



# NORLAND PRODUCTS INCORPORATED

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## Norland UV Sealant 91

Norland UV Sealant 91 (UVS 91) is a screenable paste adhesive specifically designed to seal the perimeter of liquid crystal displays. It provides the ultimate solution for manufacturing displays because it is a single component, solventless, sealant that cures quickly at room temperature by exposure to UV light.

### Norland UVS 91 has the following advantages:

- No mixing or drying operations
- Non reactive with liquid crystal chemistry
- No long heat cures
- No viscosity increase during use
- Excellent adhesion
- Excellent flow out characteristics
- Excellent screenability
- Outstanding aging characteristics
- Low moisture permeability.

The overall benefit to the user is simplification of the operation which saves time while still providing a high quality product.

### Physical Properties of UVS 91

Elongation at Failure	58%
Modulus of Elasticity (psi)	45,000
Tensile Strength (psi)	2,900
Hardness - Shore D	55
Water Absorption (24 hrs @ 50° C)	0.14%
Shear Strength - Glass to Glass (psi)	850

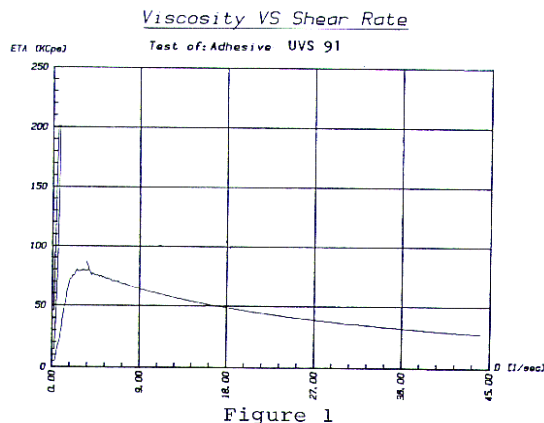


Figure 1 shows the viscosity vs shear rate as measured on a plate and cone viscometer. UVS 91 is formulated to allow easy screening in thin layers. The viscosity is designed to flow under shear and to be relatively high on standing.

One of the major advantages of UVS 91 is its non-reactivity with liquid crystal chemistry. Figure 2 shows the typical compatibility of this material with liquid crystals. UVS 91 shows no contamination when used to make cells with an undoped ester liquid crystal even under accelerated heat aging at 100° C.

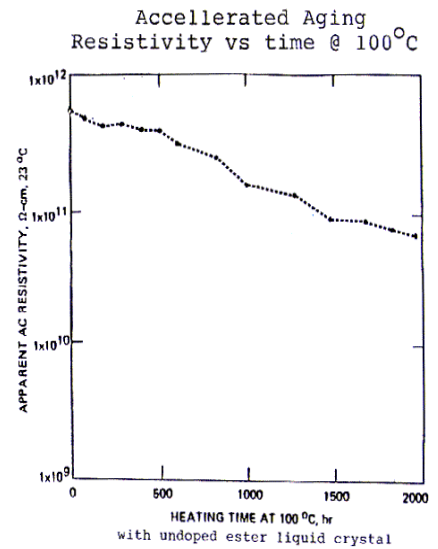


Figure 2

## Handling Procedure

The adhesive should be screened onto clean glass or metaloxide surfaces. No primers are required. A 350 to 400 mesh polyester screen is recommended to provide the very thin coatings necessary for LCD's. Adjust the screen tension and application pressure to get the coating thickness desired.

When the top plate is laminated to the bottom, even pressure must be applied to bring the spacing in all areas down to the required distance. Controlled size spacers are often added to the adhesive or sprayed onto the surface to provide the exact distance for each application.

The display is then placed on a conveyor which travels under a high intensity UV light source. Curing occurs in 5 to 10 seconds using a 1000 watt or 1500 watt medium pressure mercury lamp @ 4 to 6 inches. Conveyor speed would be approximately 12 ft/min to accomplish this. For small production or test work, curing can be accomplished in 5 minutes with a 100 watt mercury spot lamp at a distance of 12 inches. Longer exposure to UV light will in no way harm the adhesive.

Clean up of equipment can be accomplished with acetone or trichloroethylene. Care should be taken in handling this sealant. Prolonged skin contact should be avoided and affected areas should be washed well with soap and water. Avoid prolonged vapor inhalation and use in a well ventilated area.

The data contained in this technical data sheet is of a general nature and is based on laboratory test conditions. Norland Products does not warrant the data contained in this data sheet. Norland does not assume responsibility for test or performance results obtained by users. It is the users responsibility to determine the suitability for their product application, purposes and the suitability for use in the user's intended manufacturing apparatus and methods. The user should adopt such precautions and use guidelines as may be reasonably advisable or necessary for the protection of property and persons. Nothing in this technical data sheet shall act as a representation that the product use or application will not infringe a patent owned by someone other than Norland Products or act as a grant of a license under any Norland Products Inc patent. Norland Products recommends that each user test its proposed use and application before putting into production.