

MONSANTO CHEMICAL COMPANY
Plastics Division
Limited Procedure for Process Modification

MASTER COPY

Requested by ...A..P..Torrenzano.....

TO BE RETAINED IN
STANDARDS DEPT. FILES
Number ...E.88-53.....

Technical Supervision
and Reporting ByA..P..Torrenzano..

Plant Springfield....

Product Group ...Vinyl.....

Plant Dept. No88.....

Limited to: Amt. of Material 20,000lbs

or Expiration Date

Modification of SDP .Opalon X-62.....

Reason for Requested Variation

To manufacture a low viscosity resin
for evaluation in 85 bldg. calendering operations.

	Date	Approval
P.T.S. Supv. Eng.	8/11	R.A. Coffey
Research Grp. Lead.	8/11	A.W. Coaker/REP
Oper. Supt.	8/11	R.K. Perry
*Gen. Mfg. Supt.		
*P.T.S. Manager	8/11	R.I. Dunlap
Standards Dept.	8/12	A.O. Ericksberg

*Approval required when segregation
of expense is specified.

ISSUED/AUG 12 1960
STANDARDS-DEPARTMENT

BY *A.O. Ericksberg*

Details of Modified Procedure

- (1) See attached TOP for "Experimental Line" operations.
- (2) The "Opalon X-62 TOP" will be modified by the use of 0.2% GMS and an increased final vent in order to improve resin porosity and initial color.
- (3) Target Specifications

Specific Viscosity:	0.29 to 0.33
Dry Time:	12:00 max. (Read Mixer)
Contamination:	8 - 45 max.
Moisture:	0.3 % max.
Particle Size:	Trace Max. on 40 Mesh

Reference to Previous Work

1. Final Report "PVC Resin for Rigid Sheeting", C.G. McCubbin, May 19, 1954
Job No. 1583

Safety Hazards and Precautions (Including Toxicity, Air, and Steam Pollution)

Use protective equipment when handling TCE.

Product Testing Required and by Whom

Control Lab. - Specific viscosity, drytime, contamination, moisture, particle size, Robbin color, and heat stability.

Identification and Disposition of Material

Segregation of Product	Keep segregated
Labeling of Product	Plain bags, lot number only
Approval for Shipment	PTS (A.P. Terrenzano, R. Coffey)

Costs

A. Estimated effect on manufacturing costs, if successful
Opalon X-62 - 12.44¢/lb. as compared to Opalon X-70 - 12.3¢/lb.
Opalon X-69 - 11.9¢/lb.
Op Susp Res - 12.4¢/lb.

B. Estimated extra manufacturing cost of this experiment

Negligible

C. Segregation of Costs (by Operating Superintendent)

☐ No segregation of Costs required
☒ Special Accounting number will be required

D. If costs are segregated, accounting number assigned (by P.T.S. Manager) 890.42.....

Informational Copies to: (To be filled out by Standards Department)

Plant Laboratory Supervisor
Planning and Control Supt.
Marketing Technical Service Mgr.
General Mfg. Supt.
P. T. S. Manager
Accounting Dept.
Product Administrator
Research Section Leader
Overseas Mfg. Dept.
Other Domestic Plants

Foreign Plants

Other

L. E. Louraine
J. D. Hinchey
C. E. Hamlin
W. P. Willis
R. I. Dunlap
J. M. Crabtree - P. Pastuszek
R. T. Clark
O. P. Cohen
H. F. Armstrong
C. E. Alden
Operating Supervisor - J. Shriver

Tentative Operating Procedures

Opalon X-62

August 12, 1960

The procedure described below will be employed to manufacture two batches of modified Opalon X-62, a low viscosity homopolymer resin for evaluation in 85 Bldg. calendering operations.

Briefly, the modifications include the addition of glyceryl monostearate, GMS, and a lower conversion level, approx. 87%, in order to improve the resin porosity. The 1% trichloroethylene in the formulation is used to obtain a 0.30 specific viscosity at the 60°C reaction temperature.

