

HOW TO BOND PLASTICS

TABLE OF CONTENTS

	PAGE
BACKGROUND	1
RESIN FAMILIES	2
SYSTEMS FOR JOINING	3
ABS	5
ACETAL HOMOPOLYMERS	6
ACETAL COPOLYMERS	7
ACRYLIC RESINS AND MONMERS	8
ALKYD MOLDING COMPOUNDS	9
ALLYL RESINS AND MONOMERS	10
AMINO RESINS	11
CELLULOSE PLASTICS	12
CHLORINATED POLYETHER	13
EPOXY RESINS	14
FLUORO PLASTICS	15
IONOMERS	16
NYLONS (POLYAMIDES)	17
PHENOLIC RESINS	18
PHENYLENE OXIDES	19
POLYCARBONATES	20
POLYESTER RESINS	21
POLYETHYLENE	22
POLYPROPYLENE	23
POLYURETHANES	24
STYRENE POLYMERS AND COPOLYMERS	25
VINYL POLYMERS AND COPOLYMERS	26
FURANE RESINS, HIGH TEMPERATURE RESINS, METHYLPENTENE POLYMERS, PARYLENE POLYMERS, PHENOXY RESINS, POLYALLOMER COPOLYMERS, POLYBUTYLENE, POLYSULFONE RESIN, SILICONES:	

BACKGROUND

The history of plastics dates back to 1838 when a Frenchman by the name of Pelouze discovered Nitrocellulose. In 1851 Nitrocellulose was utilized in the manufacture of Photographic Film. The first plastic was developed from this semi-synthetic in 1868. It was called "Celluloid".

Now we have at least 30 families of plastics with hundreds of variations. The purpose of this report is to provide you with some basic information about these plastics and to act as a guideline in helping you select an adhesive system for bonding them.

The essential components of all plastics are substances which possess resinous characteristics 'these resins may be natural, partly synthetic or wholly synthetic. Although resins are generally classified as either Thermoplastic or Thermosetting, the resulting plastic may have properties of one or the other or both.

Listed on the following page are 30 families of resins and molding compounds from which plastic film, sheet, foam, fabrics, adhesives, coatings, sealers, paints, castings, extruded and molded shapes are made.

From the 30 families of resins and molding compounds emerge thousands of variations of plastics.

The reasons for this are that a single family group can be divided into extrusion, molding, sheet, cast, granular putty, flexible and rigid grades all with variations in properties.

These grades are sometimes further broken down into types with variations in impact resistance, heat and flame resistance, density, filler used, etc.

Beyond this, many of these grades or types may be used as an "Alloy" in the recipe of another plastic to impart certain properties.

Because of this, a chart showing the physical properties of plastics becomes long and complicated. Therefore, the following pages list only those things that will help in your decision as to the type of adhesive that may be compatible.

RESINS AND MOLDING COMPOUNDS

ABS (Acrylonitrile - Butadiene - Styrene)
Acetal Homopolymers and Copolymers
Acrylic Resins
Alkyd Molding Compounds
Allyl Resins and Monomers
Amino Resins (Urea and Melamine Formaldehyde Resins)
Cellulosic Plastics
Chlorinated Polyether Epoxy Resins
Fluoro Plastics
Furane Resins
High Temperature Resins (Polybenzimidazole, Polybenzothianzole)
Ionomers
Methylpentene Polymers
Nylons (Polyamides)
Parylene Polymers
Phenolic Resins
Phenoxy Resins
Phenylene Oxides
Polyallomer Copolymers
Polybutylene
Polycarbonates
Polyester Resins
Polyethylene
Polypropylene
Polysulfone
Polyurethanes
Silicones
Styrene Polymers and Copolymers
Vinyl Polymers and Copolymers

SYSTEMS OF JOINING

There are four basic systems for joining plastic parts:

1. With adhesives.
2. By heat welding and heat sealing.
3. By solvent welding.
4. With mechanical fasteners.

1. Adhesives offer a number of advantages over other systems of joining plastic parts. Among these are: low cost, ease of application and in many cases, the only solution for joining some plastics to other surfaces. Adhesives also eliminate stress concentration, they seal, provide electrical insulation and dampen vibration. However, care must be exercised in proper adhesive selection. Many thermoplastics are dissolved by solvents in adhesives. The adhesive should not contain a solvent that causes excessive crazing, cracking, softening of the plastic, loss of gloss or staining.

