United Adhesives

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# TUF 1210

**Thermally Conductive Epoxy Underfill and Encapsulant**

| Typical Properties | | | |
|---|---|---|---|
| **Property** | **Unit** | **Value** | **Test Method** |
| Color of Component | | Grey | Visual |
| Density | Gram /cc | 2.5 | ASTM D792 |
| Viscosity at 25°C | cps | 15,000 | ASTM D2196 |
| **Property as Cured** | | | |
| Color | | Grey | Visual |
| Young's modulus | GPa | 7.0 | DMA |
| Thermal Conductivity | W/mK | 1.0 | ASTM D5470 |
| Dielectric Constant | @1000Hz | 3.5 | ASTM D150 |
| Dielectric Strength | Volt/mil AC | > 500 | ASTM D149 |
| Volume Resistivity | Ohm-cm | > 10E+14 | ASTM D257 |
| Coefficient of Thermal Expansion | ppm/℃ | 67 (@ > Tg)<br>23 (@ < Tg) | IPC-TM-650 |
| Adhesion (Al/Al lap shear) | Psi | > 1800 | ASTM D1002 |
| Tg | ℃ | 125 | DMA |
| Temperature Usage | ℃ | -80 to 200 | TGA |
| **Cure Profile** | | | |
| Cure at 115°C | min | 50 | Durometer |
| Cure at 125°C | min | 25 | Durometer |
| Cure at 150°C | min | 15 | Durometer |
| Pot / Work Life at 25°C (after warmed up) | hr | 24 | Viscosity double |

These figures are only intended as a guide and should not be used in preparing specifications.

## Characteristics

TUF 1210 is an epoxy-based thermally conductive adhesive. Its one-part, capillary flowable formulation makes it an underfill or an encapsulant for chip-on-board, bare die, BGA, flip-chip, CSP, and other electronic devices. It also has low CTE to improve thermal cycle performances. It cures at elevated temperature to provide strong bonding to silicon, flip chip, BGA, ceramics, FR4, LTCC, aluminum, copper, stainless steel, etc. with minimized thermal mismatching stress. TUF 1210 is dispensable. For underfilling application, it is recommended to warm the applied surface to ~ 105℃ to promote faster capillary flow.

## Special Features and Benefits

- High thermal conductivity
- Fast flow and capillary flow
- Low CTE for stress compliance
- High structural bonding strength
- Low bleeding, low volatile
- Low ionic content

## Typical Applications

- Aerospace electronics
- Automotive electronics
- Semiconductor and Telecommunications
- Bonding of die to LTCC, Al, Cu
- Underfilling of BGA, Bare die, flip-chip, CSP
- Chip-on-board bonding / encapsulating

## Processing Instruction

The adhesive is a pre-mixed adhesive as one part for easier applying. In order to keep longer usage life, please always store the original or unused material in freezer (- 40℃). For some applications, it is recommended to warm the applied surface to ~ 105℃, and/or the adhesive to about 50℃, to promote faster capillary flow.

We recommend running preliminary tests to optimize conditions for the particular application. Comprehensive processing instructions can be obtained by contacting directly to United Adhesives, Inc.

TUF 1210 has a shelf life of at least 3 months when stored in freezer (-40℃) in the originally sealed container. The 'Best use before end' date of each batch appears on the product label. Storage beyond the date specified on the label does not necessarily mean that the product is no longer usable. In this case however, the properties required for the intended use must be checked for quality assurance reasons.

## Safety information

General hygiene regulations should be observed. Comprehensive instructions are given in the corresponding Material Safety Data Sheets. They are available on request from United Adhesives, Inc.

The data presented in this leaflet are in accordance with the present state of our knowledge, but do not absolve the user from carefully checking all supplies immediately on receipt. We reserve the right to alter product constants within the scope of technical progress or new developments. The recommendations made in this leaflet should be checked by preliminary trials because of conditions during processing over which we have no control, especially where other companies' raw materials are also being used. The recommendations do not absolve the user from the obligation of investigating the possibility of infringement of third parties' rights and, if necessary, clarifying the position. Recommendations for use do not constitute a warranty, either express or implied, of the fitness or suitability of the products for a particular purpose. For technical, quality, or product safety questions, please contact directly to United Adhesives Inc.