SPECIFICATION

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Wichita, Kansas

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GLUES, CEMENTS, AND SEALERS

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1. INTRODUCTION

1.1 Type.- This specification covers the methods and materials required in the preparation for and application of glues, cements, and sealers.

1.2 Applicable Publications:

1.2.1 Beech Specifications.-

PS 133 Resin Glue Specification for Wood Gluing
PS 358 Cold Process Repair

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1.2.2 Beech Process Standards.-

MP 1132 Cleaning and Degreasing - Alkaline Hot Dip Method

1.3 Definitions:

1.3.1 Tacky.- The term tacky as referred to in this specification is that degree of stickiness in the drying or curing of a film of cement which allows one's knuckle to be placed on the film and withdrawn with no transfer of any cement to the knuckle.

1.3.2 Set.- The term set as referred to in this specification is the condition of a film of cement which has cured or dried to the state where it is free from tack or any stickiness. The use of the knuckle is preferred to the tip of the finger because it is less likely to transfer moisture, grease, dust, etc.

2. MATERIAL

2.1 General Requirements.- All materials and compounds unless otherwise specified shall be equivalent in quality to applicable United States Air Force, United States Army, or Bureau of Aeronautics Standards. All glues, cements, and sealers, substitutions or equivalents, shall be approved by the Engineering Department.

2.2 Detail Requirements.- Material data, recommended thinner, chief use, and specification compliance are given in Table I below:

TABLE I

Material Number	Thinner	Chief Use and Temperature Range	Military Spec	Manufacturer
EC-164	Naphtha	Textiles to metal insulation to metal -40 to +220° F	JAN-P-140 MIL-P-3542	Minnesota Mining & Manufacturing Company
EC-524	Naphtha	Rubber and weather-strip to metal -20 to +240° F	JAN-P-101 JAN-P-140 MIL-C-5092 USAF 26544	Minnesota Mining & Manufacturing Company

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Material Number	Thinner	Chief Use and Temperature Range	Military Spec	Manufacturer
EC-612		Caulking compound -50 to +250° F	MIL-S-7124 MIL-S-7126	Minnesota Mining & Manufacturing Company
EC-750	Acetone	Joint-sealer, cabin-sealer, -90 to +200° F		Minnesota Mining & Manufacturing Company
EC-755 with EC-807		Spotweld through sealer, -60 to +225° F	52-C-36	Minnesota Mining & Manufacturing Company
EC-870	Toluol	Rubber to rubber, rubber to metal, general all purpose, -20 to +300° F. For best results, when bonding to metal, use Bostik 1007.	JAN-C-1154	Minnesota Mining & Manufacturing Company
EC-801 with EC-807		Windshield installation cabin pressurization	S-151 MIL-S-7124 MIL-S-7126 MIL-S-11031 14153	Minnesota Mining & Manufacturing Company
EC-847	Acetone	Rubber to metal; vinyl materials to metal; metal to metal. For best results, when bonding to metal, use Bostik 1007.	26609 MIL-C-4003 MIL-C-5092 MIL-C-10668	Minnesota Mining & Manufacturing Company
EC-867	Naphtha	Metal to metal; ceramic to metal; plastics to metal, -40 to +200° F. For best results, when bonding to metal, use Bostik 1007.		Minnesota Mining & Manufacturing Company

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Material Number	Thinner	Chief Use and Temperature Range	Military Spec	Manufacturer
EC-930	Ethyl Acetate	Slushing compound, -70 to +250° F		Minnesota Mining & Manufacturing Company
EC-1034	Naphtha	Sound deadener, -30 to +300° F		Minnesota Mining & Manufacturing Company
EC-1020	None	White-extruded sealer-filleting compound		Minnesota Mining & Manufacturing Company
EC-1055B	None	Black-extruded sealer-filleting compound		Minnesota Mining & Manufacturing Company
Bostik 1007	Butyl Acetate	Metal primer for maximum adhesion		B. B. Chemical Co.
No. 26	Methyl Isobutyl Ketone or Acetone	Cellulose acetate to itself or to wood		E. I. du Pont de Nemours & Co. Inc.
Plaskon 250-2	Water	Wood to wood	AN-G-8	Libby-Owen-Ford Glass Co., Plaskon Division
C46 Boat Builders	Alcohol	Wood to wood; phenolic plastic to rubber, acrylic plastic, or to wood. For best results, when bonding to metal, use Bostik 1007.	JAN-A-397 14124-A	National Casein Company
I.T.S.		Upholstery materials prior to stitching		I.T.S. Company

