***TECHNICAL DATA SHEET***

**NITTO DENKO CORPORATION**
Semiconductor Related Products Divis

## CLEAR TRANSFER MOLDING COMPOUND

# NT-510

NT-510 is a highly transparent epoxy compound. In comparison with conventional transparent materials, it has higher glass transition temperature and lower contents of ionic impurities like $Na^+$ and $Cl^-$. Therefore, it has excellent reliability in hot and humid environment in the use as the encapsulation of optical semiconductors such as photodiodes and phototransistors. Especially it has been applied for molding optoelectronic devices used in automobiles.

## 1. FEATURES

1) Noble resistance to heat and thermal cycles with highly cross-linked network.
2) Excellent performance in hot and humid environment using highly purified materials.

## 2. MOLDING CONDITIONS

The following table shows the recommended cure profile that may be adjusted depending on the mold die design, package design, and the characteristics of the semiconductor device molded in the package.

Outer releasing agent (silicones or fluorinated compounds) must be applied onto the mold surface prior to use of this product to ease its release from the mold dies.

Molding condition:

| | |
|---|---|
| Mold Temperature: | 145 – 160 °C |
| In-mold cure time: | 3.0 – 5.0 min |
| Transfer pressure: | 3 – 8 MPa (30 – 82 kgf/cm$^2$) |

Post mold curing condition

| | |
|---|---|
| Temperature x time: | 150 °C x 2 hrs |

Note:
Post cure time above is the required time after the temperature of molded package goes up to the indicated one.
Temperature rising rate of molded package changes depending on air flowing rate and heat capacity of package and its holder in the oven. Please measure the time the packages heated up to the cure temperature and add it in the time packages kept in the oven.

# 3. PROPERTIES

## 3.1 GENERAL PROPERTIES

Inspected specimens were cured under following condition.

In-mold curing : 150 °C x 4 min

Post mold curing : 150 °C x 16 hrs

| PROPERTY | TEST CONDITION | UNIT | VALUE | NOTES |
|---|---|---|---|---|
| Specific Gravity | JIS K 6911 | - | 1.20 | |
| Hardness | Shore D | - | 84 | |
| Molding shrinkage | 100 mmϕ 2mmt | % | 1.27 | Without post cure |
| Hardness at molding temperature vs.molding condition | Shore A | - | Fig. 1 | |
| Water Absorption | JIS K 6911 | wt% | 0.20 | 25±5℃ 24hrs |
| Boiling Water Absorption | | | 0.35 | 95 °C×1h |
| Flexural Strength | | $N/mm^2$ | 120 | |
| Flexural Modulus | | | 3100 | |
| CTE below Tg | | $1/^oC$ | $6.0x10^{-5}$ | |
| CTE above Tg | | | $17x10^{-5}$ | |
| Tg - (TMA) | | °C | 147 | |
| Tg - (DSC) | | | 152 | |
| Post-cure condition vs. Tg | TMA | | Fig. 2 | |
| Volume Resistivity ($\rho_v$) | JIS K 6911 | Ω·cm | $11x10^{15}$ | 25℃ |
| Dielectric Constant | | - | 3.7 | 100kHz |
| Dissipation Factor | | % | 1.9 | 100kHz |
| Transmittance at 400 nm | Spectrophotometer | % | >90 | $1.0mm^t$ |
| Refractive Index | Abbe method | - | 1.54 | at 589.3 nm |

Value* : The above values are not specifications and cannot be guaranteed.

