

# UV22 Master Bond Polymer System

*One component, optically clear, nanosilica filled UV curable epoxy system; meets NASA low outgassing specification*

## Key Features

- ✓ Exceptional abrasion resistance
- ✓ Little shrinkage upon curing
- ✓ Very low coefficient of thermal expansion
- ✓ Withstands 1,000 hours 85°C/85% RH

### Product Description

Master Bond UV22 is a nanosilica filled, UV curable, epoxy based system for bonding, sealing, coating and encapsulation. It is 100% reactive and does not contain any solvents or diluents. There is no oxygen inhibition while curing. This nanosilica filled system is fully optically clear and has excellent dimensional stability. UV22 will cure quickly and easily when exposed to a UV light source with a wavelength range between 320-365 nm, with the optimum at 365 nm. The energy required is typically 20-40 milliwatts per cm<sup>2</sup>. The rate of cure depends upon the distance from the light source, the thickness of the layer being cured and the intensity of the light source. In a relatively good set up, where the layer is thin and the light source is strong, it can cure as quickly as 10-15 seconds.

It cures in thicknesses of a few microns to about 1/8 inch in 15-45 seconds depending upon the depth of cure. UV22 has superior adhesion to a wide variety of substrates including plastics, glass and many metals. UV22 has excellent resistance to a wide variety of chemicals including water, acids, bases, fuels and many solvents. Other physical properties include enhanced abrasion resistance and outstanding dimensional stability. It is a reliable electrical insulator. As is typical with UVs, it has excellent

optical clarity and light transmission properties. UV22 has exemplary low shrinkage properties, linearly less than 1%.

Epoxy based, cationic type curing systems, such as UV22, tend to have much higher temperature resistance than other UV type systems. Its glass transition temperature ( $T_g$ ) with a straight UV cure is 100-110°C, and when post cured for 30-60 minutes at 125°C, the  $T_g$  is about 135-140°C. This post cure also enhances UV22's chemical resistance. The service temperature range for this system is -80°F to +350°F. It should be noted that there's no settling out of the nanosilica filler and the product retains its uniformity throughout its shelf life. It can be used for a wide variety of applications in the optical, opto-electronic, aerospace and related industries.

### Product Advantages

- One component system; no mixing needed
- Cures very quickly. Not oxygen inhibited. Cationic type cure
- Nanosilica filled, enhanced dimensional stability and superior abrasion resistance
- Superior temperature resistance, especially when post cured with heat
- Outstanding optical clarity and light transmission

### Typical Properties

Viscosity, 75°F	2,000-6,000 cps
Tensile strength, 75°F	6,000-7,000 psi
Tensile modulus, 75°F	350,000-400,000 psi
Hardness, 75°F	75-85 Shore D
Hardness after 1,000 hours 85°C/85% RH	85 Shore D
Coefficient of linear expansion, 75°F	30-35 ppm/°C
Glass transition temperature, 75°F, without post cure	100-110°C
Glass transition temperature, 75°F, with post cure at 125-150°C	135-140°C
Refractive index, 75°F	1.52
Linear shrinkage	<1%

## Typical Properties—Continued

Volume resistivity, 25°C	>10 <sup>14</sup> ohm-cm
Dielectric constant, 25°C, 60 Hz	3.4
Dielectric constant, 25°C, 100 Hz	4.1
Dissipation factor, 25°C, 60 Hz	0.025
Dissipation factor, 100°C, 106 Hz	0.029
Shelf life, in original, unopened containers at 75°F	6 months
Service temperature range	-80°F to +350°F [-62°C to +177°C]

## Preparation of Adhesive & Bonding Surfaces

UV22 is a one part system that requires no mixing. Realistically, one of the substrates to be bonded must be optically clear with no UV blocking agents to allow the light to penetrate the surface of the substrate. Typical optically clear surfaces such as glass and acrylics, etc (provided they do not contain UV blocking agents) require no surface preparation. It is advisable to prepare metals, plastics and rubber. All substrates should be clean and free of oils, dirt, grease, etc. for proper adhesion.

## Adhesive Application

Master Bond UV22 can be conveniently applied by brushing or rolling. For bonding, thicknesses of 0.001-0.003 inches are usually fine. When coating, layers of 0.015-0.020 inches are usually used. When encapsulating, it can be cured in sections up to 1/8 inch thick. When bonding, the parts should be fixtured together with just enough pressure to maintain intimate contact during cure. The beauty of the system, from a processing standpoint, is that it requires no mixing, it's fast curing and fixturing time is minimal. Since UV22 is 100% reactive and does not contain any solvents or diluents, shrinkage upon cure is minimal.

## Cure

Master Bond UV22 requires exposure to an appropriate UV light source with adequate intensity to cure, ideally at a wavelength of 320-365 nm. UV22 normally cures in 15-45 seconds, or less, under appropriate conditions. It will not sufficiently cure in sunlight and needs a suitable UV light source. UV22 is formulated to cure only in areas that are exposed to the UV light. The system can be post cured for 30-60 minutes at 125-150°C for enhanced chemical and temperature resistance. One can remove the excess adhesive with a spatula, then wipe with a rag and solvent such as acetone or xylene.

## Packaging

Product is available in:

- 1/2 Pints
- Pints
- Quarts
- Gallons



Specialty packaging is also available in syringes.

## Handling and Storage

All materials of this type should be used with good ventilation and skin contact should be avoided. For safe handling details, please consult the product SDS. Optimum storage is at or below 75°F in closed containers. No special storage conditions are necessary. Containers should, however, be kept closed when not in use to avoid contamination. The material should be kept in a dark area to avoid any accidental exposure to sunlight. Cleanup of spills and equipment is readily achieved with aromatic or ketone solvents employing proper precautions of ventilation and flammability.

## Certifications



## Not to Be Used for Specification Purposes

The values contained herein are considered typical properties only and are not intended to be used as specification limits. For assistance in preparing specifications, please contact Master Bond technical support for further details.

## Notice

Master Bond believes the information on the data sheets is reliable and accurate as is technical advice provided by the company. Master Bond makes no warranties, expressed or implied, regarding the accuracy of the information, and assumes no liability regarding the handling and use of this product.