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Material Number	Thinner	Chief Use and Temperature Range	Military Spec	Manufacturer
1-A with Benzoyl Peroxide	Methylene Dichloride	Plexiglas I to itself		Rohm & Haas Co.
2-A with Benzoyl Peroxide	Methylene Dichloride	Plexiglas II to itself and to Plexiglas I		Rohm & Haas Co.
No. 106 with accelerator		Spotweld through sealers, cabin pressurization, windshield installation, -60 to +250° F	52-S-10	Presstite Engineering Co.
Acetate Cement		Cellulose nitrate to itself and to cellulose acetate; Royalite to itself		Schwartz Chemical Co.
Dolflex CC-1015 Insulating Compound	None	Abrasion resistant coating - heavy-duty electrical insulating coating 300° F		John C. Dolph Co.
Pro-Seal No. E.P. 601-H-Kit		Windshield installation, cabin pressurization sealer -60 to +250° F	14153	Coast Paint & Chemical Co.
Pro-Seal 590	Acetone	A general purpose adhesive with high bond strength, -65 to + 300° F		Coast Paint & Chemical Co.

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Material Number	Thinner	Chief Use and Temperature Range	Military Spec	Manufacturer
Bostik 1008	None	Leather, neoprene and porous materials to themselves and to each other. For best results, when bonding to metal, use Bostik 1007.		B. B. Chemical Company
32-A	None	Royalite to itself and to other materials		General Cement Mfg. Co.
Woodlok Q-3022	Water	Wood to wood where waterproofness is not necessary		National Adhesives
Narmco M3C and MN3C Tape		Metal to metal		Narmco Inc.
FM 47 Bloomingdale		Metal to metal		Bloomingdale Rubber Co.
EC 373	Naphtha	Metal, rubber, glass, wood, and most plastics to themselves and to each other. For best results, when bonding to metal, use Bostik 1007.		Minnesota Mining & Manufacturing Co.
155 Presstite		Windshield installations -50 to +375° F		Presstite Engineering
Pro-Seal 354	Water	Sealing compound for fuel or oil tanks	3610 52-S-12	Coast Paint & Chemical Co.
Pro-Seal 303-7	Methyl-Isobutyl Ketone	Aluminum and other metals to themselves and to each other up to +300° F continuous use		Coast Paint & Chemical Co.

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Material Number	Thinner	Chief Use and Temperature Range	Military Spec	Manufacturer
Bralite Aluminum Putty	Ketones	Fillet over skin laps and fill metal surfaces		Andrew Brown Co.
Sauereisen No. 1		Electrical insulation up to 2000° F		Sauereisen Cements Company
EC-800	Methyl-ethyl Ketone	Weather seal for aircraft cabins, -90 to +200° F		Minnesota Mining & Manufacturing Co.
Pro-Seal 502	Ketones	Coating for interiors of oil coolers, fuel tanks, and battery boxes, -60 to +350° F		Coast Paint and Chemical Co.
EC-678	Methyl-ethyl Ketone	Repairing and sealing Buna N type synthetic rubber fuel cells. For best results, when bonding to metal, use Bostik 1007.	26610	Minnesota Mining & Manufacturing Co.
Pro-Seal TC86	Methyl-ethyl Ketone	General purpose air drying cement. For best results, when bonding to metal, use Bostik 1007.		Coast Paint & Chemical Co.
U.S. Royal M-5136	Methyl-ethyl Ketone	Neutral materials and synthetic rubbers to themselves and to metal. For best results, when bonding to metal, use Bostik 1007.		U.S. Rubber Co.
Epon Adhesive VI		Metal to metal, -70 to +180° F		Shell Chemical Corp.
EC-1294	None	Glass, plastics, rubber and wood to themselves and to metal; up to 200° F		Minnesota Mining & Mfg. Co.

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2.2.1 Purchasing Note.-

B. B. Chemical Company, 784 Memorial Drive, Cambridge, Massachusetts

E. I. duPont de Nemours & Co., Inc., 626 Schuyler Avenue, Arlington, New Jersey

I.T.S. Company, Elyria, Ohio

B. F. Goodrich Company, Akron, Ohio

Minnesota Mining & Manufacturing Company, Piquette Avenue, Detroit, Michigan

Narmco Incorporated, 930 West Grape Street, San Diego, California

National Casein Sales, 608-18 West 80th Street, Chicago 20, Illinois

Plaskon Division of Libby-Owens-Ford Glass Co., 2112-24 Sylvan Avenue, Toledo, Ohio

Presstite Engineering Company, 3900 Chouteau Avenue, St. Louis, Missouri

Rohr and Haas Company, 712 Locust Street, Philadelphia, Pennsylvania

Schwartz Chemical Company, 826 West 70th Street, New York 23, N. Y.

Armstrong Cork Company, Lancaster, Pennsylvania

John C. Dolph Company, 1062 Broad Street, Newark, New Jersey

Coast Paint & Chemical Company, 1507 Grande Vista Avenue, Los Angeles 23, California

Shell Chemical Corporation, 100 Bush Street, San Francisco, California

U. S. Rubber Company, Mishawaka, Indiana

2.2.1 Purchasing Note.- (Continued)

National Adhesives Division, National Starch Products, Inc., 268 Madison Avenue, New York 16, N. Y.