Plastics are non-porous so solvents trapped in the bond line will not dry and will lower adhesive strength. Many of the thermo-plastics such as the polyolefins (polyethylene, polypropylene) and the fluoro plastics such as Teflon and Kel-F are chemically inert and very difficult to bond unless the surface is treated with chemical solutions.

Most of the thermoset plastics are not too difficult to bond. The prime concern is to have a clean surface. Some of these plastics have a mold release agent on the surface that must be removed before adhesive application.

2. Methods of heat welding and heat sealing thermoplastics from the standpoint of structural fabrication are classified as:

- Hot Gas Welding
- Heated Tool Welding
- Induction Welding
- Friction or Spin Welding
- Ultrasonic Welding

There are four major heat sealing techniques:

- Dielectric
- Thermal
- Induction
- Ultra Sonic

3. Solvent welding of thermoplastics is normally the most economical system for joining these plastics to themselves. Again, care must be exercised in the selection of the solvent. Crazing of the surface or stress crazing which may cause joint failure, are two common problems with this technique. Some solvents may cause the plastic to swell or stain the surface. Normally, only one surface is coated. The parts are then joined immediately and held with some pressure for a few minutes.
 4. Mechanical fasteners are also used for joining plastic parts, especially in cases where repeated assembly and disassembly is necessary. In this case, threaded metal inserts are used to protect the plastic from damage, to add strength to the joint and to provide durable, permanent threads.
-

Generic Name: ABS (Acrylonitrile - Butadiene - Styrene)

Trade Names: Abson, Cycolac, Dylel, Kralastic, Lustran, Tybrene

A tough, hard, rigid compound with excellent dimensional stability, good heat resistance, good chemical, electrical and weather resistance. (Thermoplastic)

Processing: Injection molding, extrusion and vacuum forming.

Typical Applications: Refrigerator door liners, luggage shells, housings for vacuum cleaners, blenders, cameras, radios automotive dashboard panels, grills, construction pipe, decorative panels, safety helmets, fishing reels, golf club heads.

Joining: Solvent or heat welding (Ketone Solvents).

Bonding: ABS parts can be bonded to other surfaces with the following adhesives:

Surface Preparation: Wipe surface with Ethyl-alcohol, then lightly sand with a fine grit abrasive paper. Wipe again with Ethyl-alcohol to remove dust using a clean, lint-free cloth or tissue.

Generic Name: Acetal Homopolymers

Trade Names: Delrin

Physical properties include: high strength, rigidity, excellent dimensional stability and resilience. Good resistance to organic solvents and abrasion resistance. (Thermoplastic)

Processing: Injection and blow molding, extrusion, machinable.

Typical Applications: Cams, gears, bearings, printing wheels, automotive turn signal switches, carburetor components, plumbing ball cocks, shower heads, furniture casters, telephone push buttons, lawn sprinklers, lawn mower wheels, bra buckles.

Joining: Heat welding

Bonding: Polyurethane and epoxy based adhesives can be used for bonding Delrin to other surfaces.

Surface Preparation:

Satinize:

Surface must be satinized or sanded.

Blend by weight 0.3% dicalite bulk, 0.3% paratoluene sulfonic acid, 3.0% dioxane and 96.4% perchloroethylene.

Immerse for 10-30 seconds at 175°F to 250°F then hold in an oven at 250°F for 1 minute before rinsing in warm water and air drying.

Sand:

or

Wipe surface with MEK - lightly sand with a 280 grit emery cloth - wipe surface with MEK to remove dust using a clean, lint free cloth or tissue.

Generic Name: Acetal Copolymers

Trade Names: Celcon

Physical properties include: high strength, stiffness, resilience and toughness even at elevated temperatures. Good resistance to alkalies and solvents. Good electrical properties. (Thermoplastic)

Processing: Injection and blow molding, extrusion, machinable.

Typical Applications: Gears, cams bushings, clips, lugs, housings, aerosol containers, pens, [pencils, automotive fender extensions, toy components, appliance parts.

Joining: Heat welding.

Bonding: Epoxy, polurethane, nitrile based adhesives can be used for bonding Celcon to other surfaces.

Surface Preparation: Wipe surface with MEK. Then treat surface with concentrated chromic acid for 10 seconds at room temperature. This must be done in a hooded area to remove any formaldehyde fumes generated by the chemical reaction. Water rinse and dry.

or

Wipe surface with Ethyl-alcohol. Sand surface with a medium grit emery cloth. Wipe surface with Ethyl-alcohol to remove dust using a clean, lint-free cloth or paper.