I. Batch Formulation

<u>Raw Material</u>	<u>Parts</u>	<u>Weight</u>
Water	135	14,850 lbs.
VCM	100	11,000 lbs.
PDR-1	0.15	16.5 lbs.
GMS	0.20	22.0 lbs.
L ₂ O ₂	0.15	16.5 lbs.
TCE	0.99	108.9 lbs.

II. Charging Raw Materials

1. Charge 1700 gallons of water to the kettle at 54-56°C. Correct dipstick outage is 75 3/4 inches.
2. Start up kettle agitator. Adjust agitator speed to 121 RPM (approximately 7.7 rheostat setting on the variable speed controller).
3. Filter the PDR-1 solution into kettle.
4. Add the GMS and L₂O₂ solids.
5. Close manhole and draw a 24" vacuum purge.
6. Add TCE using kettle vacuum to draw in material via a straw arrangement.
7. Adjust instrument set point to 60°C and switch instrument to automatic control.

8. Position the Reset Cut-Out controller to the manual position using a 13.5 psi bias level.
9. When temperature has leveled out, switch Reset Cut-Out to the automatic position.

III. Polymerization

1. The reaction is held at 60°C for the entire cycle.
2. After approximately 8 hours the batch will heat kick. Use full cold water at 61°C and water injection at 62°C.
3. Start the final vent when the pressure has dropped to 115 psi.
4. Vent the unreacted VCM to the gasholder as rapidly as possible without foam carry-over. Use sterox 110 antifoam if necessary.
5. Take a two gallon sample of the slurry.
6. Dump batches into a cleaned #1 slurry tank. Dry as a two batch blend.

IV. Centrifuging and Drying.

1. The No. 1 dryer is to be cleaned out thoroughly before starting to dry Opalon X-62.
2. Operating Conditions:
 - a. Centrifuge - Feed compartment - #3
Pool depth - #5
Feed rate - as necessary to maintain dryer temperature
Wash water - none
Dilution water - 10 gpm.
 - b. Dryer - Retention ring - none
Outlet air temp. - 150-155°F (64-66°C)
Inlet air temp. - 280-310°F (136-153°C)
Air velocity - 100 FPM
3. Line up equipment for direct bagging.
4. Package material using plain bags marked only with lot number.
5. Take a 5 lb. bag sample from each blend.

MONSANTO CHEMICAL COMPANY
Plastics Division
Limited Procedure for Process Modification

Requested by A.P. TORRENZANO.....Number P.88-53.....Technical Supervision
and Reporting By A.P. TORRENZANO.....

Plant

Product Group Vinyl.....Plant Dept. No 88.....Limited to: Amt. of Material 2 batches.....

or Expiration Date

Modification of SDP Opalon X-62.....Reason for Requested Variation

To MANUFACTURE A LOW VISCOSITY RESIN
FOR EVALUATION IN 85 Bldg calendaring operations.

	Date	Approval
P.T.S. Supv. Eng.	8/11/60	RACAP / GRS
Research Grp. Lead.	8/11/60	W. H. Baker / M. K. E.
Oper. Supt.	8/11/60	R. K. Berry
*Gen. Mfg. Supt.		
*P.T.S. Manager	8/11/60	P. J. F. ...
Standards Dept.		

*Approval required when segregation
of expense is specified.

Details of Modified Procedure

- (1) See attached TOP for "Experimental line" operations
- (2) The "Opalon X-62 TOP" will be modified by the use of 0.2% GMS and an increased final vent in order to improve resin porosity and initial color.
- (3) Target Specifications
 - Specific Viscosity: 0.29 to 0.33
 - Dry Time : 12:00 MAX. (Read Mixer)
 - Contamination: 8-45 MAX.
 - Moisture : 0.3% MAX
 - Particle Size: TRACE MAX. ON 40 MESH

Reference to Previous Work

1. Final Report "PVC RESIN FOR RIGID SHEETING", C.G. McCubbin, May 19, 1964.
Job No 1583

Safety Hazards and Precautions (Including Toxicity, Air, and Steam Pollution)

Use protective equipment when handling TCE.

