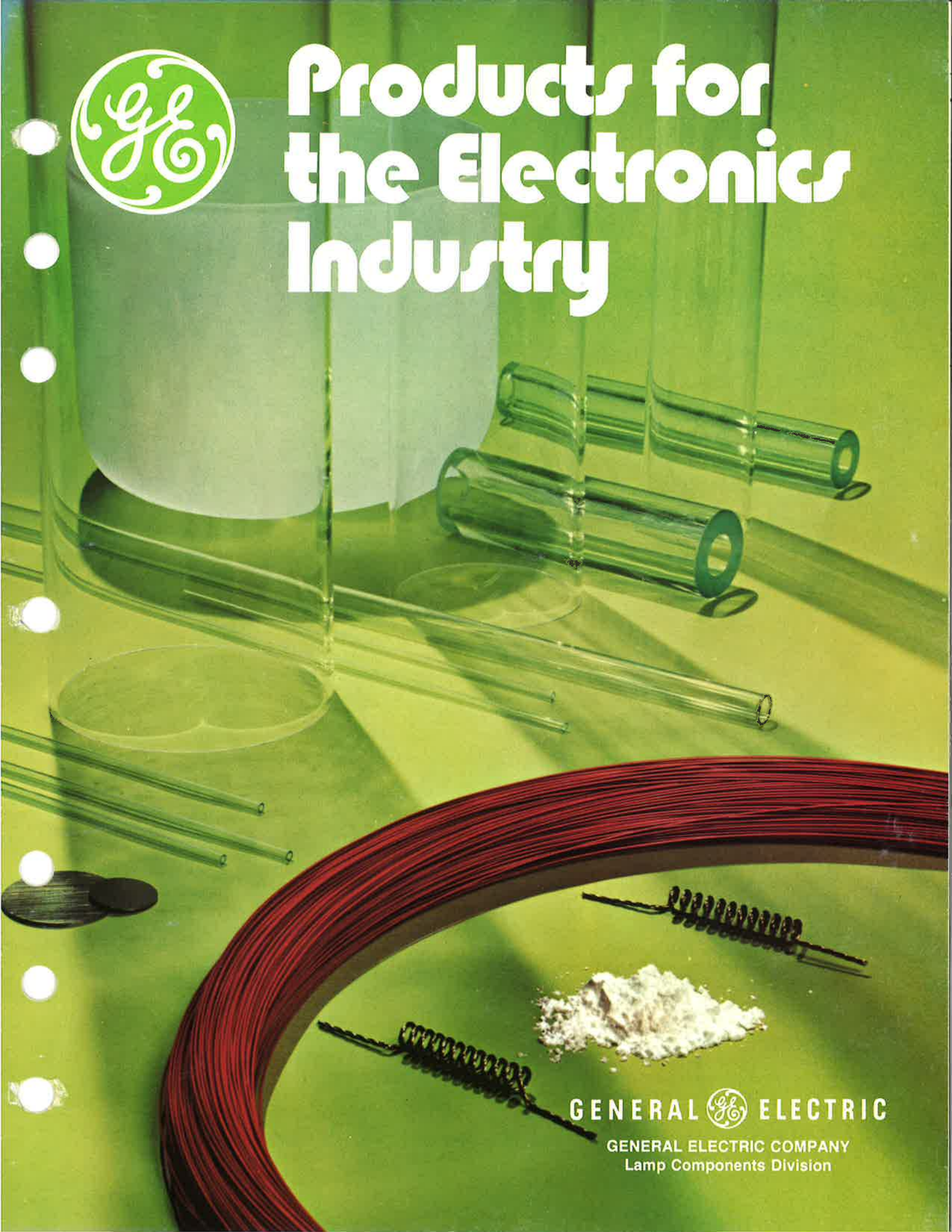




# Products for the Electronics Industry



GENERAL  ELECTRIC

GENERAL ELECTRIC COMPANY  
Lamp Components Division

# **General Electric is your single source for a variety of electronic components and materials**

Products from General Electric's Lamp Components Division are used in almost every phase of the electronics industry —from the growing of the silicon crystal to the final encapsulation of the device.

This brochure provides only a brief summary of our various product lines. More specific information is available from the Lamp Components Sales Operation sales offices listed on Page 8.

