Processed product for electronics semiconductors applications

Application Number: Electronics and semiconductors (Annex E.2.11.)

Materials used in the field are PTFE (CAS NO: 9002-84-0), PCTFE (CAS NO: 9002-83-9), PFA (CAS NO: 26655-00-5), PVDF (CAS NO: 24937-79-9), and ETFE (CAS NO: 94228-79-2).

Use Conditions: Must maintain purity in the use environment. Must not be affected by chemical solutions. Must have heat resistance and flame resistance. Must be minimal in degradation over time in the use environment. Must have non-adhesiveness, insulating properties, low-friction, and weather resistant.

Subject to use: Wetted parts and flow meters of various equipment, cutting bellows, pipes, hoses, and seals; parts of tapes, tubes, gaskets, packings, valves, and pumps; general processed products such as plunger sliding parts, diaphragms, drop tubes, and bearings; lining of piping, vessels, pumps, and valves,

Chemical Solution to use: Various chemical solutions such as strong acid, alkali, ultra-pure water, and oil depending on the equipment.

Usage Environment: –18°C or less to +200°C, pressurized and depressurized environments

Use Conditions: Must not be degraded over time even in the environment of the chemical solutions to be used and the temperatures at which they are used.

Fluororesin must not affect food.

Must be minimal in degradation over time due to the use environment, including ultraviolet rays.

Must have heat resistance, chemical resistance, oil resistance, durability, and corrosion resistance.

Must maintain non-adhesiveness.

Compared to other resin materials, fluororesin has a higher continuously usable temperature (heat resistance) and resistance to chemicals and further has high purity, non-adhesiveness (mold-releasing property), whether resistance, insulation properties, low

friction.

Although requirements vary depending on the use environment and the applications, fluororesin having high reliability relative to those requirements is used in a wide range of applications.

Fluororesin can maintain chemical resistance and meet the conditions of use even in the environment where the use temperature exceeds 200 ºC or where the temperature is below freezing, but other resin materials, rubber materials, and the like, may not endure and are difficult to serve as replacement.

If fluororesin, which is currently used in a variety of applications, become a subject of PFAS regulations, it would cause significant losses on a global scale. In light of the above, we request a regulatory exemption from subjects of PFAS regulations.

Table 2 Chemical Resistance and Solvent Resistance of Various Plastics and Rubbers*

Chemicals and solvents (concentration: %) \ Material	Polyethylene	Polypropylene	Poly(4-methylpentene)	Polyvinyl chloride		Polymethyl methacrylate	Polystyrene	Polyvinylidene chloride	4-fluoroethylene	Silicon rubber	Fluororubber
				Soft	Hard						
Hydrochloric acid (10)	◎	◎	◎	○	◎	○		◎	◎	○	◎
(38)	◎	◎	◎	△	◎	○		◎	◎	×	◎
Nitric acid (30)	○	○	○	△	○	×	×	○	◎		◎
Sulfuric acid (10)	◎	◎	◎	◎	◎	◎	◎	◎	◎		◎
(98)	△	△	△	×	△	×	×	×	◎	×	◎
Formic acid (90)	◎	◎	◎	×	○	×		○	◎	○	△
Acetic acid (10)	◎	◎	◎	○	◎	○		○	◎	○	○
(100)	△	△	◎	×	△	×		×	◎	○	○
Aqueous ammonia	◎	◎	◎	○	◎	○		◎	◎	◎	◎
Sodium hydroxide (10)	◎	◎	◎	○	◎	○	◎	◎	◎	×	○
Ethanolamine	○	○	○	×	×				◎	○	×
Ethylenediamine	○	○	○	×	×	×			◎	◎	×
Pyridine				×	×	×			◎		×
Methanol	○	○	○	×	○	×		△	◎	○	○
Ethanol	○	○	○	×	○	×		○	◎	○	◎
Isopropanol	◎	◎	◎	×	○	×		○	◎	◎	◎
Ethylene glycol	◎	◎	◎	×	△				◎	◎	◎
Diethyl ether	×	△	×△	×	△			×	○	×	×
Diisopropyl ether	○	○	○	×	△	×			◎		×
Dioxane				×	×					△	×
Formaldehyde (40)	○	◎	◎	○	○	○		○	◎		◎
Acetone	△	△	△	×	×	×	×	×	◎	○△	×
Methyl ethyl ketone	△×	△	△	×	×	×	×	×	◎	△	×
Ethyl acetate	△	△	△	×	×	△		×	◎	△	×
Butyl acetate	△	△	△	×	×	×	×	×	◎	×	×
Hexane	×	△	×△	×	○	△			◎	×	◎
Isooctane	△			×	×	△			◎	×	◎
Benzene	△	△	△	×	×	△	×	×	◎	△	○
Toluene	△	△	△	×	×	△		×	○	×	○
Methylene chloride	×	△	×△	×	×	×	×	×	◎	×	○
Chloroform	×	×	×	×	×	×	×	×	○	×	○
Carbon tetrachloride	×	△	×△	×	×	×	×	×	◎○	×	◎
Chlorine gas	△	△	△	△	○	○	◎	○	○		◎
Ammonia gas	◎			△	○			×	◎	◎	×
Ozone	△			○	○	△		◎	◎	◎	◎
Potassium permanganate (5)	◎	◎	◎	○	◎			◎	◎		
Sodium hypochlorite (5)	◎	◎	◎	○	◎	○		◎	◎	◎	◎

Resistance to inorganic chemicals was determined by focusing on changes in the appearance of the sample, the degree of liquid contamination and changes in physical properties. ◎= Superior: no or little influence, ○= Good: some influence, but can withstand use under certain conditions, △= Acceptable: should not be used as much as possible, × = Unacceptable: not suitable for use due to severe influence.
Resistance to organic oils and solvents was classified according to the following by immersing the sample at room temperature for 48 hours and measuring the weight change rate. Weight change rate = ◎: 10% or less, ○: 11 to 30%, △: 31 to 100%, ×: 101% or more
* Excerpted from references 1) and 2).
Table shows results obtained at room temperature. Resistance decreases at high temperatures, and they may be usable at room temperature but not at high temperatures.

Reference

Masahiro Natsume, National Institute of Science and Technology Agency, Nagoya University, Faculty of Agriculture, "Chemical and Solvent Resistance of Plastic Laboratory Equipment"