylene) |
| 3. L ₂ O ₂ + glycerine | combustible material |
| 4. Calcium Hydroxide (Lime)
+ L ₂ O ₂ | Heat and decomposition of
L ₂ O ₂ + possible fire |
| 5. PDR-1 | Doesn't normally support combustion, will
burn under application of heat and oxygen. |
| 6. Caustic | Causes extremely bad chemical burns, es-
pecially to eyes, exothermic (gives off
heat) when dissolved in water. |
| 7. VCM | Extremely flammable and explosive |
| 8. VAc | Flammable liquid and vapors present explosion
hazard -- vaporization is slower than VCM. |
| 9. DAM | Not highly combustible |
| 10. Glycerine | Will burn in presence of oxidizing agent |
| 11. TCE | Not flammable -- store in cool dry place.
Explosive at high temperatures. |
| 12. L ₂ O ₂ | Extremely flammable -- store in cool dry
place. Avoid contamination with organic
compounds. Avoid Spillage. |
| 13. B-1 | No fire but dust explosion hazard. |

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632.11 Description and Hazards of Raw Materials (Cont'd.)

- | | |
|-------------------------------------|---|
| 14. C-1 | No fire or explosion hazard, but will burn in presence of oxidizing agent. Slipping Hazard. |
| 15. Calcium Hydroxide | Not flammable, will irritate eyes, nose, etc. |
| 16. Dytol | Slightly Flammable, Slipping Hazard |
| 17. Nopco NXZ | No fire, Slipping Hazard |
| 18. Sterox 110 | No fire, Slipping Hazard |
| 19. Hallco CPH-35N | No fire, Slipping Hazard |
| 20. Tetrahydrofuran (Solvent) - | High Flammable and Explosive, Irritates Eyes, Nose, etc. Must be routinely inhibited to prevent formation of Peroxides. |
| 21. Methyl Ethyl Ketone (Solvent) - | High Flammable, Irritates Eyes, Nose, etc. |
| 22. Cyclohexanone (Solvent) - | Moderate Fire Hazard, Slightly Toxic Fumes, Irritates Eyes, Nose, etc. |
| 23. Acetone (Solvent) - | Highly Flammable, Large Fume Concentrations cause Headaches |

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632.12 Raw Material Charge Measurement

A polymerization log sheet, Form MS-2444, is to be completely filled out with all readings recorded. A sample of the form is attached.

632.121 Vinyl Chloride Monomer Charge Quantity

Due to density changes with temperature, it is necessary to correct the VCM volume charge for VCM temperature as shown in the following table:

Volume for 11,000 lbs. VCM

<u>VCM Temperature</u>	<u>VCM-Volume (gal.)</u>
0	1391
1	1393
2	1396
3	1399
4	1401
5	1404
6	1406
7	1409
8	1412
9	1415
10	1418
11	1420
12	1423
13	1426
14	1429
15	1432
16	1434
17	1437
18	1440
19	1443
20	1445
21	1448
22	1451
23	1454

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632.121 Vinyl Chloride Monomer Charge Quantity (Cont'd.)

Volume for 11,000 lbs. VCM

<u>VCM Temperature</u>	<u>VCM Volume (gal.)</u>
24	1457
25	1459
26	1462
27	1465
28	1468
29	1471
30	1474
31	1477
32	1480
33	1483
34	1486
35	1489

632.122 Vinyl Chloride Meter Calibration

Accurate VCM charging is essential. Hence, VCM meters are calibrated on a weekly basis using the procedures defined in Section 610.10.

632.123 Process Water Charge Quantities

The process water is divided between:

- (a) the initial kettle water charge
- (b) the water used for dissolving and flushing B-1 into kettle
- (c) the water used for "delayed catalyst" injection into kettle

- (a) The correct initial kettle water dipstick charges without B-1 are:

91-98 Kettles	73 inches
81-86 Kettles	80-1/2
87 Kettle	82-1/2

When the experimental tank in 88 Bldg. is used for B-1, 60 gallons less water is used for the initial kettle charge.

81-86 Kettles	82-1/2 inches
87 Kettle	84-1/2

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632.123 Process Water Charge Quantities (Cont'd.)

(b) The B-1 dissolving and flushing water charge consists of:

Dissolving	80 gallons
Flushing	50 gallons
Total	130 gallons

The correct dipstick for the charge water, B-1 solution and flush is 4 inches less than the dipstick readings given above.

