

Monsanto

FROM Springfield, Massachusetts

E September 12, 1966

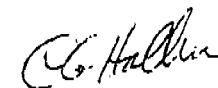
SUBJECT VCM SUPPLY FOR PASTE RESIN

REFERENCE

cc: R. A. Coffey/R.B. Wojcik
O. P. Cohen
W. F. Gabel
R. Rosenberg-Texas City
J. A. Tierney
P. J. Wetzal

TO Mr. R. W. Bueker

As a further move toward standardizing our paste resin operations, starting now, we want to use only Monsanto VCM in 84 Bldg., diverting monomer from other sources, such as Carbide and Dow, to the suspension plant. Will you please make any arrangements necessary to accomplish this. A review of the VCM supply for the past two months, plus recent discussions with Texas City personnel indicate that an ample supply of Monsanto VCM will be available for this purpose. We will continue to select Monsanto VCM suitable for paste use and keep you informed so that a satisfactory pumping schedule can be maintained. We feel that standardizing the monomer source in paste will significantly improve our long term control of the paste operation.


C. G. Hallen

/m

RSV0026289

Monsanto

FROM (NAME & LOCATION)

P. A. Trost, Texas City, Texas

DATE

February 9, 1968

BY

VCM

REFERENCE

TO

R. W. Bueker
Springfield

J. H. Bentley
R. Rosenberg

Today I learned that a car of Carbide VCM is off-spec due to iron. I understand the car was shipped on December 9 to Springfield and arrived there on December 18.

I have no further details. Would you please investigate why this car has been held so long at Springfield? Due to the current critical shortage of material, I suggest a way be found to use the car.

Carbide has been very cooperative in supplying cars which has helped Monsanto reduce VCM distribution costs. A delay of six weeks in unloading a car is an abuse of the trip-lease agreement.

As a matter of policy, we would like to be informed promptly if there is a reason that a car is not going to be unloaded in the normal routine. All quality problems should be communicated direct to Ray Rosenberg. Other problems can be relayed to John Bentley. This is the procedure followed in the past.

It is quite possible there are some unusual circumstances regarding the Carbide car. However, I believe it is to the advantage of all concerned to have timely communications.

P. A. Trost

CATX 84727 - FE-1.05

/mf

cc sent to
J. Wilhelm 2/12
P. Wetzal

Mr. T. H. Bueker - 2/16
2/19 Wetzal
2/20 Bueker

Just below

Delayed 1.05 - 1.05 - 1.05

Quality of
with material by
called for material & iron

2/25 2/28 2/29 3/1 3/2 3/3 3/4 3/5 3/6 3/7 3/8 3/9 3/10 3/11 3/12 3/13 3/14 3/15 3/16 3/17 3/18 3/19 3/20 3/21 3/22 3/23 3/24 3/25 3/26 3/27 3/28 3/29 3/30 3/31 4/1 4/2 4/3 4/4 4/5 4/6 4/7 4/8 4/9 4/10 4/11 4/12 4/13 4/14 4/15 4/16 4/17 4/18 4/19 4/20 4/21 4/22 4/23 4/24 4/25 4/26 4/27 4/28 4/29 4/30 5/1 5/2 5/3 5/4 5/5 5/6 5/7 5/8 5/9 5/10 5/11 5/12 5/13 5/14 5/15 5/16 5/17 5/18 5/19 5/20 5/21 5/22 5/23 5/24 5/25 5/26 5/27 5/28 5/29 5/30 5/31 6/1 6/2 6/3 6/4 6/5 6/6 6/7 6/8 6/9 6/10 6/11 6/12 6/13 6/14 6/15 6/16 6/17 6/18 6/19 6/20 6/21 6/22 6/23 6/24 6/25 6/26 6/27 6/28 6/29 6/30 7/1 7/2 7/3 7/4 7/5 7/6 7/7 7/8 7/9 7/10 7/11 7/12 7/13 7/14 7/15 7/16 7/17 7/18 7/19 7/20 7/21 7/22 7/23 7/24 7/25 7/26 7/27 7/28 7/29 7/30 7/31 8/1 8/2 8/3 8/4 8/5 8/6 8/7 8/8 8/9 8/10 8/11 8/12 8/13 8/14 8/15 8/16 8/17 8/18 8/19 8/20 8/21 8/22 8/23 8/24 8/25 8/26 8/27 8/28 8/29 8/30 8/31 9/1 9/2 9/3 9/4 9/5 9/6 9/7 9/8 9/9 9/10 9/11 9/12 9/13 9/14 9/15 9/16 9/17 9/18 9/19 9/20 9/21 9/22 9/23 9/24 9/25 9/26 9/27 9/28 9/29 9/30 10/1 10/2 10/3 10/4 10/5 10/6 10/7 10/8 10/9 10/10 10/11 10/12 10/13 10/14 10/15 10/16 10/17 10/18 10/19 10/20 10/21 10/22 10/23 10/24 10/25 10/26 10/27 10/28 10/29 10/30 10/31 11/1 11/2 11/3 11/4 11/5 11/6 11/7 11/8 11/9 11/10 11/11 11/12 11/13 11/14 11/15 11/16 11/17 11/18 11/19 11/20 11/21 11/22 11/23 11/24 11/25 11/26 11/27 11/28 11/29 11/30 12/1 12/2 12/3 12/4 12/5 12/6 12/7 12/8 12/9 12/10 12/11 12/12 12/13 12/14 12/15 12/16 12/17 12/18 12/19 12/20 12/21 12/22 12/23 12/24 12/25 12/26 12/27 12/28 12/29 12/30 12/31