Generic Name: Acrylic Resins

Trade Names: Acrylite, Lucite, Plexiglas

Acrylic plastics transmit and control light, resist water, are stable against discoloration, have almost unlimited color possibilities, exhibit superior dimensional stability and offer highly desirable structural and thermal properties. (Thermoplastic)

Processing: Injection molding, vacuum forming, casting and extrusion.

Typical Applications: Signs, domes, window, radar plotting boards, light covers, lenses, medallions, name plates, dials, knobs, instrument panels, hoods, beverage dispensers, models, windshields.

Joining: Heat and solvent welding (ethylene dichloride and trichloroethylene). S1524 (methylene chloride)

Bondings: Adhesives based on acrylic resins provide the best bonds. Polyurethane and epoxy based adhesives can also be used for bonding acrylics to other surfaces.

Surface Preparation: Detergent wash and rinse or wipe surface with Ethyl-alcohol using a clean, lint-free cloth or tissue.

Generic Name: Alkyd Molding Compounds

Trade Names: Duraplex, Dyal

A combination of an unsaturated polyester, a monomer and various fillers. Are extremely rigid and have good heat, chemical, electrical and high humidity resistance. (Thermosetting)

Processing: Pour, transfer, plunger, injection or compression molding, extrusion, machinable.

Typical Applications: Vacuum tube bases, distributor caps, circuit breaker, computer, switch gear components, T.V. tuner segments, coil bobs.

Joining: Adhesives or mechanical fasteners.

Bonding: Epoxy and polyester based adhesives are compatible.

Surface Preparation: Remove mold release by detergent wash and rinse, then wipe surface with MEK. This is followed by a light sanding with a fine grit paper. Wipe again with MEK to remove dust using a clean, lint-free cloth or tissue.

Generic Name: Allyl Resins and Monomers

Trade Names: Dapon

Allyl resins and monomers exhibit exceptional insulation properties, high temperature stability, resistance to most chemicals and moisture. They are widely used as agents in other resins such as polyesters. (Thermosetting)

Processing: Injection, pour and encapsulation molding, extrusion.

Typical Applications: Pre impregnated glass cloth, sealants, insulation coatings, decorative laminates, multi-pronged electrical connectors, insulators, encapsulating shells, circuit boards, housings, aircraft and missile components.

Joining: Adhesives or mechanical fasteners.

Bonding: Epoxy, nitrile and neoprene based adhesives are compatible.

Surface Preparation: Remove mold-release by wiping surface with MEK. This is followed by light sanding with a medium grit paper. Wipe surface with MEK to remove dust using a clean, lint-free cloth or tissue.

Generic Name: Amino Resins (urea and Melamine Formaldehyde Resins)

Trade Names: Amres, Cymel, Diaron, Permelite, Pollopas, Syn-U-Text

Amino resins offer flame and heat resistance, a wide range of color possibilities, color stability, resistance to boiling water, solvents and have high impact strength. (Thermosetting)

Processing: Injection, compression, transfer, plunger moldings, machinable.

Typical Applications: Electrical wiring devices, dinnerware, buttons, housings for electric shavers, mixers, electronic equipment, toilet seats, utensil handles, decorative laminates, textile crease proofing agents, coatings, adhesives.

Joining: Adhesives and mechanical fasteners.

Bonding: Most adhesives are compatible.

Surface Preparation: Remove mold-release by detergent wash and rinse, then wipe surface with MEK. This is followed by a light sanding with a fine grit paper. Wipe again with MEK to remove dust using a clean, lint-free cloth or tissue.

Generic Name: Cellulosic Plastics

Trade Names: Cellophane, Celluloid, Rayon

Cellulosic plastics are cellulose nitrate, cellulose acetate, ethyl cellulose, cellulose acetate butyrate and cellulose acetate propionate. Generally they are hard, stiff and strong materials. They are also transparent, can be given very tough smooth surfaces of high gloss. They generally have good dielectric strength, dimensional stability and water resistance. (Thermoplastic)

Processing: Compression and extrusion molding; rotational or fluidized molding; injection and vacuum molding, casting; blow molding, machinable.

