**Distribution and Substation Arresters**
- Normal duty, heavy duty and riser pole polymer-housed, metal-oxide surge arresters available for systems 4.16kV through 34.5kV.
- Gapless construction
- Resistant to moisture ingress
- Millions in service worldwide
- RUS listed

**Transmission and Distribution Insulators**
- VERI*LITE™ Deadend Insulators 15kV through 35kV
- HI*LITE® Line Posts, station posts, suspension lines and transmission insulators for systems 69 - 765kV

**Cable Accessories**
- Full 200A 15kV Loadbreak Products
- 600 amp products
- Splices
Introduction

Ohio Brass’ Electric Utility operation (“Ohio Brass”) has a rich tradition as a company based on innovation. Ohio Brass continues to thrive on developing new technologies and state-of-the-art power products.

Continually setting new standards, Ohio Brass consistently develops new materials and products for transmission and distribution. We’ve used our years of background in research, development and manufacturing as a foundation for our ever improving and expanding line of polymer insulator and surge arresters as well as cable accessories.

New products show our commitment to the future. Ohio Brass is a strong, vibrant company with a solid reputation for quality and service in the electric utility market.

This brochure highlights the visionary experience of yesterday and today at Ohio Brass’ Electric Utility operation.
The following outline traces some of the major events in the history of the Ohio Brass’ Electric Utility operation (“Ohio Brass”) and the electric utility industry. A visionary sees obsolete products while they are still in use and develops new products to meet customer needs while setting industry standards for the world.

**Time Line . . .**

Electric Utility operation of Ohio Brass founded in Mansfield, Ohio.

1893 Enters transit market with line material, including insulators, for electric powered trolley lines.

One-piece, cap-and-pin-type porcelain suspension insulator chosen to insulate 110kV Niagara Falls to Toronto, Canada, transmission line.

1910 Porcelain plant purchased in Barberton, Ohio.

1915 First high-voltage testing laboratory established at Barberton plant.

1920 The country’s first full-scale outdoor electrical testing facility established at Barberton.

1922 Canadian porcelain plant established at Niagara Falls, Ontario.

1932 HiTension News, an Ohio Brass publication about products and services of interest to the electric utility industry begins publication. New line of oil-filled apparatus bushings introduced.

1934 New high-voltage test laboratory located in Barberton plant. Canadian plant builds new, expanded facilities at Niagara Falls, Ontario.

1935 Ohio Brass insulators installed on Boulder Dam 287kV line.

1938 Clamptop concept developed for pin types and line post insulators.

1946 Ohio Brass begins participation in extra-high-voltage transmission projects.

Non-Magnetic aluminum transmission and distribution clamps introduced.

1950 Ohio Brass introduces improved protection and durability in first surge arrester design.

1953 Thorex magnetic gap surge arresters introduced.

1957 Ohui Brass introduces new condenser bushings with improved spring compression assembly. Dynagap current-limiting gap surge arresters also introduced.

1962 Development of corona-free hard-ware eliminates need for expensive corona-control rings on extra-high-voltage transmission lines.

1964 Ohio Brass begins development of organic insulation for transmission and distribution.

1966 Canadian operations expand with Pointe Claire, Quebec, plant. Ohio Brass acquires plant in Newell, West Virginia, to expand porcelain production.

1966-1967 High voltage lab performs electrical tests on 765kV mock tower and full scale towers for A.E.P.

1968 Dedication of Frank B. Black Research Center, Wadsworth, Ohio, as a modern resource for electric power research.

1969 Research center begins one of the largest research projects in Ohio Brass’ history in cooperation with A.E.P. to “determine the feasibility of transmission of electric power at 1500kV and above.”

1970 Futura-2, extended leakage design, suspension insulator introduced.

1975 Solid-core porcelain line and station posts introduced through entire production line.

1976 Lightweight, high strength HI*LITE® Polymer Insulators introduced after 12 years in development.
**HISTORY**


1984 HI*LITE® insulator manufacturing moved to Aiken, SC plant.

1985 OPTIC*LITE™, a fiber optic polymer insulator, is introduced. ESP polymer is also introduced. Surge arrester manufacturing move to Aiken, SC plant.

1986 Multi-million dollar expansion of MOV element plant in Wadsworth, Ohio. Introduction of the first U.S. made polymer-housed distribution arrester, Type PDV-100. HI*LITE® II polymer suspension insulators are also introduced.

Ohio Brass repositioned by closing of the Barberton and Newell plants and the sale of stock of old “The Ohio Brass Company” basically consisting of the mining and transit product lines.

Electric Utility operations sold to NewCo Ohio Brass, Inc. and name then changed to “The Ohio Brass Company”.

1988 Mansfield headquarters moved to Wadsworth, Ohio. The following products were introduced:

- The Type PDV-65 expands the polymer-housed arrester line.
- PROTECTA*LITE® concept, a polymer insulator with MOV arrester protection.
- Type PVR, first polymer-housed riser-pole arrester.

