

KOFORD

ENGINEERING, LLC

EPOXY STRUCTURAL ADHESIVE E-114

E-114 is a low cure temperature, high performance single component toughened paste epoxy adhesive which can be cured at temperature from 100°C to 150°C to provide outstanding shear strength in combination with good temperature resistance. Especially suitable for assembly applications such as building precision electric motors or other electromechanical devices. Offers much higher hot bond strength and long term durability than modified acrylic adhesives or conventional epoxies. Has good adhesion to plastics as well as metal and ceramics, not recommended for copper alloys. Refrigerated storage and shipment with cold packs is required due to the low cure temperature. Room temperature (25C) storage life is 3 months but at 0°C storage life is 10 months and at -40C storage life is 2 years.

PROPERTIES

| | |
|---|---------------------|
| appearance..... | black viscous paste |
| specific gravity..... | 1.2 |
| viscosity..... | thixotropic |
| maximum continuous use temperature..... | 150°C |
| maximum short time use temperature..... | 200°C |
| minimum bondline thickness..... | 0.0005 in. |

Stainless steel bond strength

| | |
|--|------------|
| shear strength, cured 1 hour (oven time) at 150°C, tested at RT | |
| abrasive blasted bonded immediately..... | 9,781 psi |
| abrasive blasted bonded in 24 hours..... | 8,121 psi |
| abrasive blasted bonded in 7 days..... | 9,781 psi |
| solvent cleaned..... | 5,613 psi |
| no cleaning..... | 3,332 psi |
| shear strength, abrasive blasted and cured 2 hr. (oven time) at 100C, tested at: | |
| Room temperature..... | 9,832 psi |
| 100°C..... | 4,694 psi |
| 150°C..... | 3,130 psi |
| 200°C..... | 1,076 psi |
| shear strength at RT after heat aging simulating 20,000 hr. at 150°C..... | 6,157 psi |
| tensile bond strength at RT, abrasive blasted stainless..... | 10,120 psi |

Aluminum bond strength

| | |
|--|-----------|
| shear strength, cured 1 hour (oven time) at 150°C, tested at RT | |
| abrasive blasted..... | 9,781 psi |
| solvent cleaned..... | 5,613 psi |
| shear strength abrasive blasted and cured 2 hr (oven time) at 100C, tested at: | |
| RT..... | 7,906psi. |
| 100°C..... | 3,794 psi |
| 150°C..... | 2,517 psi |
| 200°C..... | 865 psi |

COMPARISION WITH COMPETITIVE TOUGHENED STRUCTURAL EPOXY ADHESIVE

| | | |
|---|------------------|-----------|
| Product name | DP-460 off white | E-114 |
| Temperature rating | 150C | 150C |
| cure | 7 days 25C | 2hr 100C |
| shear strength aluminum abrasive blast RT | 3,826 psi | 7,906 psi |
| shear strength steel abrasive blast RT | 7,323 psi | 9,832 psi |
| shear strength 100C | 732 psi | 4,694 psi |
| shear strength 150C | 440 psi | 3,130 psi |
| shear strength 200C | 420 psi | 1,076 psi |

SURFACE TREATMENT

For steel surfaces solvent cleaning followed by aluminum oxide abrasive blasting is very effective. Cleaning and then sanding the bonding surfaces also works but is more variable and results in lower strength values. For aluminum solvent cleaning followed by aluminum oxide abrasive blasting works well. Solvent cleaning and sanding is more variable and results in lower strength but is still an effective method. Color anodize or hardcoat should be ground off before bonding as these surfaces result in a bond with low strength and especially low impact strength due to the brittleness and low strength of the coating. If only low strength is required or if the load is compressive then the anodize can be left in place. FPL or phosphoric anodize produce the best possible results if the waste treatment and hazardous chemical handling capability exist. Since bonding must occur immediately after surface treatment with these processes the capability for these treatments must exist on site.

BONDLINE THICKNESS

The bondline thickness is .0007 inches. For applications with non rigid adherends such as thin sheet metal a thicker bond line such as .005" or .010" will improve the stress distribution in the joint and result in a more durable joint. This can be accomplished with the use of small spacers or shims. For rigid adherends there is no advantage to a thicker bond line.

CURE CONDITIONS

Cure according to one of the following cure schedules:

2hr 100°C, 1 hr 120°C, 20 minutes 150°C

All times shown are the time after the bondline has reached the specified temperature. The total oven time must include the heat up time of the oven and of the part. This can be minimized by using high speed curing methods such as infrared, hot air tunnel etc.

STORAGE

Refrigerated storage is required. Shelf life is at least 2 years at -40°C, 10 months at 0°C, 3 months at room temperature (25°C), 8 hours at 60°C

HANDLING

All contact with skin or ingestion should be avoided in accordance with normal handling procedures with epoxy resins. No warranty or guarantee is made regarding this material. The user should determine suitability for a given application. For more information see the SDS.

PRICING

2 oz. jar \$90.00 ea., 1 lb. jar \$200.00 ea.

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