

UNION CARBIDE CORPORATION
CHEMICALS AND PLASTICS
ENGINEERING
SOUTH CHARLESTON, WEST VIRGINIA



**BUSINESS
CONFIDENTIAL**

MEMORANDUM

March 23, 1982

RECEIVED
MAR 30 1982
H. L. Wise

TO: R. E. Jarrett, 514
E. B. Snellings, 514

CC: R. N. Bates, 514
G. B. Elder, 511
B. N. Gliatta, 514
L. A. Peggs, 511
H. L. Wise, 514 ✓
A. E. Wood, 514
MOC

FROM: H. T. Pritt

SUBJECT: CONCLUSION OF TEST FOR POLYETHYLENE AND POLYBUTYLENE
IN CONTACT WITH VINYL CHLORIDE

*used to slip-line the
VCL Receiv. unit.*

The test for polyethylene and polybutylene piping materials in contact with vinyl chloride has been concluded after 119 days. The test results do not differ greatly from the interim evaluation of 19 days that was reported earlier. (1) The effect upon polyethylene by exposure to vinyl chloride at ambient temperatures (0-25°C) continues to be minor and the effect upon polybutylene under the same condition is moderate.

Polyethylene and polybutylene test specimens were cut from piping materials and exposed to vinyl chloride at ambient temperatures in the high pressure laboratory in Building 771. This information is needed in conjunction with the project to slip-line a 4" steel line with plastic piping to convey vinyl chloride from the North Charleston Terminal to the process unit on Blaine Island. One set of specimens was stressed by clamping in a U-bend position to determine if the piping would crack in service.

The results of the test in the attached table show a Rockwell M hardness increase in polyethylene from 15 to 17, an absorption rate of 8 Mgs/Cm², and no other dimensional change. Polybutylene increased in hardness from 37 to 47 Rockwell M and had an absorption rate of 19 Mgs/Cm². There was no significant change in the measured properties of either piping material from the 19 day interim evaluation to the end of the 119 day test period. No cracking was found in either the polyethylene or polybutylene stressed specimens.

UCC 102415

There is a tendency for the piping materials to harden over the longer exposure period. The hardening effect is only slight on the polyethylene but quite pronounced on the polybutylene. However, the test results indicate that polyethylene should perform satisfactorily for an indefinite period in vinyl chloride service at ambient temperatures. Polybutylene would give limited service under the same conditions.

If there are further questions, please contact me.


H. T. Pritt

HTP:es

Attachment: 1-Report

INDEX: Attach to File No.: 16116

UCC 102416

TO: R. E. Jarrett, 514
E. B. Snellings, 514

UCC CENTRAL ENGINEERING
MATERIALS TECHNOLOGY
PRODUCT EVALUATION

DATE: March 23, 1982

EVALUATION REQUESTED BY: R. E. Jarrett/E. B. Snellings

PRODUCT & MFR.: Polyethylene and Polybutylene pipe

APPLICATION: Piping for vinyl chloride service

TEST CONDITIONS: Stressed and unstressed specimens of polyethylene and polybutylene pipe were exposed to vinyl chloride at ambient temperature for 119 days with an interim evaluation at 19 days.

TEST RESULTS:	POLYETHYLENE		POLYBUTYLENE			
	19 Days	119 Days	19 Days	119 Days		
Thickness Change, IN.	---	0	---	0		
Weight Change, Mgs/Cm ²	+8	+8	+24	+19		
Hardness	15 ⁽¹⁾	15	17	37 ⁽¹⁾	47	45

(1) Rockwell M Scale hardness at start

CONCLUSIONS AND RECOMMENDATIONS:

There was no significant change in the above properties of polyethylene in contact with vinyl chloride after evaluation at 19 days and at the conclusion of the 119 day test. Polybutylene was moderately hardened under the same test conditions. Neither of the stressed specimens showed any evidence of cracking. Polyethylene is rated "Recommended" and polybutylene is rated "Fair".

IF THERE ARE ANY QUESTIONS REGARDING THIS PRODUCT EVALUATION, PLEASE CONTACT H. T. Pritt
BLDG. 740, ROOM 2403, EXT. 5554. NOTEBOOK REFERENCE: 4-HTP-105

FILE NO.: Attach to File No.: 16116

HTP:es

Corrosion and Materials Technology Lab
South Charleston Technical Center

UCC 102417