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Iron tunnel. Thousands of auto glass bending fixtures or "irons" permit fabrication of replacement windshields for virtually all domestic and imported cars. For most glass replacement parts, PPG's distribution system permits overnight delivery to dealers and repair shops.



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A Concern for the Future

Architecture and automobiles, energy conservation and aerospace. These are only some of the major areas in which PPG Industries, Inc., one of the country's oldest and largest manufacturers and a client of H&S for about forty years, is involved today. If you are still thinking solely in terms of plate glass, it is time for a reevaluation. The company's name change in 1968 (from Pittsburgh Plate Glass to PPG Industries, Inc.) was a logical reflection of the diversification philosophy that has been at the core of its success. Ever since cofounder John Pitcairn issued the mandate to produce a wider variety of merchandise—which resulted in the founding of a chemical firm and purchase of a paint company in rapid succession—PPG has been more than a one-product firm.

Today the company is a leading maker of all kinds of glass, a major producer of coatings and resins and fiber glass, and an important manufacturer of chemicals, ranking near the top in domestic output of chlorine and caustic soda. PPG is also in the forefront of research and development programs geared to meet the needs of a dramatically changed economy, where energy conservation, environmental protection and safety have moved from the realm of scientific curiosity to that of basic survival.

Located in Gateway Center, part of Pittsburgh's redeveloped business area known as the Golden Triangle, PPG headquarters reflect the diversified interests of the company. Each of the four operating divisions (Glass, Coatings & Resins, Fiber Glass and Chemical) has a vice president and general manager who reports to PPG president Joseph A. Neubauer. The divisions are given considerable autonomy and have their own research facilities, marketing procedures and distribution systems. For economy and efficiency the latter are integrated in a

network coordinated by the corporate Traffic and Transportation group.

According to L. Stanton Williams, vice president, finance, "PPG operates as a single company while recognizing that we are four different entities. Actually we are a cross between a holding company and an integrated corporation, with common cash and tax management, personnel policies and capital controls on the one side and autonomy in the four divisions on the other."

With sales topping \$1.7 billion, this company employs about 38,000 persons in more than forty domestic production facilities, six research-development centers and scores of distribution-warehouse-sales centers spread across the United States, plus operations in other parts of the world. Constantly growing (the last four years were record years in sales and operating earnings) PPG has invested more than \$1.25 billion in new plants, equipment and product development since 1963. "Owned" by some 47,000 stockholders, it can boast a seventy-four-year record of uninterrupted dividend payments.

PPG, an H&S client since the 1930s, is the largest originating client of the Pittsburgh office, where David Moore is partner in charge of the engagement. Dave, who has been involved with PPG for ten years, says, "It is a satisfying company to work with. Consistently good management and an understanding of the importance of research in maintaining market leadership have helped to make it successful in so many areas." David Moore, manager Barry Huff, senior Roger Towle and senior assistant Dave Navikas handle audit, tax and SEC work for PPG, assisted by the other H&S offices located near the clients plants.

PPG's motto, "A Concern for the Future," aptly defines the company's response to the current fossil fuel situa-

tion, which has sparked the exploration of alternative energy sources. Using technological expertise accumulated over almost a century in glass production, PPG has developed a flat plate solar collector cell, a key component in solar energy systems for commercial buildings and private homes. Developed at the Harmarville, Pennsylvania glass research center, the cell is being manufactured at the Ford City, Pennsylvania plant. A 1974 IR-100 award, given by *Industrial Research* magazine, recognized the solar collector as one of the year's most significant technical achievements.

The box-like collector cell, measuring more than six feet high and nearly three feet wide, consists of a double layer of Herculite glass on top of a black metal absorber plate sealed in a stainless steel frame. Sunlight is transmitted through the tempered glass, which is transparent to solar radiation. About 95 percent of the solar energy falling on the cell is absorbed by a coating of PPG black Duracron enamel. PPG says that Herculite requires little or no maintenance, resists breakage and withstands wind and snow loads.

A fluid, frequently water and ethylene glycol (a prime ingredient in antifreeze), circulates through tubes in the collector's metal plate. The sun's rays, transmitted through the glass and absorbed by the black enamel, heat the fluid to temperatures of up to 200 degrees. The warmed fluid is then pumped into insulated storage tanks. It can be used to heat water for household needs and for space heating. Using heat-transfer methods similar to those employed in gas refrigeration, the same fluid can even power air conditioning. Storage tanks keep the fluid hot for at least five days during bad weather. Even on cloudy days, however, the collectors can absorb the 30 percent of sunlight that is diffused in the atmosphere.