For measurement, the 100 gallon B-1 tanks are filled to within 8 inches from the top of the tank to obtain an 80 gallon charge. The 50 gallon flush is metered into the tank.

(c) For the "delayed catalyst" water injection, a total of 200 gal. of water are metered into the catalyst bomb.

632.124 B-1 Charge Preparation

The exact amount of B-1 is weighed into a container and the net weight is printed on the back of the batch log sheet. Since B-1 absorbs moisture from the atmosphere, it is important that the supply of B-1 be kept in polyethylene lined drums and the drums be covered at all times when not in use. Use only the specified lot of B-1.

632.125 C-1 Charge Preparation

The exact amount of C-1 is weighed into a container and the net weight is printed on the back of the batch log sheet. The C-1 viscosity increases rapidly as the temperature drops and therefore it is necessary to keep all C-1 55-gallon drums in a warm storage area. Be sure to use only the specified lot of C-1.

632.126 Catalyst Charge Preparation

The exact amount of Lauroyl Peroxide is weighed into a container and the net weight is printed on the log sheet. Again, use only the specified lot of catalyst.

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632.127 DAM Charge Preparation

Small variations in the amount of DAM charged cause significant changes in resin specific viscosity. Therefore, the exact volume should be accurately measured in a graduated cylinder.

632.128 TCE Charge Preparation

The TCE weigh tank system is used to accurately charge the specified amount of TCE. The weigh tank is filled and the red pointer set at the weight to be delivered. The starting weight (tare weight) and discharge weight (net weight providing starting weight is zero) are printed on the back of the log sheet. (Further details in Section 612.10)

632.13 Dissolving and filtering B-1

At least two hours before kettle is to be charged, start the B-1 makeup. As B-1 solution can be held indefinitely, prepare the next batch as soon as the tank is empty.

1. Weigh the specified quantity of B-1 into a B-1 container and position near tank. Record lot number on log sheet.
2. Add approximately 20 gallons - 2 to 3 inches above bottom impeller of hot water - 75 to 90°C on tank thermometer.
3. Start tank agitator.
4. Slowly add the B-1 to the hot water over a 1-2 minute period taking care to avoid excessive dusting of the B-1.
5. After the B-1 is thoroughly wetted, 1-2 minutes, add cold water until outage is eight inches. Temperature should be below 30°C.
6. Record time and solution temperature on log sheet.
7. Allow B-1 to mix and dissolve for two hours before filtering. After two hours shut the agitator off to avoid spillage.

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632.14 Charging Water, B-1, C-1 and DAM

1. The instrument settings to be used during the water charge are as follows:

A. 88 Bldg.

Batch Temperature Controller and Recorder
(BTRC) On Manual

Jacket Temperature Controller and Recorder
(JTRC) 62°C.

Charge Water Temperature Controller Set Point 58°C.

B. 92 Bldg.

Batch Temperature Controller and Recorder
(BTRC) On Manual

Jacket Temperature Controller and Recorder
(JTRC) On Automatic Set Point 70°C.

Charge Water Temperature Controller Set Point 74°C.

If during the water charge these settings appear to be unsatisfactory, adjust the JTRC set point and/or the charge water temperature controller set point as necessary.

2. When the kettle is ready for polymerization (kettle has been spaced, VCM is available, etc.) start addition of hot charge water.

At the start of the water charge, after the T on bottom of kettle has been filled with water, close the diaphragm valve, and check piping downstream of the Durco plug valve for indication of leakage (pipe would be hot). If pipe is hot, and both valves shut, notify kettle floor to stop water charge and take action to correct cause of leakage. The dump line check should be made before the start of the vacuum purge.

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632.14 Charging Water, B-1, C-1 and DAM (Cont'd.)

3. When water charge is started, charge B-1 by:
 - a. Pressurizing system between B-1 tank bottom valve and kettle valve with water to 30 psig to be sure of no leaks.
 - b. Pump B-1 solution to kettle.
 - c. Add 50 gallons (metered) of cold water to the tank when $1/4$ full to flush out system. Pump out flush water while adding to tank. If a flush of more than 80 gallons is necessary, notify the kettle floor so that a proper adjustment can be made in the amount of charge water.