Product Testing Required and by Whom

Control Lab - specific viscosity, Dry Time, contamination, moisture, particle size,
Robbin color, and heat stability.

Identification and Disposition of Material

Segregation of Product	Keep segregated
Labeling of Product	Plain bags, Lot number only
Approval for Shipment	PTS (A. E. Torgenzano, R. Coffey)

Costs

A. Estimated effect on manufacturing costs, if successful

Opalon X-62 - 12.44 ¢/lb	AS COMPARED TO	Opalon X-70 - 12.3 ¢/lb
		Opalm X-69 - 11.9 ¢/lb
		Op Susp Res. - 12.4 ¢/lb

B. Estimated extra manufacturing cost of this experiment

Negligible

C. Segregation of Costs (by Operating Superintendent)

☒ No segregation of Costs required
☐ Special Accounting number will be required

D. If costs are segregated, accounting number assigned (by P.T.S. Manager) ...840.42.

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Tentative Operating Procedure

Opalon X-62

August 12, 1960

The procedure described below will be employed to manufacture two batches of modified Opalon X-62, a low viscosity homopolymer resin for evaluation in 85 Bldg. calendering operations.

Briefly, the modifications include the addition of glyceryl monostearate, GMS, and a lower conversion level, approx. 87%, in order to improve the resin porosity. The 1% trichloroethylene in the formulation is used to obtain a 0.30 specific viscosity at the 60°C reaction temperature.

I. Batch Formulation

<u>Raw Material</u>	<u>Parts</u>	<u>Weight</u>
Water	135	14,850 lbs.
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6. Add TCE using kettle vacuum to draw in material via a straw arrangement.
7. Adjust instrument set point to 60°C and switch instrument to automatic control.

8. Position the Reset Cut-Out controller to the manual position using a 13.5 psi bias level.
9. When temperature has leveled out, switch Reset Cut-Out to the automatic position.

III. Polymerization

1. The reaction is held at 60°C for the entire cycle.
2. After approximately 8 hours the batch will heat kick. Use full cold water at 61°C and water injection at 62°C.
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1. The No. 1 dryer is to be cleaned out thoroughly before starting to dry Opalon X-62.
2. Operating Conditions:
 - a. Centrifuge - Feed compartment - #3
Pool depth - #5
Feed rate - as necessary to maintain
dryer temperature
Wash water - none
Dilution water - 10 gpm
 - b. Dryer - Retention ring - none
Outlet air temp. - 150-155°F (64-66°C)
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Air velocity - 100 FPM
3. Line up equipment for direct bagging.
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MONSANTO CHEMICAL COMPANY
Plastics Division
Limited Procedure for Process Modification

Requested by ... A. P. Torrenzano.....

Number ... P. 88-53.....

Technical Supervision
and Reporting By A. P. Torrenzano..

Plant . Springfield....

	Date	Approval
Product Group ... Vinyl.....	P.T.S. Supv. Eng.	8/11 R.A. Coffey
Plant Dept. No 88.....	Research Grp. Lead.	8/11 A.W. Coaker/E
Limited to: Amt. of Material 20,000lbs	Oper. Supt.	8/11 R.K. Perry
or Expiration Date	*Gen. Mfg. Supt.	
Modification of SDP . Opalon X-62.....	*P.T.S. Manager	8/11 R.I. Dunlap
	Standards Dept.	8/12 A.O. Erickson

Reason for Requested Variation

*Approval required when segregation
of expense is specified.

To manufacture a low viscosity resin
for valuation in 85 bldg. calendering operations.

