new materials NEWS

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MATERIALS SERVICE
Schenectady, New York

FOR GENERAL ELECTRIC EMPLOYEES ONLY

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METALS AND METAL PRODUCTS

Alternative to Plated Molybdenum

Nickel-clad and copper-clad molybdenum sheet is now available to replace plated molybdenum for use in semiconductor units and electronic tubes. There is no flaking or blistering as with plated metal. The clad sheets come in thicknesses from 0.010" to 0.080" and in widths up to 4".
(General Electric Co., Lamp Metals and Components Dept., Cleveland 12, Ohio)

Improved Corona-Stress Electric Wire

A new electric wire, called Mono-Tet CR, is insulated with a specially compounded Teflon plastic which makes it seventy times more resistant to corona stress than ordinary fluorocarboncoated wire. The single-conductor insulated wire comes in sizes from AWG 28 to AWG 0, in ten color designations.
(W. L. Gore & Assoc., Inc., 487 Paper Mill Rd., Newark, Del.)

New Heat-Treated, High-Strength Titanium Sheet Alloy

A new heat-treated, high-strength titanium sheet alloy is designated as Type RS-140. It contains 5% aluminum, 1.25% iron, 2.75% chromium, and the balance titanium. It can be had in sheets as thin as 0.010" in sizes up to 48" by 120". The fully heat-treated sheet has a tensile strength above 190,000 psi. The sheet was developed especially for aircraft skins, stiffeners, and internal structures.
(Republic Steel Corp., Cleveland 1, Ohio)

Stainless Steel Shim Stock

Stainless steel shim stock, in full-hard spring temper, in Type 302 steel, is now available in nine thicknesses from 0.002" to 0.010" for use as shims, or for electronic parts. Designated as P. M. C., it comes in 60" roll lengths, calibrated to indicate the number of inches remaining on a cut roll.
(Roblinger Co., 40 Cross East, Boston, Mass.)

Titanium Alloy with High Strength-Weight Ratio

Developed under a defense contract, a titanium alloy, claimed to have the highest strength-weight ratio of any structural metal hitherto available, is now being offered commercially as Alloy 6Al-4V. The alloy contains 6% aluminum, 6% vanadium, 2% tin, 0.5% iron, 0.25% copper, and the balance titanium. The tensile strength of the open-die forged metal is 190,000 psi., yield strength 180,000 psi., and elongation 9.5%. It is easily forged and machined.
(Mallory-Sharon Metals Corp., Niles, Ohio and
Crucible Steel Company of America, Pittsburgh 30, Pa.)

Precipitation-Hardening Austenitic Alloy for Springs

A new alloy for springs requiring resistance to service temperatures up to 1000 F is designated as NS-A286. It was designed especially for use in jet engines and gas turbines, and is a precipitation-hardening austenitic alloy containing 24% to 27% nickel, 13.5% to 16% chromium, 1.75% to 2.25% titanium, 1% to 2% manganese, 1% to 1.5% molybdenum, 0.4% to 1% silicon, 0.35% max aluminum, 0.1% to 0.5% vanadium, up to 0.01% boron, and 0.08% max carbon. It is lower in cost than the usual high-alloy spring materials. The annealed wire has a tensile strength of 103,500 psi. The tensile strength, after a 30% reduction and heat treatment at 1350 F, is 198,000 psi.
(National-Standard Company, Niles, Michigan)

Thermocouple Wire Suitable for Vacuum Furnaces

A new thermocouple wire, which will give reliable temperature measurements up to 2800 C (5072 F), is made from a combination of tungsten and tungsten-rhenium alloy containing 26% rhenium. It is suitable for use in vacuum furnaces and in hydrogen or inert-gas atmospheres, but not in oxidizing atmospheres or in the presence of hydrocarbon vapors. The tungsten-tungsten rhenium thermocouple was developed in England. It has a higher emf than tungsten-molybdenum combinations.
(Engelhard Industries, Inc., 72 Austin St., Newark 2, N. J.)

