
Conoco

TECHNICAL INFORMATION

Commercial Compound Processing Trends in Vinyl Window Production

Headquarters

Conoco Chemicals Company
A Division of Conoco Inc.
15990 N. Barkers Landing Road
P.O. Box 19029
Houston, TX 77224
(713) 531-3200
TELEX 794557
TWX 910-881-7329

Domestic Sales Offices

Eastern Region
Park 80 Plaza East
Saddle Brook, NJ 07662
(201) 845-3800
TWX 710 990-5123

Midwestern Region
Suite No. 120
2222 Camden Court
Oak Brook, IL 60521
(312) 655-7070
TWX 910 651-0210

Southwestern Region
Allied Bank Building
6161 Savoy
P.O. Box 2197
Houston, TX 77252
(713) 965-5117
TELEX 775347

Western Region
Smoketree Plaza
1430 N. Tustin, Suite 100
Santa Ana, CA 92701
(714) 541-8449
TWX 910 593-1949

International Sales Offices

Conoco Chemicals Latin America S.A.
15990 N. Barkers Landing Road
P.O. Box 19029
Houston, TX 77224
(713) 531-3200
TELEX 794557

Conoco Chemicals Europe, S.A.
Conoco Incorporated
Rue Joseph Stevens 7
Brussels 1000, Belgium
Telephone: (32-2) 513-7490
TELEX: 24727
Cable: CONOCHEM, Brussels

Conoco Chemicals Far East, Incorporated
P.O. Box 110
Kasumigaeki Building
(25th Floor)
Tokyo, Japan 100
Tel: (81-3) 593-0611
TELEX: J29368
Cable: CONOCHEM Tokyo

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Introduction

In the summer of 1983, Conoco Chemicals Company contracted with the market research consulting firm, Thomas Research, Houston, Texas, for the gathering of in-depth information on processing equipment and product requirements for rigid PVC window profile compounds.

A questionnaire was developed to survey PVC window producers who processed industry-supplied rigid PVC compound, either in pellet or powder form.

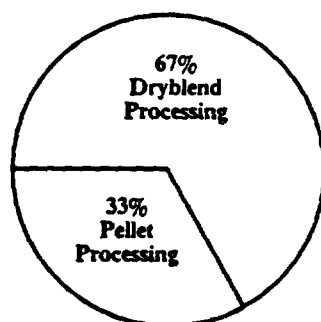
Product requirements included quantity, color, gloss, impact strength, transportation, and weatherability for both profiles and windows. A cost-benefit tradeoff analysis was incorporated in the questionnaire to produce a true picture of actual requirements. Compiled, this information defines current market requirements for compound and identifies emerging trends.

Specific conclusions of the questionnaire have been applied by Conoco Chemicals Company to its RP200 Window Profile Dryblend Program. While individual responses remain confidential, general information and trends are provided here, offering insight into the future of window profile compound development.

Dryblend vs. Pellets

Of new extrusion equipment purchases planned for 1984, the survey showed that over two-thirds will be for dryblend processing. Dryblend is typically processed on twin screw extrusion equipment. As in the PVC pipe and the PVC siding industries, PVC window profile extrusion companies are realizing the cost of pelletizing rigid PVC is an unnecessary cost.

The survey indicated that dryblend processing is increasing through both the addition of new companies entering the market and new equipment at existing companies.

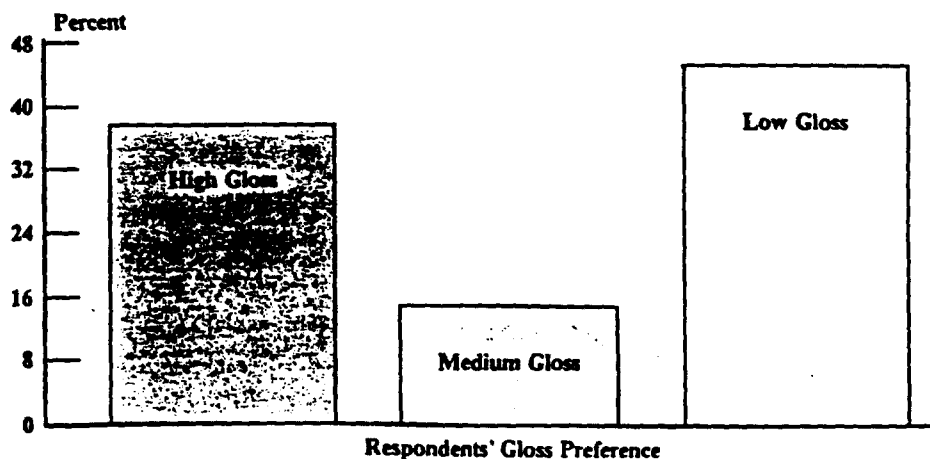


1984 Planned Extrusion Equipment Purchases

Color and Gloss

Even though the blue-toned white color has dominated the U.S. PVC window market for years, survey respondents showed a growing interest in removing the blue toning agent and thereby reducing raw materials cost. The resulting color would be a white, deriving its color from titanium dioxide, an ultraviolet light screen, important in weatherability. This color has been the predominant white in West German PVC windows for 20 years.

The respondents did not indicate any clear market preference for high, low or medium gloss. High gloss was preferred by 38 percent of the respondents, low gloss was preferred by 46 percent and a medium gloss was preferred by 16 percent. Those preferring high gloss said its clean and shiny appearance was valuable as a selling tool. Those preferring low gloss cited its ability to hide finger prints and dirt smudges. The low gloss advocates faulted high gloss because of fading within 12 months. The survey indicated that a compound which would produce a medium gloss, with processing adjustability for high and low gloss, should satisfy most processors' demands.



Respondents' Gloss Preference

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Ninety-two percent of the respondents indicated a minimum 10 percent level of titanium dioxide additive in compound was necessary to minimize color change due to weather exposure.

The proportion of brown windows (light, dark, beige) in the respondents' product lines is expected to increase significantly within the next two years. In some cases, respondents said brown windows will comprise as much as 25 percent of a total product line.

Impact Strength

Maximizing impact strength was reported by all to be critical in fabrication (punching, drilling, sawing, etc.). The necessary ductility of the lineal could be obtained from a nonimpact-modified compound, if the compound was processed correctly to obtain the properly fused product. However, the appropriate processing margin for a nonimpact-modified compound was reported to be extremely narrow, and thus most respondents desired an impact-modified raw material.

Ninety-two percent of the respondents indicated the need for medium-to-high (maximum efficiency) levels of the expensive impact modifier in the compounds they used. These levels would widen processing latitudes and reduce the amount of scrap resulting from brittle profiles during fabrication.

Summary

The major conclusions drawn from this project are as follows:

- PVC window profiles will be produced from dryblend, typically processed on twin screw extrusion equipment, and
- the current PVC window market overwhelmingly requires high raw material quality.

The increasing preference for dryblend processing is shown by the percentage of new dryblend processing equipment purchases and the growing awareness that pelletizing dryblend prior to processing is an unnecessary cost. The high raw material quality requirements are exhibited through the willingness of the processors to pay for high levels of titanium dioxide and impact modifier, both expensive additives.

Respectively, these additives will contribute to the in-use performance of the window via good weatherability and the efficiency in fabrication through lower breakage scrap rates.

PVC windows produced from high-quality dryblend will be both cost competitive and satisfactorily performing products in the 1980s.

If you have any questions or comments, please contact your Conoco Chemicals Company Representative.

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