

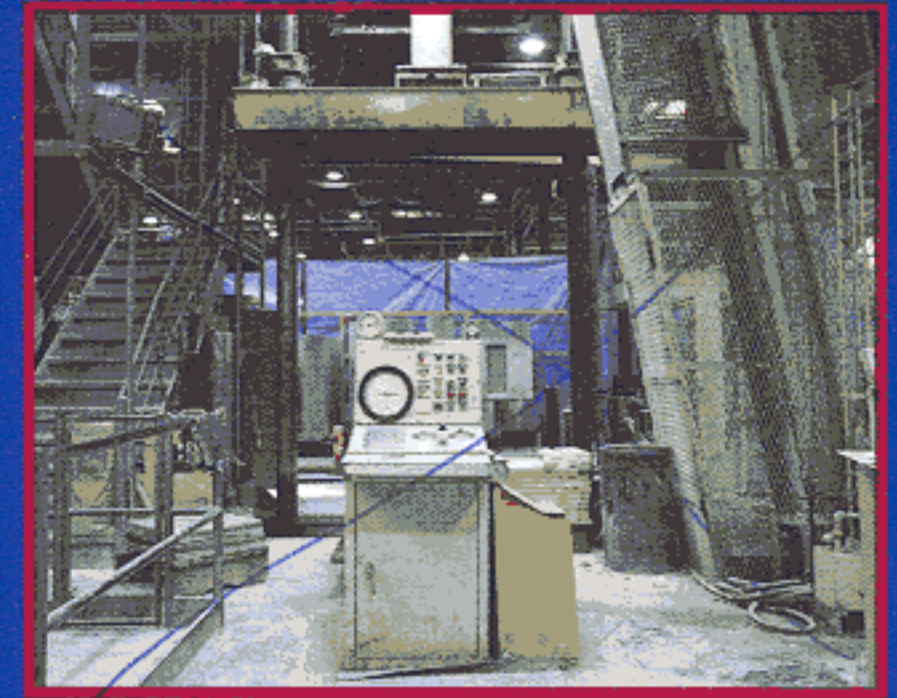
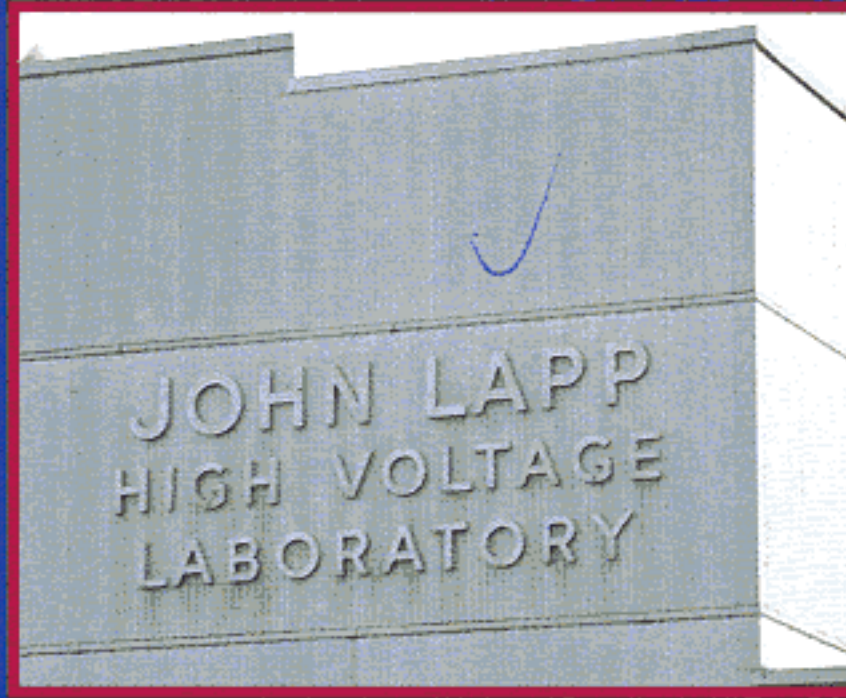
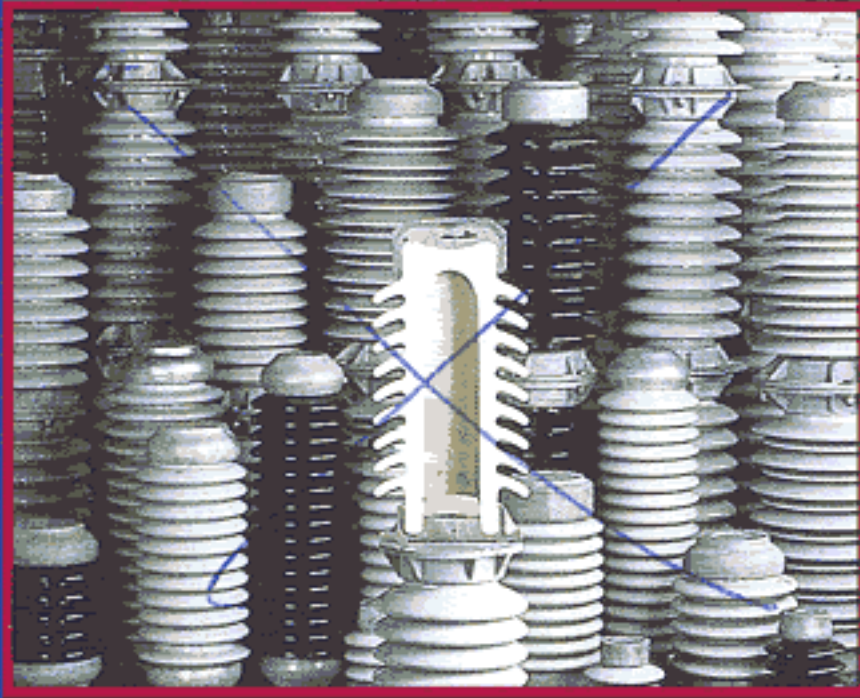
**Lapp**



