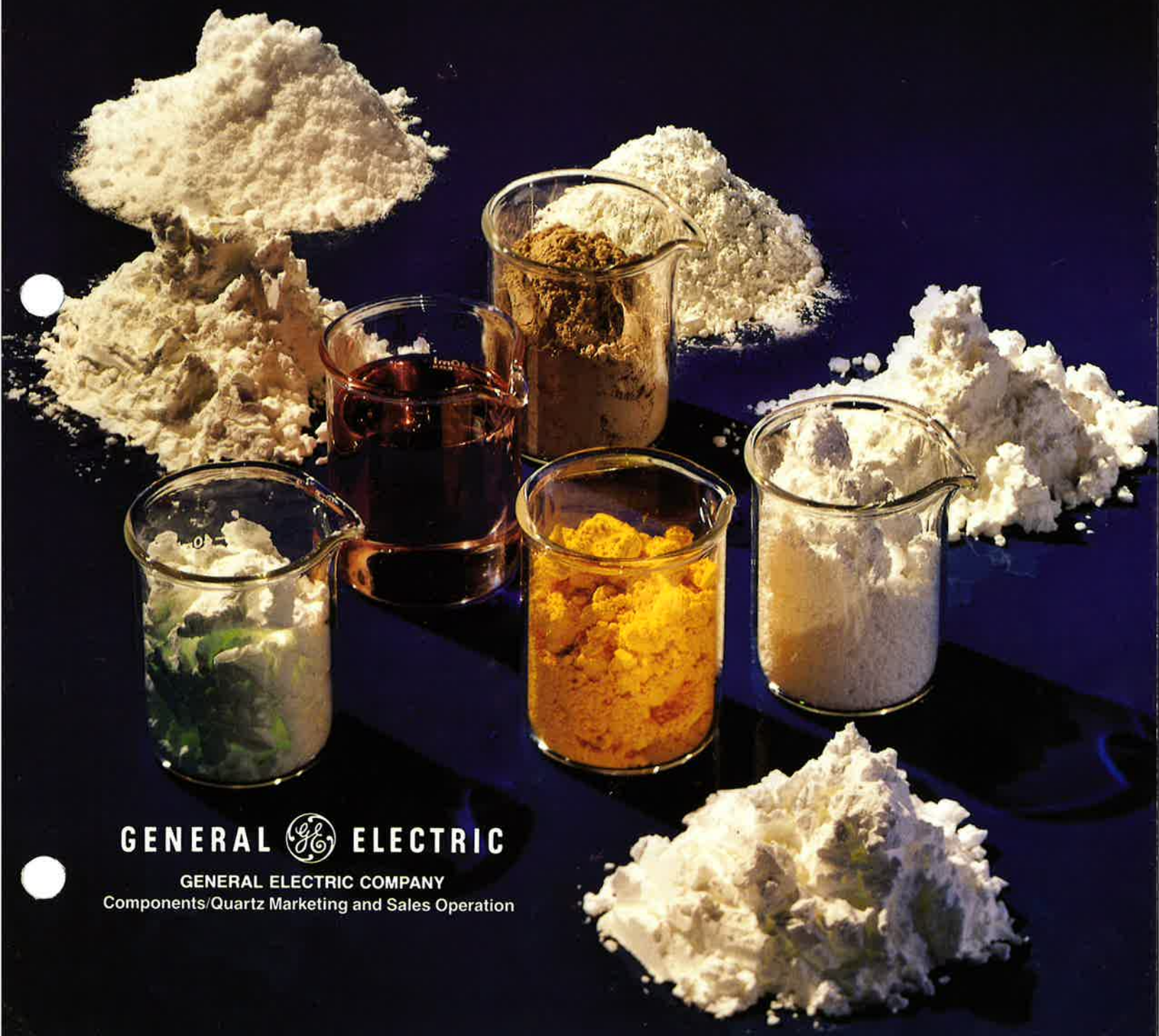
HIGH PURITY INORGANIC Chemicals



GENERAL ELECTRIC

GENERAL ELECTRIC COMPANY
Components/Quartz Marketing and Sales Operation

Think Of General Electric For High Purity, Controlled Particle Size:

• Carbonates • Fluorides • Phosphates • Sulfides • Selenides

(Many Knowledgeable Users Do!)

A number of high purity chemicals developed by General Electric Company for its worldwide lamp making operations are now finding new fields of application outside the lighting industry.

Because these chemicals were developed expressly for lighting applications, many of them are not widely available in the outside market. Even the chemicals we produce as intermediates in our operations are considered specialty products.

All the chemicals described on these pages are inorganic compounds, processed to high purity levels. They include various salts of calcium, cadmium, magnesium, manganese, strontium, zinc and others.

