Qualities that Bond

TECHNICAL BULLETIN

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## PRODUCT INFORMATION

**ULTIFIL 2114TC#**
2 PART EPOXIDE
CLASS H
HIGH THERMAL CONDUCTIVITY
AVAILABLE IN VARIOUS COLOURS
EXCELLENT THERMAL SHOCK RESISTANCE
FLAME RETARDANT UL94 HB (File No. E174454)

## ULTIFIL 2114TC#

**Ultifil 2114-TC#** is a highly filled, two-component epoxide resin system available in various colours dependant on quantity. As standard the material is black in colour. The system is designed to give very high thermal conductivity and excellent electrical characteristics at high temperatures whilst achieving a low mixed viscosity for easy processing. The cured material is recognised for UL94 HB flame retardancy. The resin has excellent electrical properties together with superior thermal shock resistance and durability enabling it to be used at Class H temperatures.

### APPLICATION

Encapsulation, sealing and potting of electronic and electrical components.
Filling of motor end windings for thermal dissipation.

### SPECIFICATION

PROPERTIES OF THE BASE -

| | | |
|---|---|---|
| Viscosity @ 25°C | cPs | 10000 - 22000 |
| Density | g/ml | 1.81 - 1.84 |
| Appearance | | Black as standard but available in various colours |

PROPERTIES OF THE HARDENER -

| | | |
|---|---|---|
| Viscosity @ 25°C | cPs | 50 |
| Density | g/ml | 0.97 |
| Appearance | | Clear |



Email: aev@aev.co.uk
www.aev.co.uk

**AEV Limited,**
**Marion Street, Birkenhead,**
**Wirral. U.K CH41 6LT**
**Tel: ++ 44 (0) 151 647 3322**
**Fax: ++ 44 (0) 151 647 3377**

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PROPERTIES OF THE MIXTURE -

| | | |
|---|---|---|
| Mix ratio base: hardener | | 10:1 PBW |
| | | 5.5:1 PBV |
| Viscosity @ 25°C | cPs | 2000 - 3000 |
| Specific gravity | g/ml | 1.66 – 1.70 |
| Gel time 100grm | 25°C | 400min |
| Usable life 500 grams mass | | 180 minutes at room temperature |

WORKSHOP PRACTICE

Most problems occur with 2 part systems due to the failure to mix correctly. The following procedure is recommended: -

Stir the base component prior to mixing to ensure any settled filler is included. The stirring process should scrape the bottom and the sides of the container and be sufficient to ensure there are no dead areas of unmixed material but should also be a relatively slow process stirring in a horizontal circular motion so that minimal air is included into the mix. If time permits this initial stir is made easier if the base component only is heated to 30-40°C and stirred some hour before the 2 components are mixed. Use of still warm base component will reduce the usable life of the mixture. The base and hardener can be measured out by weight, volume or by using all of the pre-weighed kit, but it should be noted the usable life of the mixture decreases as the weight of the mixture increases. Ensure the base and hardener are mixed thoroughly using the scraping minimal air inclusion method described previously. This mixing process can take up to 4-5 minutes, and it is recommended that, if the usable life allows, extra time is spent mixing at this stage where failure to mix is most frequent.

When curing the material in larger quantities there is the risk of a heat generating reaction this can lead to components reaching high temperatures and undesirable internal stresses within the system. The extent of the heat generated depends, the temperature, the heat sink of the system and the quantity of the resin.

CURE SCHEDULE

| | | | |
|---|---|---|---|
| 500 grams mass | Hard | 24 hrs | at room temp. |
| | Full | 48 hrs | at room temp. |
| Elevated temperature cure (recommended) | | 8 hrs | at 60°C |
| | | 5 hrs | at 80°C |



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PROPERTIES OF CURED COMPOUND -

| | | |
|---|---|---|
| Shore D hardness | DIN 53505 | 85 |
| Thermal class | ASTM D2307 | 180°c (20k Hrs) |
| Elongation at Break | ISO 527 | 1 % |
| Tensile strength | ISO 527 | 65 $N/mm^2$ |
| Coefficient of linear thermal expansion | DIN 53752 | $58x10^{-6}K^{-1}$ |
| Thermal Conductivity | ISO 8894-1 | 1.0 W/M/K |
| Dielectric strength | IEC 243-1 | 190 kV/cm. |
| Dielectric constant | IEC 250 | 5.2 50Hz |
| Dissipation factor | IEC 250 | 10% 50Hz |
| Volume resistivity | IEC 93 | $>10^{13}$ohm/cm |
| Water absorption | ISO 62 | 0.15 % @ |
| Flame Retardancy File No.E174454 | UL94 | HB |
| Tracking index | IEC112 | >600 V |

## STORAGE

24 months shelf life, stored between 10°C and 30°C.
Filled epoxide systems can have a tendency to settle.
Ensure the base is stirred before mixing

## PACKAGING

25kg, 5 kg, 1 kg kits
25kg base and hardener

## HEALTH & SAFETY

See relevant Material Safety Data Sheet.



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