Bloomingdale Rubber Co., Chester, Pennsylvania

Andrew Brown Company, Los Angeles, California

American Cements Co., 3389 Shrapsburg Station, Pittsburg 15, Pennsylvania

General Cement Mfg. Co., 921 Taylor Avenue, Rockford, Illinois

3. PROCEDURE

3.1 Mechanical Fit.- Care should be taken to bring all surfaces into contact with each other. Remove all air pockets (blisters) by working from the center to the outside edges with a roller or fingers as the job permits.

3.2 Cleaning.- All surfaces to be bonded, glued, or sealed, shall be free of dust, oil, fingerprints, etc.

3.2.1 Metal.- Clean all metal surfaces with acetone, naphtha, methyl ethyl ketone or in alkaline cleaning solutions. Refer to Beech Process Manual MP 1132, Cleaning and Degreasing - Alkaline Hot Dip Method, for alkaline cleaning.

3.2.2 Wood.- Clean wood surfaces to be glued by brushing, sanding, or wiping with a clean cloth. Wood with oil or wax on a surface to be glued shall be rejected.

3.3 General Requirements:

3.3.1 Application on Nonporous Material.- On a nonporous material, apply one thin, medium coat evenly to each surface being bonded, allowing the cement to become very tacky before making the bond.

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3.3.2 Application on Porous Material.- On porous materials, it is the general practice to spread a thin coat on each surface to be bonded, allowing the cement to become set. Then spread a second coat on each surface to be bonded, allowing the cement to become tacky before making the bond.

3.3.3 Use of Cement.- The use of any cement is governed by the requirements of the job. Consult Process Engineering for any special applications. Keep all materials tightly sealed when not in use and have adequate ventilation when using.

3.3.4 Methods of Application.- Cements may be applied by brush, spray, flow-gun, or scraper.

3.3.5 Cyclizing Rubber.- Cyclize the surface to be bonded by applying a thin coat of concentrated sulphuric acid. Keep the area wet for 15 to 20 minutes, rinse with water, dry, and bond.

CAUTION: Avoid contact with the skin.

3.4 Detail Requirements:

3.4.1 EC-164 Cement:

3.4.1.1 Use.- This material is used in bonding soundproofing rugs or trim fabrics to wood or metal.

3.4.1.2 Special Characteristics.- This cement has long tack, high heat resistance, and water resistance. The shelf life of this material is 6 months.

3.4.1.3 Application.- When applying soundproofing to metal, apply a single, medium-heavy coat of the cement to the metal and allow it to become tacky before placing the soundproofing material in place. In applying soundproofing to fabrics, precoat the fabrics by spraying and permit to cure. Apply one coat of cement to the metal and bond when tacky.

3.4.2 EC-524 Cement:

3.4.2.1 Use.- This cement is used for the adhesion of neutral materials--insulation, cloth, felt, wood, cork, linoleum--and rubber to metal and to each other.

3.4.2.2 Special Characteristics.- EC-524 cement has tough bond, and it is resistant to heat and cold. It is not resistant to oil or gasoline. The shelf life of this material is 6 months.

3.4.2.3 Application.- Apply one coat to each surface to be bonded. Allow the cement to become tacky. Follow the general procedure as given in Paragraphs 3.3.1, 3.3.2, 3.3.3, and 3.3.4.

3.4.3 EC-612 Caulking Compound:

3.4.3.1 Use.- This material is used in sealing stringer cutouts, isolating fuel cell compartments, firewall fittings, and electrical lead-in fittings.

3.4.3.2 Special Characteristics.- This compound has a seal of a flexible nature, and it is resistant to water and aromatic fuels. It has an objectionable odor and is not recommended for such applications as the interior of air ducts, etc. The shelf life of this material is 10 months.

3.4.3.3 Application.- Apply the caulking compound with a putty knife or with fingers by rolling it into a bead and working it into the opening. This material develops strong adhesion within a few hours. The initial tack is slow.

3.4.4 EC-801 Sealer with 807 Catalyst:

3.4.4.1 Use.- This material is used in sealing and caulking operations in integral fuel tanks and cabin pressurization.

3.4.4.2 Special Characteristics.- This type of seal is resistant to aromatic fuels, and has a good bond to metals. The shelf life of this material is one year.

3.4.4.3 Application.- Mix 8.3 parts of EC-801 with 1 part EC-807 by weight and stir thoroughly. Apply by a flow-gun or a spatula on clean surfaces.

3.4.4.4 Working Range.- The working range of this material is about 4 hours at 70° F; however, if an unused portion is placed in a refrigerator, the pot-life may be increased to 2 or 3 days.