RSV0026290

MONSANTO CHEMICAL COMPANY

Plastics Division

Limited Procedure for Process Modification

MASTER COPY

TO BE RETAINED IN

STANDARDS DEPT. FILES

Requested by A. P. Torrenzano

Number 88-58

Technical Supervision and Reporting By R. Saxton

Plant Springfield

Product Group Vinyl

Date Approval

Plant Dept. No 333.67

P.T.S. Supv. Eng.	10/3	R. Coffey
Research Grp. Lead.	10/3	A. Coaker
Oper. Supt.	10/3	R. Perry
*Gen. Mfg. Supt.		
*P.T.S. Manager		
Standards Dept.	10/3	A. Ericksberg

Limited to: Amt. of Material 100,000 lbs. 12 batches

or Expiration Date

Modification of SDP Evaluation of Union Carbide VCM

Reason for Requested Variation

*Approval required when segregation of expense is specified.

Union Carbide VCM will be compared with Texas City VCM to determine the effect on Opalon 300-1 (X-57) Resin quality. Of specific interest is the effect of high quality VCM (expected from Union Carbide) on homopolymer particle size. This will forebode any polymerization problems with the improved Texas City VCM quality to be manufactured starting in late 1960.

Details of Modified Procedure

Operating Procedure:

- The SDP for Opalon 300-1 (X-57) will be used throughout the study.
- The Experimental line will be employed for this evaluation. The kettle will be re-equipped with small (4 1/2" x 15") three fingered baffles to provide data for comparison to historical quality level, and in addition, direct comparison with quality level in the other Production kettles.

2. Experimental Design:

- One tank car of Carbide VCM will be segregated from Std. VCM by circumventing the tank farm and scrubber and pumping directly from the tank car into #5 hold tank.
- In addition, Std. VCM will be used without scrubbing for direct comparison to Carbide VCM.
- If initial Carbide results permit, the following design will be followed:

Reference to Previous Work

(Continued on attached sheet)

ISSUED Oct. 5, 1960
STANDARDS DEPARTMENT

BY A. A. Ericksberg

2. Experimental Design:

		Vacuum Purge	
		24.5"	20"
C. (Cont)	Unscrubbed T.C. VCM	X X X	X X X
(Control)	Unscrubbed U.C. VCM	X X X	X X X

- D. If initial Carbide produced is too fine or too coarse, then the remaining batches with Carbide VCM will be made under best conditions to remedy the particle size problem. (To be agreed upon by W. Ocker and R. Coffey or A. Torrenzano).

Methods: Reduced L2O2 Charge
Vacuum purge change
Addition of inhibitor.