## **Special Porcelain**

**The commitment  
no one else can make**





**Lapp can apply its resources as an experienced, full-line supplier of electrical insulators to your special porcelain needs.**

Lapp Insulator Company has manufactured special porcelain since 1916, when all porcelain insulators were "special" because standard catalog items did not exist. We pioneered insulators such as line posts and station posts that were once considered special porcelain but now are standard products.

Today, Lapp is a full-line supplier of standard insulators—line posts, station posts, suspension insulators, distribution products, POLYPACE® polymer insulators, and bushings. In addition, we make a wide range of special porcelain products, including porcelain for use in transformer bushings, circuit breakers, arrester housings, capacitors, current transformers, coupling capacitors, fuse cutouts, precipitators, SF-6 housings and third rail insulators.

We are unique in our ability to meet tough special porcelain challenges such as making flat ceramic solar heating tiles, insulating rings for linear particle accelerators, and horizontal bushings for use in environments with a temperature gradient of 600°F.

Because Lapp is America's leading insulator manufacturer and makes such a wide range of products, our special porcelain customers benefit in a variety of ways. First of all, we have the resources needed to make major investments in our special porcelain manufacturing facilities.

Secondly, we can apply the expertise we've gained in working on a wide variety of insulating products to the unique requirements of your project. And we're in a position to inventory the more popular special porcelain products to expedite delivery.

**Lapp's manufacturing and research facilities are second to none.**

Lapp's headquarters, research facilities, and major manufacturing facilities are located in LeRoy, N.Y. Lapp also manufactures special porcelain in its plant located in Sandersville, Ga.—the newest complete porcelain insulator manufacturing facility in the country. Lapp has an additional manufacturing location in Hamilton, Ont., Canada.

These facilities cover more than 30 acres, include some of the most sophisticated production processes in the industry, and are staffed by a dedicated team of more than 900 people.

Lapp's research resources are the best the country has to offer—the renowned John Lapp High Voltage Laboratory and the Pavillion Test Site permit comprehensive product testing under real and simulated conditions, during design and before installation.

The plant is equipped with electronically controlled clay-making facilities recognized as some of the most advanced in the insulator industry worldwide. A customized robot totes tons of clay wads each week. Modern tunnel kilns, periodic kilns (including a sweep-fire periodic kiln used for large-scale products), several batteries of horizontal and vertical turning lathes, and precision grinding equipment add to the facility's capabilities. And Lapp can cement flanges and other hardware to porcelain to extremely tight tolerances.

