



EP21TCHT-1
**Used in Telescopes,
Laser Packaging
Assembly, Magnet
Bonding and More**

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Master Bond EP21TCHT-1 is a two component, thixotropic paste formulated for bonding and sealing applications. This system has been used in various applications involving different substrates, service conditions and requirements. Multiple published research articles from University of Florida, Princeton University and NASA, among others make reference to the use of Master Bond EP21TCHT-1. This heat resistant epoxy is serviceable over the temperature range of 4K to +400°F and maintains its properties under cryogenic conditions. This room temperature curing compound is thermally conductive and electrically insulative. EP21TCHT-1 passes NASA low outgassing testing and is therefore recommended for use in vacuum environments. Below is a summary of the many ways EP21TCHT-1 has been effectively used in research labs and commercial applications.

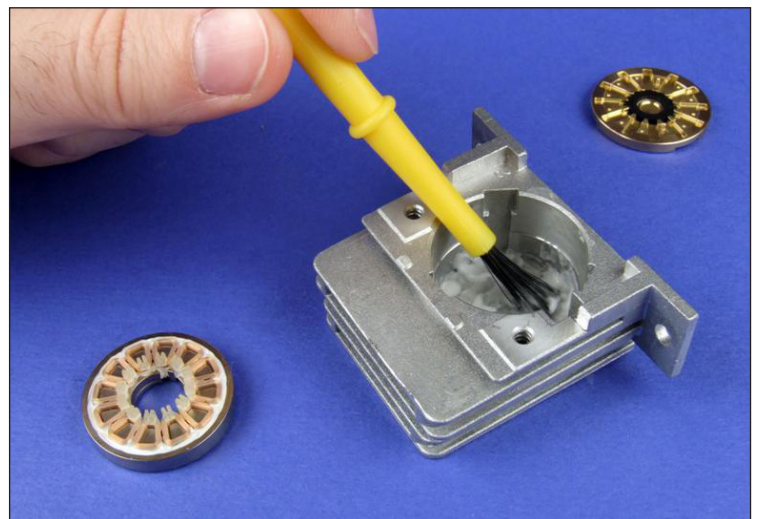
EP21TCHT-1 Application Highlight

University of Florida, wrote a study titled Stability Of Materials For Use In Space-Based Interferometric Missions.² Among the topics discussed in this paper was the use of hydroxide bonding for the assembly of instrumentation for space based missions. A prototype telescope support structure for the Laser Interferometer Space Antenna (LISA) mission was constructed. After fabrication of the telescope was completed, it was found that a hydroxide bonded strut was tilted. A small amount of force was able to dislodge the strut following exposure to -70°C. In attempt to provide extra strength to the multiple struts in the structure, they tried sister-block bonding using an epoxy adhesive in conjunction with hydroxide bonding to adhere SiC to SiC for strut bonding.

After researching several different epoxy compounds, Master Bond EP21TCHT-1 was selected for the sister-block bonding application. It offered a combination of advantageous properties including:

- Low outgassing
- Fast room temperature cure
- Low CTE
- High strength
- Cryogenic serviceability

Master Bond EP21TCHT-1 was cured for 2 days at room temperature and applied without any surface preparation. Shear strength tests showed significant improvement in results over hydroxide bonding and demonstrated the suitability of using EP21TCHT-1 for sister-block bonding.²



Two component epoxy compound for high performance bonding and sealing.

Application	Substrates	Conditions/Requirements
Magnet bonding and potting ¹	Sm-Co magnets	Low outgassing, low CTE, high strength, and ability to be used at cryogenic temperatures.
Sister-block bonding for a telescope ²	SiC	Low outgassing, low CTE, high strength, and ability to be used at cryogenic temperatures.
Mounting gratings for a telescope ³	Silicon; titanium alloy; invar	Operational temperature of 200K
Laser packaging assembly ⁴	Glass; Si wafers with gold metallization	4K to 400°F service temperature range
Wire bonding in micro sensor packaging ⁵	Gold; TO-39 header	
Mirror coating ⁶	Mirror	NASA low outgassing; used in environments of 10 ⁻⁹ torr
Teflon wire coated with epoxy; used to secure the wire tie downs to the structure ⁷	Teflon* ¹	NASA low outgassing
Sealing magnetic field coils ⁸	Wrapped fiberglass braid	Epoxy is intended to eliminate vacuum leaks
Ionizer coating ⁹	Ceramic; radioactive silver foil	Low outgassing
Bonding heat dissipation plate to housing wall of laser emitter module ¹⁰	Ceramic	Electrically insulative, thermally conductive
Solar cell package bonding and sealing ¹¹	Solar cell; aluminum	Thermal conductivity
Sealing a probe ¹²	Stainless steel	NASA low outgassing. Low viscosity. Good dimensional stability. Very low shrinkage. Rigid.
Bonding metal mounting blocks to lenses ¹³	Fused silica; metal; zinc selenide; calcium fluoride; sapphire	Provided really good bond strength, and broke the substrates in some bond strength tests
Spectrograph camera assembly: Injected between spider and bushing ¹⁴	Optical Lens, ICs, ultem, metals	Flow; gap filling; precise alignment
Bonding heat sink components ¹⁵	Copper, aluminum	NASA low outgassing
Sister block bonding for space based gravitational wave detectors ¹⁶	SiC	Dimensional stability, bond strength

*1 - Teflon needs to be chemically etched for epoxies to adhere to it.

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