Typical Application: Screw driver handles, pen and pencil barrels, tubular packages, steering wheels, tooth brush handles, blister packaging film, lacquers, hot melt coatings, tapes, football helmets, bowling pin cases, flashlight cases, electrical appliance parts, dolls and toys.

Joining: Solvent welding (acetone S1383, ethyl acetate, methyl cellosolve, methyl alcohol, diacetone alcohol).

Bonding: Nitrile and epoxy based adhesives can be used for bonding cellulose to other surfaces.

Surface Preparation: Remove dust or dirt, loose particles, oil or grease by detergent, wash and rinse.

Generic Name: Chlorinated Polyether

Trade Names: Penton

Chlorinated polyether has excellent mechanical, thermal, electrical and chemical-resistant properties, It resists over 300 chemicals and has very high water resistance. (Thermoplastic)

Processing: Injection, transfer molding, extrusion, calendering, machinable.

Typical Application: Valves, pumpheads, pipe with threaded or socket connections, gears pins, bushings, coatings and monofilament; linings for pipes, valves, pumps vessels and other chemical processing components.

Joining: Adhesives and mechanical fasteners.

Bonding: Epoxy and polyurethane based adhesives are compatible.

Surface Preparation: Immerse surfaces to be bonded in a solution of 150 parts concentrated sulfuric acid, 12 parts distilled water and 7.5 parts potassium dichromate at 160 F for 5 minutes, water rinse and dry.

or

Wipe surface with MEK. This is followed by a light sanding with a medium grit paper, wipe with MEK to remove dust using a clean, lint-free cloth or tissue.

Generic Name: Epoxy Resins

Trade Names: Epon, Epotuf, Epi-Rez, Epodite, Epoxical, Araldite

Epoxy resins can be divided into two broad categories: Glycidylether resins and epoxidized olefins. When reacted with curing agents or catalysts they cure to form products with good mechanical and electrical characteristics. They have superior dimensional stability and good resistance to heat and chemical attack. (Thermosetting)

Processing: Molding, potting, encapsulating, impregnating.

Typical applications: Coatings adhesives, flooring, coatings for underground storage tanks, drums and pipes; road and bridge deck coatings, filament wound composites, electrical potting.

Joining: Adhesives or mechanical fasteners.

Bonding: Any of our epoxy, neoprene, nitrile or synthetic resin based adhesives are compatible.

Surface Preparation: Lightly sand surface with a fine grit paper. Wipe surface with MEK using a clean, lint-free cloth or tissue.

ADHESIVE

Generic Name: Fluoro Plastics

Trade Names: Halon, Kel-F, Plaskon, Teflon

Fluorocarbons are paraffinic hydrocarbon polymers in which all or part of each hydrogen atom has been replaced with a fluorine atom. The result is a relatively dense, chemically inert, thermally stable product with a low friction coefficient, high electrical resistivity and low dielectric constant. (Thermoplastic)

Processing: Lubricated molding, bag molding, ram extrusion, hot and cold forming, isostatic pressing, machinable.

Typical Applications: Seals, bearings, packings, gaskets, piston rings, pipe thread sealants, pipe and hose lining, wire and cable jackets.

Joining: Heat welding.

Bonding: Adhesives can only be used if surface is treated.

- no recommendation

Surface Preparation: Strong etching solutions are used to modify the surface to make it bondable. The process is critical and relatively hazardous. It is suggested the product be purchased "Bondable" or the solutions be purchased from:

Action laboratories	Newark, N.J.
Chemgineers Inc.	Los Angeles, Calif.
W.L. Gore Assoc.	Newark, Del.
Joclin Mfg. Co.	Wallingford, Conn.
Carl H. Biggs	Santa Monica, Calif.
Plastic Assoc.	Laguna Beach, Calif.

Grneric Name: Ionomer Resins

Trade Names: Surlyn A, Surlyn D

This class of resins characterized by low density, high transparency, toughness, flexibility, resilience, resistance to oils, greases and organic solvents. (Thermoplastic)

Processing: Injection and blow molding, extrusion and extrusion coating.

Typical Applications: Housewares, toys, containers, safety shields, tool handles, closures, electrical insulation, tubing, coatings, multiwall bags, pouch packaging, skin packaging.

Joining: Heat welding - heat sealing.

Bonding: Epoxy adhesives are compatible after surface preparation.