1990 Introduction of VERI*LITE™ distribution insulators and HI*LITE® polymer suspension insulators.

1992 Introduction of 69kV VERI*LITE™ polymer line post insulators and Series 250 HI*LITE®-XL polymer line post.

1993 Introduction of Polymer station arrester, PVN. Four Millionth PDV shipped.

1994 Introduction of Series 300 HI*LITE® XL polymer line posts.

ISO 9002 Registered Aiken & Wadsworth.

Hubbell Incorporated acquired The A.B. Chance company and Lapp’s Polypace Insulator Line.

1996 HI*LITE® XL, a silicone rubber suspension insulator, is introduced.

1997 Introduction of VERI*LITE™ polymer suspension insulators.


1999 Acquired Chardon Electrical Components, Inc. Introduction of H1 high voltage gradient MOV distribution blocks and 35/46kV VERI*LITE™, a polymer post insulator.


2001 Porcelain arrester assembly moved from Bayamon, Puerto Rico to Vega Baja, Puerto Rico. Introduction of the following products:

- Series 250 HI*LITE®-XL silicone rubber line post.
- 600 Amp SAFE OP® Tap Plug.
- 600 Amp Loadbreak Reducing Tap Plug.
- 600 Amp Insulating Cap.
- 600 Amp Bushing Extender.
- PVIA polymer-house intermediate arrester.

2002 IIIDA MOV block manufacturing moved from Bayamon, P.R. to Aiken, S.C. and Wadsworth, OH plants. Introduction of the following products:

- PVI-LP® polymer-house intermediate arrester.
- PVNA polymer-housed station arresters.
- H3 high voltage gradient MOV station/intermediate blocks.
- PDI silicone rubber distribution deadend insulators.
- F-Neck VERI*LITE™ polymer line post insulators.
- Y-Clevis VERI*LITE™ polymer suspension insulators.

2003 Introduction of 35/46kV VERI*LITE™ silicone rubber post insulators.

2004 Under Oil arrester assembly moved from Vega Baja, P.R. to Aiken, S.C. plant.
In 1920, after 15 years of performing research in a small building, Ohio Brass’ Electric Utility operation (“Ohio Brass”) converted a palatial horse barn and pasture yard in Barberton, Ohio into the country’s first great indoor-outdoor high-voltage electrical laboratory. Many of today’s accepted principles of high-voltage transmission were proven there. This facility was the most capable in the industry, devoted exclusively to problems of insulation and transmission.

Ohio Brass technical papers became industry textbooks. Over the years, Ohio Brass engineers developed the data for the design of lines working at 138kV and 230kV. As the era of refinement became evident in the 1930s, laboratory investigators progressively became quantitative more than qualitative. Lightning, once accepted as “an act of God,” was reliably simulated in the laboratory with new equipment and instrumentation.

In 1934 a new facility was built in Barberton, equipped with a world class lightning impulse generator capable of producing a 3-million volt impulse of phenomenally steep wave.

The Ohio Brass team contributed to industry technology development, most notably in ultra-steep wave research related to lightning. They incorporated the findings into an entire line of insulators with an unheard-of immunity to lightning damage.

On October 1, 1947, the Tidd 500kV Test Project was energized and the modern concept of extra-high voltage was born with Ohio Brass as the insulator manufacturer.

By 1963, Ohio Brass had already run full scale tests on 500 - and 765kV transmission.

Named after the founder of the old “The Ohio Brass Company”, the Frank B. Black Research Center opened in 1968 and continues today to house the research and development team.

In 1976, following 12 years of development, HI*LITE® Insulators were introduced, the first commercially successful polymer insulators. Today polymer insulators are constantly replacing heavy, bulky and breakable porcelain and glass insulators.

In 1986, Ohio Brass introduced the first U.S. made polymer-housed arrester. Today Ohio Brass continues to further expand the polymer distribution arrester product line.

By constantly developing and improving materials and products, Ohio Brass will continue to introduce industry “firsts.”
Yesterday’s commitment leads to today’s quality. Facilities in Wadsworth, Ohio, Vega Baja, PR and Aiken, South Carolina house our manufacturing technology.

Constructed in 1978, the varistor block plant in Wadsworth had a multimillion dollar expansion in 1986 and another in 1994. New technology for polymer-housed distribution arresters led to new equipment needs. Ohio Brass is committed to the industry and the requirement for only state-of-the-art innovation in the 48,000 square-foot MOV element plant. Emphasis on material development, process engineering, and process control coupled with a strong quality assurance program yield high quality, cost competitive MOV elements.

Assembly occurs in our large, modern 357,000 square-foot plant in Aiken where HI*LITE® Insulators are manufactured and the full line of MOV arresters are assembled and shipped. In addition to assembly operations, rubber injection molding of HI*LITE® weathersheds and distribution arrester housings are also done in Aiken. Ohio Brass’ quality assurance program is ISO 9001:2000 registered.

Varistors are tested for energy absorbing capability and classified prior to packing for shipment to Aiken, SC.
**Introduction**

While electric utility products have changed greatly, Ohio Brass is committed to our current HI*LITE® Insulator and MOV arrester cable accessory lines. In 1976, when we introduced HI*LITE® Insulators, we saw the great advantages of polymer and advanced our developments to the arrester line.

