Thermoplastics News

ISSUE No. 3

GOODRICH ANNOUNCES RESULTS OF NEW VINYL CHLORIDE CONTAINMENT PROGRAMS

John D. Ong, President of The B.F. Goodrich Company, announced the company's progress in containment of vinyl chloride in its plants, in the atmosphere and in PVC resin at a press briefing in New York, December 4, 1975.

The results indicated the largest research and development program in B.F. Goodrich's history has enabled the company to continue and expand production of polyvinyl chloride (PVC) while complying with existing or expected Federal regulations on vinyl chloride gas exposure.

PVC is the second largest-selling plastic in the United States. Goodrich operates five PVC plants and one plant that produces the vinyl chloride (VC) monomer from which PVC is manufactured.

We now believe that the chances are extremely remote of future angiosarcoma (a rare form of cancer) cases resulting from vinyl chloride exposure in our current operations. We still face the possibility that, because of the long latency period, we will see other cases of angiosarcoma among workers who experienced exposures at high levels in the past.

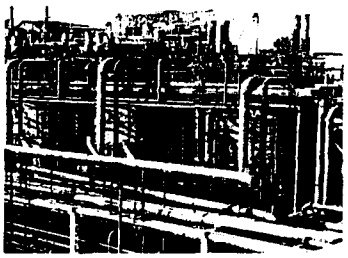
Masks fed by clean air virtually eliminate the possibility of breathing vinyl chloride gas by polyvinyl chloride (PVC) workers in B.F. Goodrich plants. The company's PVC and vinyl chloride plants are operating at levels of 1 to 3 parts of vinyl chloride per million parts of air (ppm) in work areas.



Highly accurate personal monitoring systems measure amounts of vinyl chloride gas which can be breathed by workers in polyvinyl chloride (PVC) operations. These devices show that exposure of workers to the gas is below the standard established by the Federal Occupational Safety and Health Administration.



B.F. Goodrich's new polyvinyl chloride (PVC) facility at Louisville, Kentucky, will be as good or better than any plant in the country in the prevention of employee exposure to vinyl chloride gas, escape of VC to the environment, and in reducing the amount of VC in resins produced to trace amounts, according to company engineers. For further information on the new vinyl chloride stripping process, refer to the cover article in Thermoplastics News, Issue No. 2.



Even though the containment technology we have developed is proprietary, and could give Goodrich a competitive advantage, we consider it our responsibility to make it available on an unrestricted basis to all competitors in the PVC and vinyl chloride monomer industry in the United States and abroad.

It is B.F. Goodrich's intention to continue efforts to reduce vinyl chloride exposure resulting from all operations and products, and to continue our research and development efforts to refine techniques and develop new ones.

B.F.Goodrich Chemical Company / 6100 Oak Tree Boulevard, Cleveland, Ohio 44131

B.F.Goodrich

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NEW COM-TECH® EXTRUSION TECHNOLOGY

Our newly developed Com-Tech extrusion technology centers around a new concept in extrusion screw design, the Kim Screw. This system allows plastic materials to be exposed to proper amounts of shear rate and heat as they pass through the thermoplastic extruder. By design, materials are prepared to an optimum melt quality. The result is maximum extrusion rate at minimum stock temperatures. The capability of the Kim Screw has been demonstrated at our Avon Lake Technical Center on both Estane® polyurethane and Geon® flexible PVC materials. Examples of its capability are:



Dr. H. T. Kim

Estane Polyurethane

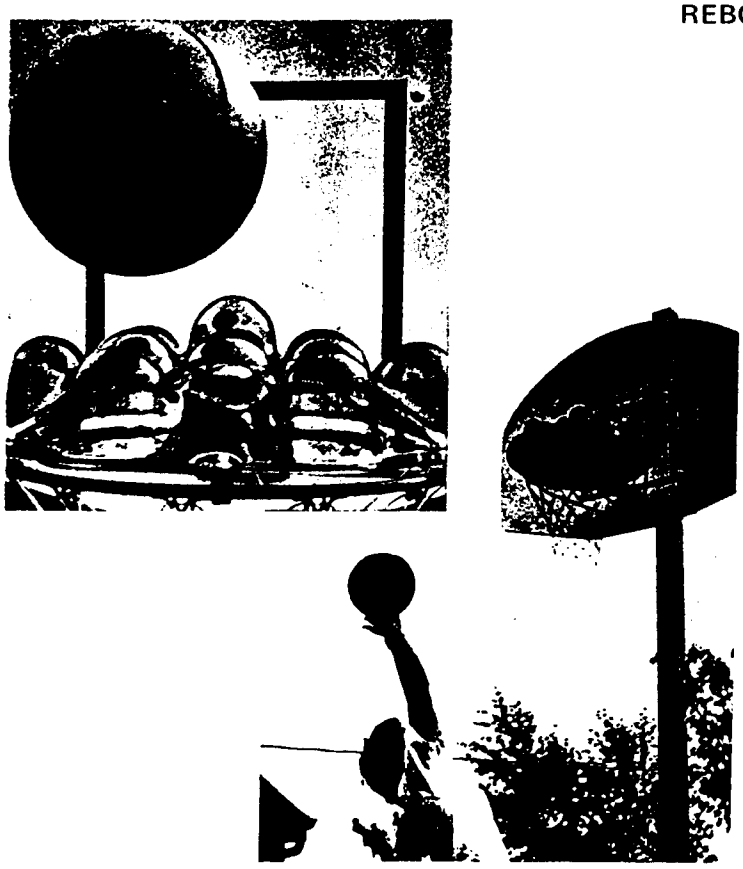
Today, Estane 58300, a polyether polyurethane, and Estane 58092, a polyester polyurethane, are being extruded into tubing at rates ranging from 60 to 100 pounds per hour on 2½ inch, 24:1 extruders. This new screw, using the same materials and machine, can produce high quality tubing at rates of 275 to 300 pounds per hour.

