

Date March 10, 1972 *7MR*

INTER-OFFICE
MEMORANDUM

Subject TECHNICAL SERVICE MONTHLY SUMMARY

FEBRUARY, 1972

To J. M. Davidson Valley Forge
(Location, Organization, or Department)

From D. J. Mann Linwood
(Location, Organization, or Department)

I. CUSTOMER TRIALS

A. Conex Division, Illinois Tool Works, Des Plaines, Illinois,
February 3, 1972.

A roll of C-2017 sheet of 40+ mil thickness was made on a 2½-inch NRM Pacemaker extruder. Initially, the sheet was rough, and the zone heats were raised. A burn streak developed in the center of the sheet but disappeared when the screw speed was slowed. Once good sheet was being run, the extrusion was stopped to save the remaining compound for another extrusion.

B. Kusan, Inc., Nashville, Tennessee, February 14, 1972.

Compound C-2025 was evaluated on a 500-ton Van Dorn, 60-ounce capacity machine employing a five-cavity mold with a total shot weight of 1.5 pounds. Upon initial conditioning of the melt with stock temperatures between 370°-375°F., a degradation streak developed in the melt. A check of the screw tip and check ring revealed that a badly worn check ring on the screw was causing metal burns to be formed and yielding degraded material in this area.

The molding trial was resumed the following day using a new screw tip and check ring. After adjusting machine conditions and increasing gate diameters, good parts were produced. Later, another mold (two-cavity) was also evaluated with C-2025, and good parts were obtained.

C. Kusan, Inc., Nashville, Tennessee, February 16, 1972.

Kusan had requested an adhesive system which could be used to adhere PVC to PVC and PVC to styrene. Technical Service prepared two formulations designed for PVC-to-PVC adhesion, and obtained a sample of F-101-28 formulation from Mr. J. Sandler, designed for PVC-to-styrene adhesion. Toy samples were being prepared during this visit to Kusan for the toy show in New York, and these adhesives were tried out at that time with excellent results, although some further

[320]

AP00047414

development work might be needed on these adhesives for production application.

D. Foster-Grant Co., Lexington, Massachusetts, February 14, 1972.

Because of machine torque problems encountered in running C-5011, an evaluation trial of C-2025 was made. This compound was run on a 75-ton, 3-ounce capacity Newburg, employing a two-cavity, eye-glass frame mold. After conditioning the melt, parts were molded successfully and the total cycle reduced to 16 seconds. Unfortunately, after about one-half hour, an ejector pin malfunctioned and froze a frame in the mold, thereby ending the trial.

Later, a tour was taken through the spray department, where the requirements and application techniques for spray color coatings were reviewed.

II. CUSTOMER COMPLAINTS

A. Continental Copper, Linden, New Jersey (#133).

This customer returned a bulk car of PVC 214 because the resin was so wet that it would not flow.

An analysis of one compartment at Calvert City revealed that the bottom layer of resin contained 34% moisture. According to R. R. Harvey, this would indicate that rain was the source of moisture, probably during transit, since it is virtually impossible for the resin to have absorbed this amount of moisture any other way.

To insure that resin with the proper moisture level is being shipped to this customer, each loaded bulk car will be sampled and analyzed before release is authorized.

B. Tenneco Chemicals, Inc., Nixon, New Jersey (#134).

This customer rejected 25,000 pounds of PVC 6180 plus 15,000 pounds of finished sheet, due to polyethylene and polystyrene contamination.

This complaint was clearly the fault of the Matlack Trucking Company. To avoid any future occurrence, Matlack has assigned a "dedicated" truck to handle the transfer and delivery of PVC 6180.

AP00047415

C. Phillips Films, Auburn, Pennsylvania (#135).

On February 10, this customer rejected all four compartments of a bulk rail shipment of PVC 1250 due to contamination. This excessive contamination was verified by D. J. Mann, who was at the customer's plant at the time this car was being tested.

Another equally serious quality problem arose when Phillips Film found that the Calvert City PVC 1250 tends to give plate-out during the manufacture of heavier gauge film.

The problem of wet contamination is being solved at the point of manufacture. In addition, both Q.C. groups have had the opportunity to visit this customer's plant and see first-hand how in-coming Q.C. checks are made.

Relative to the plate-out problem, studies at Calvert City have verified the fact that Calvert City PVC 1250 gives more plate-out than Escambia PVC 1250.

Suspicion is now being directed to the protective colloid used at Calvert City and pilot-plant studies, which will identify the responsible ingredient, will be completed shortly.

D. Abcom, Inc., Mishawaka, Indiana (#136).

Essex International returned 6,000 pounds of wire compound to Abcom due to poor performance (wire extrudate was rough and grainy). Abcom, in turn, complained about the PVC 214 resin on which the wire compound was based.

Technical Service extruded a sample of compound and could find nothing wrong with the quality of extrudate.

R. R. Harvey and W. C. Kuehnle evaluated the past year's shipments of PVC 214 to Abcom and have concluded that the processing problems appeared to be related to the resin I.V. They have, therefore, recommended that all future shipments of PVC 1250 be made at the high end of the I.V. specification range.

E. Goodyear Aerospace, Akron, Ohio (#137).

This customer rejected 17,000 pounds of PVC 470, Lot 3181 due to 9% moisture.

AP00047416

According to R. R. Harvey, this lot was analyzed at 0.46% moisture when packaged. However, on return, all skids but one showed excessive moisture.

The use of plastic bags may have produced excessive moisture content by condensation and migration. The use of paper bags should eliminate this effect.