When using the experimental B-1 tank, the following changes to above procedure should be followed:

- a. Have steam on tank jacket while adding hot water to 4 inches above bottom agitator.
 - b. Turn off steam before adding B-1.
 - c. After the B-1 is wetted turn on cold water to jacket and add cold water to tank until outage is 4 inches.
 - d. After pumping B-1 to kettle, shut off pump and add cold water to tank to a level of one inch above the bottom impeller. Pump this flush water to kettle.
4. As soon as both the water and B-1 are being added (visually check through manhole), add C-1 and DAM (if required) to the kettle and dog down manhole cover.
 5. Turn kettle agitator on high speed. (92 Bldg. only)

632.15 Vacuum Purging

1. Check all kettle valves, except water and B-1 if being used, are closed.

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632.15 Vacuum Purging (Cont'd.)

2. Determine and record maximum vacuum controller level. Do not proceed unless level is less than 3.5 inches of mercury. Notify foreman if level is above 3.5 inches. Water must be flowing through the precondenser.
3. Open vacuum valve on kettle; manhole cover must be closed at this time.
4. After adding B-1 and the specified volume of water* the batch temperature should be in the desired range (54-61°C for Opalon 660, 650 or 58-61°C for Opalon 630, 610, 600) and approaching a constant temperature. If it is necessary to adjust batch temperature after water and B-1 charges are complete, hold vacuum on kettle until temperature is within specified range, then start time.
5. If the kettle contents are boiling, i.e., the vacuum controller is reading less than the theoretical boiling pressure listed below and the actual pressure is not dropping faster than 0.2 inches per minute, hold the vacuum for the specified boil time (5 min. for Opalon 660, 650 or 10 min. for Opalon 630, 610, 600). If the kettle contents are not boiling, continue to purge until a boil is reached, and then hold the vacuum for the specified boil time.

*If the system is under vacuum, complete the water charge in 88 Bldg. by:

- a) closing Y-valve above flexible line
- b) close Durco valve on kettle
- c) relieve vacuum in water line by opening valve below antifoam bomb.
- d) release flexible line.

If water meters are more than 30 gallons apart at end of water charge:

- a) shut off vacuum
- b) break vacuum through water charge line
- c) open manhole cover and dipstick.

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632.15 Vacuum Purging (Cont'd.)

For undercharge of water - add proper amount. For overcharge of more than 3 inches on dipstick, drain kettle contents to sewer and recharge.

If only one water meter is operable, dipstick kettle after completion of water charge before dogging down manhole cover and pulling vacuum.

Batch Temperature

Theoretical Pressure at Boil

53.0°C	4.22 inches of mercury
53.5	4.32
54.0	4.43
54.5	4.52
55.0	4.61
55.5	4.73
56.0	4.86
56.5	4.98
57.0	5.10
57.5	5.20
58.0	5.40
58.5	5.50
59.0	5.60
59.5	5.75
60.0	5.90
60.5	6.00
61.0	6.15
61.5	6.3
62.0	6.45

6. At the end of the boil close the kettle vacuum valve.

632.16 Charging TCE

1. At the end of the vacuum purge, charge the specified amount of TCE from the weigh tank.
2. Print the discharge weight on the log sheet.

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632.17 Charging VCM

1. After completion of the vacuum purge, and TCE charge (if required) charge all the VCM to the kettle. Do not use any recovered VCM unless directed to by supervision. If recovered VCM is used reclassify batch as defined in Section 632.31
2. As the VCM is added, the batch temperature will fall off. Allow the batch temperature to drop to 49-52°C for Opalon 660, 650, by cooling the jacket water, as follows:
 - a. BTRC is switched to manual control.
 - b. JTRC is switched to automatic control.
 - c. The jacket temperature is dropped to 48-50°C at the start of the VCM addition.
 - d. As soon as the batch temperature falls below 54°C switch the BTRC to automatic control and adjust the BTRC set point to reaction temperature. This will start to heat the batch and prevent the batch temperature from dropping too low when the cold water is added with the catalyst.

For Opalon 630, 610 and 600 control the batch temperature by keeping the BTRC on manual and adjusting the jacket temperature to 60-65°C. As soon as the batch temperature falls below 57°C, switch the BTRC to automatic control and adjust the BTRC set point to reaction temperature.

3. During the VCM charge, read the VCM thermometer and determine the proper gallonage figure from the chart.

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632.17 Charging VCM (Cont'd.)

