

# High transparent micro titanium dioxide slurry (HTD Series) technical sheet

## Refractive index regulator for optical film

### ■ Features

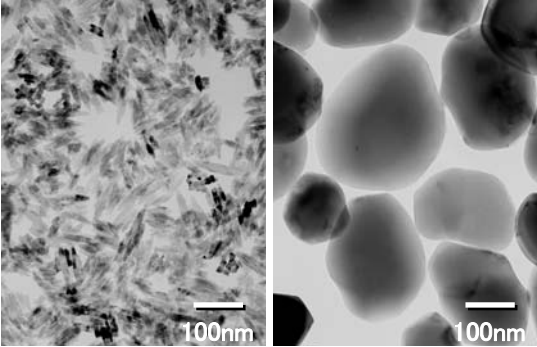
- High refractive index material (Refractive index: 2.72)
- Refractive index regulator for wet coating
- Excellent transparency, low haze

### ■ Base material particle characteristics (micro titanium dioxide)

|                                  |              |
|----------------------------------|--------------|
| Appearance                       | White powder |
| Titanium oxide crystal structure | Rutile       |
| Refractive index                 | 2.72         |
| Specific gravity                 | 4.2          |
| Crystal size <sup>*1</sup>       | 15 – 25 nm   |

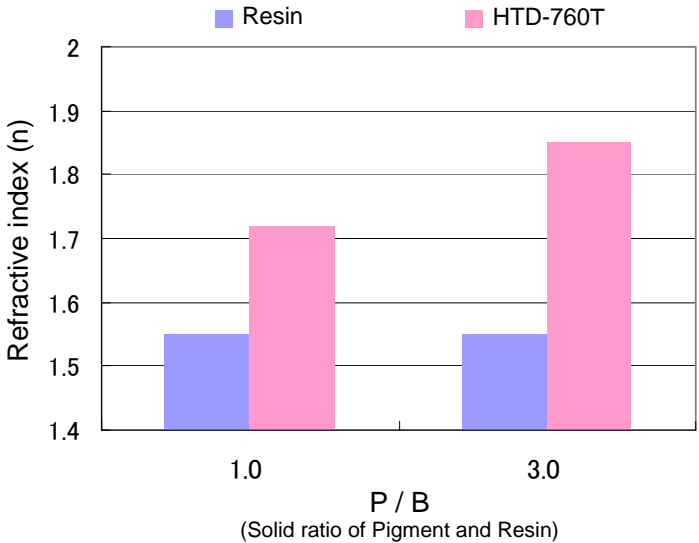
<sup>\*1</sup>: X-ray diffraction analysis

Micro titanium dioxide      Pigment grade titanium dioxide



### ■ Refractive index of coating film including HTD Series

Relation between pigment concentration of Coating film and refractive index



| Sample name | P/B                     |                         |
|-------------|-------------------------|-------------------------|
|             | 1.0                     | 3.0                     |
| HTD-760T    | n = 1.72<br>Haze = 1.0% | n = 1.85<br>Haze = 1.3% |
| Resin       | n = 1.55    Haze = 0.8% |                         |

### ■ Making method of coating film

#### Formulation

HTD-760T (toluene type Slurry)      37.5 - 112.5 g (P/B=1-3)  
(pigment: 15.0 - 45.0 g)

BECKOLITE M-6401-50 (solid 50%)      25.5 g (Solid: 12.8 g)  
SUPER BECKAMINE J-820-60 (solid 60%)      3.7 g (Solid: 2.2 g)  
(Made by DIC Corporation)

#### Mixing

Disper: 1,000 rpm for 1 minute

#### Dilution (you can dilute according to application)

Solvent: Toluene  
In the case of Spin coat resin concentration is diluted to 1.5%

#### Making Film

Equipment : Spin Coater 1HDX2 made by Mikasa corporation)  
Substrate :Micro Slide Glass ( n = 1.51 - 1.54)  
made by Matsunami Glass Corporation  
Condition : 3000 rpm-3 sec-Slope 7 sec  
(Film thickness : 0.1 μm)  
Setting : 5min, Drying : 140°C - 30 min

### ■ Evaluation method of coating film

Equipment : DVA-FL3G automatic ellipsometer  
(made by Mizojiri Optical Corporation)  
Condition : He-Ne Laser( 632.8 nm)

## High transparent micro zinc oxide slurry **HTD-711Z (IPA)**, **750Z (Toluene)**, **770Z (Ethyl acetate)**

### Features

- **Excellent transparency**
- **Excellent UV ray shielding effect**
- **Good compatibility with various resins**
- Easy to use in applications with high pigment concentrations

### General characteristics

|                                 |  |
|---------------------------------|--|
| Appearance                      | Pale yellow liquid   |
| Pigment                         | Zinc oxide   |
| Pigment concentration (%)       | 35-45  |
| Main solvents                   | <b>711Z: IPA</b> <sup>*1</sup><br><b>750Z: Toluene</b><br><b>770Z: Ethyl acetate</b> |
| Residue on drying (%)           | 40 - 50  |
| Crystal size <sup>*2</sup> (nm) | 20 - 30  |
| Viscosity (mPa·s)               | < 50   |

\*1: Isopropyl alcohol

\*2: X-ray diffraction analysis

The figures shown are typical values and are not guaranteed.

### Appearance of Coating Film (polyester / melamine system)

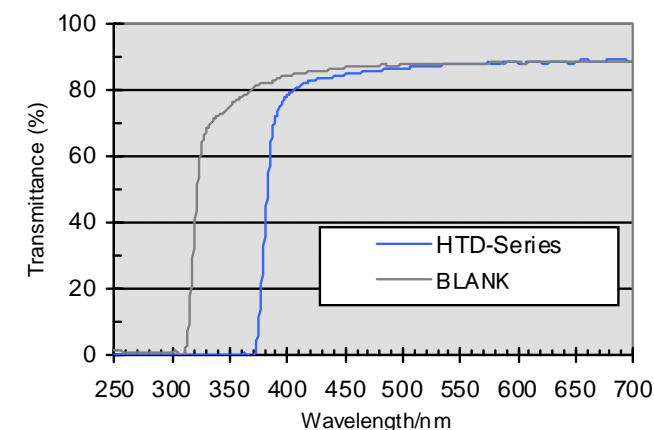


### Haze of Coating Film (polyester / melamine system)

|                       |     |     |     |     |
|-----------------------|-----|-----|-----|-----|
| Pigment concentration | 5   | 10  | 100 | 200 |
| Film thickness (μm)   | 40  | 20  | 5   | 2   |
| Haze (%)              | 1.2 | 1.2 | 1.1 | 1.0 |

The figures for haze show values after deductions for the blank film haze.

### Transmittance curve (polyester / melamine system)



#### Formulation

100 PHR : pigment / resin (solid) = 100 / 100  
 HTD series (pigment content 40wt%) 37.5 g (pigment: 15.0 g)  
 BECKOLITE M-6401-50 (solid: 50wt%)\* 25.5 g (pigment: 12.8 g)  
 SUPER BECKAMINE J-820-60 (solid: 60%)\* 3.7 g (pigment: 2.2 g)  
 Solveso 100 (solvent) \* 0.8 g

※. made by DIC Corporation

#### Dispersing method

Disper: 2,000 rpm for 1 minute

#### Measurement

Coating film thickness : 5 μm (bar coater #12, on PET film)  
 Blank : PET film only  
 Transmittance : 250 - 700 nm  
 (Hitachi UV-3000 spectral photometer.)