3.4.4.5 Curing Time.- The curing time for this seal is 72 to 76 hours at 70° F and 15 hours at 120° F.

3.4.5 EC-847 Cement:

3.4.5.1 Use.- This material is used for bonding rubber to metal, cloth to metal, rubber to leather and metal to metal.

3.4.5.2 Special Characteristics.- EC-847 cement has exceptionally strong flexible adhesion and is recommended for bonding rubber to itself or to metal or fabric. This material may also be used as a metal-to-metal adhesive where shear strengths of less than 100 psi are not objectionable. The shelf life of this material is 6 months.

3.4.5.3 Application.- Coat both surfaces with an evenly spread film of cement and permit it to become very tacky before bonding. It is also possible to precoat one or both surfaces and store. The parts may be re-activated by wiping with acetone or by use of heat. When bonding coated-fabric materials, the coating must be scraped or sanded off before applying the cement. When using on porous surfaces, coat them several times. Since the solvent evaporates quickly, add solvent frequently so very even films of cement can be applied. The curing time may be accelerated by heat. Consult Process Engineering for an accelerated curing schedule.

3.4.6 EC-930 Synthetic Rubber Sealer:

3.4.6.1 Use.- This sealer is used to coat the interior of oil cooler assemblies or fuel tank assemblies.

3.4.6.2 Special Characteristics.- EC-930 has a high resistance to aromatic fuels and unusually good penetration qualities when used on porous metals. The shelf life of this material is 6 months.

3.4.6.3 Application.- Slosh the interior surfaces. Permit ample drainage time with all vents open. In order to maintain thin uniform coatings, reduce the sealer with ethyl acetate, maintaining the original package viscosities.

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3.4.7 EC-870 Cement:

3.4.7.1 Use.- This is a good general purpose cement and forms a good bond. It is used to bond rubber to itself or to metal and to bond fabrics to metal or to wood.

3.4.7.2 Special Characteristics.- EC-870 cement has a medium length, moderately strong tack and it is resistant to heat, cold, oil, water, and gasoline. This material is not intended for use where it will be in constant contact with oil or aromatic fuel. The shelf life of this material is 6 months.

3.4.7.3 Application.- Either one or two coats of adhesive are brushed on each surface--dependent upon porosity--allowing approximately 20 minutes between the coats. The coated surfaces should be bonded when the adhesion exhibits an aggressive tack but does not transfer to the knuckle. When desirable, this material may be thinned with toluol and sprayed. The parts may be precoated and stored. They can be reactivated by applying the dry parts to a tacky surface or by wiping with a clean rag dampened with toluol.

3.4.8 EC-750 Synthetic Sealing Compound:

3.4.8.1 Use.- This material is used for sealing skin seams or laps, gaps, and cutouts.

3.4.8.2 Special Characteristics.- This compound has fair adhesion to metals which is improved by using Bostik 1007 primer. It is resistant to oil, water, and aromatic fuel, and it has good cold and heat resistance. A film skins over within 5 minutes at room temperature, however, the film drying time is approximately 3 days at 80° F. The shelf life of this material is 3 months.

3.4.8.3 Application.- For best results, EC-750 must be applied as it is received--that is, without heating or diluting--by pressure pump equipment with a nozzle that extrudes the sealer to form a seal covering the seam approximately 1/8 inch on each side of the edge and approximately 1/16-inch thick in an uncured state. The cement may be applied to the faying surfaces before riveting. The parts can be coated one hour before assembly.

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3.4.9 EC-755 Sealer with EC-807 Catalyst:

3.4.9.1 Use.- This material is used in sealing and caulking operations requiring no shrinkage and is used for molding small test parts. It is also used as a spotweld-through sealer.

3.4.9.2 Special Characteristics.- This sealer has good adhesion to porous surfaces but poor adhesion to metal and glass. On metal, the use of a primer coat of Bostik 1007 primer improves the adhesion. It has unlimited package stability before adding EC-807 accelerator. This material has good resistance to weather, water, oil, and aromatic fuel. The cured film is smooth, elastic, and strong. The sealer is a synthetic rubber base with 100 percent solids and is flexible at 60° F.

3.4.9.3 Application.- Mix 10 parts of EC-807 catalyst to 100 parts of EC-755 sealer, by weight. The sealer and the catalyst shall be thoroughly mixed to prevent soft spots from occurring in the finish cure.

3.4.9.4 Curing Time.- This material has a working range of approximately 4 hours at room temperature, 70° F. The activated mass will cure within 24 hours at room temperature--70° F--or 2 to 4 hours at 130° F.

3.4.10 EC-1034 Protective Coating and Sound Deadener:

3.4.10.1 Use.- This material is used as a sound deadener.

3.4.10.2 Special Characteristics.- This is a rubber-based coating that remains comparatively soft and resilient and is abrasion resistant. The shelf life of this material is 12 months.

3.4.10.3 Application.- EC-1034 protective coating and sound deadener may be sprayed or brushed on clean surfaces.

3.4.11 EC-1020 and EC-1055B Sealer - Extruded Type.- EC-1020 is white in color and EC-1055B is black.

3.4.11.1 Use.- This sealer is used in filleting material.

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3.4.11.2 Special Characteristics.- This sealer is 100-percent solid content and is supplied in extruded strips. The shelf life of the material is 12 months.