## **Fused Quartz**

General Electric Company's line of fused quartz products includes all the various grades, types, shapes and dimensions required for processing silicon wafers in diffusion and epitaxial furnaces.

The most widely used of GE's fused quartz products in these applications is Type 214 LD tubing. Designed specifically for wafer processing, it is high-purity silicon dioxide and is low in hydroxyl content. To answer the need for larger wafers and larger furnaces, General Electric now supplies this product in diameters up to 200 mm and lengths up to seven feet. The tubing has functioned well under a variety of thermal and chemical environments.





GE Type 214 LD Fused Quartz Tubing



In the application shown here, Type 214 LD fused quartz muffle tubes are used in furnaces cycling between 850° and 1250° C. For less demanding applications, Type 214 LD tubing has exhibited a furnace life of up to six months, based on almost daily use.

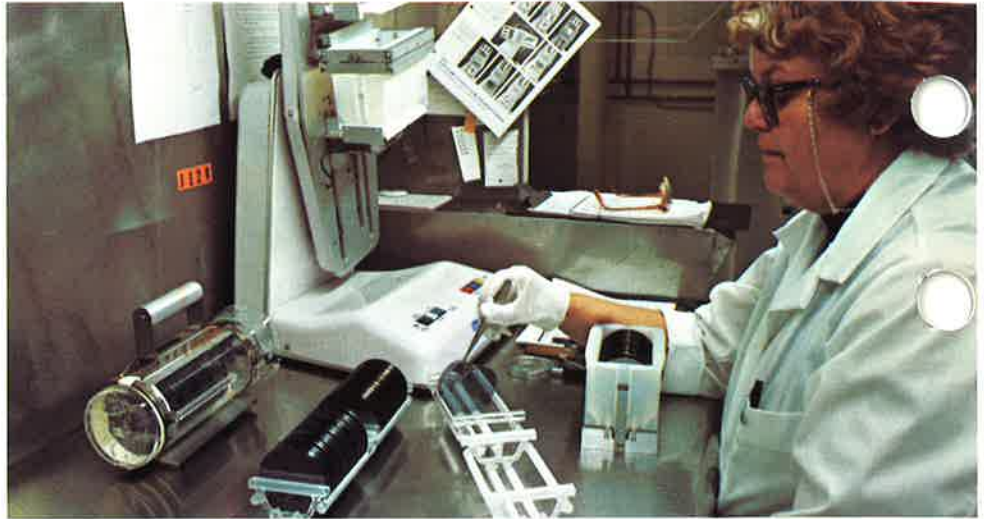
In addition to the furnace tubes, the fused quartz parts shown above include loading sleeves, end caps and push rods.



While Type 214 LD is used for most silicon wafer processing operations, GE also has available heavy-walled translucent tubing and other types of clear tubing which are preferred by some users for certain applications.

## Fused Quartz (Continued)

There are also major applications for fused quartz rod and small diameter tubing in the electronics industry. Both are used to fabricate slice boats, trays and carriers for holding the wafers during processing.



GE manufactures large fused quartz boules, up to 1.8 meters (72 inches) in diameter and .6 meters (2 feet) thick. These are normally supplied to fabricators who use the material to make a variety of quartzware for the semiconductor industry.



General Electric standard and precision fused quartz crucibles, with high purity silicon dioxide, have a smooth, clear inside surface and a white granular outside surface.

Available in several sizes up to 14 inches in diameter, fused quartz crucibles are widely used for growing single crystal silicon in large kilo melts. They can be used for processing with either broken-chunk silicon or large single-piece silicon raw material.



# Chemicals

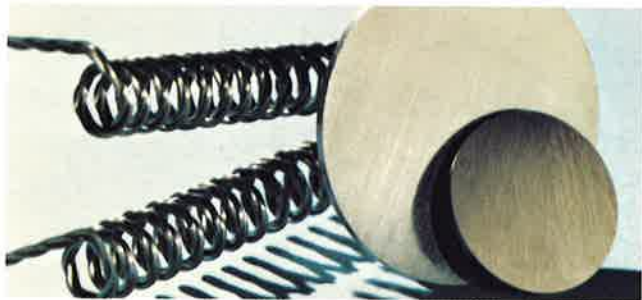


Phosphors are luminescent chemicals that glow when energized, making them very useful in such lighting products as fluorescent lamps and in a number of electronic devices as well.

