

SURFACE PREPARATION FOR EPOXIES, ACRYLICS AND SILICONES

GENERAL

This bulletin describes the recommended procedure(s) for treating the surfaces of various materials before applying an epoxy, acrylic or silicone-based compound. Listed by number are different types of surface treatments. The table indicates the appropriate procedure number(s) for each material and compound combination. For example, the proper treatment prior to applying an epoxy compound to an alumina surface is found in the table to be procedure 11, which specifies that the alumina is to be degreased per procedure 1 and abraded with a 325 mesh carborundum/water slurry.

Note: Although many applications actually require only surface cleaning (of dust, grease, oxidation), maximum adhesion is assured by the procedures given here.

PROCEDURES

(Refer to table to determine applicable procedures)

1. Clean with methyl ethyl ketone, followed by toluene. Air dry.
2. Roughen surface with 220 grit sandpaper.
3. Vapor degrease and apply trichlorethylene.
4. Dip for 10 minutes in a 70°C solution consisting of 66 parts of sodium dichromate, 666 parts of 96% sulfuric acid, and 1000 parts of distilled water. Follow with demineralized water wash.
5. Degrease per procedure 1. Etch for 1 to 2 minutes in a room temperature solution consisting of 15 parts of 22% ferric chloride, 30 parts of concentrated nitric acid and 197 parts of water.
6. Degrease per procedure 1. Etch for 5 seconds in concentrated nitric acid (specific gravity 1.42).

SURFACE PREPARATION PROCEDURES TABLE

Material	Compound		
	Epoxy	Acrylic	Silicone
ABS	*	15	15 + 16
Acrylic	*	15 or 15 + 8	15 + 16
Alumina	11	1 or 3	1 + 16
Aluminum	1 + 4 or 1 + 7 or 1 + 13	N/A	1 + 2 + 16 or 1 + 7 + 16 or 1 + 12 + 16
Beryllia	11	1 or 3	1 + 15
Copper	1 + 2 + 7	N/A	1 + 2 + 16 or 1 + 7 + 16 or 1 + 12 + 16
Epoxy Polyamide	1 + 3	1	1 + 16
Ferrite	1 + 2	N/A	1 + 2 + 16
Kovar	1 + 3	N/A	*
Nickel	1 + 6	N/A	1 + 2 + 16 or 1 + 7 + 16 or 1 + 12 + 16
Polycarbonate	*	14 or 15	14 or 15 + 16
Polyester	1 + 2 + 1	*	1 + 16
Polyethylene	1 + 9	1 + 9	1 + 9 + 16
Polyimide	1	*	1 + 16
Polysulfone	1 + 2	1 + 2	1 + 16
Polytetrafluoroethylene	1 + 10	1 + 10	1 + 10 + 16
Polyurethane conformal coating	15	15	15 + 16
Silicon (metal)	1 or 3	N/A	1 + 2 + 16 or 1 + 7 + 16 or 1 + 12 + 16
Silicone rubber	*	*	2 + 16
Silver	1 + 2	N/A	1 + 2 + 16 or 1 + 7 + 16 or 1 + 12 + 16
Solder	1 + 2	N/A	1 + 2 + 16 or 1 + 7 + 16 or 1 + 12 + 16
Stainless steel	3	N/A	1 + 2 + 16 or 1 + 7 + 16 or 1 + 12 + 16
Tin	1 + 2	N/A	1 + 2 + 16 or 1 + 7 + 16 or 1 + 12 + 16
Zinc	1 + 2	N/A	1 + 2 + 16 or 1 + 7 + 16 or 1 + 12 + 16

*Substrate not normally coated or bonded with compound indicated.

7. Make a slurry consisting of approximately 50 parts by weight of 325 mesh aluminum oxide and 50 parts by weight of demineralized water. Dip waterproof laboratory wipe into slurry and abrade surface with a rubbing motion. Follow with demineralized water wash.
8. Degrease per procedure 1. Etch for 80 seconds in a 70°C solution consisting of 0.5 parts of Kieselguhr (diatomaceous earth), 3.0 parts of dioxane, 0.3 parts of p-toluenesulfonic acid, and 96.2 parts of tetrachloroethylene. Dry for 5 minutes at 65°C, and rinse immediately for 1 minute in hot water.
9. Flame treat with an oxidizing flame.
10. Sodium etch prior to bonding.
11. Degrease per procedure 1 and abrade with a 325 mesh carborundum/water slurry.
12. Scrub with non-chlorinated cleanser, and rinse with water until all detergent has been removed.
13. Irridite (chromate conversion coat) per MIL-C-5504, Class III.
14. Clean with soap and water, and rinse well.
15. Clean with IPA (isopropyl alcohol), wipe, and air dry.
16. Apply recommended silicone primer.

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