Although using the sun's rays for heat

storage and transfer is still an infant technology, solar energy may be a practical answer for the home or building owner who feels hard pressed by continuously rising utility rates and is worried about dependable fuel sources. A system of ready-made components could add from \$4,000 to \$6,000 to the cost of a new home; but over a year it can provide up to 90 percent of all heating and hot-water needs, with a subsequent reduction in utility costs. At current power rates, it is estimated that a system will pay for itself in six to eight years, with a clear saving after that time.

The concern for energy efficiency has stimulated a growing tendency to weigh the "low first cost" of constructing a building against the cost of energy consumption over its projected lifetime. In keeping with this concern, PPG has created a family of energy saving and architectural glasses available in the commercial and private-home construction markets. Solex heat-absorbing glass, developed in 1934, was the progenitor of such current products as single-pane Solarcool reflective glasses. This medium-priced glass, which has a transparent metallic coating on a bronze or gray glass base, will reduce solar heat gain, thus helping to keep down air-conditioning costs. It may be tempered for areas requiring safety glazing.

Twindow insulating glass units, developed in the forties and fifties, are important energy savers, and the Twindow Xi unit, made of two panels of glass permanently welded at the edges with a special dry gas in between, can cut heat loss over 40 percent more efficiently than single-pane glass. Solarban Twindow insulating reflective glass rejects 80 percent of the brightness of the summer sun for indoor comfort, while at the same time transmitting the ultraviolet rays necessary to grow healthy plants. PPG maintains a com-

puter service to help architects select the glass that will best suit their requirements.

PPG has recently begun marketing a new industrial coating, called Environ 1776, which is used largely as a beverage can liner to prevent corrosion and preserve the taste of the liquid. Environ 1776, as its name suggests, is revolutionary in that it requires only 15 percent of the natural gas and petroleum-based components of previous coatings, thus saving a valuable natural resource. Further, it greatly reduces the odors caused by the vaporizing of solvents during the curing process—saving greatly on emission control equipment that would otherwise be required. In addition, says PPG, it passes every taste test.

PPG has had an historic interest in products that promote safety. As early as 1928 Duplate safety glass, made by laminating layers of glass and plastic, was used for automobile windshields. Intensive research since that time has resulted in a more sophisticated shatter-resistant windshield in which the plastic interlayer is twice as thick as the original version. Combined with this tougher interlayer, two panels of thin floating glass create a high impact-resistant windshield.

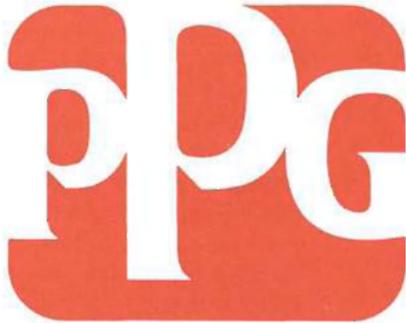
Herculite tempered safety glass, a breakthrough of the Depression years, is currently in use in such potentially hazardous locations as high-traffic areas of public buildings, and in storm and sliding doors in the home. Herculite II, an even stronger version, has found wide application in the aircraft industry.

In addition to its safety glasses, PPG has also created such products as Speedhide latex fire-retardent paint. When flame contacts the paint a puff of foam forms to insulate combustible material underneath, delaying the spread of the fire and buying valuable time for evacuation.

In 1963 PPG became the first American

Interchangeable Fit Inspection. Production superintendent Bob Stephenson (r.) shows manager Barry Huff how to check the contour and bolt alignment of an F-111 windshield.

Conference (photo left). L. Stanton Williams (r.) PPG vice president, finance, confers with H&S partner David Moore on financial reporting matters.



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company to produce float glass, which has the characteristics of quality plate glass but can be made more economically. Molten glass is formed on a bath of liquid tin and remains untouched until it hardens. The process results in a product with the surface brilliance of fire-finished glass and the parallel surfaces and high optical quality of plate glass without expensive, time-consuming grinding and polishing operations. PPG is now the country's largest float glass producer with highly computerized plants designed exclusively for this process at Meadville and Carlisle, Pennsylvania and at Wichita Falls, Texas, and single line production units at Cumberland, Maryland and Crystal City, Missouri.

