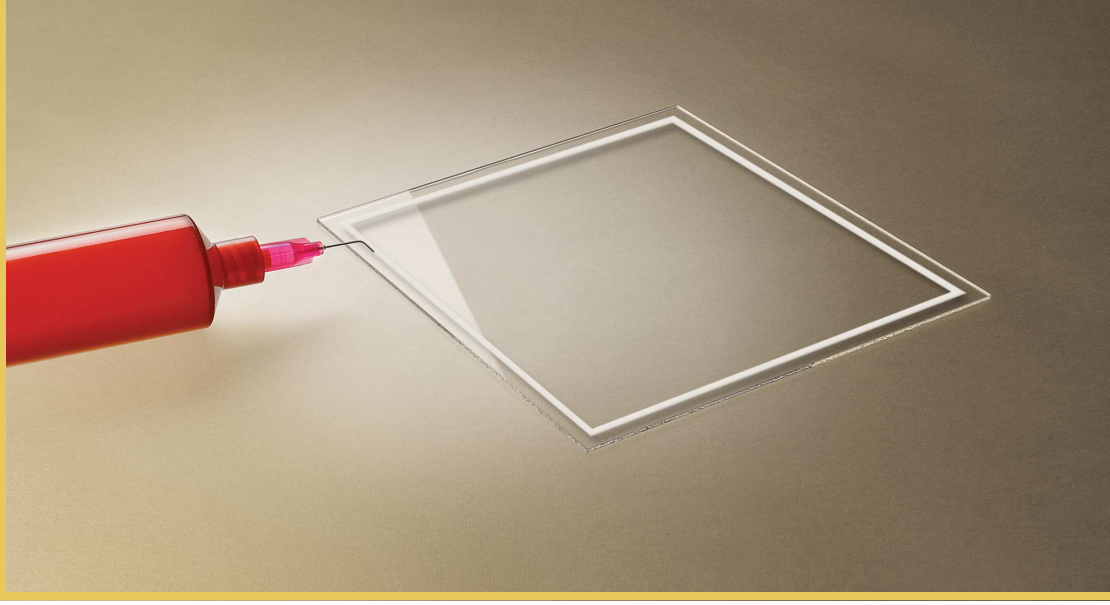
MicroSeal™
Active Edge Sealant



HIGHLIGHTS

General Features

- ☐ The first air-printable active edge sealant to keep moisture out of sensitive packages
- ☐ An easy replacement of high performance edge sealants, boosting barrier properties through a proprietary getter technology
- ☐ Breakthrough time > 1,500 hours on 4 mm line width at 60 °C/90% RH
- ☐ Compatible with any surface suitable for UV-curing
- ☐ Now with increased adhesion performances

Applications

- ☐ Solid-state detectors
- ☐ CMOS detectors
- ☐ OLED displays
- ☐ Organic photovoltaic devices
- ☐ Organic sensors
- ☐ Any moisture-sensitive device

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Product Description

MicroSeal™ is a UV curable dispersion of irreversible moisture getter in an epoxy matrix. It is designed to work as an active edge sealant.
MicroSeal looks like a whitish paste.

MicroSeal Properties

Material Property	Typical value
Appearance	Whitish glue
Viscosity at 25 °C (cP) @ 5 s^{-1} shear rate	120,000
Density (g/cm^3)	1.20
Thermal stability at 100 °C	Stable (<<1%wt loss)
Decomposition temperature (°C)	> 300
Tg (glass transition temperature) (°C)	100 < T_g <120
Storage temperature (°C)	+2 to + 8
Shelf life (months)	6
Pot life (RT, < 10 ppm H_2O) (days)	> 5
Storage atmosphere	Dry air or nitrogen
Lap Shear(*) (MPa)	> 6.9
CTE (K^{-1}) in temperature range 20 °C - 100 °C	$5.4*10^{-3}$

(*) in glass to glass configuration, with properly cured glue (according to ASTM D1002). Glass specimen broke at the indicated value

Processing

Bring MicroSeal to room temperature for at least 2 hours before use.
After deposition the uncured glue can be exposed to air for a maximum of 1 hour before losing part of its getter capacity (typical capacity loss in 25 °C / 55% RH conditions for a 200µm layer of MicroSeal after 1 hour air exposure is in the order of 30% of the total capacity).