Large-scale special porcelain is manufactured in dedicated facilities at Lapp LeRoy and Lapp Sandersville.

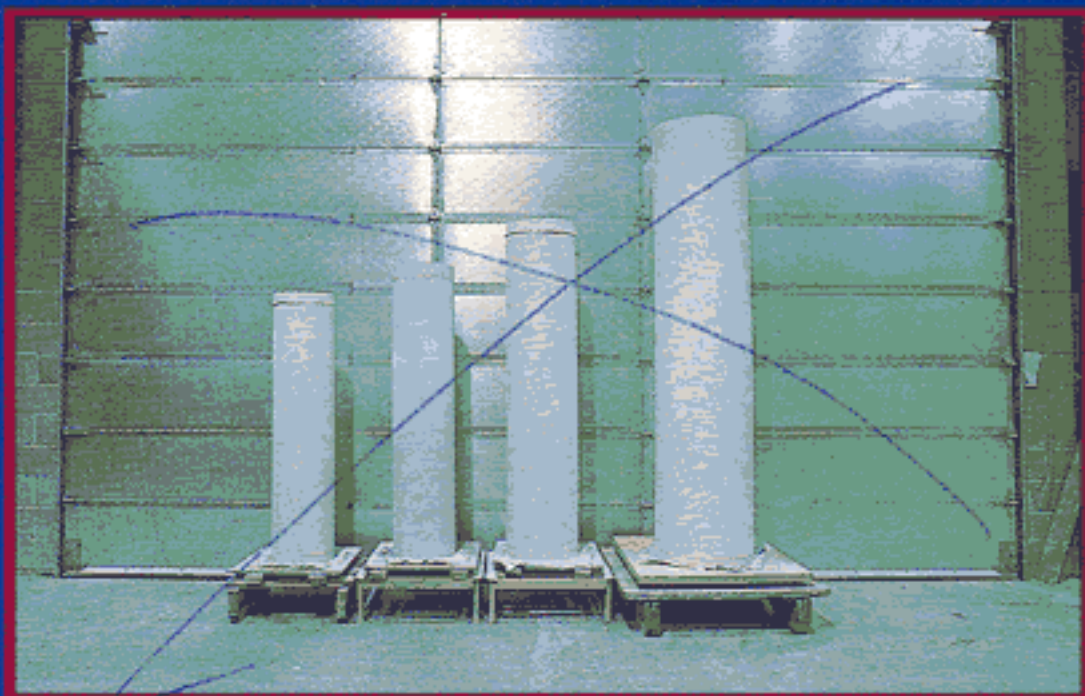
As a result of our recent multi-million dollar investment in special porcelain, we make better special porcelain products and sell them at more competitive prices.

**Manufacturing innovation: Lapp's vertical pug mills enhance large-scale special porcelain manufacturing.**

Lapp uses a specially designed manufacturing process to pug clay for large-scale special porcelain: a vertical pug mill that eliminates the need to cradle the pugged clay the way you need to with a horizontal pug mill.

This mill reduces Lapp's manufacturing losses and takes up less floor space than a horizontal mill. It was recently redesigned to minimize operating requirements and provide a level of cost efficiency seldom encountered in large-scale pugging operations.