Estane 58300 is also being extruded in the United States into wire and cable jacketing at rates ranging from 60 to 100 pounds per hour on 2½ inch, 24:1 extruders. The new Kim Screw can produce high quality wire and cable jacketing on the same size machine, using the same material, at 275 to 325 pounds per hour and a stock temperature near 204°C (400°F).

Geon PVC

Geon 8730, a PVC wire and cable jacketing compound, is being extruded in the United States at rates between 100 to 150 pounds per hour on 2½ inch, 24:1 extruders. The new Kim Screw, using the same material and machine, can produce high quality tubing at rates of 250 to 300 pounds per hour — from both powders and cubes.

REBOUNDOME®



Rebounding, one of the most important aspects of every fastbreaking, hard fought basketball game, is one of the most difficult skills for players to acquire. Reboundome is a basketball training aid manufactured by Hayden Industries, Inc., Avon, Ohio and easily installed using mounts made of Estane thermoplastic polyurethane.

These mounts are injection molded by Moore Mold and Die Company of Euclid, Ohio. The durable mounts provide the right balance of stiffness and resiliency to simulate rebounds from the hoop. The dome may be quickly and easily removed at the completion of practice.

According to Hayden Industries, John R. Wooden, former coach of the UCLA Bruins, NCAA champions for 10 of the past 12 years, says that "The Reboundome is an excellent device for improving the effectiveness of the individual rebounder." Winning coaches including Fred Taylor, Ohio State, Bob Knight, Indiana, and Joe Hall, Kentucky, make Reboundome drills part of their regular training routines, Hayden reported.

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SPRAYABLE PAINT SYSTEMS WITH HYCAR® ATBN FOR RUBBER SURFACES

Intercures of carboxylic elastomers, phenolic and epoxy resins are known to provide good adhesion to vulcanized rubber surfaces. Similarly, it has been found that combinations of Hycar 1300X16 ATBN, a deprimary amine liquid polymer of butadiene/acrylonitrile, phenolic and epoxy resins, are useful as the polymeric formulating basis for paints, primers and coatings for vulcanized elastomers, thermoplastic elastomers and thermoplastic urethanes.

A typical formulation is:

Component A

Hycar 1300X16 ATBN	100.0
Titanox RA-50 (Titanium Pigment Corp.)	76.5
Toluene/xylene 50/50	36.2
Toluene/xylene/MEK 50/15/70	168.9
Total	381.6

Component B

DER 331 (Dow Chemical Co.)	20.0
BKR-2620 (Union Carbide Corp.)	50.0
Methyl ethyl ketone	164.4
Toluene/xylene 50/50	34.2
Toluene/xylene/MEK 15/15/70	113.0
Total	381.6

Titanium dioxide level may be varied; other fillers (pigments) could be used or none at all. Modulus may be significantly altered by varying the phenolic resin level.

Preparation: Component A is prepared by dispersing coarsely the first three ingredients with good agitation. Two passes are then made through a 3-roll ink mill (roll gaps at 2 and 1 mils) (.050 and .025 mm). Ingredients listed as the fourth item are then blended in. Component B is prepared by adding ingredients one and two to the mixture of three, four and five. If a residue exists after stirring, then filter Component B to obtain a clear solution. Mix A and B well in equal proportions prior to spraying.

Application: After mixing Components A and B, spray with normal paint spraying equipment. Apply no more than 1.0 to 1.5 mil (.025 to .038 mm) thicknesses and no more than three passes over the surface. Air dry (30 to 60 seconds) between coats and prior to curing.

Paint systems with Hycar ATBN are normally cured for 10 to 15 minutes at 250°F (121°C). Properties were obtained on a system having 50 parts titanium dioxide, cured 10 minutes at 250°F (121°C).