4. When the VCM charge is completed, close the valve at the VCM meter first, then the valve at the kettle to allow the liquid in the vertical line at the kettle to drain. This will lessen pressure buildup problems caused by thermal expansion of VCM.
5. Keep the Durco T valve and the Durco Plug Valve downstream of the meter open unless it becomes necessary to valve off for repairs.

632.18 Charging Lauroyl Peroxide

Before completion of VCM charge, charge lauroyl peroxide to the catalyst bomb. Both the overhead bombs and the bottom kettle bombs are charged in the same basic manner.

1. Make sure water is flowing to the jacketed nozzle on the kettle. Nozzle will build up with PVC if not water cooled.

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632.18 Charging Lauroyl Peroxide (Cont'd.)

2. Weigh out correct amount of lauroyl peroxide into container and position near bomb. Record the lot number on the log sheet.
3. Pour lauroyl peroxide through funnel into bomb.
4. Add water to bomb until level reaches the base of funnel valves to displace extra air from the bomb.
5. Close the funnel valve, then close water injection valve.
6. Upon completion of the VCM charge check the batch temperature before charging lauroyl peroxide. For Opalon 660, 650 the temperature should be below 52°C, for Opalon 630, 610, 600 it should be below 57°C.
7. Open fully the high pressure water line to the catalyst bomb. Bomb pressure must be above 175 psi.
8. Check bomb to make sure there are no visible leaks.
9. Open valve between bomb and kettle.
10. Meter in the specified amount of high pressure water. 250 + 5 gallons for Opalon 660, 650 or 200 + 5 gallons for Opalon 630, 610, 600.
11. First close valve between bomb and kettle.
12. Then shut off high pressure water.
13. Slowly bleed off bomb pressure to drain line.
14. Open funnel valve and drain bomb.

632.20 Polymerization

632.21 Reaction Temperature Control

1. As defined in Section 632.17, Charging VCM, both the BTRC and the JTRC are on automatic control.

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632.20 Polymerization (Cont'd.)

632.21 Reaction Temperature Control (Cont'd.)

2. The reaction temperature is controlled at the exact specified temperature (defined on Instruction Card).

632.22 Instrument Setting

1. The correct instrument settings are defined below.
Any deviation should be immediately reported to Foreman.

Batch Temperature Controller and Recorder (BTRC) ...	On automatic
Proportional Band	18 - 20
Reset	10
Derivative	10
Set Point	at reaction temp.

Jacket Temperature Controller and Recorder (JTRC) ...	On Automatic
Proportional Band	10
% Pneumatic	50

2. The correct instrument charts to be used are:

Batch Temperature Recorder and Controller (BTRC) .. 898523 - 88 Bldg.
& 808629A - 92 Bldg.

Jacket Temperature Recorder and Controller (JTRC).. 898423

Vacuum Purge Controller 892282

632.23 Heat Kick Control

1. When the batch temperature starts to rise during the heat kick, start full cold water at one degree above the reaction temperature.
2. Start water injection for Opalon 660, 650, at 57°C. For Opalon 630, 610, 600 start the water injection at 62°C. Use the minimum quantity of water possible. Do not exceed 500 gallons.

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632.20 Polymerization (Cont'd)

632.23 Heat Kick Control (Cont'd)

3. Turn off water injection at 2°C below reaction temperature. Do not knock batch temperature too low.
4. Should reaction temperature rise again, water inject again at the temperature specified in Step 2 and add only the remaining volume of water. Do not exceed a total of 500 gallons of water for all combined injections.
5. If heat kick cannot be stopped and reaction temperature reaches 66°C start the final vent immediately. It is important that the batch temperature be prevented from reaching 70°C to prevent partial batch coagulation. Having started the final vent, complete the operation and downgrade the batch according to instructions in Section 632.31.
6. Near the end of the cycle, the pressure will start to drop off. When the batch temperature is under control:
 - a. Shut off full cold water.
 - b. Switch BTRC to manual
 - c. Control the jacket temperature - manually - so as to maintain the batch temperature between 50 to 57°C during the entire final vent.

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632.24 Final Vent

1. Begin the final vent at 50 psig or 45 minutes after 100 psig, whichever comes first. (Note: for 660 or 650, begin vent at 50 psi or 20 minutes after 75 psi, whichever comes first).
2. Listed below are the recommended antifoams along with the alternate antifoams and the maximum amount of each which can be used. Note that the alternate antifoams are not as effective and are to be used only if the recommended antifoam is not available.