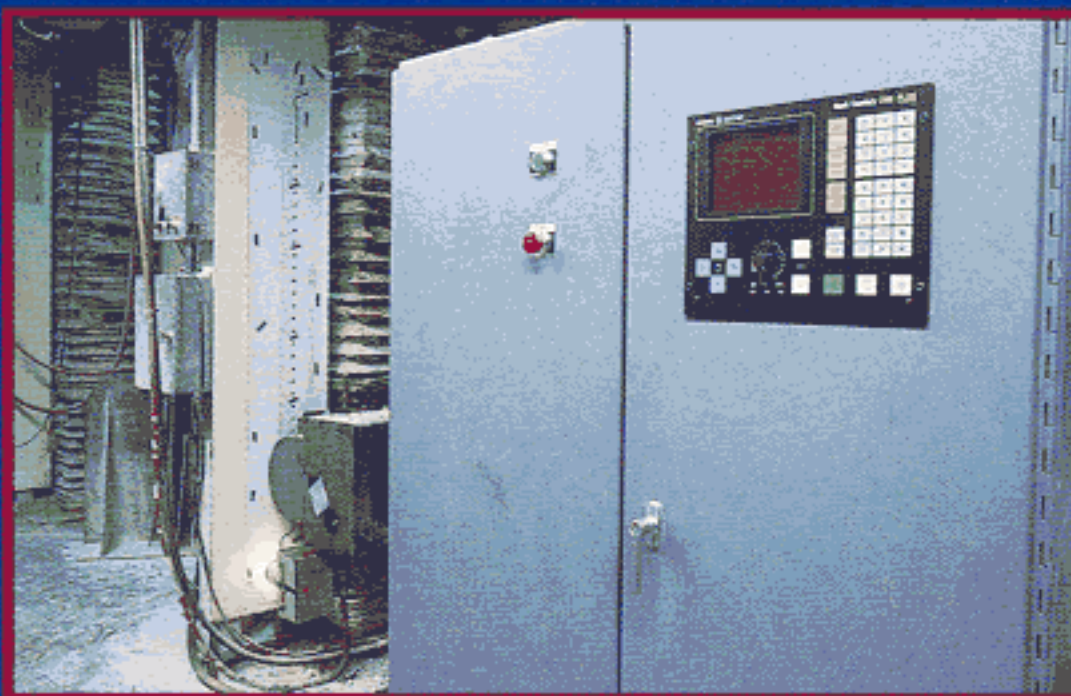




**Manufacturing innovation: A computer-controlled dryer reduces losses and speeds drying of large-scale special porcelain.**

The time a pug must dry before it's machined adds significantly to the delivery time and the product's cost. And if drying is uneven, significant manufacturing losses can occur. In another innovation designed to increase manufacturing efficiency and reduce costs, Lapp has applied computer controls to the dryer in which pugs for large-scale special porcelain products are dried.

The result is improved product quality and consistency, reduced drying time, and reduced energy requirements. In short— manufacturing efficiencies that let us deliver products quicker, and at more competitive prices than ever before.

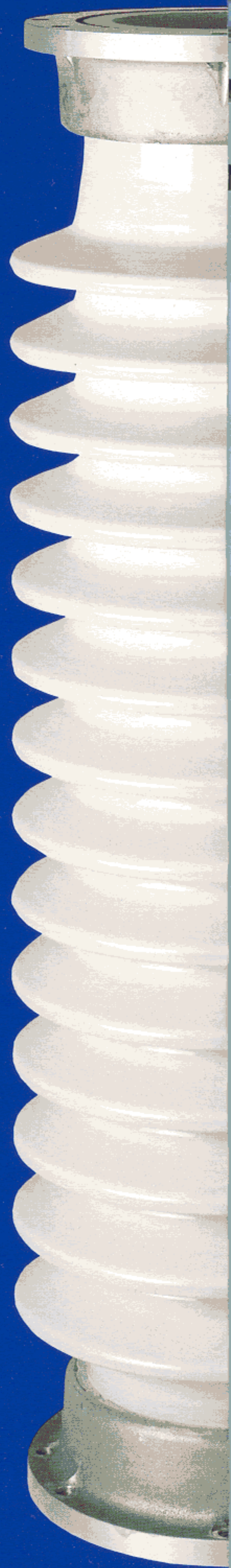


**Manufacturing innovation: Lapp's computerized vertical turning lathes shorten setup time and improve product quality.**