3.4.11.3 Application.- Lay a bead, by hand, on clean surfaces. The consistency remains like a rubbery dough permitting the material to be worked into any opening.

3.4.12 Acetate Cement:

3.4.12.1 Use.- This cement is used in bonding plastic-type materials.

3.4.12.2 Special Characteristics.- This material is a slowly evaporating solvent which softens the surfaces to be bonded.

3.4.12.3 Application.- In order to determine its effectiveness, put a drop of cement on the surface of the plastic to be bonded. If the surface softens slightly, a good bond can be made. Apply the solvent by a brush or applicator. When the surfaces begin to soften, put them together, maintaining a light pressure for at least 30 minutes. Maximum strength occurs in about 48 hours at ordinary room temperatures.

3.4.13 No. 26 Cement:

3.4.13.1 Use.- No. 26 cement is a cellulose nitrate solution and is used to bond cellulose nitrate to itself or to wood.

3.4.13.2 Special Characteristics.- This cement is fast drying.

3.4.13.3 Application.- Apply a liberal amount of the cement by brush to both surfaces to be cemented and bond immediately, applying a minimum pressure of 5 psi for at least 2 hours.

3.4.14 C46 Boat Builders Glue:

3.4.14.1 Use.- This is a two-part resorcinol type glue, and it is used to bond wood to wood, phenolic plastics to wood or other plastic materials, and cyclized rubber materials to wood or plastics. Refer to Paragraph 3.3.5 for cyclizing of rubber.

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3.4.14.2 Special Characteristics.- This glue is nonshrinking and cures by polymerization. It is waterproof, mildewproof, and insectproof.

3.4.14.3 Application.- Mix the two parts combining 5 parts of resin with 1 part of filler by weight, stirring until the consistency is smooth and lump-free. Apply the cement to both surfaces and assemble immediately, using 5 to 20 pounds pressure for at least 2 hours at 75° F. Maximum strength is reached within 72 hours. Never use this glue below 70° F.

3.4.15 250-2 Plaskon Glue:

3.4.15.1 Use.- This is a urea formaldehyde resin glue used primarily as a wood glue. Refer to Beech Specification BS 133, Resin Glue Specification for Wood Gluing.

3.4.16 EC-867:

3.4.16.1 Use.- This material is a heavy mastic-type adhesive and is used to bond glass and ceramics to plastics, wood, and metal.

3.4.16.2 Special Characteristics.- This sealer has a strong original tack.

3.4.16.3 Application.- Apply a series of small dabs of the adhesive to a clean surface then press it into place against the second surface so the adhesive film is reduced to 1/16- to 1/32-inch thickness. The adhesive gains maximum strength within 72 hours.

3.4.17 I.T.S. Cement:

3.4.17.1 Use.- This material is used in upholstering for cementing leather to leather, imitation leather and/or numerous other materials to hold a seam until it can be sewed.

3.4.17.2 Special Characteristics.- This cement has an excellent adhesion to metals and can be used over zinc chromate primers without harming the film.

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3.4.17.3 Application.- Spread an even coat of cement on each surface to be cemented. Allow it to become tacky, then apply pressure.

3.4.18 1-A Cement and 2-A Cement:

3.4.18.1 Use.- This material is used in bonding Plexiglas and Lucite. Plexiglas and Lucite are the trade names of Rohm and Haas and du Pont respectively for methyl-methacrylate resin. The choice of cement depends upon the service required of the finished part. Table II summarizes the use of these two cements.

TABLE II

Choice of Cements

Cement	Use and Character of Bond
Cement 1-A (50-percent Methylene Dichloride, 50-percent Methyl Methacrylate Monomer)	Plexiglas I-A to Plexiglas I-A and Lucite HC201 to Lucite HC201. Produces the strongest joints, especially when heat treated. Used when part is subsequently to be formed, machined, sanded, etc.
Cement II (60-percent Methylene Dichloride, 40-percent Monomeric Methyl Methacrylate)	Plexiglas II to Plexiglas I-A or II and Lucite HC202 to Lucite HC202 or 201 (heat resistant grade). Strength of the joints can be increased by heating the cemented piece from 12 to 24 hours at 122 to 158° F.
Methylene Dichloride	Produces a medium strength joint. Quick-setting and therefore widely used for production.
Methylene Dichloride	Produces a medium strength joint. Evaporates so fast that the joint must be assembled quickly and is apt to be cloudy.

3.4.18.2 Special Characteristics.- With care and practice, it is possible to bond Plexiglas and/or Lucite to Plexiglas and/or Lucite in a cement joint which closely approximates Plexiglas itself in transparency.

