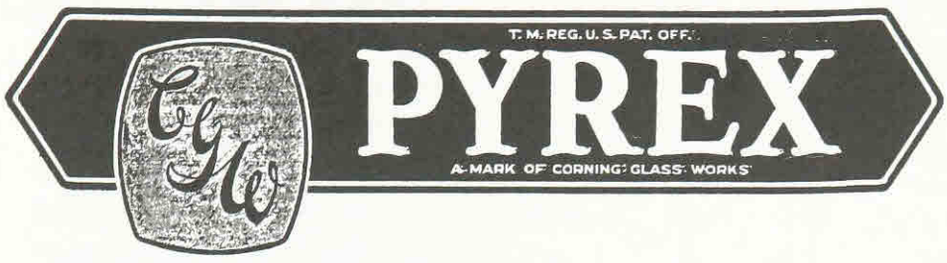
CORNING GLASS WORKS

CORNING, NEW YORK

World's largest makers of Technical Glassware



The Corning Glass Works traces its origins to a glass company in Cambridge, Massachusetts, in which Mr. Amory Houghton purchased an interest. By 1854 he had founded the Union Glass Company in Somerville, Massachusetts, and in 1864 bought the Brooklyn Flint Glass Company in Brooklyn, New York. The operation was moved to Corning, New York, in 1868 for the fuel and the transportation resources. The company manufactured fine tableware and decorative glasses. The Corning Glass Works was incorporated in 1875 and their product line was expanded to include tableware blanks, thermometer tubing, and pharmaceutical glassware.

The glassworks was always researching the concepts and properties of glass while trying to improve the quality of their product lines. By 1877 they were working on developing better railroad signal lenses by putting the focusing ridges on the inside. The American railroads also needed a standard color system and through field research on color perception, the ideal colors were found to be red, yellow, and green. In 1908 the Railway Signal Association adopted Corning's colors as standard, and lenses were mass-produced. Also in 1908, the Corning Research Laboratory was established which was one of the first in American industry. Their research was directed at producing a glass that could withstand sudden temperature changes. By 1909, Corning was manufacturing lantern globes and battery jars of their non-expansion glass under the tradename of "NONEX."

Through the time period of 1910 to 1920, the researchers at Corning were working on expanding the concepts of the NONEX line of glass products. Fred M. Locke, who was well known in the insulator-manufacturing field at this time, was also working on the development of various compositions of borosilicate glass. After much research, in 1909 he successfully produced a new insulator material he called "transparent porcelain". It had the capability of withstanding severe temperature changes. Locke developed boroporcelain by 1915, and a composition material called "borosilicon" soon after that. In all, he was granted eight patents for borosilicate glasses for the manufacture of insulators. Locke sold the rights to many of these different glasses to Corning Glass Works.

Various borosilicate glasses were produced at Corning with the desired properties of chemical stability, heat resistance, and shock resistance. One line of borosilicate glasses developed between 1910 and 1915 contained silica, alumina, boric oxide, and sodium oxide. It was filed with the U.S. Patent Office on June 24, 1915, and had the tradename of "PYREX". This PYREX line was immediately used in glass piping for chemical and food processing firms. Corning also developed their PYREX ovenware and was offering it for sale by late 1915. Laboratory glassware was introduced soon after this and became an industry standard.

The Corning PYREX glass formula was registered July 10, 1915, issued July 13, 1917, and was patented May 27, 1919, Patent No. 1,304,623. The *Official Patent Gazette* published the proposed PYREX trademark on February 10, 1925. It was granted to Corning Glass Works on May 5, 1925, Patent No. 198,173. The trademark "PYREX" designates a product of Corning Glass Works and, as such, carries the guarantee against defects of workmanship and material.

The same ideology of high quality control certainly was carried through to the Corning PYREX line of communication, power, and radio insulators. Initial consideration to use glass as an insulator material by the glassworks is dated 1913. The borosilicate PYREX line as mentioned above had the permanent characteristics of high thermal endurance and high stability, while meeting the insulation requirements for high voltage transmission and distribution lines. Corning was very interested in capturing the porcelain insulator market by 1920, and they were using the following benefits of their PYREX glass line as selling points: PYREX insulators were homogeneous and nonporous, requiring no glaze to provide a strengthening cover: The glass is transparent to solar heat, thus even in

What do you EXPECT
~from an insulator

LOW TEMPERATURE RISE?