Surface Preparation: Wipe surface with Ethyl-alcohol then immerse in a solution composed of 150 parts by weight concentrated sulfuric acid, 12 part/weight water and 7.5 parts/weight of potassium dichromate for 30 seconds at 160 F. Rinse surface with cold water and dry.

An alternate treatment would be the same as the "Flame Treatment" used for polyethylene and polypropylene.

Generic Name: Nylon (Polyamides)

Trade Names: Capran, Dymetrol, Zytel, Namex, X-Tal

The basic nylons are 6, 6/6, 6/10, 11 and 12. Others like 7, 8, 9, 13, and 13/13 are less popular. Although each type varies in melting point and moisture sensitivity, they all possess outstanding resistance to repeated impact and fatigue, low coefficients of friction, excellent abrasion resistance, inertness to aromatic chemicals and good electrical properties. Most grades are classified as self extinguishing. (Thermoplastic)

Processing: Injection molding, extrusion, casting, sintering, machinable.

Typical Applications: Wire and cable jacketing, tubing, food packaging films, control cables, non-corrosive fasteners, bearings, gears, wire connectors, gas tank floats, cams, pulleys, rollers, coatings, adhesives, stockings.

Joining: Heat welding, heat sealing, mechanical fasteners.

Bonding: Aqueous Phenol, Resorcinol-Ethanol solvent and Nylon-bodied calcium chloride-ethanol solvent cements are recommended. Neoprene, nitrile and epoxy based adhesives provide bonds with lower strength.

Surface Preparation: Wipe surface with MEK. Then lightly sand surface with a medium grit paper. Wipe surface with MEK to remove dust using a clean, lint-free cloth or tissue.

Generic Name: Phenolic Resins

Trade Names: Amres, Kauresin, Plenco, Plyophen, Varcum

Phenolic parts are strong, rigid, dimensionally stable, have exceptional resistance to heat, most corrosive agents and moisture. They have excellent electrical properties, high impact, flexural, tensile and compressive strength. (Thermosetting)

Processing: Compression or transfer molding.

Typical Applications: Appliance parts, utensils, handles, electrical controls, telephones, wiring devices, high pressure laminates. Paints, varnishes, adhesives, printed circuit boards, croquet and billiard balls, toilet seats.

Joining: Adhesives and mechanical fasteners.

Bonding: Neoprene, nitrile, epoxy based adhesives are generally used for bonding Phenolics.

Surface Preparation: Wipe surface with MEK. Then lightly sand surface with a medium grit paper. Wipe surface again with MEK to remove dust using a clean, lint-free cloth or tissue.

Generic Name: Phenylene Oxides

Trade Names: Noryl

Polyphenylene oxide has a wide temperature range (-275 F to 600 F), good mechanical, electrical properties and usual resistance to aqueous environments, acids, bases and steam. (Thermoplastic)

Processing: Injection molding, extrusion.

Typical Applications: Hospital utensils, medical instruments, food processing packages, TV tuner and deflection yoke components, tube bases, control shafts, power tool cases, business machine housing, fixtures, grills, handles, pump parts, sprinkler systems, shower heads.

Joining: Solvent and heat welding (Toluene or a mixture of 95% Chloroform and 5% Carbon Tetrachloride).

Bonding: Neoprene, Nitrile, Polyurethane and Epoxy based adhesives and compatible.

Surface Preparation: Wipe surface with Ethyl-alcohol. Then lightly sand with a fine grit paper. Wipe surface again with Ethyl-alcohol to remove dust using a clean, lint-free cloth or tissue.

Generic Name: Polycarbonates

Trade Names: Lexan, Merlon

Polycarbonates have high heat resistance and dimensional stability, high impact strengths, good optical and electrical properties. (Thermoplastic)

Processing: Injection, compression, blow molding, extrusion, thermoforming, film casting, machinable.

Typical Application: Electric knife handles, hand power tool, blender, electric tooth brush handles; appliance housings, dust covers and transparent switch housings, food vending machine components, baseball caps, football helmets, outdoor lighting fixture components, sun and safety glasses.

Joining: Heat and solvent welding (Methylene Chloride and Ethylene Dichloride).

Bonding: Epoxy based adhesives are compatible.

Surface Preparation: Wipe surface with Ethyl-alcohol. Then lightly sand with a fine grit paper. Wipe again with Ethyl-alcohol to remove dust using a clean, lint-free cloth or tissue.

