

OFFICE MEMORANDUM



MICHIGAN

STATE HIGHWAY DEPARTMENT

JOHN C. MACKIE, COMMISSIONER

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June 6, 1962

To: E. A. Finney, Director
Research Laboratory Division

From: A. J. Permoda

Subject: Reinforced Polyethylene Sheeting for Curing Concrete (Griffolyn Co. Films). Research Project 55 B-30. Report No. 386.

In accordance with R. L. Greenman's memorandum of February 16, 1962, samples and literature submitted by the Griffolyn Company were examined to determine whether additional studies should be made to evaluate the usefulness of this material to the Department.

The samples were polyethylene concrete curing film consisting of two or more plies, cemented together over a core of nylon-type fiber netting or reinforcing. The sheeting samples were of several weights and some consisted of black film on one side and a white ply on the other.

In construction these closely resembled a similar material called "Kuverall M," white, submitted for evaluation about a year ago by the Joanna Western Mills Company of Chicago, and to our knowledge made under same patent as subject samples. In our report on Kuverall M to R. L. Greenman on April 28, 1961, we said, "We consider this material at least the equal of the conventional polyethylene sheet and recommend that it be accepted as an alternate for curing paper or white polyethylene."

Subsequent to receipt of original small samples, the following larger specimens were obtained for testing from the Griffolyn Company:

No. 55 White, 2 ply	Sample No. 62 MR-30
No. 55 Black/White, 2 ply	Sample No. 62 MR-31
No. 65 Black/White, HD, 2 ply	Sample No. 62 MR-28
No. 85 Black/White, 3 ply	Sample No. 62 MR-29

Laboratory tests were conducted on these specimens by D. F. Simmons to determine conformance of samples to current (1960) specification requirements. Determinations were made on thickness, tensile and elongation characteristics, with results reported in Table 1 as average values of ten determinations.

The recorded thickness measurements were of the film only, excluding the thickness of the nylon reinforcing. Results for tensile and elongation characteristics show that all four samples meet and exceed Department specification requirements.

Results for reflectance show that the all-white sample meets the specification requirement while the combination black-white samples do not, which would be expected since the black background of these samples lowers the reflectance values. Tabulated data on reflectance results for black-white samples show that there was significant difference between results obtained for original small samples (results also given in Table 1) and later samples, indicating considerable variation in this quality among factory batches.

Water retention qualities were not tested. From previous experience with materials of this kind, it was presumed that the samples would meet the water retention requirement, although actual compliance would have to be determined in tests for acceptance.

For comparison, test results obtained previously for the white product of Joanna Western Mills are also included in the table.

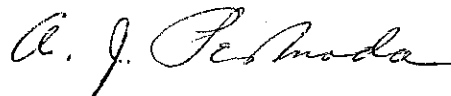
Conclusions and Recommendations

1. Reinforcing used in subject polyethylene sheeting construction confers greater tear resistance to this material, an especially desirable characteristic if the sheeting is to be reused. The reinforced construction probably demands a premium price.

2. The evaluated white sample of Griffolyn reinforced polyethylene sheeting was found to meet specification requirements. The same remark made for a similar product, "Kuverall M" of Joanna Western Mills, on April 28, 1961, applies here: "We consider this material at least the equal of conventional polyethylene sheet and recommend that it be accepted as an alternate for curing paper or white polyethylene."

3. Evaluated black-white samples of reinforced polyethylene sheeting from the Griffolyn Company were found to conform to specification requirements in thickness, and in tensile and elongation characteristics, but not in reflectance. The latter is due to the effect of the black ply of the combination sheeting. At present, we do not see any advantage to be gained from recommending a color combination of black-white in polyethylene sheeting.

OFFICE OF TESTING AND RESEARCH



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TABLE 1
SUMMARY OF TEST RESULTS
FOR FIBER-REINFORCED POLYETHYLENE CURING SHEETS

Characteristic	MSHD 1960 Specifications (Par. 7.24.4)	62 MR-30 Griffolyn No. 55 White	62 MR-31 Griffolyn No. 55 Black/White	62 MR-28 Griffolyn No. 65 Black/White (HD)	62 MR-29 Griffolyn No. 85 Black/White (3 ply)	61 MR-33 Joanna Western (reported 4-28-61)
Thickness, inches	0.004 min.	0.0045	0.004	0.005	0.006	0.006
Smaller samples		0.0045	0.004	0.005	0.008	
Tensile strength, psi*						
Longitudinal	1700 min.	2000	2180	2440	2700	1750
Transverse	1200 min.	1820	1510	1560	1780	1615
Elongation at break, percent						
Longitudinal	225 min.	335	330	1050	685	152
Transverse	330 min.	690	725	1100	825	254
Reflectance (45°-0°), percent	80 min.	91.1(6)**	50.8	66.1	49.9	89.9(16)**
Smaller samples		90.3(8)**	62.8	40.8	54.9	

* Tensile tests run at 2 in. per min.

** Numerals in parenthesis indicate number of films of white polyethylene necessary for maximum reflectance as required in test procedure. All other reflectance values determined on white face of samples as received.