<u>Product</u>	<u>Recommended Antifoam</u>	<u>Max. Amt.</u>	<u>Alternate Antifoam</u>	<u>Max. Amt.</u>
OP. 660	Sterox 110	4 qts.	Hallco CPH-35N	3 qts.
650	Sterox 110	4 qts.	Hallco CPH-35N	3 qts.
630	Hallco CPH-35N	3 qts.	Sterox 110	4 qts.
610	Nopco NXZ	4 qts.	Hallco CPH-35N	4 qts.
600	Noccp NXZ	4 qts.	Hallco CPH-35N	4 qts.

3. Prior to starting final vent, add one gallon of antifoam to antifoam bombs.
4. Pressurize antifoam bomb with nitrogen. Bomb pressure should be 10 psi higher than kettle pressure.

Note: Make sure bomb pressure is 5-10 lbs higher than kettle pressure during vent.

5. One minute before starting final vent, open antifoam valves to kettle for continuous addition during vent.
6. If foaming occurs, slow down rate of venting.
7. Do not exceed maximum amount of antifoam allowed.
8. After final vent is completed, drop jacket temperature to 45°C

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632.25 Emergency Action

If for any specific reason there is danger of a set-up batch, add one gallon of styrene monomer to the kettle via the antifoam bomb. Specifically, styrene injection should be employed for the following conditions:

1. Power Failure - See Section 637.0 Emergency Procedure; (add 1/2 gallon of styrene monomer to each batch).
2. Water Failure - same as above.
3. Mechanical Failure of Equipment Causing Loss of Agitation - If for any reason (such as seal leak, spark generation, motor overload, excessive vibration at both high and low speed agitation, reducer failure, belt breakage) it becomes necessary to stop agitation, immediately add 1/2 gallon of styrene to the batch.

If repairs cannot be effected in 30 minutes, vent off remaining VCM with batch temperature reduced to 35-40°C. If repairs can be completed, start up agitation (by jogging agitator on-off) and complete batch polymerization.

5. Suspending Agent Omission or Failure - If the B-1 charge is accidentally omitted (or only partially charged) or if the B-1 suspending agent is destroyed by an impurity -- such as caustic -- batch set-up will occur. An early indication of this problem is a sudden drop in the jacket water temperature after only 4 to 5 hours of polymerization. A heat kick will follow immediately. With these symptoms, add 1/2 gallon of styrene to the batch.
6. Discretionary Action - If for some reason batch temperature and batch pressure show abnormal performance, contact kettle foreman. If he cannot be reached and it is your opinion that a set-up batch may occur, add 1/2 gallon of styrene to short-stop the reaction.

632.30 Dumping Batches

632.31 Reclassification of Batches in Kettle

1. Downgrade to Code 6 (Technical Grade) for the following reasons:

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632.31 Reclassification of Batches in Kettle (Cont'd.)

1. a. Batch is mischarged.
- b. Agitator is off more than 15 minutes after the L2O2 charge has been started.
- c. Recovered VCM is used.
- d. Heat kick exceeds 64°C for Opalon 660, 650, or 66°C for Opalon 630, 610, 600.
- e. Particle size is obviously too coarse.

632.32 Segregation of Batches

1. Complete wash-out of lines and slurry tanks is required between all product changes; i.e., going from 650 to 630, 660 to 650, etc.
2. Code 1 (A-grade) and Code 6 (Technical-Grade) are normally kept completely segregated. If it becomes necessary to dump a Code 6 batch into a partially full tank, then the entire contents are immediately downgraded to Technical-Grade.

632.33 Dumping Batches and Flushing the Kettle

A. Opalon 660, 650, 630

1. Line up kettle to be dumped to correct slurry tank.
2. Start up dump pump on water and check line for clear, unobstructed flow.
3. If necessary, clear resin chips from dump strainer and tank strainer before starting slurry flow.
4. Two men will station themselves at the kettle to be dumped-- one on the kettle floor and one at the dump valve. They will both confirm that the correct valve is being opened, before the dump valve is turned.

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632.33 Dumping Batches and Flushing the Kettle (Cont'd.)