3. Evaluation:

- A. VCM used during the study will be sampled and tested by dilatometer polyrate and gas chromatography. An attempt will be made to sample recovered VCM & test also by dilatometer polyrate and gas chromatography.
- B. PVC manufactured will be tested for particle size, bulk density, drytime, and extrudability.
- C. Points of comparison will include:
1. Unscrubbed T.C. VCM, vs Scrubbed T.C. VCMs
vs Unscrubbed U.C. VCM, as it effects Opalon 300 FM.
 2. Unscrubbed T.C. VCM, vs Scrubbed T.C. VCM,
vs Unscrubbed U.C. VCM, in terms of virging and recovered monomer impurities.

4. nProduct Specifications:

Same as Standard Opalon 300 FM.

5. VCM Specifications:

Data will help information to establish VCM quality requirements, as part of the present Research on this subject.

MONSANTO CHEMICAL COMPANY
Plastics Division
Limited Procedure for Process Modification

Requested by

Numbers . . . E . . . - 38 . . .

Technical Supervision
and Reporting By

Plant

Product Group 44

Plant Dept. No. ~~88~~ 8407

Limited to: Amt. of Material 100,000 (in bundles)

of Expiration Date

Modification of SDP *Collection of Data*.....

Reason for Requested Variation

	Date	Approval
P.T.S. Supv. Eng.	10/2/60	<i>[Signature]</i>
Research Grp. Lead.	10/2/60	<i>[Signature]</i>
Oper. Supt.	10/2/60	<i>R. Henry</i>
*Gen. Mfg. Supt.		
*P.T.S. Manager		
Standards Dept.		

*Approval required when segregation of expense is specified.

*Approval required when segregation of expense is specified.

Details of Modified Procedure

INTERESTING PERSONS

3. The cost per option ~~test~~ ^{unit} (x_i) will be used to determine the choice.

2. Location of the Group

1. Can you tell us whether you will be separating from the Hong Kong authorities the Police, Customs and Excise, and the Inland Revenue Department?

2. In what way will the Government be able to ensure that the Hong Kong Police will be able to continue to maintain law and order in the New Territories?

Reference to Previous Work

Batteries with Carbide vcm will be made under best conditions to
Remedy the particle size problem. (To be improved upon by W. Coaker and
R. Gifford or A. T. Thompson.)
Methods: Reduced CO_2 charge
Vacuum purge charge
Addition of Inhibitors

5. Evaluation:

- a. VCM used during the study will be sampled and tested by dilatometer, polymer and gas chromatography. An attempt will be made to sample recovered vcm & test also by dilatometer, polymer and gas chromatography.
- b. PVC manufactured will be tested for particle size, bulk density, dryline, and extrudability.
- c. Points of comparison will include:
 1. Unscrubbed TC VCM, vs Scrubbed TC VCM, vs Unscrubbed UC VCM, as it effects Quality 300FM
 2. Unscrubbed TC VCM, vs Scrubbed TC VCM, vs Unscrubbed UC VCM, in terms of virgin and recovered monomer impurities

Product Specifications

~~a. Particle Size 45-150 SRF~~

~~b. Bulk Density 1.2 g/cc~~

~~c. Dry Time, 1 hr 5-30 min~~

d. Extrusion Rate ~~140 g/hr maximum~~
~~Grade D maximum~~

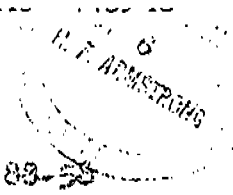
Same as standard

Opal/On 300 FM

5. VCM Specifications

Data will help provide information to establish VCM quality requirements as part of the present Research Project in this subject

MONSANTO CHEMICAL COMPANY
Plastics Division
Limited Procedure for Process Modification



Requested by A. F. Thompson

Number 83-58

Technical Supervision R. Barton
and Reporting By

Plant Springfield

Product Group Vinyl

	Date	Approval
P.T.S. Supv. Eng.	10/3	R. Coffey
Research Grp. Lead.	10/3	A. Conker
Oper. Supt.	10/3	R. Perry
*Gen. Mfg. Supt.		
*P.T.S. Manager		
Standards Dept.	10/3	A. Erickson

Plant Dept. No 833.67

Limited to: Amt. of Material 100,000 lbs.

or Expiration Date

Modification of SDP Evaluation of Union Carbide VCM

Reason for Requested Variation

*Approval required when segregation of expense is specified.