Porous Silver Sheets for Filtering Uses

Porous silver in various uniform porosities for filtering uses is now being offered in sheets, in thicknesses from 1/32" to 1", in a standard 6" by 9" size. The porosity grades are from 2 to 55 microns, with each grade giving a 98% screening out of all particles larger than the designated grade size.
(Micro Metallic Div., Pall Corporation, Glen Cove , New York)

CHEMICALS

New Chemical for Improved Polyurethane Foams

A new chemical that will produce polyurethane foams of fine cell structure and low density is being marketed as Dow-Corning 199. It is a silicone-glycol copolymer. In one-shot flexible foams, it gives a high concentration of open cells; while, in the process of making rigid foams, it gives a high percentage of closed cells. The foams have otherwise the general characteristics of the urethanes.
(Dow Corning Corp., Midland, Michigan)

Light-Degradation Protection

Two new ultraviolet light absorbers for protecting lacquers and plastic films against light degradation are Uvinul N-35 and N-38. They are substituted acrylonitriles, are colorless, and do not contain acidic hydroxyl groups. They are suitable for use under varying pH conditions.
(General Aniline and Film Corporation, 435 Hudson Street, New York 4, N. Y.)

PLASTICS

New Inhibitors for Stabilizing Plastics

Four new inhibitors for stabilizing plastics are being offered. Many plastics degrade or yellow rapidly by a catalyzed oxidation of the molecular chain, by light radiation or by ultraviolet rays, unless the plastic is protected by the incorporation of a suitable stabilizer. Three of the new stabilizers, HPT, RMB, and OPS, are hexamethyl phosphoric triamide, resorcinal monobenzoate, and octo phenyl salicylate, respectively, and are ultraviolet stabilizers for vinyls, polyesters, cellulosics, and polyolefins. The first is a light yellow liquid easily soluble in water and common solvents. RMB is particularly adapted for cellulose plastics, while OPS is adapted for polyethylene and polypropylene. The fourth inhibitor, THBP, is a crystalline solid to be added to plastics during milling or in solvent solution. It is an antioxidant for paraffins as well as for plastics.
(Eastman Chemical Co., 260 Madison Ave., NY 16, NY)

New Packaging Film of Greater Strength and Clarity

A new type of polyethylene for producing packaging film of unusual strength and great clarity is being marketed as Poly-Eth, grades 5305, 5365, and 5375. It derives its extra properties from its "polymorphous" condition, wherein

the crystals normally coming from extrusion remain small, leaving an unusually large number of highly-branched non-crystalline molecules. The film is tough and impact resistant. It retains the chemical resistance and other properties of regular polyethylene.
(Spencer Chemical Co., Kansas City 5, Mo.)

Improved Colloidal Water Suspension of Silica Sol

Nalcoag 1050 is a colloidal water suspension of silica sol now available in a 50% concentration. The extremely small size of the silica particles, a million billion per drop, permits the material to fill minute pores and thus increase the film strength and bonding of coating compounds, and to promote the formation of smaller bubbles in latex foams. In paper coatings, it increases friction resistance.
(Nalco Chemical Co., 6216 West 66th Pl., Chicago 38, Ill.)

Colloidal Silica Concentrate for Spraying or Brush Use

Another colloidal silica concentrate for use as a paint or enamel covering is offered as a water-like liquid that can be mixed with fourteen parts water, for spraying or brushing on the painted surface. It dries in fifteen minutes to a hard, transparent coating; and, the extremely fine silica particles fill all the microscopic pores, to give a surface that sheds dirt and is easily kept clean.
(E. I. duPont deNemours & Co., Inc., Wilmington 98, Del.)