A. 5. Start dump as follows:

- a. At batch pressure of 0 psig and with line to atmosphere closed, open dump and shut off water to pump.
 - b. As batch level drops, the pressure in the kettle will decrease. When pressure drops below 0 psig, open line to atmosphere.
 - c. Ten minutes after the line to the atmosphere is opened, open the kettle manhole.
6. If normal dumping is not possible due to plugged dump line, use "Siphon Unloading Technique", Section 639.70.
7. When the slurry level is such that the agitator blades are plainly visible (600-800 gal. slurry left), stop the agitator and place the Sellers rotojet in position. Pump 600 gal. of high pressure water through the jet. Be sure jet rotates and that the backs of the baffles are covered by the spray.

NOTE: Considerable attention must be given to cleaning out all loose polymer before proceeding with next batch. Residual polymer will result in an out-of-spec batch.

8. After 600 gal. of water have been flushed, stop jet and inspect kettle. If no slurry remains, direct flow from kettle to sewer. Start agitator and flush the front of the baffles and agitator (turning) using the high pressure water hose for 2-3 minutes. Make sure all loose resin is out of the kettle since even a handful of loose PVC will result in a high out-of-spec resin fisheye level.

NOTE: If slurry remains in the kettle after the Sellers flush, pump this to the slurry tank. When kettle is empty, direct flow to sewer and proceed with high pressure water flush for 2-3 minutes, being especially careful to flush clean the bottom of the kettle.

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632.33 Dumping Batches and Flushing the Kettle (Cont'd.)

- A. 9. Line to and from the pump should be flushed 2-3 minutes after dump to prevent plugging.
10. It should be noted that meticulous kettle cleaning on a scheduled basis is necessary to prevent excessive kettle buildup which contributes to high fisheye level resin.
- B. Opalon 610 and 600
1. Line up kettle to be dumped to correct slurry tank.
 2. Start up dump pump on water and check for clear, unobstructed flow.
 3. If necessary, clear resin chips from dump strainer and tank strainer before starting slurry flow.
 4. Two men will station themselves near the kettle to be dumped - one on the kettle floor and one at the dump valve. They will both confirm that the right valve is being opened, before the dump valve is turned.
 5. Start dump as follows:
 - a. At kettle pressure of 0 psig and with line to atmosphere closed, open dump valve and shut off water to pump.
 - b. As batch level drops, the pressure in the kettle will decrease. When pressure drops below 0 psig, open line to atmosphere.
 - c. Ten minutes after the line to the atmosphere is opened, open the kettle manhole.
 6. If normal dumping is not possible due to plugged dump line, use "Siphon Unloading Technique", Section 639.70.
 7. After the dump has been completed (no slurry remains in kettle), flush the kettle with high pressure water for 2-3 minutes in the following order:

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632.33 Dumping Batches and Flushing the Kettle (Cont'd.)

- B. 7. a. Dome - especially pop valves and catalyst nozzle.
- b. Agitator Shaft - running
- c. Baffles
- d. Walls
- 8. Flush line to and from the pump 2-3 minutes after dump to prevent plugging.

SPECIAL NOTES:

1. Because #4 Kettle, 88 Bldg. has a raised lip on the dump nozzle, resin is not easily flushed out. Therefore, after Sellers cleaning and hosing the front of the baffles, connect the charge water line to the kettle and add approximately 200 gallons of water (100 gpm) to create enough turbulence to flush out the residual resin retained by dump nozzle.
2. Sellers flushing results in a large amount of dilution water being introduced to the slurry hold system. This normally will be no problem; however, when slurry hold tank capacity is limiting kettle production, flush the kettle with the Sellers after the batch has dumped, and direct all the flush water to the sewer.
3. If a kettle is Sellers flushed while the batch is dumping, do not add any dilution water to the slurry hold tank for that batch -- none required.

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632.90 Process Adjustments

This section of the procedure is to assist operating supervision in making normal process adjustments.

632.901 B-1 Concentration

The following are recommended charges for the start of an X-70 product run, based on B-1 charge being used in X-75:

X-75 Product (660, 650, 669) B-1 Charge	630 B-1 Charge	600-610 B-1 Charge
Less than 6#	3# 8 oz.	2# 8 oz.
6# to 7#	3# 12 oz.	2# 12 oz.
More than 7#	4# 0 oz.	3# 0 oz.

Make all X-70 process B-1 adjustments in
4 oz. increments.