Union Carbide VCM will be compared with Texas City VCM to determine the effect on Opalon 300-1 (X-57) Resin quality. Of specific interest is the effect of high quality VCM (expected from Union Carbide) on homopolymer particle size. This will forebode any polymerization problems with the improved Texas City VCM quality to be manufactured starting in late 1960.

Details of Modified Procedure

1. Operating Procedures:

1. The SDP for Opalon 300-1 (X-57) will be used throughout the study.
2. The Experimental line will be employed for this evaluation. The kettle will be re-equipped with small (4 1/2" x 15", three fingered) baffles to provide data for comparison to historical quality level, and in addition, direct comparison with quality level in the other Production kettles.

2. Experimental Design:

1. One tank car of Carbide VCM will be segregated from Std. VCM by circumventing the tank farm and scrubber and pumping directly from the tank car into #5 hold tank.
2. In addition, Std. VCM will be used without scrubbing for direct comparison to Carbide VCM.
3. If initial Carbide results permit, the following design will be followed:

Reference to Previous Work

(Continued on attached sheet)

ISSUED Oct. 5, 1960
STANDARDS DEPARTMENT

BY *A. C. Erickson*

1. Particle Size Problem:

a. (continued)

Unscrubbed T.C. VCM vs Scrubbed T.C. VCM
Unscrubbed U.C. VCM vs Scrubbed U.C. VCM

Process Range

24.5	30
25	30
25.5	30
26	30
26.5	30
27	30
27.5	30
28	30
28.5	30
29	30
29.5	30
30	30

1. If initial carbide produced is too fine or too coarse, then the remaining batches with Carbide VCM will be made under best conditions to remedy the particle size problem. (To be agreed upon by W. Cooker and P. Giffey or L. Tarsanzeno).

Methods: Reduced 120g Charge
Vacuum purge change
Addition of inhibitor.

3. Evaluation:

- A. VCM used during the study will be sampled and tested by dilatometer, pyrolysis and gas chromatography. An attempt will be made to sample recovered VCM & test also by dilatometer, pyrolysis and gas chromatography.
- B. PVC manufactured will be tested for particle size, bulk density, drytins, and extrudability.
- C. Points of comparison will include:
1. Unscrubbed T.C. VCM, vs Scrubbed T.C. VCM, vs Unscrubbed U.C. VCM, as it affects Spalon 300 M.
 2. Unscrubbed T.C. VCM, vs Scrubbed T.C. VCM, vs Unscrubbed U.C. VCM, in terms of virgin and recovered monomer quantities.

4. Product Specifications:

Same as Standard Spalon 300 M.

5. VCM Specifications:

Data will help information to establish VCM quality requirements, as part of the present research on this subject.

PLASTICS DIVISION
Springfield, Mass.

C. P. Cohen
A. W. M. Coaker
R. I. Dunlap
F. A. Duston
A. O. Ericksberg (15)
C. E. Hamlin
R. K. Perry
V. P. Phillips
J. L. Shriver
M. W. Williams
W. P. Willis
A. P. Torrenzano

TO: R. A. Coffey (2)

FROM: PVC-PTS

February 10, 1961

SUBJECT: FINAL REPORT: UNION CARBIDE VCM EVALUATION
LIMITED PROCEDURE P 88-58

INTRODUCTION

Monsanto at Texas City is undergoing equipment and process changes which will improve the quality of the vinyl chloride monomer shipped to Springfield for polymerization in late 1960. In order to try to forebode any polymerization problems caused by higher quality monomer, this P-Number was authorized to evaluate high quality VCM from Union Carbide.

SUMMARY

Seven batches of Opalon 300-1 were made during October, 1960 in the experimental line using unscrubbed Union Carbide Monomer. For comparison 9 batches were made using segregated unscrubbed Texas City monomer. The SDP for Opalon 300-1 (X-57) was used throughout the study. Two different levels were used for the vacuum purges.