GE supplies high response phosphors to makers of LED's, digital readout tubes and displays, cathode ray tubes and photo cells.

A prototype of one phosphor display is shown (top left).

# Tungsten



Many power semiconductors utilize GE pressed and sintered tungsten discs to support the silicon wafer. GE tungsten discs provide a close match with the thermal expansion of silicon, a rigid platform to resist bending, and compatibility with the corrosive materials used in semiconductor manufacturing processes. These high-purity discs are essentially free of nickel, carbon and other contaminants. They are made of specially processed and sized tungsten powders utilizing precise manufacturing techniques which result in properties that are reproducible. After sintering, the discs are lapped and OD ground to the close tolerances needed for fixturing the wafer. Standard diameters typically range from 0.4 to 4 inches and thicknesses from .010" to .200". Sizes outside these ranges will be quoted upon request.

General Electric also supplies vacuum metallizing coils that are specially constructed for the needs of the electronics industry. The configuration shown here is a tightly wound tungsten coil designed to vaporize a thin layer of gold in the production of certain types of devices.

GE is equipped to custom-make coils for the vacuum deposition of a variety of metals on an equal variety of substrates.

Another major application of GE coils is the metallizing of television picture tubes.

# Glass

General Electric glass tubing and pressed glass shapes have a number of applications in television, electronic tubes and components packaging. Glass tubing of different diameters and wall sections is used as the housing for reed switches and many types of fuses.

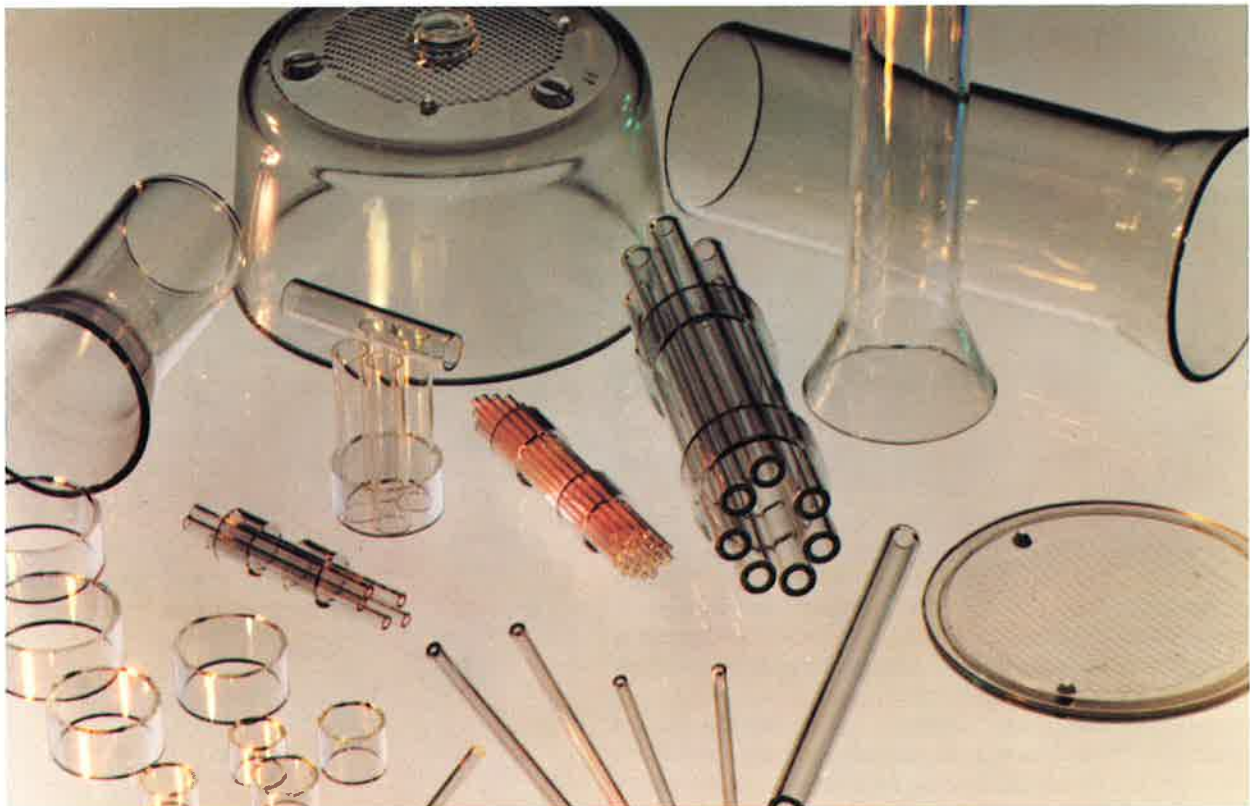
High-lead Type 821 glass tubing is of special interest to the electronics industry. It is the starting material for trimmer type capacitors, a device that demands extremely close tolerances. Type 821 glass also has good x-ray radiation absorption characteristics and high electrical resistivity.

