



# Epoxy-based Magnetic Adhesive

## OVERVIEW

Epoxy-based magnetic adhesives are pasty products produced by mixing TODA KOGYO soft ferrite powders and epoxy resins. These adhesives can reduce the deterioration of magnetic properties due to magnetic flux leakage by filling the voids in the magnetic parts. Consequently, their inductance can be improved in addition to the downsizing and low profile of the components, by using them for the encapsulation of wire-wound inductors and noise suppression.

## FEATURES

### High permeability

They show excellent permeability due to the high filling of soft ferrite powders.

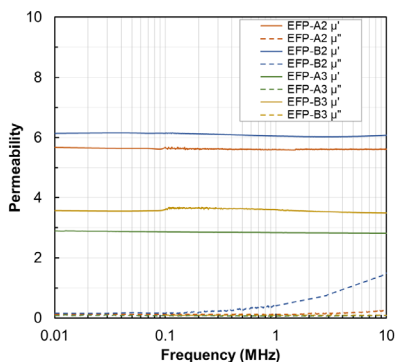
### Superior fluidity

They are paste that show high fluidity as using well-dispersible soft ferrite powders.

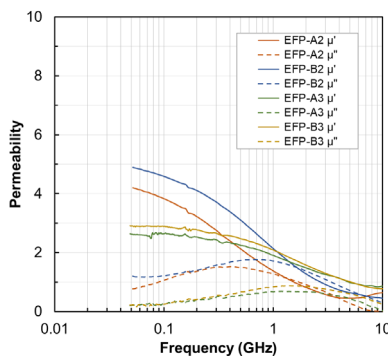
## CHARACTERISTICS

【Properties of typical sample】

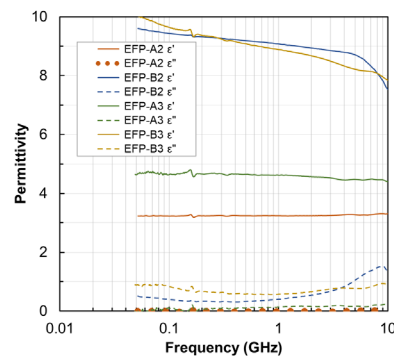
| Property     |  | Sample name                      | EFP-A2<br>(Ni-Zn ferrite) | EFP-B2<br>(Mn-Zn ferrite) | EFP-A3<br>(Ni-Zn ferrite)                      | EFP-B3<br>(Mn-Zn ferrite)                      |
|--------------|--|----------------------------------|---------------------------|---------------------------|--|--|
| Before cured | Inventory  |                                  | -                         | -                         | China, Korea, Taiwan, Philippines (The US, EU) | China, Korea, Taiwan, Philippines (The US, EU) |
|              | Appearance   |                                  | Black · High viscosity    | Black · High viscosity    | Black · viscosity                              | Black · High viscosity                         |
|              | Specific gravity (Graduated cylinder, 25°C) (g/cm <sup>3</sup> ) |                                  | 2.7                       | 2.7                       | 2.2  | 2.19   |
|              | Viscosity (BH type, 25°C) (mPa·s) 20rpm                          |                                  | 15,000                    | 32,000                    | 32,000   | 37,400   |
|              | T I (Thixotropic index)  |                                  | 3.3                       | 2.5                       |  |  |
|              | Potlife at 25°C  |                                  | A few days                | A few days                | more than 2 weeks                              | more than 2 weeks                              |
| After cured  | Curing condition   |                                  | 120°C - 2 hours           | 120°C - 2 hours           | 80°C - 30 mins                                 | 80°C - 30 mins                                 |
|              | Hardness   | JIS K-7215 at 25°C Shore D       | 93                        | 93                        | 92   | 92   |
|              | Glass-transition temperature, Tg                                 | TMA (°C)                         | 100                       | 100                       | 85   | 81   |
|              | Coefficient of thermal expansion                                 | Below Tg (×10 <sup>-5</sup> /°C) | 2.3 (at 30~50 °C)         | 2.4 (at 30~50 °C)         | 3.6 (at 40~50 °C)                              | 3.8 (at 40~50 °C)                              |
|              |  | Above Tg (×10 <sup>-5</sup> /°C) | 10.5 (at 160~180 °C)      | 10.7 (at 160~180 °C)      | 8.0 (at 120~130 °C)                            | 9.3 (at 120~130 °C)                            |
|              | Bending strength   | JIS K-6911 t=3mm (MPa)           | 90                        | 100                       | 57   | 90   |
|              | Volume resistivity [500V]  | JIS K-6911 at 25°C (Ω·cm)        | 1.9 × 10 <sup>11</sup>    | 1.5 × 10 <sup>9</sup>     | 4.8 × 10 <sup>12</sup>                         | 1.3 × 10 <sup>7</sup><br>※measured at 100V     |
|              | Storage  |                                  | Frozen                    | Frozen                    | Refrigerated (cold)                            | Refrigerated (cold)                            |



【Frequency dependence of permeability at low-frequency】



【Frequency dependence of permeability at high-frequency】



【Frequency dependence of permittivity at high-frequency】

## APPLICATIONS

- Encapsulant for winding inductors
- Magnetic shield as noise suppression