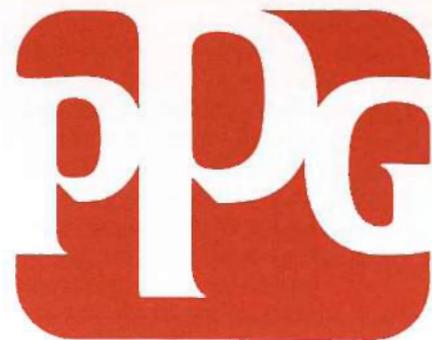
While 1974 saw a reduction in the amount of glass required for new car production and in the construction industry, PPG continues to benefit from its strong position in the replacement market. According to Robinson F. Barker, chairman of the board, the upsurge in the use of insulating storm windows and doors will help offset the decline in glass sales in new homes. In addition, major steps were taken last year to expand and consolidate European glass capabilities through a merger with an Italian glass manufacturer. The new company, in which PPG has a majority interest, produces flat and fabricated glass products for the European market and gives PPG its first interest in a float glass plant outside the United States.

PPG's position in the chemical market continues to strengthen. Chemicals accounted for the largest percentage of earnings in 1974, due in large part to favorable price trends and a strong demand for chlorine, caustic soda and chlorine-based derivatives—products required in a broad range of industrial applications, which are the core of the Chemical Division.

Preparing annual report (photo right). PPG's Robert Mitchell (c.), vice president and controller, and Jerry Krider (l.), director of financial accounting, meet with H&S partner David Moore (r.) and manager Barry Huff (standing) to discuss the company's annual report.

Winding down (photo far right). Fiber glass strands, direct from the melting furnace, are placed on these twist frames for processing into yarn that winds onto the milk-bottle-like bobbins below.

River of glass (photo below). Hundreds of conveyor rolls carry this continuous float glass "ribbon" through the 300-foot-long cooling section at PPG's Carlisle, Pennsylvania plant. The glass is brought to room temperature before inspection and cutting operations.



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in reinforcements, tire cord, plastics and decorative and industrial glass fabrics. Fiber glass reinforced plastics in automobiles have become a major replacement for metal because of the need to reduce vehicle weight in order to cut fuel consumption.

Industrial fiber glass sales have been up, with increases in electrical laminates, aerospace applications, environmental protection systems and recreational products.

Fiber glass textile materials now account for a significant portion of the ready-made drapery market and continue to gain consumer acceptance because of their unique characteristics: they need no ironing, wash easily, do not shrink and are permanently fireproof.

Pittsburgh Paints, a product of the Coatings & Resins Division, are familiar to many consumers since they are found on the shelves of 5,000 dealers. PPG strives for continuous improvement here, too. Wallwide flat latex paints are made using the patented Microflo process, which creates a paint film that includes air-filled spaces called microvoids. These microvoids reflect light more efficiently than ordinary paints, offering an exceptionally opaque finish that is durable, washable and bright.

Products that meet the needs of today and anticipate the requirements of tomorrow are the foundation of PPG Industries' success. Since 1919, when the annual report stated that the company was a "diversified business," PPG has been engaged in active expansion of its product lines, as well as in the development of raw material sources and marketing outlets.

Now PPG looks to the future—a future that will see a continuous upgrading of the company's top-quality products and a dynamic commitment to research for a better way of life.

A Lake Charles, Louisiana complex is a leading producer of chlorine, caustic soda, solvents, vinyl chloride monomer and other key industrial chemicals. PPG's Puerto Rican operations, set up in 1971, represent the company's largest single investment in the chemical process.

The excellence of PPG chemical technology is evidenced by the fact that increasing numbers of firms use processes under PPG license. For example, the company predicts that in the near future 20 percent of the world's capacity to produce perchlorethylene and trichlorethylene—key chemicals in dry cleaning and degreasing—will be based on a PPG technique.

Fiber Glass, the last of the divisions to be added to the PPG structure, makes its ample contribution with expansion in the production of continuous strand fiber glass where PPG expertise is unsurpassed. With the sale of its fiber glass insulation facilities in Shelbyville, Indiana, the company is now concentrating on sales and marketing efforts