New Versatile Polypropylene Plastic

The new versatile polypropylene plastic is now being offered under the names of Escon and Avisun in any commercial quantities. Polypropylene is the lightest in weight of the plastics, has high strength, and high adhesive and chemical-resistant properties, making it useful for a wide range of products. The molded or extruded material has a density of 0.897 to 0.910, tensile strength of 3500 to 4900 psi., and Rockwell R hardness of 80 to 90. The resin has a clarity that permits brilliant colors of high gloss. With the high melting point of 335 F, molded dishes or containers can be heat-sterilized without injury, and the dielectric strength of 660 volts per mil makes the resin suitable for wire covering and other insulation. In addition to the molding resin, the plastic is also available in the form of high-strength clear or colored wrapping film and as textile fiber.
("Escon" from Enjay Co., Inc., 15 West 51st St., New York 19, N. Y.
"Avisun" from Avisun Corp., Marcus Hook, Pa.)

Polyester Wire Enamel

A new grade of Alkanex polyester resin for enamel insulation of electrical wire is stated to give the highest temperature resistance, 175 C, of any previous polyester wire enamel. (Temperature resistance required for Class F insulation is 155 C.) The new enamel has excellent flow characteristics, improved dielectric strength, and good resistance to oils and Freon.
(General Electric Company, Schenectady, New York)

Nylon Tubing for Replacing Alloy Metal Piping

To replace alloy metal piping for conducting corrosive liquids up to a working pressure of 2000 psi., nylon tubing is now available in stock sizes from 0.060" O. D. to 0.500" O. D. The 0.060" tube has an inside diameter of 0.^10" and the 0.500" tube has in inside diameter of 0.280". It can be hade on reels in continuous lengths.
(The Garlock Packing Company, Palmyra, New York)

Lightweight Polyethylene Sheets

For neutron shielding where light weight is necessary, specially developed polyethylene sheets are available in 1/8" to 1" thicknesses. The hydrogen nuclei arrangement of the polyethylene (Petrothene 100) molecule absorbs the high-energy neutrons, and a content of 2% boron absorbs the low-energy neutrons.
(Panelyte Div., St. Regis Paper Co., Woodside Drive, R. D. 3, Richmond, Ind. Petrothene 100 from U. S. Ind'l Chemicals Co., Div. Nat'l Distillers and Chemical Corp., 99 Park Ave., New York 16, New York)

Low-Cost Polyethylene Coating Resin with High Adhesion

A new low-cost polyethylene coating resin, Petrothene 205-15, gives high adhesion to a wide variety of materials, and will provide greaseproofness (passing Military Spec. MIL-B-121B) with coatings as thin as 0.005". The resin has a density of 0.924, and a melt index of 3.0. At the recommended coating melt temperature of 575 F, it gives good bond strength to foil and other nonporous materials, as well as to porous materials.
(U. S. Industrial Chemicals Co., 99 Park Ave., New York 16, N. Y.)

Cable Insulation

Greatly improved low loss characteristics are afforded by a new cable insulation of varnished polyester-glass cable tape (designated No. 76554). Tests have

shown that at 100 C the new tape's power factor rises to only approximately one-third that of conventional varnished cambric. The straight weave tape is also said to provide increased flexibility. Slippage allowed by a high oil content eliminates need for a slipper compound in most cases. Tests also have shown the insulation's dielectric strength to be unimpaired by stretch. Comparable to cambric in its ability to withstand assembly punishment, the new tape can be used in all cable taping machines.
(Insulating Materials Dept., General Electric Company, Schenectady, New York)

FABRIC AND PAPER PRODUCTS

New Sheet Electrical Insulator for Motor Slot Liners, etc.

A new sheet electrical insulator for such uses as motor slot liners and phase separators is Duroid 2100. The sheet is made of Orlon fibers combined in an acrylic resin, and comes in thicknesses from 0.010" to 0.030" to very close tolerances. It is strong and flexible, with a tensile strength of 10,000 psi., and an elongation of 23%. The material is chemical resistant, and was designed particularly to resist Freon-oil mixtures. The dielectric strength is 750 volts per mil, and the power factor is 0.026. It is available in rolls 13" wide.
(Rogers Corp., Rogers, Conn.)