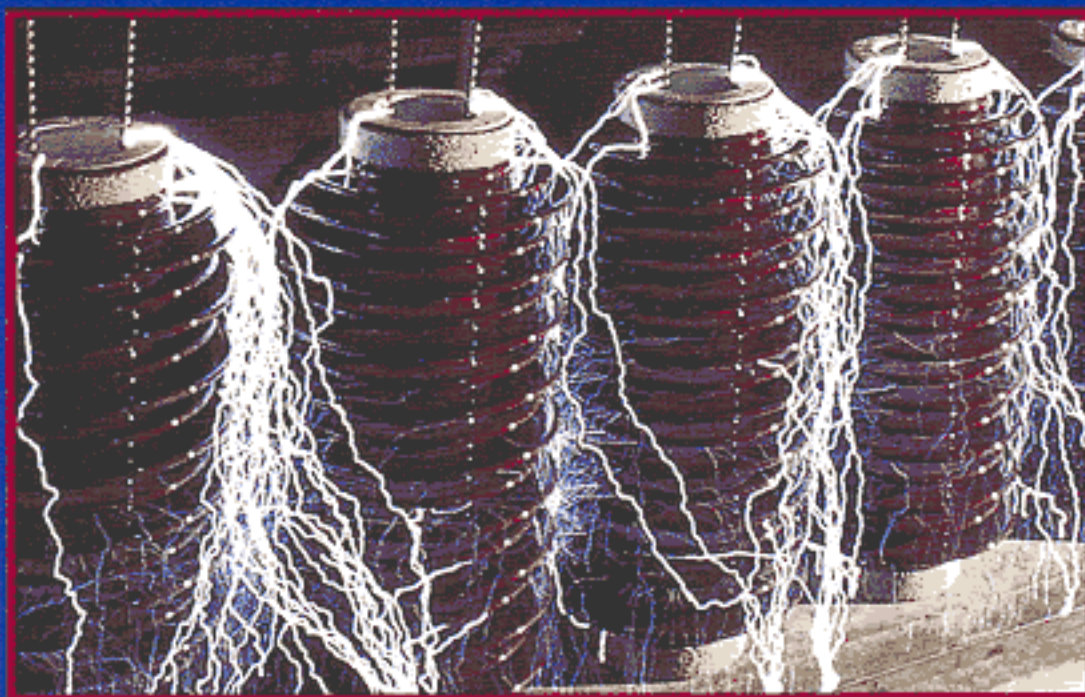
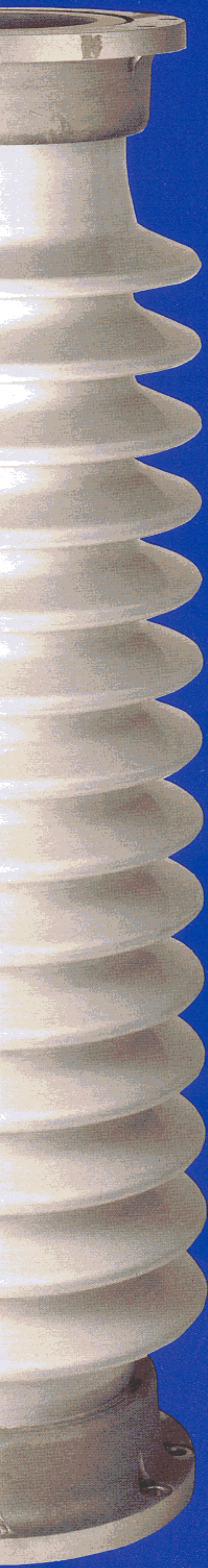
In another manufacturing innovation, Lapp has computerized a vertical turning lathe for machining large-scale special porcelain products. This allows the equipment to be programmed by computer to machine the product to the correct configuration and dimensions. This translates into faster setup time.

Better repeatability is realized by smooth movement of the cutting mechanism over the clay chunk (less "chatter"). Another benefit is the improved ability to make changes and fine-tune a design without driving up costs.

High Voltage  
Circuit Breaker Support







**Lapp special porcelain is backed by the industry's toughest QC program -- a program that includes 100% electrical testing.**

Lapp subjects all special porcelain products to a stringent battery of quality control tests as part of a QC program which is the most comprehensive in the industry. The raw materials that go into Lapp special porcelain products undergo laboratory tests such as x-ray analysis, particle size distribution analysis, and chemical purity analysis, as well as strength and shrinkage tests.

At each step in the manufacturing process, the products are visually inspected. After machining, for instance, all pieces are sprayed with a dye that fluoresces under ultraviolet light and searches out any imperfections.