If you wish to warm almost any material—just expose it to the hot sun.

But lay a PYREX Power Insulator in the hot sun to heat it and you'll be disappointed with the result.

You'll find that it will not ABSORB heat.

That is why a PYREX Power Insulator does not get hot in service.

And why it has a minimum of expansion due to temperature change caused by sunlight, snow, ice, sleet, rain or electrical heat.

So that it cannot chip, crack or craze under weather conditions.

When your specifications call for an insulator with the irreducible minimum of temperature rise . . .

That's a PYREX
TM REG U.S.PAT.OFF.
POWER INSULATOR

—the logical insulator, representing the TRUE fusion of materials resulting in a non-porous dielectric possessing unalterable uniformity of structure, high in puncture strength and wet flashover, low temperature rise—a rugged one-piece, non-crazing insulator unaffected by any atmospheric condition and one that can be visually inspected clear through to the pin.

Sales Offices
309 Lexington Ave., New York — 79 Milk St., Boston
193 Second St., San Francisco — Candler Building, Atlanta
Polson Building, Seattle — 3152 Cambridge Ave., Chicago
J. W. Hellman Bldg., Los Angeles
Oliver Bldg., Pittsburgh

A PRODUCT OF CORNING GLASS WORKS

What do you EXPECT
~from an insulator

ONE PIECE DESIGN?

Usually a one-piece design is wanted simply to get away from such mechanical failures as cracked top shells caused by cement.

Each PYREX Power Insulator, being one solid homogeneous, non-porous mass, not only meets that requirement, but goes way ahead of it.

For a PYREX Power Insulator is unique in that it has the right fundamental for such design, viz., a ONE-MATERIAL structure.

And the high dielectric strength of this material permits one-piece design, light in weight yet high in puncture strength.

So when you want an insulator to provide you with all the benefits accruing from one-piece design . . . . .

That's a PYREX
TM REG U.S.PAT.OFF.
POWER INSULATOR
(PYREX MEANS CORNING)

—the logical insulator, representing the TRUE fusion of materials resulting in a non-porous dielectric possessing unalterable uniformity of structure, high in puncture strength and wet flashover, low temperature rise—a rugged one-piece, non-crazing insulator unaffected by any atmospheric condition and one that can be visually inspected clear through to the pin.

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A PRODUCT OF CORNING GLASS WORKS

Late 1928 Journal of the A.I.E.E. advertisements for PYREX power insulators.

What do you EXPECT
~from an insulator

SURFACE CLEANLINESS?

A diamond-hard and smooth surface is a pretty poor place for dirt to accumulate.

A PYREX Power Insulator on account of its original hard surface which never pits, crazes or corrodes, presents *just that*.

It is easily cleaned. But ordinarily it need never be, since, under normal rainfall conditions, soot, dirt or dust do not accumulate upon it to the extent of affecting its operating performance.

And because of its chemical stability it is particularly desirable in locations where acid fumes and salt fogs are prevalent.

When you want a hard, smooth original surface on your insulators . . . . .

That's a PYREX
TM REG U.S.PAT.OFF.
POWER INSULATOR

—the logical insulator, representing the TRUE fusion of materials resulting in a non-porous dielectric possessing unalterable uniformity of structure, high in puncture strength and wet flashover, low temperature rise—a rugged one-piece, non-crazing insulator unaffected by any atmospheric condition and one that can be visually inspected clear through to the pin.

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What do you EXPECT
~from an insulator

UNIFORMITY?

In routine manufacturing the score of 100% perfect *may* come BEFORE the millenium.

In the routine overpotential test of PYREX Power Insulators, after visual inspection the run shows a deviation from the perfect of ONLY TWO TENTHS OF ONE PERCENT.

Interpreted in terms most important to you it means that you may order 50,000 PYREX Power Insulators and due to characteristics of material and making you receive 50,000 perfect insulators all equal in performance.