F. G. S. & Plastics, Cleveland, Ohio (#138).

This customer has complained periodically about the quality of PVC 4185-2S and -3S since April, 1971, and has recently asked for a credit adjustment.

The quality control problems of PVC 4185-2S and -3S are well known. The only comment worthwhile at this point is that R&D is working to upgrade the quality of these products; meanwhile, we can attempt to solve only those problems which are called to our attention at the time they occur.

G. Tenneco Chemicals, Inc., Arlington Heights, Ill. (#139).

This customer complained that 80,000 pounds of bagged PVC 6180 was unsatisfactory, in that it was producing streaks in rigid sheet. Although the customer related the problem to excessive volatiles in the resin, Technical Service could find no resin deficiencies, both by the Q.C. sheets as well as independent laboratory checks.

It is Technical Service's understanding that the customer has solved its problem, and that it was probably caused by factors other than resin.

III. TECHNICAL SERVICE REQUESTS.

A. Color Streaking - Oster Corporation

Another molding trial was held at Morristown, New Jersey, to re-evaluate Customcolor's concentrate on the newly vented Oster mold. One hundred pounds of C-7021 "pre-colored" compound (made by formulating resin dry blend with the color concentrate in a 10:1 ratio, then extruding into pellets) were prepared along with another color match of the Oster green by conventional coloring techniques. The streaking problem was again encountered in the "pre-colored" compound, the C-7021 (natural) let-down with a 10:1 ratio of color

AP00047417

concentrate and also, the Middlesex color match (C-7021-7E). An unsuccessful attempt was made to increase the ratio to 5:1 in both the "pre-colored" and the natural pellets. Although the color shifted to a darker green, the streaking problem was still evident. A regrind of the parts made initially was reprocessed giving what appeared to be acceptable parts, leading to the tentative conclusion that the problem is one of mastication. In running the various concentrate levels in this compound, it was made apparent that the molding conditions are critical if parts are to be molded successfully, since other pigment problems can and do occur if the melt is not processed carefully.

B. Underwriters Laboratories

Samples of C-5011, C-7021 and C-2025 were prepared for UL indexing. These samples were transmitted to B. Melnick on February 29, who, in turn, delivered them to the U. L. Laboratory.

C. Electrical Properties for Modern Plastics Encyclopedia

Samples of C-7021 natural and C-2003A were submitted to the Linwood Physical Testing Laboratory for the following electrical properties measurements:

Dielectric Constant
Dissipation Factor
Surface and Volume Resistivity

The results of these tests were submitted to R. Bertrand who will then forward them to Modern Plastics.

D. Data Sheets - C-7021 Natural and C-2025.

Samples of both the above compounds were tested at Linwood's Physical Testing Laboratory. The flexural properties reported for C-7021 were questioned because the flexural modulus was under 300,000 psi. Additional samples of this compound were, therefore, retested and found to give values of 350,000 psi. These new data have been published and sent to J. M. Davidson for review.

E. Fusion Dry Blend, C. E. Shepherd

An epoxidized soya oil, Flexol EPO, as the plasticizer in a fusion dry blend gives non-fuming characteristics seen in the Shepherd compound. A new problem is the dullness of

AP00047418

the fused film which is related to the fusion characteristics of the 4185-2S and -3S resins.

A sample of micro-PEARL® resin has been requested from the Escambia plant.

F. Fadeometer Exposure of 400 Series® Compounds.

Three-hundred exposure hours have been completed with the following results.

Clears	2006 CL-2	No color break
	2025 CL-2	Color break < 100 hours
	5011 CL-1	" " " "
	FO-11 CL-2	" " " "
Whites	2012 WH-5	Color break < 200 hours
	D-594 WH-25	" " 100 "
	2016 WH-16	" " " "
	2003A WH-3	" " " "
Colors	7021 GY-27	No color break
	7021 GY-28	" " "
	7021 GY-26	Fading - 300 hours
	7021 BN-6	" - 300 "
	Cycloac GSM	
	Red	" - 300 "
	7021 GN-8	Color break < 100 hours
	2012 BL-3	" " 100 "
	2016 YW-3	" " 100 "

G. Tin Stabilizers Color Hold in UPPI-16 Pipe Formulation.

The tin stabilizers of different manufacturers were blended with 1230-P into the APCI C-2230-2 formulation, each at 0.4 pph, and tested for color hold using the Bender Plastograph at 60 R.P.M. and 200°C. jacket and removing chips every two minutes.

	<u>Stabilizer</u>	<u>Time to Equivalent Color</u>
Best	Ferro GH 108T	> 10 minutes
	Argus Mark 1414A	> 10 minutes
	Ferro GH 106T	> 10 minutes
	Cincinnati Milicron	
	Advastab TM-181	6 minutes
	R. T. Vanderbilt	
	Vanstay 8207	4 minutes

AP00047419

	<u>Stabilizer</u>	<u>Time to Equivalent Color</u>
	R. T. Vanderbilt Vanstay 8213	4 minutes
	R. T. Vanderbilt Vanstay 8214	4 minutes
	Ferro GH 96 T	4 minutes
Poorest	M&T Thermolite 31	3 minutes

IV. OTHER ACTIVITIES

- A. The following two Technical Service Bulletins were published and distributed.
1. Good Injection Molding Practice
 2. Injection Molding Machines
- B. The following two rough drafts were submitted to the APCI Advertising Department for publication as "Vinyl Progress" letters.
1. Injection Molding of the "400 Series" Compounds.
 2. Film and Sheet From the "400 Series" Compounds.

DJ Mann
David J. Mann

DJM/11j

cc: A. R. Adams
A. J. Mason
L. L. Grove

AP00047420