**Fig.1 Molding condition vs. Hardness at molding**

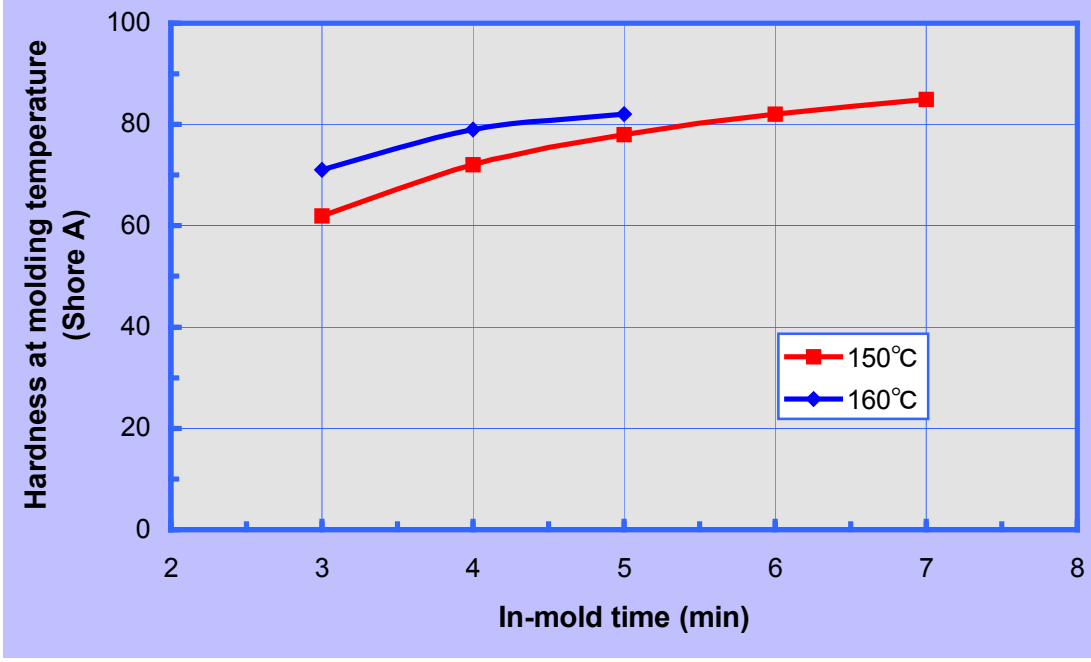
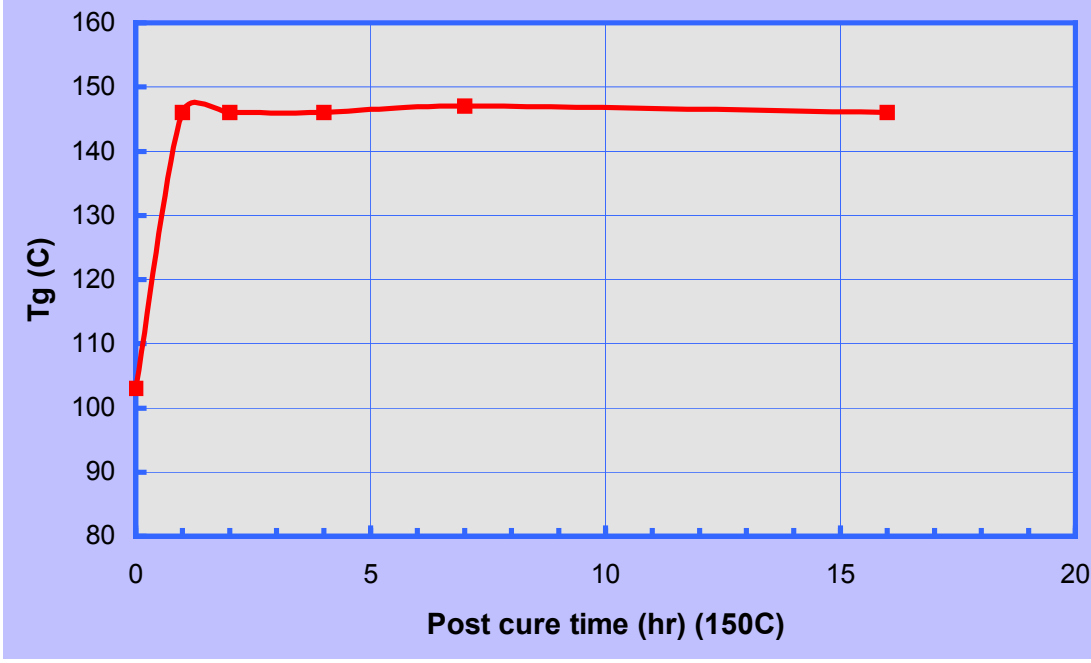



**Fig. 2 Post-cure time vs. Tg**



### 3.2 IONIC IMPURITIES IN EXTRACTED WATER

Test Method

Preparation of specimen

Molding condition : 150 °C x 4 min

Post cure condition : 150 °C x 16 hrs

Extracting Condition

Specimen : 60 mesh pass granulated product

Extraction : 121 °C x 0.2 MPa (2 atm) x 20 hrs

| PROPERTY | UNIT | VALUE |
|---|---|---|
| Electric Conductivity | $\mu\Omega^{-1}\cdot cm$ | 170 |
| pH | — | 3.4 |
| $Na^+$ | ppm | 0.4 |
| $Cl^-$ | ppm | 11 |

* Measured by : $Na^+$ = Atomic absorption spectrometry, $Cl^-$ = Ionic chromatography

* Above figures are typical ones and not for specification purposes.

## 4. ATTENTION

Before use, see Material Safety Data Sheet (MSDS) of this product.