Slurry samples were taken and dried for the following tests: SAP, bulk density, kitchen dry time, and extrudability. Monomer samples, both virgin and recovered, were taken from previously selected batches and tested by dilatometer polyrate and gas chromatography.

CONCLUSION:

difficulty is anticipated when Springfield starts using a high quality (dilatometer above 5.5%) monomer. Based on the results using Union Carbide VCM the following is expected:

1. SAP - no significant change
2. Bulk density - slightly lower
3. Extrudability - results of this experiment were inconclusive
4. Dry time - no significant change
5. Cycle time - no significant change

DISCUSSION

A change in the date for the experimental line shut down needed to adapt the kettle for X-24 caused a change in the experimental plan of this study. An extra flush batch was needed in switching back to Texas City from Union Carbide VCM and one batch was produced in #3 kettle due to the anticipated short time available.

One monomer tank was segregated for this study. Common lines, however, had to be used when charging the kettle and at the tank farm. For this reason, all the Union Carbide charges were contaminated with various amounts of Texas City monomer (estimated at 5 - 10%). This fact is substantiated by an analysis of the gas chromatograph data.

Three batches (two using Texas City VCM) produced with a 23 1/2 in. vacuum purge were downgraded due to excessive reaction time between the slow vent and the final vent at 90 psig. This was probably caused by the fact that the scrubber was bypassed. This might allow some normally removed impurities to reach the kettle.

Extrusion results were inconsistent. A check of other extruded results run on the same day showed wide variability. This indicated that there was trouble in the extruder itself.

Analysis of the Union Carbide tank car confirmed its good quality. The dilatometer polyrate was 5.71% compared to 5.0% for October Texas City production. The results of the gas chromatograph showed no trace of some of Texas City's impurities and minute amounts of impurities not present in Texas City VCM. Common impurities were much lower in level in Union Carbide VCM except for four of the first five impurities to be detected by the gas chromatograph. These impurities have not been identified to date.

R R Saxton
R. R. Saxton

/ps

20 in. VACUUM

23 1/2 in. VACUUM

20 in. VACUUM								23 1/2 in. VACUUM							
BATCH	SAF	BD	KDT	EXTROD RATE GRADE	CYCLE TIME	DILA- TOMETER		BATCH	SAF	BD	KDT	EXTROD RATE GRADE	CYCLE TIME	DILA- TOMETER	
946	138	384	3 ²⁰	93 D	11 ⁴²			883F	NS				11 ⁴²		
960	120	371	3 ⁴⁵	93 D	11 ²⁰			886	97	416	3 ⁴⁵	149 D	10 ³⁰	5.06	
968	144	380	3 ⁴⁵	81 D	11 ²⁰	4.81	940F	87	400	3 ¹⁵	114 D	10 ⁴⁰			
								953	123	397	4 ²⁰	150 C	11 ¹⁰	4.84	
								975	112	384	4 ²⁰	127 A	11 ²⁰		
								982	114	380	3 ⁴⁵	141 A	10 ³⁰		
AVE	134	378	3 ⁴⁰		11 ²²			AVE	107	395	3 ⁵¹		10 ³⁰		
922	121	384	4 ²⁰	116 C	11 ²⁰	5.76	891F	92	389	4 ¹⁵	153 B	11 ²⁰			
927	113	380	4 ²⁰	111 D	11 ²⁰		898	84	408	4 ¹⁵	151 B	11 ¹⁵	5.28		
937	101	387	3 ⁴⁵	146 A	12 ¹⁰	5.64	904	126	381	4 ²⁰	113 F	10 ³⁰	5.64		
								915	146	384	4 ¹⁵	90 F	10 ³⁰		
AVE	112	384	3 ⁵⁵					AVE	112	391	4 ¹¹		10 ³⁰		

* F = Flush Batch
 * = Downgraded

883 115 min between vents - cycle time not averaged No Sample
 898 105 " " " " " "
 953 100 " " " " " "