In addition to tubing, GE supplies repair necks for monochrome television picture tubes (top of the photo below), parts for certain wide screen television applications and large diameter tubing and cut rings for television applications. The smaller rings and tubing are used chiefly in electronic tubes.

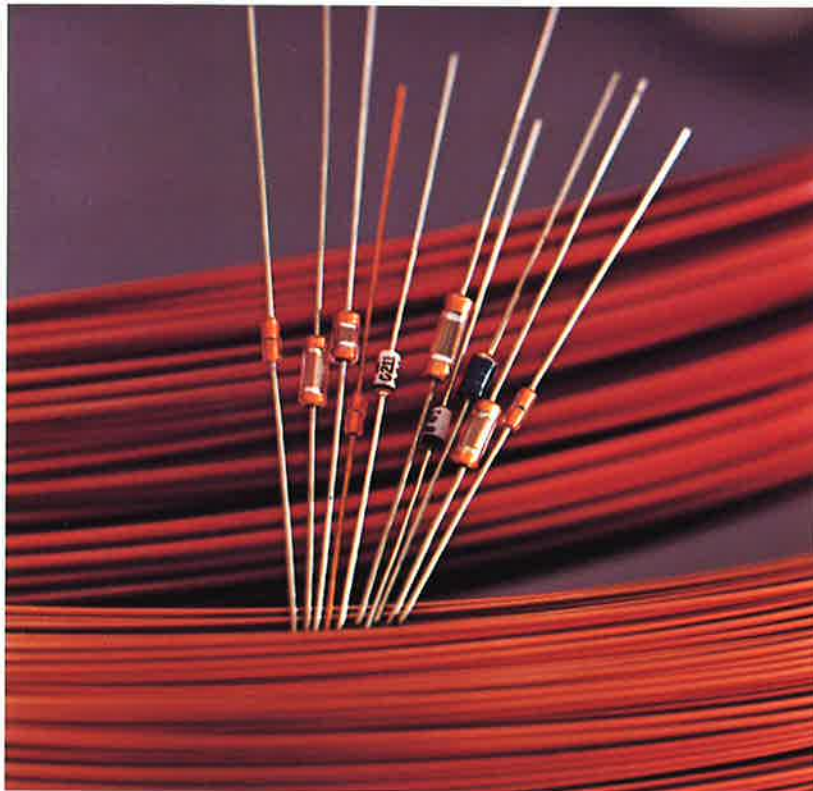
Heavy walled glass tubing (photo at right) is supplied to the electronics industry for redrawing into diameters as small as .00010". These small sizes are used for packaging capacitors, diodes and other devices.

Another product, Type 351 zinc borosilicate glass powder, is specifically designed for encapsulating diodes and other semiconductor devices.

GE also makes glasses that can be powdered for glass sealing applications, similar to Type 351 glass powder. These glasses have coefficient of expansion properties that are designed to seal to Silicon, Kovar, Fernico, Rodar, Therlo, Tungsten, Molybdenum, Dumet, #4 Alloy, Platinum, Iron and other materials.