3.4.18.3 Application.- The surfaces to be cemented should be polished, or sanded, or machined smooth. They should fit accurately. Mask the area around the surfaces to be cemented with cellulose acetate tape--scotch tape--to keep the excess cement off the clear surfaces. The cement may be applied in several ways. Small parts may be soaked in the cement and then bonded. Larger parts may have the cement applied by a brush until the joining area softens and then bonded. For convenience in bonding larger surfaces, dissolve some shavings of the material to be bonded in the cement to prepare a thick syrup. Then apply the cement like a glue to soften the edges to be bonded. Assemble the pieces quickly and hold them together 15 to 30 seconds before clamping the pieces together lightly. Scrape off excess cement and remove the masking tape. Allow the assembly to stand in the jig 4 hours. Allow another 4 hours--a total of 8 hours--to obtain full strength.

3.4.18.4 Preparation of Cement 1-A.- Dissolve the catalyst--benzoyl peroxide--in the proportion of one capsule--0.8 gram--to each pint of Cement 1-A. After the catalyst is added, the cement will thicken unless it is kept under refrigeration. Cement 1-A loses methylene dichloride more rapidly than monomer because of more rapid evaporation and because of preferential absorption by Plexiglas. Methylene dichloride should be added as necessary to maintain the specific gravity indicated in Table III.

TABLE III

Temperature °C	Temperature °F	Permissible Range Specific Gravity
20	68	1.17 to 1.21
25	77	1.16 to 1.20
30	86	1.15 to 1.19
35	95	1.14 to 1.18
40	104	1.13 to 1.17

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3.4.18.5 Preparation of Cement 2a.- Dissolve the catalyst--benzoyl peroxide--in the proportion of one capsule--0.8 gram--to each pint of Cement 2a. After the catalyst is added, put unused portions of the cement under refrigeration to keep it from becoming thick. Methylene dichloride must be added to maintain the required specific gravity indicated in Table IV.

TABLE IV

Temperature °C	Temperature °F	Permissible Range Specific Gravity
20	68	1.13 to 1.18
25	77	1.12 to 1.17
30	86	1.11 to 1.16
35	95	1.10 to 1.15
40	104	1.09 to 1.14

3.4.19 Bostik 1007 Primer:

3.4.19.1 Use.- This material is used as a primer on metal where maximum adhesion of cements is desired.

3.4.19.2 Special Characteristics.- Bostik 1007 primer has an excellent adhesion to metal. This material has a very short shelf life unless stored at a temperature of 65° F or lower.

3.4.19.3 Application.- Apply one coat of primer to the cleaned metal surface. Allow 30 minutes or more drying time.

3.4.20 No. 105 and Accelerator:

3.4.20.1 Use.- This material is used as a sealer for integral fuel tanks, pressurized cabins, or in areas where there can be no shrinkage. It may also be used as a spotweld-through sealer.

3.4.20.2 Special Characteristics.- The exact amount of accelerator is furnished with each package. The 105 compound has unlimited package stability before addition of the accelerator. It has good resistance to

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3.4.23.3 Application.- Coat both surfaces to be bonded with cement and allow the cement to dry tack-free. Recoat each surface and bond when the film has reached the tacky stage.

3.4.24 U.S. Royal R-6136:

3.4.24.1 Use.- This material is a general purpose air-drying cement for bonding neutral materials and synthetic rubbers to themselves and to metal. It is also used to overcoat tape in fuel cell areas.

3.4.24.2 Special Characteristics.- This cement has a good fuel resistance, and has a shelf life of 6 months.

3.4.24.3 Application.- Coat both surfaces to be bonded with cement and bond them when the cement reaches the tacky stage.

3.4.25 Pro-Seal 590:

3.4.25.1 Use.- This material is a general purpose adhesive with high bond strength. It is highly resistant to most plasticisers used in the manufacture of highly flexible synthetic rubbers.

3.4.25.2 Special Characteristics.- This adhesive has a moderately long tack and good resistance to heat, cold, oil, fuel, and water. It is a good aromatic fuel resistant cement.

3.4.25.3 Application.- Apply the adhesive smoothly to both surfaces to be bonded. Allow 40 to 60 minutes drying time before bonding. Wherever possible use mechanical pressure in making the bond, and hold the pressure at least 20 minutes.. Where the use of pressure is not practical, bond the surfaces when the film reaches the tacky stage.

3.4.26 Bostik 1008 Part A and B:

3.4.26.1 Use.- This material is a general purpose adhesive used in the repair of deicer boots.

3.4.26.2 Special Characteristics.- This cement has an exceptional bond strength, good aging qualities, and it is resistant to oil and gasoline. It may also be used to bond leather, neoprene, and porous materials.

3.4.26.3 Application.- Mix 1 part of Part B with 40 parts of Part A by volume. Apply two coats of well mixed cement to both surfaces to be bonded allowing 45 minutes between each coat and 45 minutes after the final coat before bonding. Use the mixture within 8 hours unless it is stored at a temperature below 65° F.