940 50 min final vent cycle time averaged

886 kettle cycle time not averaged

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APPENDIX II
UNION CARBIDE VCM EVALUATION
G.L.P.C. Results

Dilatometer Reactivity %	Sample Number	Batch Number		Peak Ht.	Peak Ht.	Peak Ht.
			Minutes →	7	7 1/2	9
5.34-5.19	U-1	898	Virgin	5.3 mm	13.3 mm	10.2 mm
5.60-5.67	U-2	904	Virgin	0	2.2	4.8
5.70-5.82	U-3	922	Virgin	0	4.0	6.8
5.70-5.59	U-4	934	Virgin	13.2	16.2	13.4
5.65-5.66	U-2R	904	Recovered	0	17.6	30.7
5.71-5.82	U-3R	922	Recovered	1.8	31.2	40.5
5.91-5.76	U4R	934	Recovered	3.9	38.7	37.6
UNSCRUBBED TEXAS CITY						
4.75-4.73	T-1	883	Virgin	0	0	2.8
5.11-4.99	T-2	886	Virgin	0	0.8	3.2
4.96-4.73	T-3	953	Virgin	0	1.4	4.9
4.82-4.80	T-4	968	Virgin	0	1.4	2.5
5.44-5.41	T-3R	953	Recovered	0	12.2	21.6
5.70-5.58	T-4R	968	Recovered	10.0	17.2	17.4
5.68-5.74	Union Carbide Corp. Tank Car Shpx. 3964			0 mm	0.7 mm	4.8 mm

Peak Heights are unidentified impurities measured in millimeters deflection on the recorder of the gas-liquid partition chromatograph (GLPC).

Cis- butene-2	1-Pentane	1-3 Butadiene	Methyl Acetylene	Pentene-1 Methyl Chloride	VCM	Peak Millimeters		Heights	
19	20 1/2	21 1/2	23 1/2	25	45	50	60	65	70
0 ppm	0.2 ppm	0.6 ppm	0.2 ppm	1.6 ppm					
0	0.2	0.6	0.2	1.4					1.5
0.2	0.2	0.6	0.2	1.6					
0.1	1.0	1.4	0.5	3.6					
0.1	0.8	0.1	0.6	4.1		1.5	3.1		
0.1	0.9	0.1	0.9	6.7					
0.2	1.1	0	1.0	7.8					
0.1	13.0	4.2	0.3	3.8	3.7	30.0	0	19.3	26.6
0.4	13.8	5.0	0.4	4.2	6.0	36.0	1.0	8.2	2.7
0	9.2	5.6	1.0	6.0	5.4	15.4	0	12.6	0
0.4	5.4	2.2	0.4	4.2	4.6	8.2		3.5	
0.6	10.8	0	2.2	13.0	6.8	5.1			
0	7.2	0	1.2	11.4	6.8	3.9			
0 ppm	0 ppm	0.5 ppm	0.2 ppm	1.4 ppm					

Peak Ht.	Iso-butane	Peak Ht.	n-Butane	Butene-1 Isobutene	Peak Ht.	Trans- butene-2
10	11	12	13	15	16	17
8.2 mm	0.6 ppm	0.2 mm	1.4 ppm	0.2 ppm	0 mm	0.2 ppm
4.1	0.4	0.1	1.6	0.2	0	0.1
5.0	0.7	0.1	1.9	0.4	0	0.2
7.4	1.4	0.4	6.1	0.4	0	0.3
19.1	1.8	0	5.9	0.3	0	0.2
24.0	3.0	0.7	7.2	0.6	0	0.2
16.2	3.5	0	13.8	0.8	0	0.4
0	2.5	0	29.9	1.2	0	0.9
0	2.8	0	32.1	1.7	0.8	1.0
1.7	4.5	0	26.4	1.8	0	1.3
0	2.4	0	13.4	0.8	0	0.6
0	11.4	0	57.6	3.0	0	2.4
0	8.9	0	38.6	1.4	0	1.1
4.3 mm	0.4 ppm	0.4 mm	0.6 ppm	0.1 ppm	0 mm	0 ppm

TOTAL P.16