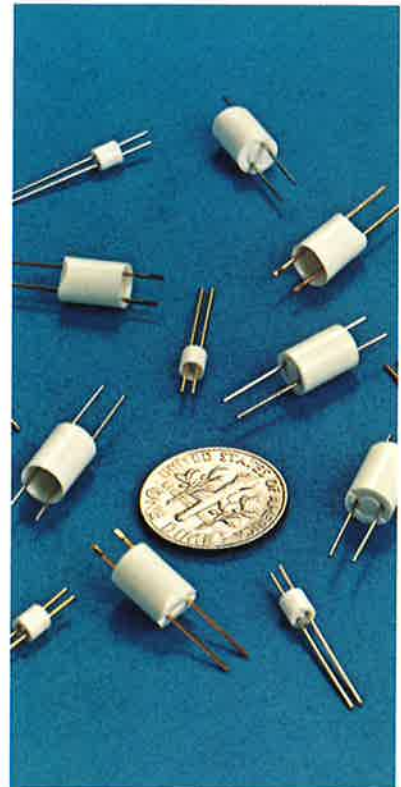
# Dumet, Cumet & Bases



Dumet wire is used to achieve a hermetic seal between glass and metal in the packaging of diodes, capacitors, rectifiers and electronic tubes. This wire product which consists of a copper sheath metallurgically bonded to a nickel-iron core has a radial coefficient of expansion which closely matches that of soft glass.

GE's slug grade Dumet is manufactured to meet individual customer specifications. Tensile and color can be varied to achieve the desired product performance. Slug grade Dumet typically ranges in standard sizes from 30 to 68 mils in diameter and is usually supplied with either an oxidized or a leach resistant borated surface. Other diameters and surface coatings are also available.

Another GE wire product, Cumet, is commonly used as a pigtail for devices using Dumet slugs. Cumet consists of a highly concentric copper sheath bonded to a carbon steel wire core. It is designed to provide the weldability required for cross wire welding, the strength, flexibility and magnetic feeding needed in component manufacture, and good electrical conductivity.



Also supplied by GE are plastic bipin bases. They have two nickel leads in place for encapsulation of LEDs, photo cells and other solid state devices. Options include gold-plated or other special leads, and flattened wire ends.



# Lamp Components Division

The Lamp Components Division of General Electric Company offers a very special capability to the electronics industry. Since our products serve very definite functions either in processing operations or in the device itself, production is closely controlled in our desire to achieve a high level of quality and conformity. Most of our products are available from stock, but many can be custom-tailored to meet your requirements—in fact, this is one of our main strengths.

Because of the technical nature of our products, we have always put strong emphasis on design assistance and application engineering. In addition to the products covered in this publication, we manufacture glass bulb blanks and pressed shapes, tungsten powders, molybdenum and tungsten wire, and lead wires.

Literature, technical assistance and product application is available on all products. Contact the nearest Lamp Components Sales Operation sales office shown below.

## Sales Offices

## Lamp Components Sales Operation

### Domestic

#### **Cleveland (Headquarters)**

21800 Tungsten Road  
Cleveland, OH 44117  
(216) 266-2451

#### **Boston**

50 Industrial Place  
Newton Upper Falls, MA 02164  
(617) 332-6200

#### **Chicago**

4333 Trans World Road  
Schiller Park, IL 60176  
(312) 671-6390

#### **Pittsburgh**

205 Valley Park Drive  
Pittsburgh, PA 15216  
(412) 531-5700

#### **San Jose**

1727 North First Street  
San Jose, CA 95112  
(408) 298-4126

#### **West Orange**

10 Rooney Circle  
West Orange, NJ 07052  
(201) 736-5305  
New York: 943-9820

### International

#### **Headquarters**

International Sales  
21800 Tungsten Road  
Cleveland, OH 44117  
(216) 266-3295  
Telex: 985569 (GECOLCS EUCD)

#### **Canada**

Canadian General Electric Co., Ltd.  
Components Sales  
165 Dufferin Street  
Toronto M6K1Y9, Canada  
(416) 537-4481 Loc. 208

#### **Japan**

Soei Tsusho Company, Ltd.  
Kagoshima Bank Bldg.  
7, Azuchi-machi 3-chome, Higashi-ku  
Osaka, Japan  
(262) 3358

#### **Europe**

International General Electric Co.  
of New York  
Lamp Components Sales Operation  
The Old Hall, Langham, Oakham  
Leicestershire LE15 7JE, England  
Phone: 0572-3960  
Telex: 34362 (GELCOS)

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