

DATA SHEET

LOCA-133: Low Index Liquid Optically Clear Adhesive

LOCA-133 is a Low Refractive Index Liquid Optically Clear Adhesive (Low RI LOCA) with strong adhesion to various types of plastic films, and many other materials.

The low index of 1.33 is useful in bonding (lamination) of light guiding layers in the field of electronic displays: LCD back-lights, touch screens, auto-stereoscopic 3D displays, digital signage, silver nanowire transparent conductors, etc.

Compared to our other low index UV and Moisture Cured adhesives/coatings, it has a much better adhesion to many types of materials (plastics, metals, ceramics,...). In addition, its adhesion is not degraded by thermal cycling or vibrations, as it poses a self-healing property.

A typical application is to laminate PET or PMMA films onto other substrates. LOCA-133 is not recommended for glass.

For lamination to glass LOCA-133-1 should be preferred. LOCA-133-1 is suitable to all other substrates as well.

LOCA-133 is a solvent borne UV cured adhesive. Its properties, as listed in the table below, relate to the cured state.

The product is a polymer with a very low surface energy, yet, it sticks to most surfaces. It is highly hydrophobic. It will not interact with aqueous media.

Properties

The product is inherently tacky and will not harden with time. It has a very low Tg.

The tackiness of LOCA-133 is permanent and long lasting. The material is stable to environmental conditions (oxygen, UV, humidity, heat).

The material is heat stable to at least 150°, however, since adhesion decreases with temperature, it is intended to be used at temperatures up to 120°C.

Table: Properties of the final cured coating

Refractive index@589nm	1.338
Refractive index@950nm	1.334
Density	1.66
Appearance	Tacky, Non flowing, Clear, Colorless
Viscosity	Non-flowing
T- Peel Force, g/cm	600 gram/cm @ 10 cm/min. (PET/PET, 15 micron thick adhesive, at 25°)
Shear Strength @120°C	>10 gram/cm ² (PC/PC, 15 micron thick adhesive, 4 minutes under stress)
Temperature range	-20°C to 120°C
Shelf life	12 months

Application

LOCA-133 can be applied by conventional coating technologies such as doctor blade. It is supplied as a 35% resin in a volatile solvent (HFE, an hydro-fluoro-ether, boiling point 130°C) at a viscosity of about 1000 cps and can be further diluted to achieve thinner coatings.

The solvent has to be evaporated before bonding (by pressure) takes place. After solvent removal it will stick to almost any surface. Adhesive thickness depends on the lamination process and the specific application. It can be in the range of 3 to 30µ, or thicker.

Lamination should take place after solvent removal. Final strength and final thermal stability of the laminated product shall be achieved after UV curing of the laminated product. The UV curing can be done immediately after lamination or at a later stage.

Note: For experimentation, lamination can be done on an office laminating machine at 20-120°C.

Cleaning and solubility

Further dilution can be achieved with butyl acetate (dilution down to about 25% solids). Further dilution and clean-up requires blends with fluorinated solvents such as Freon 225 (Asahi AK-225, AE-3000), HFE-7100, 7200, 7300, 7500(3M), Vertrel (DuPont) and other CFC and HFC substitutes for Freon. For instance, the best solvent based on HFE-7300 is a mixture of HFE-7300/butyl-acetate in the range 55/45 to 98/2 by weight (40/60 to 96/4 by volume). A 1/1 by volume is a good economic blend.

Safety

The product is a polymer and relatively safe. Care should be taken handling the solvents involved. Please refer to the specific MSDS.

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