Reference: R. Carney 10/24/68
Supersedes SDP 88-632 A issued 4/22/64
92-632 A

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BY *A. O. Ericksberg*

MS204 3/61

OPERATING LOG

DEPARTMENT 88 & 82

DATE

SHIFT

OPERATOR

KETTLE NO.

BATCH NO.

RESIN TYPE

POLYMERIZATION

PRODUCT CODE

R A W	L ₂ O ₂	BLEND NUMBER	VACUUM PURGING ☐ YES ☐ NO				TIME B-1 CHARGED
		AMOUNT LB. OZ.	IS WATER FLOWING TO PRE-COND? ☐ YES ☐ NO				TIME C-1 CHARGED
M A T	B-1	BLEND NUMBER	VALVES TO PRE-COND OPEN? ☐ YES ☐ NO				TIME L ₂ O ₂ CHARGED
		AMOUNT LB. OZ.	BY PASS VALVE TO PRE-COND OPEN? ☐ ☐				TIME DAM CHARGED
E R I	C-1	BLEND NUMBER	STEAM TO NORTH/EAST JET ON? ☐ ☐				VACUUM PURGE STARTED
		AMOUNT LB. OZ.	STEAM TO SOUTH-WEST JET ON? ☐ ☐				VACUUM PURGE COMPLETED
A L	DAM	BLEND NUMBER	ARE ALL VACUUM VALVES POSITIONED ☐ ☐				TCE CHARGED
		AMOUNT LB. OZ.	MAXIMUM VACUUM READING IN				VCM CHARGE STARTED
	TCE	BLEND NUMBER	TIME	BATCH TEMP.	THEO. PR.	ACT. PR.	VCM CHARGE COMPLETED
		AMOUNT LB. OZ.					TIME BTC SWITCHED
	VCM	BLEND NUMBER					REACTION TEMP. °C
		FROM TANKS					TIME FCW ON °C
		TEMP. °C					TEMP. WHEN FCW ON °C
		AMT. VIRGIN. GAL.					TIME W.I. STARTED
		AMT. REC. VCM GAL.					TEMP. WHEN W.I. STARTED °C
B-1 SOLUTION MAKE-UP & FILTRATION							AMOUNT W.I.
TANK NUMBER							HIGHEST TEMP. DURING H.K. °C
TANK HOT WATER TEMP. °C							TIME B.P. AT 100 PSI
TEMP. AFTER COLD WATER °C							TIME FINAL VENT STARTED
TIME B-1 MADE UP			HOURS BATCH READINGS				TIME FINAL VENT COMPLETED
LINES PRESSURIZED BEFORE CHARGE?			TIME	BATCH TEMP.	BATCH PRESS.	JACKET TEMP.	TEMP. AT END OF FINAL VENT °C
TIME TO CHARGE B-1 MIN							AMOUNT OF ANTIFOAM USED QTS
SYSTEM PLUSHED?							TIME BATCH DUMP STARTED
KETTLE WATER CHARGE							TIME BATCH DUMP COMPLETED
TIME WATER CHG. STARTED							SLURRY DUMPED TO TANKS//
TIME WATER CHG. COMPLETED							COMMENTS:
METER RDG. DIPSTICK IN							
WATER TEMP. °C							
WATER TEMP. SET POINT °C							

RSV0028372

APPROVAL SHEET

TO:	Date	APPROVAL
A. Ericksberg	10/24	<i>A. Ericksberg</i>
R. Carney	11/24	<i>R. Carney</i>
J. Uihlein	11/24	<i>J. Uihlein</i>
C. Hallen	12/1/68	<i>C. Hallen</i>
J. Ott	12/4/68	<i>J. Ott</i>

92-6328
 No: SDP 88-~~600-04~~ 6328

Date: October 24, 1968

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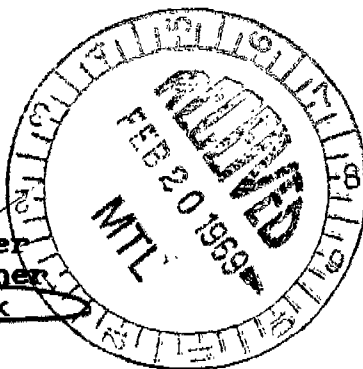
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To: Dr. R. N. Crozier
Mr. M. O. Debacher
Mr. R. B. Woicik

Date

2/20/69

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☐ Research Tentative Process

☒ SDP - 88-632 B
92-632 B

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☐ Std. Formula -

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☐ P _____

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