New Sheet Electrical Insulation for Transformers, etc.

Acto-Glas Mark II is a new sheet electrical insulation for use in transformers, coils, and armatures. The material is a woven glass fiber cloth impregnated with a polyester resin for temperatures to 130 C, or with an epoxy resin for temperatures to 150 C. The sheet comes in thicknesses from 0.005" to 0.015" in rolls to a width of 38". The tensile strength is 45,000 psi., and dielectric strength is 400 volts per mil.
(Sun Chemical Corp., Electro-Technical Products Div., Nutley, N. J.)

LABORATORY MATERIALS

Dialdehyde Starch for Adhesives, etc.

Dialdehyde starch, made by a new process, is now being offered in pilot-plant quantities for adhesives, for increasing the wet-strength of paper, and as a binding agent. The starch is produced by oxidizing corn starch with periodic acid. The commercializing has been made possible by the continuous regeneration of the costly periodic acid after use by a process developed by the Department of Agriculture. The periodic acid is reduced in the making of the new starch to Iodic acid, HIO_3, which is then put through an electrolytic cell and oxidized to periodic acid.
(Miles Chemical Co., Zeeland, Michigan)

Low-Cost Substitute for Cellulose

Not yet commercialized, but well worth watching by procurement people, is a sponsored research program for corn grown amylose that can be used as a low-cost substitute for cellulose, particularly for making wrapping films. Amylose is a linear chain glucose that can be readily insolubilized by chemically cross-linking for use as film or fiber. Or, soluble film can be made with untreated amylose for use as prepared-food wrappers that need not be removed for boiling. Unlike cellulose, the soluble amylose is digestible. The program sponsors were previously successful in developing a hybrid corn containing more than 90% amylopectin (a branched-chain glucose polymer) to replace tapioca starch for adhesives and sizes. The new hybrid corn now under development should contain more than 90% amylose.
(Beer Hybrid Corn Co., Decatur, Ill.)

MISCELLANEOUS

Improved Solid-Film Lubricant

A new solid-film lubricant, Lube-Lok 1005, will give good lubrication at temperatures up to 700 F. It is molybdenum disulphide bonded with a porcelain enamel frit. For aircraft and missile use, the material will lubricate at altitudes above 100,000 ft., where other lubricants normally fail.
(Electrofilm, Inc., North Hollywood, Calif.)

Molybdenum Disulphide Dispersion for High-Temperature Use

For extreme pressure lubrication, as for cold-metal forming dies and for slow moving heavy machine bearings, a new molybdenum disulphide dispersion, Molykot M-55 Plus, is offered. It contains no additives that are reactive at high temperatures such as sulphur or chlorine. Tests indicate that the new lubricant will give 116% greater loading, and 71% greater wear resistance, than the former M-55 medium oil dispersion grade.
(Alpha-Molykote Corp., Stamford, Conn.)

New Additive for Latex Paints

A new additive for latex paints that improves adhesion and aids bonding of the paint to chalky surfaces is Castung 403-Z-3. It is a bodied dehydrated castor oil, and is capable of replacing one-third of the latex resin. It also improves resistance to alkalies.
(Baker Castor Oil Co., 40 Avenue A, Bayonne, New Jersey)

Sodium in Solid Dispersion Bricks

Sodium is now available in a solid dispersion in the form of 1-lb bricks that are easy and safe to handle, providing a fine particle size which gives a more active sodium. The bricks consist of 50% sodium metal, with an average particle size of 50 microns, together with 50% paraffin binder. They can be handled in the air, and can be cut to any size.
(Gray Chemical Co., Inc., Gloucester, Mass.)

COMMENTS

The claims in this report are those of the manufacturer and, although screened before printing by technical personnel in various interested departments, they have not necessarily been verified. Those interested will communicate directly with the manufacturer and make their own evaluations.

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