And in still other words: Should you order 500 PYREX Power Insulators taken from untested stock the check shows that you would find but ONE insulator not perfect.

So when you use the term UNIFORMITY. . .

That's a PYREX
TM REG U.S.PAT.OFF.
POWER INSULATOR

—the logical insulator, representing the TRUE fusion of materials resulting in a non-porous dielectric possessing unalterable uniformity of structure, high in puncture strength and wet flashover, low temperature rise—a rugged one-piece, non-crazing insulator unaffected by any atmospheric condition and one that can be visually inspected clear through to the pin.

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brilliant sunshine the insulator's temperature is raised only a few degrees: The insulators are easily inspected for any internal defects from factory production, during installation, and while in service.

By 1922, Corning was experimenting with suspension insulators on electrical lines in northern New York state. The researchers believed a PYREX suspension insulator could take the place of two porcelain units with the same factor of electrical safety. In 1924, the PYREX suspension insulators were being offered for sale to American power companies. These units were eventually available in 6", 9", and 10" diameters and were manufactured through 1945.

The Corning Glass Works laboratories were not interested in the development of pintype insulators at first, but by 1923 the three-piece PYREX stacker insulator was in use by the Montana Power Company. It is assumed that this unit was an early test insulator. The stacker was soon replaced by suspension-type assemblies of three or more connected units. By using the same voltage characteristics, another likely replacement for the stacker is the one-piece PYREX 441 insulator that was designed in 1926. Other catalog models designed throughout 1926 include the 161, 661, 662, 271, and 401. After samples were sent to various power companies across the country, they were all mass-produced. In 1927, Corning Glass Works made available catalog models 131 and 233. The growing need for electrical service in the country at this time saw a ready market for related equipment, and by 1927, Corning Pyrex insulators were in service in thirty-seven states.

The thirty-eight-pound one-piece PYREX insulator model 701 was released for sale by Corning in January of 1930. This addition to their product line made PYREX insulators available for operating voltages from 6,600 to 70,000 volts. The pintypes made by Corning also include the model numbers 353, 453, 553, and 663, which were authorized throughout 1931. The actual production of these four insulators took place by 1932.

An insulator's value when in use is determined by its electrical resistance. Corning experimented with the electrical resistance of glass made iridescent by a thin coating of tin oxide. This same process was used on PYREX suspension and pintype insulators starting in 1928. A build-up of electricity on insulators would reach a peak and discharge causing extensive radio static, making reception impossible. The tin oxide treatment allowed the electricity to leak off of the insulator without causing any static. All of Corning's PYREX insulators were offered in the clear glass, while the majority were also available with the tin oxide under the tradename "PYREX-NOSTATIC". The nostatic surface is an inherent part of the insulator and will not peel, scale, or craze. The term "carnival glass" insulator results from the association of insulators being treated by the same process as glassware given out at carnivals in the 1920's and 1930's.

The mold markings on PYREX insulators were used to identify the electrical characteristics of the unit and to assure that the correct-sized insulator was used on any given power line. "Corning PYREX" and "PYREX" as mold markings apparently indicated the origin of the insulator's manufacture within the Corning Glass Works. The glassworks no longer knows the specific code for the letters and series of dots found on many of their insulators, but it is felt that these also somehow indicated some type of product-control method. Many of the larger insulators such as the 553, 663, and 701 have their markings on the underside of the glass, reading through it. In this way, rainfall was supposed to help keep the unit clean. The marking "REG. U.S. PAT. OFF." that appears on virtually all of Corning Pyrex insulators refers to the PYREX glass patent of May 27, 1919.

Corning Glass Works produced power line insulators from 1924 to 1945, commmunication line insulators from 1926 to 1941, and radio insulators from 1924 to 1951. These production dates are for United States manufacture only.

Corning Glass Works owns the distinction of having produced the smallest and largest known glass pintype insulators. Perched on the shoulder of a 38-pound 701 model (CD 331) is the smallest, the mid-span insulator (CD 100.5). Four of the CD 100.5 insulators were placed on a bracket which was used to transpose wires in mid-span, while the CD 331 supported voltages of 70,000 volts. (Courtesy of Tommy Bolack collection; photograph by John McDougald)