Generic Name: Polyester Resins

Trades Names: Alkanex, Arothane, Laminac, Multron, PolyLite Resins, Mylar, Dacron, Kodel, Vycron.

Polyester resins are the result of a reaction of dicarboxylic acids with glycols. They are classified into saturated and unsaturated types. They are primarily used in combination with fibrous reinforcements, have good corrosion and electrical properties as well as a high strength to weight ratio and are low cost. (Thermosetting)

Processing: Molding, laminating, casting, hand lay up and spray processes.

Typical Applications: Boats, truck auto bodies; corrugated and flat sheets, skylight domes, decorative fixtures, tanks, wall panels, coating wood, concrete floors, patching, advertising displays, aircraft components, impregnating, encapsulating.

Joining: Adhesives or mechanical fasteners.

Bonding: Neoprene, Nitrile, Epoxy, polyester based adhesives work well,.

Surface Preparation: Wipe surface with MEK. Then lightly sand surface with a medium grit emery paper. Wipe surface again with MEK to remove dust using a clean, lint-free cloth or tissue.

Generic Name: Polyethylene

Trade Names: Alathon, Durethene, Dylan, El Rexene, Fortiflex, Modulene, Petrothene, Poly-eth, Poly-G, Trolen, Crown Seal, Visqueen, Sclair.

Low and high density polyethylenes are produced from ethylene monomers and catalysts. Innumerable variations in the parameters of performance are possible. Generally, they have excellent electrical properties, good resistance to water, oils and solvents. They are low cost and ranked number one in volume. (Thermoplastic except one variation can be made Thermosetting)

Processing: Extrusion, extrusion coating; injection, blow, compression, molding; calendering, flame spraying, fluidized coating.

Typical Applications: Housewares, toys, food packaging, liners and coatings, wire and cable coating, pipe, milk cartons board, dry cleaning and laundry bags.

Joining: Heat welding - heat sealing.

Bonding: Untreated surfaces require "Tacky Type" or pressure sensitive adhesives.

Treated:

Surface Preparation: Wipe surface with Ethyl-alcohol. Then immerse in a solution of 15 parts/weight sodium dichromate, 24 parts/weight distilled water, 300 parts/weight concentrated sulfuric acid for 60-90 minutes at room temperature or 1-2 minutes at 150 F. Rinse thoroughly with cold, running, distilled or deionized water. Then air dry.

Polyethylene may also be prepared for bonding by lightly waving the blue (oxidizing) flame of a Bunsen or Oxy-acetylene burner over surface until it appears shiny or by subjecting the surface momentarily to a blast of hot air. Care must be taken to avoid overheating and melting of the article. Corona treatment works on films of polyethylene.

NOTE: Polyethylene can also be purchased commercially in "Bondable Form".

Generic Name: Polypropylene

Trade Names: Aerotuf, Celmar, Hypac, Impolene, Polypro, Pro-fax, Propylux, Trolen PP, Vectra.

Polypropylene resins are copolymers of polypropylene and ethylene. They have high tensile strength, flexural strength and surface hardness. Good chemical resistance, clarity, gloss and electrical properties. (Thermoplastic)

Typical Applications: Pipe, wire and cable coatings, housewares, closures, furniture & luggage components, food containers, hinges, TV set backs, vacuum cleaner tanks, medical syringes, cases for power tools, fishing tackle, typewriters, women's compacts, packaging films.

Joining: Heat welding, heat sealing.

Bonding:

Surface Preparation: Same as for Polyethylene.

Generic Name: Polyurethanes

Trade Names: Castomer, Celthane, Clocel, Estane, Isofoam, Nopco Foam, Poly Foam, Poly Foam-fill, Rich Foam, Uralane, Uralite, Ure Foam

Urethane polymers involve the reaction of a polyisocyanate with compounds containing reactive hydrogens. The end products are foams, coatings, elastomers, resins and fibers. Foams are either flexible or rigid with various densities. (Thermoplastic)

Processing: Pour, spray, froth, molding.

Typical Applications for Foams: Furniture padding, cushions, mattresses, filters, sponges, toys, panel cores, insulation, automotive padding, medical dressings, tapes.

Joining: Adhesives.

Bonding:

Surface Preparation: A dust free, dry surface is required.

Generic Name: Styrene Polymers and Copolymers

Trade Names: Ancorene, Biax, Celatron, Cellofoam, Callulite, Celpak, Dylene, Dylite, Fostacryl, Kralon, Lustrex, Pelaspan, Piccolastic, Sternite, Stylafoam, Stryrolux, Styron, Thermco, Ticor, Trolitul.