Deposition

Typical dispensing by syringe (needle diameter > 0.1 mm)
Typical deposition values:

- Needle: 400 µm; Pressure: 30-75 psi; Speed: 40 mm/s; Dispense gap: 200 µm

Compatible surfaces are:

- Glass
- Stainless Steel and other metals (one-side only e.g. metal to glass)
- Plastics if compatible with UV curing

Curing

- UV Curing is required
- Curing can take place in air
- Suggested curing conditions are:
  - ☐ irradiance of $100mW/cm^2$ for > 120s with λ = 365 nm
  - ☐ thermal post curing at 80 °C for 30 minutes
  - ☐ max irradiance: < $500mW/cm^2$
  - ☐ max energy density: < $12J/cm^2$
- Weight loss during curing: < 0.2 %

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Adhesion Properties

Lap Shear test was performed on glass to glass sample, with properly cured glue.
After 1000h exposure @85 °C/85% RH MicroSeal shows high adhesion strength.

Adhesion	t=0h	t=500h	t=1000h
Lap shear strength (MPa)	>6.9 (*)	>7.5 (*)	>8.3 (*)

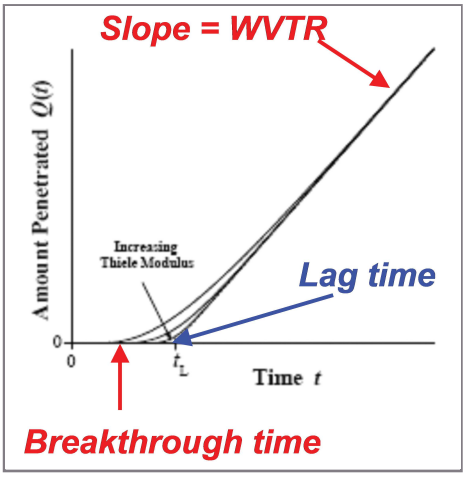
(*) Glass specimen broke at the indicated value.

Barrier Properties

(*) In glass to glass configuration, on properly cured film. During breakthrough time the permeability is theoretically null and lower than the limit of detection.
(**) This can be considered equivalent to 2.5 years at 25 °C 30% RH. After this transient period the glue keeps working as state-of-art passive barrier, as shown with the reported WVTR after saturation.

Barrier property	MicroSeal Typical value
WVTR at 23 °C 65% RH (300 µm, g/m^2 day) after saturation(*)	<0.1
Breakthrough time on 4 mm line width at 60 °C/90% RH (*) (hour)	>1,500 (**)

Barrier Properties: the Concept of Breakthrough Time



VOCs Content

- Total VOCs content determined by GC-HS
- Total VOCs content less then 40 ppm

Cleaning

Typical solvent used for cleaning is Acetone, toluene, methyl ethyl ketone (MEK) and glycol ethers.

Shipping and Storage

MicroSeal recommended storage temperature is between 2 °C and 8 °C.
MicroSeal can be stored in a normal refrigerator provided that the original packaging is not open, or it is sealed in dry atmosphere,
In the event of exposure at temperature higher than 50 °C, MicroSeal must be discarded.

Handling and Air Exposure

Once removed from the barrier bag, MicroSeal can be exposed to air within 8 hours if packed in the original syringe.
In the event of air exposure > 8 hours, MicroSeal must be discarded.
Before use, it must be left at room temperature for at least 2 hours; otherwise viscosity could be higher than the nominal value.
Uncured MicroSeal can be maintained at room temperature for maximum 120 hours before use.

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