Most of these compounds are free flowing powders although several are available in liquid form. These specialty chemicals are characterized by controlled particle size and particle size distribution, and high purity.

Although our primary products are inorganic chemicals, GE also produces specialty solvents, organic dyes, and a low molecular weight polymer. In the high vacuum distillation process, shown here, low molecular weight polymers are separated in a molecular still.

Manufacturers of optical devices such as lenses, laser windows, infrared temperature sensing and light transmitting devices, have become major users of our chemicals.

Producers of food and pharmaceutical products, electronics devices, medical equipment and ceramics are some of the other industries that have recognized GE's special capabilities in chemical manufacturing.

Because General Electric specializes exclusively in a narrow range of chemicals, we can focus more closely on specific customer needs. Our chemicals are made in relatively small, tightly monitored batches, so we have the flexibility to customize products for particular user requirements. We are adept at controlling particle size, particle size distribution, and surface chemistry to within very close tolerances. We can fill small orders —5 to 10 kilos—or deliver quantities up to a half million kilos. Even when quantity levels are rather modest, all orders benefit from the continuing chemical and physical characterizations in our modern analytical labs as well as our high purity processing methods.

Under ultraviolet light, our luminescent chemicals take on a variety of different colorations.

WIDE RANGE OF APPLICATIONS

Manufacturers of specialized glass products, including lenses and infrared transmission devices, utilize our cadmium sulfide, calcium fluoride, magnesium fluoride, and zinc sulfide because of their high purity.

Barium carbonate, cadmium selenide and cadmium sulfide are used in a number of electronic and optical devices, including electronic capacitors (barium carbonate), and duplicating machines (cadmium selenide). GE's 40% amonium fluoride, a clear liquid, is used as an etchant in electronic parts manufacturing.

Our very pure grades of zinc sulfide and zinc selenide are valuable in the preparation of crystals, thin films and powders for the production of electro-luminescent, photo-luminescent, and catho-luminescent phenomena. Our luminescent grade cadmium sulfide and cadmium selenide are used in the production of commercial devices based on photoconductive and photovoltic phenomena as well as in research and development in these technologies.

Extra fine manganese carbonate, a light brown free flowing crystaline material, is utilized in the manufacture of color pigments for vinyl products and coatings. This product is specially processed to create an extra fine particle size material having a relatively narrow particle size distribution and a correspondingly high surface area. The alkali metal impurities in this material are the lowest of all commercially available sources.

A growing portion of the calcium oxide, calcium pyrophosphate, calcium phosphate and calcium carbonate we produce is being used in the medical industry. The unique crystal structure of this chemical is used for the manufacture of synthetic bones among other applications.

Producers of certain foods and pharmaceuticals also use our calcium based compounds, along with basic magnesium carbonate, because of their high purity levels. Calcium oxide is used additionally to manufacture oxide ceramics. Strontium carbonate, strontium fluoride and strontium phosphate, as well as calcium phosphate, are used for cathode ray tubes and infrared transmission applications.

A variety of specialized equipment is used for controlled size reduction. Precision ball mills shown here, Trost, Bauer, ACM and others, reduce particle size to submicron levels and also adjust the surface area of the particles to achieve the desired chemical reactivity.

Manufacturing To The Highest Quality Standards

In a typical application, these chemicals must perform with a great degree of reliability and often in high temperatures and demanding atmospheres. That's why product purity and manufacturing consistency are so important in our operations. GE's reputation as one of the world's leading lampmakers depends on keeping our quality standards high, and meeting them every day.

To maintain this reputation, General Electric Company operates a modern production facility with quality control and inspection procedures during manufacturing operations. There are repeated checks for purity and reproducibility using the most modern analytical techniques. Measurements on physical properties, crystal modification, particle size and surface area are taken regularly to assure that our products remain uniform from lot-to-lot.

High capacity, stainless steel blenders mix large batches to the exact compositions our customers specify.

Making Our Transition To The Future!

Our research and development labs are focused on both the present and the future.

Our approach to producing high quality products has evolved from the rigorous demands of our worldwide customer base. Our in-process controls during manufacturing are backed up by quality inspections before shipment. Our laboratory equipment is maintained to high standards and our analytical methods follow ASTM practices.

Our labs are also concerned with the products we will be making in the future.

Almost every department is engaged in testing new chemical compounds or developing new processing methods in our constant search for better performance, higher quality, or a combination of both.

To do this job, we've assembled a highly qualified staff and provided them with state-of-the-art equipment with which to work. Our research and development facilities compare with the best in our specialized segment of the chemical industry. This expertise is available to all of our chemical customers.

The physical characteristics of chemicals are studied on the thermogravometric equipment shown here, as well as on our X-ray diffraction and differential thermal analysis apparatus.