Special porcelain housings that will be filled with gas under pressure are also subjected to an exacting hydrostatic test: Each and every piece is filled with water and subjected to a pressure of three times maximum allowable service pressure.

In addition, Lapp is the only manufacturer that offers 100% electrical testing of all special porcelain products. In this test, the electrical stress imposed on each unit is considerably greater than that it will experience in service. This means you're assured the porcelain is sound and will perform to your specifications.

**Meeting tough challenges: Lapp uses a novel manufacturing approach to meet the unique requirements of third rail insulators.**

Third rail insulators for subway trains look like simple products, but they pose a variety of manufacturing challenges. For instance, some must be glazed on all external surfaces, which means that there is no firing surface to set the insulator on the kiln furniture. Other manufacturers meet the challenge by positioning each insulator on a pin during firing, a process that's time-consuming, costly, and results in a high rate of manufacturing losses.

Lapp manufacturing engineers applied our glaze-making expertise to come up with a manufacturing solution: The bottom of the insulator is glazed with a unique Lapp glaze that won't stick to the kiln furniture during firing, while the remainder of the insulator is glazed in the traditional manner. The result is a 100% glazed insulator produced in a cost effective manner.





**Meeting tough challenges: Virtually no special porcelain is too large for Lapp.**

Manufacturing special porcelain up to 13½ feet tall and 30 inches diameter is beyond the capabilities of most manufacturers. But Lapp routinely makes porcelain of this scale for use in column breakers, freestanding current transformers, high-voltage bushing housings, and other applications.

Why can Lapp produce results in an area where other manufacturers don't even dare to compete? Lapp's major investment in a whole series of manufacturing innovations especially for large-scale porcelain is a major factor in our ability to handle the manufacturing challenges posed by such work. For instance, maintaining such critical characteristics as straightness and end-face parallelism is extremely difficult in large porcelains, but Lapp's custom vertical pug mill and other manufacturing processes enable us to do it successfully—and cost-effectively.

The expertise Lapp personnel have gained by routinely making pieces of this scale also contributes to our capability. And Lapp's position as a full-line supplier of porcelain comes in to play since our line of standard bushings gives us a wealth of opportunities to perfect the skills and processes needed to meet tight tolerances in large-scale porcelains.

**Meeting tough challenges: Lapp outpaces other manufacturers in the ability to provide a hermetic ceramic-to-metal seal on large porcelains.**

Lapp is one of the few manufacturers in the world who can provide a ceramic-to-metal seal on large-scale special porcelains. This capability has been put to work in the manufacture of a unique horizontal porcelain housing for a 115 kV Circuit Switcher, made by Lapp for the S&C Electric Company. Manufacturing this product is a special challenge because of the unit's large size and the need to meet extremely tight tolerances.

In addition to manufacturing the high tolerance porcelain, Lapp solder-seals a metal spinning to each end of the housing to form a hermetic seal. And Lapp cements a cast-metal flange to each end of the unit to provide the mechanical attachment required for S&C's application. Among other quality control tests that take place before shipment, the unit is subjected to a leak test to ensure that the seal is gas tight.

**Lapp backs all special porcelain products with service and technical support that no other manufacturer can match.**

Lapp engineers work closely with special porcelain customers in designing the best products for the particular application and applying the most effective manufacturing processes to make those products. In doing so, we draw on experience gained with a wide variety of electrical insulation products.

After the sale, Lapp backs its products in the field with the most comprehensive service and technical support services the industry offers. Lapp technical personnel have access to a wide variety of published materials, computer programs, and in-house experts to provide the high level of support that customers expect from the country's leading insulator manufacturer.

Our field engineers are experienced in working with customers in evaluating product performance, providing the expertise for a variety of applications and developing equitable solutions to customer problems.

For instance, a firm with a precipitator insulator that failed recently came to Lapp to order a replacement. Since the firm's precipitator wouldn't operate at peak performance without the insulator, Lapp engineers fabricated a temporary substitute from our inventory of standard products. This kept the precipitator up and running until the permanent replacement product was delivered.

Quality products at competitive prices. Technical support. A special porcelain commitment you can count on. That's what Lapp offers you.





Small special porcelain products are representative of Lapp's design versatility and production capabilities.