**Arresters**

Ahead of Their Time

In the 1970s Ohio Brass introduced an automatic pressure relief system on its Multirester II® distribution arrester design. A tensioned diaphragm seal at the lower end of the arrester sensed an increase in pressure and opened ports to exhaust gas caused by excess fault current. The device proved to be ahead of its time. The need for pressure relief in distribution class arresters was not generally recognized. Few power companies considered the benefits worth any extra cost. However, in the mid 1980s, the need for distribution class pressure relief became widely recognized. Other designs with end venting systems became available, sometimes enhanced with arc transfer systems and/or use of internal liners. All of these designs continued to use porcelain housings. The risk of porcelain fragmentation remained. That risk has been reduced with the advent of the PDV arresters with polymer housings — also a development introduced by Ohio Brass.

**Arrester Development**

When Ohio Brass’ Electric Utility operation (“Ohio Brass”) developed the current-limiting gap in 1957, the arrester ceased being merely a lightning protective device and assumed a key role in allowing the lowering of insulation levels for equipment. Millions of dollars have been saved in the ensuing years. The advent of MOV accelerated the rate of savings. PVI and PVN arresters have again increased the savings rate, because the polymer housings reduce the possibility of breakage and increase protection to personnel and equipment.
Today, engineers are continually improving the design. HI*LITE® XL incorporates integral stress distribution disc, and mechanically bonded weathersheds under pressure. Ohio Brass Electric Utility operation offers HI*LITE® XL insulator designs for suspension, deended, line post, station post, braced line post, horizontal-vcc, and many other special applications.

Introduced commercially in 1976, Ohio Brass’ Electric Utility operation set the standards for polymer technology. Ohio Brass realized the many benefits of polymer at the outset: less weight, ease of construction, and vandalism resistance.

Later, we realized the less obvious benefits HI*LITE® Insulators provide for the industry: power loss cost savings. The beauty of lines was greatly enhanced with the development of HI*LITE® Insulators, the first polymer high-voltage insulators.

VERI*LITE™ Insulators: Ohio Brass VERI*LITE™ Insulators were developed for distribution and subtransmission applications, 69 kV and below. The VERI*LITE™ product line includes the following product families:
- PDI: distribution deadend insulators – 15-35kV
- VLS: suspension insulators, specifically engineered to replace existing strings of porcelain bells – 15-69kV
- Post insulators, equipped for horizontal and vertical mounting – 35-69kV

All VERI*LITE™ insulators incorporate a bonded rubber design, high mechanical strength, generous leakage distance, and superior electrical performance.

Development: Ohio Brass’ Electric Utility operation ("Ohio Brass") began serious development of the HI*LITE® Insulator in 1964 recognizing potential problems with porcelain insulators at UHV voltages and the solution offered by fiberglass rod-cored insulators. The strength-to-weight ratio of porcelain and glass insulators was becoming a problem as voltages increased. The importance and frequency of deadened towers required reliable insulation.

The requirements of a high-voltage insulator are the same today as they were in early development:
1.) Strong
2.) Reliable (long time strength)
3.) Temperature and contamination resistant
4.) Non-conducting under any conditions

Development testing and trials occurred over the years.

The basic design for HI*LITE® transmission insulator products includes the structural member of fiberglass rod of extremely high mechanical and dielectric strength. The weathersheds are a proprietary compound of rubber using fillers to meet the demands of electrical power transmission. At the interface of the rod and weathersheds, a silicone compound is used. End fittings are directly swagged to the rod at both ends. The weathersheds are axially compressed between the fittings.

PRODUCTS

HI*LITE® and VERI*LITE™ Insulators

Throughout the world, HI*LITE® Insulators cover more miles of transmission line than any other polymers.
As we continue to improve HI*LITE® Insulators, we’ll continue to search for the best materials and developments to meet the changing applications of the industry.

New Developments: Beginning with the solid base of HI*LITE® Insulator technology, Ohio Brass is expanding the insulator product line with new design concepts and products.

PROTECTA*LITE® System: The concept behind this product is to prevent transmission and distribution line insulation from flashing over when subjected to an impulse, thus providing protection from lightning. New unshielded lines constructed with a system comprised of a HI*LITE® Insulator and a polymer-housed arrester realize:
• reduced construction costs,
• reduced magnetic fields,
• reduced visual impact and
• the ability to provide fewer interruptions than a shielded line. Zero lightning-caused interruptions are possible with a complete system at every structure. Plus suitable for retrofit applications to:
• supplement poorly performing shielded lines,
• protect unshielded lines,
• protect special structures (i.e., river crossings) and
• reduce structure heights (i.e., airport locations).

Full 15/25 kV LB Line
In March of 1999, Hubbell acquired Chardon Electrical Components, Inc., Greenville, TN.

With the addition of Chardon, Hubbell now offers a wide variety of underground cable accessories under the Hubbell brand.
NOTE: Because Hubbell has a policy of continuous product improvement, we reserve the right to change design and specifications without notice.

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