3.4.27 22-A:

3.4.27.1 Use.- This material is used to bond Royalite to itself and to other materials.

3.4.27.2 Special Characteristics.- This is an acetate-type adhesive very similar to household cement.

3.4.27.3 Application.- Coat both surfaces to be bonded with a light film of cement and make the bond.

3.4.28 Woodlok 0-3022:

3.4.28.1 Use.- This material is used to bond wood where waterproofness is not necessary.

3.4.28.2 Special Characteristics.- This is a single part water dispersed emulsion which gives a quick firm bond.

3.4.28.3 Application.- Apply a thin film to both surfaces to be bonded and bond immediately. Place the parts in pressure clamps for approximately 30 minutes prior to any further processing or fabrication of the bonded assembly. Allow approximately 2 hours in pressure clamps whenever parts are to be placed in a woodlathe for milling. Additional pressure clamp time is required whenever the bond is made at temperatures less than 70° F. Protect this material from freezing.

3.4.29 Narmco M3C and M3C Tape:

3.4.29.1 Use.- This material is used to make metal-to-metal bonds.

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3.4.29.2 Special Characteristics.- This is a thermosetting modified phenolic and it is resistant to water, solvents, and temperatures to 300° F.

3.4.29.3 Application.- Special cleaning and etching of the parts to be bonded is required. Clean the parts by immersing them in a hot acid cleaning solution for 10 minutes at 180° F. The acid cleaning solution to use is composed of 30 parts water, 10 parts technical grade sulphuric acid, and 4 parts of sodium dichromate by weight. Apply a sufficient number of M3C coats to both surfaces to give a dried film thickness of not less than two mils. Air-dry 15 minutes between coats and 30 minutes after the final coat. Cut the M3C tape to proper dimensions allowing 1/8-inch excess on the overlap. Put the tape in place with a slight pressure, clamp the parts together, and cure. Cure at a temperature of 320 to 350° F for 30 minutes to 1 hour with 25 to 50 psi.

3.4.30 FM47 Bloomingdale:

3.4.30.1 Use.- This material is used to make metal-to-metal bonds.

3.4.30.2 Special Characteristics.- This is a modified phenolic giving extremely high strength. It is resistant to water, solvents, and temperatures to 300° F.

3.4.30.3 Application.- The parts to be bonded are first etched in a solution consisting of 45 ounces of concentrated sulfuric acid (Sp. Gr. 1.84), 4 ounces of sodium dichromate in 1 gallon of water. Apply a uniform thickness of the adhesive to both surfaces with a brush, spray, or roller and a doctor knife. Allow to dry and apply 2 to 5 additional coats allowing each coat to dry until the dried cement thickness on each surface is greater than 3 mils. Allow the final coat to dry at least 1 hour at 150° F before bonding the surfaces together. Heat the bonded parts for 8 minutes at 300° F. Apply 12 to 200 psi and cure for 12 minutes at 300° F. For curing at other temperatures, consult Process Engineering.

3.4.31 EC-373:

3.4.31.1 Use.- This material is used to bond metal, rubber, glass wood, and most plastics where the assembly presents irregularities.

3.4.31.2 Special Characteristics.- This is a high solids filler-type adhesive.

3.4.31.3 Application.- Apply the material with a hand gun or spread with a scraper or spatula on both surfaces to be bonded. Bond by firmly pressing the parts together and trim off the excess from the edges before drying.

3.4.32 155 Presstite:

3.4.32.1 Use.- This sealer is primarily used in windshield installation, but it may also be used in spotwelded assemblies provided the sealer is not applied on the areas to be spotwelded.

3.4.32.2 Special Characteristics.- This is a mastic-type sealer received in ribbon form which will not craze acrylic plastic.

3.4.32.3 Application.- Place the ribbon in the channel and assemble the glass. Trim the excess with a sharp piece of wood or plastic immediately after installation. The part is ready for immediate use.

3.4.33 Pro-Seal 354:

3.4.33.1 Use.- This material is used as a sealing compound for fuel and oil tanks. It exhibits good adhesion to metal, wood, and fabrics.

3.4.33.2 Special Characteristics.- This is a putty-like polysulfide sealer and has a high fuel resistance. It cures to a tough rubber compound regardless of temperature or thickness of application.

3.4.33.3 Application.- Apply by brush, spray, or filleting gun to the areas to be sealed. Allow 48 hours drying time before putting the part into use.

3.4.34 Pro-Seal 303-7:

3.4.34.1 Use.- This material is used as a high temperature duct sealer.

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3.4.34.2 Special Characteristics.- This seal has an excellent adhesion to bare aluminum and other metals. It will not strip zinc chromate primer and has a good temperature resistance to 350° F.

3.4.34.3 Application.- Apply with a brush, spatula, or extrusion gun into the faying surfaces of the area to be sealed. It may also be applied as a filleting compound over the skin-lap area. Permit 8 to 12 hours drying time.