Tensile strength, psi (MPa*)	2860 (19.7)
Elongation, %	140
10% Modulus, psi (MPa)	1460 (10.1)
20% Modulus, psi (MPa)	1550 (10.7)
50% Modulus, psi (MPa)	1850 (12.7)
100% Modulus, psi (MPa)	2340 (16.1)
Gehman Freeze, °C	–45

Adhesion to thermoplastic polyurethanes, EPDM, etc. (cross-hatch testing):

Original	– no adhesion failure
7 days, 158°F (70°C)	– no adhesion failure
7 days, 158°F (70°C) plus 2 hrs, at 151°F (66°C), water	– no adhesion failure

Ozone Chamber Testing:

2000 hrs. at 50 and 500 ppm ozone – no signs of cracking, chipping, hardening or adhesion loss.

For further information, write to the Advertising Department.

*To convert from psi to MPa, multiply by .00689.

POLYPROPYLENE MODIFICATION WITH EPCAR® EPDM RUBBER

Epcar 306 and 847 are two of a line of ethylene-propylene rubbers especially suitable for plastic modification in a variety of applications.

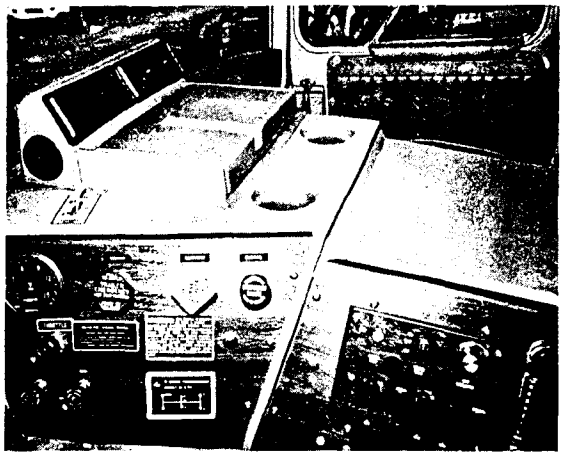
It may be used for small appliances, luggage, furniture, toys, and automobile door panels, fender aprons, kick panels and battery boxes.

The table below shows that the impact resistance of polypropylene compounds can be greatly improved by using the two Epcar EPDM rubbers. However, the improvement of impact resistance should also be assessed in the actual application.

	Properties				
Polypropylene 5.0 M.I.	100	90	85	90	85
Epcar 306		10	15		
Epcar 847				10	15
	100	100	100	100	100
Gardner VHIT, 8 Pound Weight					
Room temperature	28	128	144	120	152
–18°C (0°F)	2	6	32	8	36

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BULLDOGS ON THE ROAD

The old stereotype is no longer true. The dusty, cramped, truck cab has been replaced by a sophisticated control center in vehicles built by Mack Trucks, Inc., Allentown, Pennsylvania. Drivers ride in air-conditioned comfort surrounded by panels which provide constant monitoring of engine performance.

While the emphasis is on modernity and comfort, the truck cab interior must also be built to withstand years of hard wear and tear and provide efficient service for thousands of miles.

Fulfilling these needs, Mack Trucks selected Abson® ABS for the dispatch boxes and the housing of the air conditioning and heating air circulation inlets. The deflectors on the inlet housing are injection molded and chrome plated. The housing is vacuum formed by Brentwood Plastics, Inc., Reading, Pennsylvania, from sheet made of Abson ABS.

Easily fabricated using standard fasteners and hinges, the parts made of Abson ABS are tough and durable. According to Brentwood, the dispatch box and housing exceed the flammability requirements of Federal Motor Vehicle Safety Standard 302.

SALES OFFICE RELOCATION

Our New York area sales office has been relocated to:

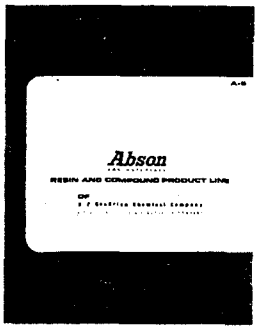
299 Market Street
Saddle Brook, N.J. 07662
(201) 368-9400

LITERATURE OFFERS



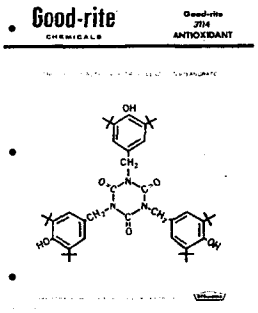
The Environmental Resistance of Estane Thermoplastic Polyurethane Compounds, G-56

This bulletin will assist in selecting the best Estane polyurethane for a given application and to further the understanding of the environmental aging characteristics of the material.



Abson ABS Materials, A-5

Abson ABS materials resin and compound product line. Bulletin shows general characteristics of injection molded samples.



Good-rite 3114 Antioxidant, GC-55

Discusses and tables the ability of Good-rite 3114 to stabilize polymers such as polypropylene and polyethylene against oxidation and deterioration initiated by light and heat.



Designing with Thermoplastics, PM-1

Application problems of production, fabrication, appearance, durability, and cost can be solved with our major family of plastics: Geon vinyls, Geon CPVC, Abson ABS and Estane polyurethanes.

To obtain a copy of either of the new publications, write to:

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