Product Datasheet

PolyFreeze™ P169

1-Component , B-Stageable Adhesive & Coating

PolyFreeze™ P169 is an amber thermosetting adhesive, primer, & coating that is excellent for bonding metals to themselves and other substrates. It is used to assemble laminated steel cores for motors and stators, to bond copper foil to epoxy laminates during PCB manufacture, and for other rigid bonding applications. Once applied and allowed to air dry, the P169 will remain suitable for bonding for 1 month or longer if protected from dust and other contaminants. The coating layers becomes liquid again when subject to heat and easily wets most surfaces. Because of the fluidity of P169 at curing temperatures, the adhesive layers typically only has to be applied to one surface for full wetting and adhesion to develop.

PolyFreeze™ P169 can also be used as a protective coating or primer layer. When cured it forms a tough protective coating that seals, unitizes and insulates coils and electronic sub-assemblies. The coating is highly resistant to heat, moisture, and many types of chemical exposure and provides improved adhesion for other types of adhesives and coatings when used as primer layer.

Many variations on the standard PolyFreeze™ P169 are possible including custom colors, and thinner or thicker versions. Please contact us to discuss your application if you think such a variant would be helpful for your application.

APPLICATIONS & BENEFITS:

- Exceptional Shear & peel strength
- Dried coating bondable for at least 1 month
- Heat, Chemical, & Radiation resistant
- Easy to Use One component formulation

HANDLING PROPERTIES	VALUE	TEST METHOD
Visual Appearance	Clear to Light Amber liquid	
Specific gravity	0.90	ASTM E-201
Viscosity at 25ºC	40 - 100 cps	ASTM D-2393
Percent Solids (non-volatile %)	21% ± 2%	
Base Chemistry	Epoxy – phenolic (phenoxy)	
Primary Solvents	Acetone & Methyl Ether Ketone (MEK)	
Flash Point	-14°C (6°F)	
VOC Content	246 g/L	SCAQMD rule 1168

Drying time: PolyFreeze™ P169 will air dry to a tack-free layer in about 10 – 20 minutes at room temperature with thicker layers taking longer to dry. For optimum performance, after the initial air drying time, oven dry the P 169 layer for 45 minutes at 93°C (200°F) **or** 30 minutes at 121°C (250°F) **or** 10 minutes at 149°C (300°F). This oven heating step will drive off any remaining solvent and make the coating stable and resistant to mechanical damage until you are ready to do the final bonding or fully cure coating.

Curing Schedule: Cure for 20 – 40 minutes minimum at 177°C (350°F). For adhesive applications apply a bond-line pressure of approximately 75 psi. Ensure that the P169 layers has reached the curing temperature before starting the timer for the cure cycle.

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PHYSICAL PROPERTIES	VALUE	TEST METHOD
Color	Light yellow to amber	Visual
T-Peel Strength	>10 pli	ASTM D-1876
Lap Shear Strength (etched aluminum)		ASTM D-1002
at -55°C (-67°F)	5000 psi	
at 25°C (77°F)	5000 psi	
at 82°C (180°F)	3500 psi	
at 121°F (250°F)	1200 psi	
at 150°C (300°F)	300 psi	
Lap Shear Strength - Environmental Aging		ASTM D-1002
30 days in tap water at 25°C (77°F)	5000 psi	
30 days in 20% salt solution at 35°C (95°F)	5000 psi	
7 days in hydraulic oil at 25°C (77°F)	5000 psi	
7 days in aromatic fuel at 25°C (77°F)	5000 psi	
Glass Transition Temperature (Tg)	95°C (203°F)	ASTM D-648
Coefficient of Thermal Expansion (CTE)		ASTM E-831
Alpha 1 (below Tg)	262 ppm/°C	
Alpha 2 (above Tg)	543 ppm/°C	

ELECTRICAL PROPERTIES	VALUE	TEST METHOD
Dielectric Constant at 1 kHz & 25°C (77°F)	5.2	ASTM D-150
Dissipation Factor at 1 kHz & 25°C (77°F)	0.11	ASTM D-150
Dielectric Strength at 1 mil thickness	2400 V/ mil	ASTM D-149
Volume Resistivity at 25°C (77°F)	>1.0 x 10^{15} ohm-cm	ASTM D-257

NOTE : Values above are based on laboratory or average production results – not for specification purposes. All properties generated on samples cured for 60 minutes at 350°F (177°C). Adhesive samples subject to 75 psi bond-line pressure applied using a platen press.