Polystyrene is produced from coaltar and petroleum gas. It has long term, load-bearing strength, excellent clarity, rigidity, water resistance and electrical properties, good resistance to mineral oils, organic acids, alkalies and salts. (Thermoplastic)

Processing: Injection molding, extruding, vacuum forming, machinable.

Typical Applications: Housewares, toys, food containers, light diffusers, dial faces, brush backs, lenses, decorative panels, cigarette packages, picnic jugs, coolers, loose fill packaging, meat trays, novelties, refrigerator liners, appliance housings.

Joining: Solvent welding (Toluene, Xylene, Diethylbenzene).

Bonding: Neoprene, Nitrile and Epoxy based adhesives are compatible

Surface Preparation: Wipe surface with Ethyl-alcohol. Then lightly sand surface with a fine grit paper. Wipe again with Ethyl-alcohol to remove dust using a clean, lint-free cloth or tissue.

Generic Name: Vinyl Polymers and Copolymers

Trade Names: Amerifilm, Anvyl, Astraglas, Bolta Flex, Boltaron, Butacite, Chemclad, Chromalon, Dacovin, Derakane, Durelene, Elvax, Exon, Geon, Irvinil, Lifetex, Naugahide, Opalon, Pliovic, Rucoam, Saran, Solvic, Tavyne, Tedlar, Tri-Lite, Ultron, Vygen.

The vinyl family is made up of Homopolymers and Copolymers of vinyl chloride (PVC) resin. They are relatively low cost, easy to process, have excellent water and chemical resistance, good strength and abrasion resistance and unlimited color possibilities.

Processing: All known plastic processing methods including molding, extruding, calendering, dip coating, spraying and fluidized-bed coating.

Typical Applications: Pipe, fittings, tanks, ducts, hoods, food packaging, decorative flooring, sheet panels, wire and cable insulation, coatings, adhesives, fabric, upholstery, clothing, phonograph records.

Joining: Heat welding heat sealing-solvent welding (Tetrahydrofuran and Cyclohexanone).

Bonding: Nitrile based adhesives are compatible. (Customer should check for plasticizing and staining.)

Surface Preparation (Rigid Type): Wipe with Trichlorethylene. Then lightly sand surface with a medium grit paper. Wipe again, with Trichlorethylene to remove dust using a clean, lint-free cloth or tissue.

Furane Resins: Are the results of vegetable by products and are used as wetting agents and modifiers in other compounds.

High Temperature Resins: Are a special class of thermally and oxidatively stable resins generally used in the compounding of new high temperature resistant adhesives and coatings for the Aerospace industry.

Methylpentene Polymers: Are new, polyolefin type, thermoplastic polymers that are finding use as trays or containers for bakery or frozen food products, hospital syringes, beakers and indoor lighting fixtures.

Parylene Polymers: Are a new thermoplastic substance that can be produced as a very thin, free or adherent coating for a wide variety of materials - metals, plastics, etc. To provide the surface with excellent chemical and electrical properties.

Phenoxy Resins: A broad family of thermoplastic compounds for blow molding, injection molding and extrusion and for adhesives for coatings. Primarily used as containers for food, cosmetics and drugs. Phenoxy film is heat sealable.

Polyallomer Copolymers: A new class of thermoplastic crystalline block copolymers that are finding use as fishing tackle boxes, typewriter cases, luggage shells, food and hardware packages and stationary supplies such as file folder and loose-leaf binder covers. They are heat sealable.

Polybutylene: A new high strength, thermoplastic resin now available in semi-commercial quantities. Primary uses for flexible irrigation piping, tape and packaging applications. Similar in characteristics to polyethylene and polypropylene.

Polysulfone Resin: A new thermoplastic with a temperature range of -150 F to 300 F. It is self extinguishing, has excellent strength, electrical properties and toughness. It is finding use in the electronics industry for connectors, integrated circuit carriers and circuit breaker parts, aircraft cabin interior parts, steam iron handles, film for transparencies and TV components.

Silicones: Are produced in the form of resins, elastomers, fluids, reactive monomers or intermediates. They are being used as additives in other plastics to upgrade their heat, moisture and electrical resistance. They are not considered a plastic as such. For bonding Silicone, see the booklet on Rubber Bonding.