ISSUED AL 11-1960
STANDARDS DEPARTMENT

BY *A.O. Erickson*

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- (1) See attached TOP for "Experimental Line" operations.
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III. Polymerization

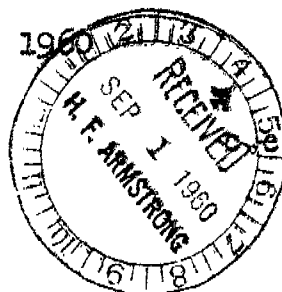
1. The reaction is held at 60°C for the entire cycle.
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 - b. Dryer - Retention ring - none
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Inlet air temp. - 280-310°F (136-153°C)
Air velocity - 100 FPM
3. Line up equipment for direct bagging.
4. Package material using plain bags marked only with lot number.
5. Take a 5 lb. bag sample from each blend.

ACE
MONSANTO CHEMICAL COMPANY
Springfield, Massachusetts

August 30, 1960



To: R. A. Coffey (2)

At: PVC - PTS

Subject: Final Report: Opalon X-62
Limited Procedure P 88-53

Reference: (1) Final Report: "PVC Resin for
Rigid Sheetting", C.G. McCubbin,
May 19, 1954
Job No. 1583

Full expansion
H.F.
A. W. Coaker
R. E. Pollard
R. I. Dunlap
R. K. Perry
W. P. Willis
C. F. Smith
J. L. Shriver
V. P. Brower
G. W. Smith
A. O. Ericksberg (9)
W. F. Gabel
G. F. Dorval

I. Introduction

Subject P-number authorized the production of 20,000 pounds of a low specific viscosity resin for evaluation in 88 Bldg. calendering operations.

On August 12 and 13, 1960, two batches of Opalon X-62 were made in the Experimental Line. The procedure employed (detailed in P-number request) was a modification of the original Opalon X-62, as recommended in Ref. 1. Glyceryl monostearate was added to the formulation and the degree of VCM conversion was reduced in attempt to make the resin more porous and thus improve initial color and heat stability properties.

II. Summary and Conclusions

1. Operational: Two batches were made under similar conditions without any major operating difficulties.
2. Quality: The resin blend met all quality target specifications, except for a slightly high specific viscosity.

<u>Property</u>	<u>Target Specification</u>	<u>Blend 19010</u>
a. Spec. Visc.	0.29 to 0.33	0.335
b. Dry Time, minutes	12:00 max. Read Mixer	9:00
c. Contamination	8 - 45 max.	0 - 19 P #1 0 - 56 P #5 0 - 19 P #10
d. Particle Size, 40 mesh	Trace max.	7
60 mesh	-	7
80 mesh	-	3
100 mesh	-	10
140 mesh	-	30
200 mesh	-	34
Pan	-	24
e. Robbins Initial Color	-	Better than Std.
f. Heat Stability	-	Better than Std.

RSV0026414

3. Quantity: Production consisted of 13,450# A-grade, and 1445# of off-grade. The high off-grade production resulted from dryer difficulties at the end of the run and in no way reflects upon the X-62 process.

The low total production, approx. 15,000 lbs., is a result of low VCM conversion during the polymerization. Rather than starting the final vent a 115 psig, the final vent could be delayed until pressure drop to 80 psig. In order to increase conversion to the desired 85-87% level.

4. Rates: Cycle times were 9.9 and 10.0 hrs. for the two polymerization batches. No difficulties were encountered with centrifuging and drying, and it is reasonable to assume that this product can be handled at 5000-6000 lbs. per hour. The Experimental Line equipment only permitted ca. 1000 lbs. per hour rate.
5. Yields: Insufficient quantities for accurate yield determinations.
6. Conclusion: The resin produced under authorization of this P-number met the required quality properties. Desirability of a low viscosity resin will be determined by Ultron personnel. If desired, further quantities can be successfully manufactured in the Experimental Line at improved A-grade yields and increased VCM conversions.

A. P. Torrenzano

July