SUGGESTED PROCESSING GUIDELINES:

Apply from a syringe or by brush, roller, dipping or spraying. If spraying, the material may be thinned with small amounts of Acetone or MEK to produce a lower viscosity to lower application thickness, but this is seldom necessary. Typical application thickness is around 1 mil dry coating or primer layer. For use as an adhesive, at least 1 -2 mil dry thickness to one surface or 0.5 – 1.0 mil thickness to each surface to be bonded.

For best results, ensure surfaces to which the P169 is applied are clean and dry. For best adhesive results, lightly roughened the surface is possible. Surfaces that have had the adhesive applied and allowed to B-stage remain bondable for at least 1 month, but the P 169 layers must be protected from dust, oil, and other contaminates. Wrapping or covering the surface in

unplasticized kraft paper is generally suitable to protect the surface from most contamination, avoiding unnecessary pressure on the surface until the material is fully cured.

STORAGE GUIDELINES:

Store this material in a clean, cool and dry environment in its tightly closed original container. Keep from freezing and if frozen immediately warm to room temperature rather than allowing to remain frozen. Tightly reseal containers after use to prevent evaporation. If the recommended storage conditions are observed the products will have a minimum shelf-life of 12 months from the date of shipment.

HANDLING PRECAUTIONS:

Mandatory and recommended industrial hygiene procedures should be followed whenever these products are being handled and processed. For additional information please consult the corresponding material safety data sheets.

PERSONAL HYGIENE:

PolyFreeze™ P169

WARNING: FLAMMABLE KEEP AWAY FROM OPEN FLAMES, SPARKS, AND HEAT. Avoid breezing vapors. Avoid contact with eyes, skin, or clothing. Wear eye protection and impervious gloves when handling. May cause respiratory irritation and overexposure may cause nausea or light headiness. Use only with good mechanical ventilation and/or respirator. Do not take internally.

FIRST AID

In case of contact:

Skin – Immediately wash skin thoroughly with mild soap and water. Remove contaminated clothing and wash before reuse. Destroy contaminated shoes and other articles made of leather.

Eyes – Immediately flush eyes with plenty of water for 15 minutes and get prompt medical attention.

Inhalation - Remove person to fresh air. Administer oxygen or artificial respiration if necessary. Call a physician. **Ingestion** - Do not induce vomiting. Dilute with plenty of water and contact physician immediately. Never give anything by mouth to an unconscious person.

DISCLAIMER:

IMPORTANT: The following supersedes Buyer's documents. **SELLER / MANUFACTURER MAKES NO REPRESENTATION OR WARRANTY, EXPRESS OR IMPLIED, INCLUDING OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE**. No statements herein are to be construed as inducements to infringe any relevant patent. Under no circumstances shall Seller / Manufacturer be liable for incidental, consequential or indirect damages for alleged negligence, breach of warranty, strict liability, tort or contract arising in connection with the product(s). Buyer's sole remedy and Seller's sole liability for any claims shall be Buyer's purchase price. Data and results presented are based on controlled or laboratory work and must be confirmed by Buyer by testing for its intended conditions of use. The product(s) has not been tested for, and is therefore not recommended for, uses for which prolonged contact with mucous membranes, abraded skin, or blood is intended; or for uses for which implantation within the human body is intended

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Note: SP&S acquired the assets and intellectual property of PFI Polyfreeze, Inc. effective October 1, 2022. This product was made by PFI Polyfreeze, Inc. prior to that date. If you have any questions about that transition, please contact us for more information.