3.4.35 Brolite Aluminum Putty:

3.4.35.1 Use.- This material is primarily used to fillet over skin-laps and to fill irregularities in metal surfaces.

3.4.35.2 Special Characteristics.- This is a metal putty which has a very hard sandable surface.

3.4.35.3 Application.- Apply the putty with a filleting gun or spatula and permit it to cure. When the putty is dry, sand it off to the desired smooth finish.

3.4.36 Sauereisen No. 1:

3.4.36.1 Use.- This material is used in places demanding a very hard, porcelain-like, or temperature-resistant bond or seal.

3.4.36.2 Special Characteristics.- This is a good electrical insulator and withstands temperatures up to 2000° F. It is a good high temperature sealer.

3.4.36.3 Application.- Stir the material to a cream-like consistency and apply it in applications rather than thick coats. The material hardens by either air-drying or baking. Where used as a filler which is not exposed to air, it must be baked at 150° F for 24 hours and 200° F for 2 to 3 hours. It has good adhesion to glass, porcelain, metal, asbestos, and wood.

3.4.7 Pro-Seal EP 601-H Kit:

3.4.37.1 Use.- This material is used primarily as a sealer for pressurization or fuel tank compartments. It may also be used as a sealant in the installation of windshields.

3.4.37.2 Special Characteristics.- This is a blue, equal part two part thyokol based sealing compound. It has a good resistance to fuels and has good adhesion to metals. The shelf life of this material is 1 year.

3.4.37.3 Application.- Thoroughly mix equal parts of Part A and Part B by weight or volume and apply by filleting gun or spatula. When mixed by hand, the sealer must be mixed immediately after it is taken out of the container. It may also be mixed and applied by using a Coast Paint & Chemical Company applicator gun. The pot life of the mixed compound varies from 30 minutes to 4 hours depending upon the temperature.

3.4.38 EC-800:

3.4.38.1 Use.- This material is used primarily for pressure and weather-sealing aircraft cabins. It can be used over rivet heads and other seams that present a comparatively tight fit.

3.4.38.2 Special Characteristics.- This is a red, solvent release-type of sealer and has a high solids content and a fair adhesion to metal. It also has good fuel resistance.

3.4.38.3 Application.- The sealant may be brushed over the areas to be sealed or applied as a bead with a standard filleting gun.

3.4.39 Pro-Seal 502:

3.4.39.1 Use.- This material is used as a coating for the interior surfaces of oil coolers, fuel tanks, and battery boxes.

3.4.39.2 Special Characteristics.- This is a slow solvent release type of coating. It has good adhesion to aluminum, and high resistance to oil, fuel, and water.

3.4.39.3 Application.- Apply by the fill and drain method permitting ample drying time between coats. Permit at least 24 hours drying-time before plugging the openings.

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3.4.40 EC-1294 Adhesive:

3.4.40.1 Use.- This adhesive is used in bonding metal, glass, plastics, rubber, and wood to themselves or to each other.

3.4.40.2 Special Characteristics.- EC-1294 adhesive has high shear strength; however, its shock resistance is about the same as glass at extremely low temperatures. At room temperature it indicates a high resistance to concentrated acids and alkalies. By adding EC-1101 aluminum powder to the accelerated mixture it may be used for filling surface cracks, pits, or blow holes.

3.4.40.3 Application.- Apply to cleaned surfaces by brush, scraper, or spatula. Mix 100 parts, by weight, of EC-1294 base compound to 9.2 parts, by weight, of EC-1295 accelerator and mix in a disposable container. If aluminum powder is required add 16 parts of EC-1101.

CAUTION: Do not dispose of excess material into inflammable solvents or waste.

3.4.41 Epon Adhesive VI:

3.4.41.1 Use.- This material is a good metal-to-metal cement. It is also used in bonding wood, plastics, glass, and rubber to themselves or to each other.

3.4.41.2 Special Characteristics.- This material has good adhesion and good solvent resistance. It cures at room temperature and sets to handling consistency in approximately 12 hours at room temperature--75° or more.

3.4.41.3 Application.- Mix 6 parts, by weight, of Shell Curing Agent A to 100 parts, by weight, of Epon Adhesive VI. Spread a thin layer of adhesive evenly on each of the surfaces to be bonded and press them together gently. Only contact pressure is required. The parts shall be assembled immediately after spreading the adhesive.

CAUTION: Avoid prolonged contact with skin.

3.4.41.4 Working Range.- This material has a working range of 4 hours, or slightly longer, at 70° F. The limited pot life should be taken into account when mixing this material. For best results keep the adhesive in a covered container.

3.4.41.5 Curing Time.- The curing time of this material is 144 hours at 77° F, 2 hours at 165° F, or 45 minutes at 200° F.

Approved:

SIGNATURE WAIVED
Neaumont
6-5-53

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