EPOXY TECHNOLOGY

# EPO-TEK® H20E-FC

**Technical Data Sheet**
**For Reference Only**
*Electrically Conductive Epoxy*

| | | |
|---|---|---|
| **Date:** | November 2019 | |
| **Rev:** | VI | |
| **No. of Components:** | Two | |
| **Mix Ratio by Weight:** | 1 : 1 | |
| **Specific Gravity:** | Part A: 3.80 | Part B: 2.51 |
| **Pot Life:** | 20 Hours | |
| **Shelf Life- Bulk:** | One year at room temperature | |

**Recommended Cure: 140°C / 10 Minutes**

Minimum Alternative Cure(s):
*May not achieve performance properties listed below*
140°C / 35 Seconds
120°C / 15 Minutes
80°C / 45 Minutes

**NOTES:**
- Container(s) should be kept closed when not in use.
- Filled systems should be stirred thoroughly before mixing and prior to use.
- Performance properties (rheology, conductivity, others) of the product may vary from those stated on the data sheet when bi-pak/syringe packaging or post-processing of any kind is performed. Epoxy's warranties shall not apply to any products that have been reprocessed or repackaged from Epoxy's delivered status/container into any other containers of any kind, including but not limited to syringes, bi-paks, cartridges, pouches, tubes, capsules, films or other packages.

**Product Description:** EPO-TEK® H20E-FC is a two-component, electrically conductive, snap curing epoxy for photovoltaic thin film module stringing, semiconductor packaging and PCB circuit assembly.

**Typical Properties:** Cure condition: 140°C / 10 Minutes    Different batches, conditions & applications yield differing results.
Data below is not guaranteed. To be used as a guide only, not as a specification. * denotes test on lot acceptance basis

| **PHYSICAL PROPERTIES:** | | | |
|---|---|---|---|
| * Color (before cure): | | Part A: Silver | Part B: Silver |
| * Consistency: | | Smooth thixotropic paste | |
| * Viscosity (23°C) @ 50 rpm: | | 1,000 - 5,000 | cPs |
| Thixotropic Index: | | 4.6 | |
| * Glass Transition Temp: | | ≥ 70 | °C (Dynamic Cure: 20-200°C/ISO 25 Min; Ramp -10-200°C @20°C/Min) |
| Coefficient of Thermal Expansion (CTE): | | | |
| | Below Tg: | 53 | $x 10^{-6}$ in/in°C |
| | Above Tg: | 233 | $x 10^{-6}$ in/in°C |
| Shore D Hardness: | | 55 | |
| Lap Shear @ 23°C: | | > 2,000 | psi |
| Die Shear @ 23°C: | | ≥ 10 | Kg    3,556 psi |
| Degradation Temp: | | 392 | °C |
| Weight Loss: | | | |
| | @ 200°C: | 0.73 | % |
| | @ 250°C: | 1.67 | % |
| | @ 300°C: | 2.37 | % |
| Suggested Operating Temperature: | | < 300 | °C (Intermittent) |
| Storage Modulus: | | 927,509 | psi |
| * Particle Size: | | ≤ 45 | microns |

| **ELECTRICAL AND THERMAL PROPERTIES:** | | |
|---|---|---|
| Thermal Conductivity: | 2.6 | W/mK |
| * Volume Resistivity @ 23°C: | ≤ 0.0004 | Ohm-cm |

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EPOXY TECHNOLOGY, INC.
14 FORTUNE DRIVE, BILLERICA, MA 01821 (978) 667-3805, FAX (978) 663-9782
www.epotek.com

## EPO-TEK® H20E-FC Advantages & Suggested Application Notes:

- It is a snap cure version of EPO-TEK® H20E, designed for snap cure at 140°C and <15 minute cure at 120°C.
- Strengths include dispensable rheology and a long pot life.
- Suggested Applications:
  - Semiconductor: die-attaching IC's onto Cu plated lead-frame yielding semiconductor plastic package formats.
  - PCB: solder replacement adhesive, electrical bridge of Au, Ag and AgPd electrode pads onto Au- or Cu-plated PCBs.
  - Photovoltaics:
    - Electrically conductive stringing of thin film, organic and crystalline Si solar cells.
    - Compatible with SnCu and AgCu metalized solar ribbons, and TCO substrates such as ITO, ZnO and SnO.
    - Versatility in ribbon bonding geometries, such as dotted or continuous line.
    - In-line/in-situ curing processes in <1 minute at 140°C can be achieved.
    - Reliable green strength holds solar ribbons in position prior to cure.
    - Low temperature cure is well suited for CIGS and OPV/DSC solar cells requiring a low temperature process.
    - Suitable for use on IEC 61646, IEC 61730 and UL 1703 certified solar panels.