An inductively coupled plasma direct-reading spectrometer determines the impurities in chemicals in parts-per-million. By comparing the spectrum of the sample to that of an established standard, metallic trace impurities in the composition can be identified and quantified. This equipment, along with our atomic absorption instruments and the ion chromatograph, allow us to maintain very high purity levels.

A statistical analysis of the particle size distribution of a chemical is summarized and printed out for study on this Leeds & Northrup Microtrac small particle analyzer.

On the scanning electron microscope, size, distribution, shape and morphology of crystals are viewed and studied. At magnifications up to 100,000 X, it is possible to study submicron sizes. Among the other particle size measurements we provide are Coulter Counter, Fisher Sub Sieve Sizer and Cilas Granulometer.

X-ray fluorescence instruments are used to study the bulk differences in chemical compositons.

Chemical	Purity	Particle Size	Applications
Ammonium Fluoride 40% solution NH_4F	99.999%	—	Etchant for glass and integrated circuit manufacturing
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
Calcium Carbonate $CaCO_3$	99.95%	6-10 µ	Glass, crystal growing Medical products
Calcium Fluoride CaF_2	99.95%	1.5-1.8 µ	Glass, single crystals
Calcium Oxide CaO	99.95%	3-5 µ	Oxide ceramics, plastics pharmaceuticals
Calcium Phosphate $CaHPO_4$	99.95%	6-8 µ	Medical applications
Calcium Pyrophosphate $Ca_2P_2O_7$	99.95%	6-8 µ	Oxide ceramics, plastics pharmaceuticals
[illegible]	[illegible]	[illegible]	[illegible]
Manganese Carbonate $MnCO_3$	99.99%	1.0-1.2 µ	Pigments, ceramic colors and glazes
[illegible]	[illegible]	[illegible]	Infrared transmitting thin films and glass
Strontium Carbonate $SrCO_3$	99% (1% Barium)	1.0-1.5 µ	Glass, electronic parts
Strontium Fluoride SrF_2	99%	1.0-1.5 µ	Glass, crystal growing
Strontium Phosphate $SrHPO_4$	99% (1% Barium)	1.4-2.0 µ	Glass
[illegible]	[illegible]	[illegible]	Optical and laser glass
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]

Packaging

General Electric Company offers its chemical customers a number of package options depending on the quantity ordered, product density, and the user's facilities.

These options include 55 gallon fiber drums lined with polyethylene to maintain the required purity; both regular and dark colored bottles for light sensitive chemicals, containers shrink wrapped and strapped to pallets, one-to-five gallon plastic containers, polyethylene bags in steel pails, 2000-pound supersack bags, and many others.

We are experienced in both domestic and overseas shipments, and can accommodate your delivery needs from our customer service department.

Detailed product data sheets are available on most of the products described in this catalog. Safety data sheets are provided for all General Electric chemical products.

Technical Assistance

Because General Electric Company uses these chemicals in its own operations, either directly or as chemical intermediates, we have developed a great deal of expertise in their manufacture and use. This is information we gladly share with our customers.

GE will also put its production capacity at your disposal. Since we are essentially batch producers, we have the flexibility to manufacture comparatively small quantities without sacrificing high purity and other quality characteristics.

Facilities are also available for selective doping and sintering of sulfides and selenides, and for controlling the level of additives.

Ordering Information

Detailed information about these chemicals are available from the Marketing and Sales Operation listed below.

Direct orders for chemicals may include data regarding particle size, particle size distribution, and other engineering details, as well as packaging instructions. Send orders to the Customer Service Department at the Ivanhoe Road plant, address below.

General Electric Company
Components/Quartz
Marketing & Sales Operation
24400 Highland Road
Richmond Heights, Ohio 44143
(216) 266-2451

General Electric Company
Chemical Products Operation
1099 Ivanhoe Road
Cleveland, Ohio 44110
(216) 266-4611

Europe
GENERAL ELECTRIC
Components Marketing & Sales Oper.
21a High Street East, Uppingham
Leicestershire LE15 9PY, England
Telef: 0572-823748/9
Telex: 34362 (GELCOS)
Telefax: 0572-823836

General Electric's Components/Quartz Marketing & Sales Operation is the source for tungsten, molybdenum, glass, fused quartz, Lucalox® ceramic, phosphors, chemicals, Dumet and Cumet wire, EDM wire, leads, bases and other components used by the lamp, electronic, cemented carbide, and other industries. Technical and engineering assistance is available on all products. For information contact.:

General Electric Company
Components/Quartz Marketing & Sales Operation
24400 Highland Road
Richmond Heights, Ohio 44143
Phone: (216) 266-2451
Telex: 985569

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