



# DURAFIDE®

Polyphenylene Sulfide (PPS)

## Grade Compositions

**POLYPLASTICS CO., LTD.**

# DURAFIDE® PPS

## Grade Compositions

DURAFIDE® PPS has equivalent or superior characteristics to conventional PPS resins in respect of heat resistance, flame resistance, chemical resistance and dimensional stability, which are known as inherent characteristics of PPS resins in general. Because of a linear type polymeric polymer structure, it also has such other characteristics as described below.

| Item                                          | Unit                 | Testing Method        | Glass fiber reinforced |                    |                           |                    |                    |                    |                    | Glass fiber and mineral reinforced |                    |                                  |
|-----------------------------------------------|----------------------|-----------------------|------------------------|--------------------|---------------------------|--------------------|--------------------|--------------------|--------------------|------------------------------------|--------------------|----------------------------------|
|                                               |                      |                       | 1130A64                | 1140A64            | 1140A7                    | 1140A6             | 1130A1             | 1140A1             | 1140A66            | 6165A4                             | 6165A6             | 6165A7                           |
|                                               |                      |                       | Standard, Low flash    |                    | Ultrahigh flow, Low flash | High strength      | High toughness     |                    | Low-chlorine       | Dimensionally precise, Standard    |                    | Dimensionally precise, Low flash |
|                                               |                      |                       | GF30%                  | GF40%              | GF40%                     | GF40%              | GF30%              | GF40%              | GF40%              | GF/M65%                            | GF/M65%            | GF/M60%                          |
| Density                                       | g/cm <sup>3</sup>    | ISO 1183              | 1.57                   | 1.66               | 1.66                      | 1.66               | 1.57               | 1.66               | 1.66               | 1.98                               | 1.98               | 1.89                             |
| Water absorption (23°C, 24hrs)                | %                    | ISO 62                | 0.04                   | 0.04               | 0.04                      | 0.04               | 0.03               | 0.03               | 0.04               | 0.01                               | 0.01               | 0.01                             |
| Melt viscosity (310°C, 1,000/sec)             | Pa·s                 | ISO11443              | 240                    | 240                | 160                       | 260                | 350                | 380                | 260                | 400                                | 345                | 290                              |
| Mold Shrinkage (80×80×2mmt)                   | Flow direction       | %                     | Our standard           | 0.4                | 0.3                       | 0.3                | 0.3                | 0.3                | 0.3                | 0.3                                | 0.2                | 0.2                              |
|                                               | Transverse direction | %                     | Our standard           | 0.7                | 0.7                       | 0.7                | 0.7                | 0.6                | 0.7                | 0.6                                | 0.5                | 0.6                              |
| Tensile strength                              | MPa                  | ISO527-1,2            | 170                    | 200                | 180                       | 210                | 170                | 185                | 180                | 130                                | 130                | 165                              |
| Strain at break                               | %                    | ISO527-1,2            | 1.9                    | 1.8                | 1.4                       | 1.9                | 2.0                | 1.8                | 1.7                | 1.1                                | 1.1                | 1.2                              |
| Flexural strength                             | MPa                  | ISO 178               | 250                    | 300                | 270                       | 300                | 260                | 275                | 255                | 205                                | 205                | 250                              |
| Flexural modulus                              | MPa                  | ISO 178               | 11,800                 | 15,000             | 15,000                    | 15,000             | 11,400             | 14,500             | 14,500             | 19,800                             | 19,800             | 19,600                           |
| Charpy notched impact strength                | kJ/m <sup>2</sup>    | ISO179/1eA            | 8.0                    | 10.0               | 10.5                      | 11.0               | 10.0               | 10.0               | 9.0                | 6.0                                | 6.0                | 8.0                              |
| Temperature of deflection under load (1.8MPa) | °C                   | ISO 75-1,2            | 265                    | 270                | 275                       | 270                | 260                | 265                | 265                | 270                                | 270                | 270                              |
| Coefficient of linear thermal expansion       | Flow direction       | ×10 <sup>-5</sup> /°C | Our standard           | 2                  | 2                         | 1                  | 1                  | 2                  | 1                  | 1                                  | 1                  | 1                                |
|                                               | Transverse direction | ×10 <sup>-5</sup> /°C | Our standard           | 4                  | 4                         | 4                  | 4                  | 4                  | 4                  | 3                                  | 3                  | 3                                |
| Relative permittivity (1kHz)                  |                      | IEC 60250             | 4.2                    | 4.5                | 4.3                       | 4.2                | 4.0                | 4.6                | 4.5                | 5.8                                | 5.8                | 5.3                              |
| Relative permittivity (1MHz)                  |                      | IEC 60250             | 4.2                    | 4.5                | 4.3                       | 4.2                | 4.0                | 4.6                | 4.5                | 5.8                                | 5.8                | 5.4                              |
| Dielectric dissipation factor (1kHz)          |                      | IEC 60250             | 0.001                  | 0.001              | 0.001                     | 0.001              | 0.001              | 0.002              | 0.001              | 0.002                              | 0.002              | 0.001                            |
| Dielectric dissipation factor (1MHz)          |                      | IEC 60250             | 0.002                  | 0.002              | 0.002                     | 0.002              | 0.002              | 0.002              | 0.002              | 0.002                              | 0.002              | 0.002                            |
| Electric strength (3mmt)                      | kV/mm                | IEC 60243-1           | 15                     | 16                 | 15                        | 16                 | 16                 | 15                 | 16                 | 14                                 | 14                 | 14                               |
| Volume resistivity                            | Ω·cm                 | IEC 60093             | 8×10 <sup>15</sup>     | 4×10 <sup>16</sup> | 4×10 <sup>15</sup>        | 5×10 <sup>15</sup> | 3×10 <sup>16</sup> | 1×10 <sup>16</sup> | 5×10 <sup>15</sup> | 8×10 <sup>15</sup>                 | 8×10 <sup>15</sup> | 2×10 <sup>15</sup>               |
| Surface resistivity                           | Ω                    | IEC 60093             | 8×10 <sup>16</sup>     | 1×10 <sup>17</sup> | 1×10 <sup>15</sup>        | 1×10 <sup>15</sup> | 2×10 <sup>17</sup> | 8×10 <sup>16</sup> | 1×10 <sup>15</sup> | 9×10 <sup>15</sup>                 | 9×10 <sup>15</sup> | 8×10 <sup>16</sup>               |
| Tracking resistance (CTI)                     | V                    | IEC 60112             | 125                    | 150                | 125                       | 125                | 150                | 150                | 125                | 200                                | 200                | 175                              |
| Flammability                                  | —                    | UL94                  | V-0                    | V-0                | V-0                       | V-0                | V-0                | V-0                | V-0                | V-0                                | V-0                | V-0                              |
| The yellow card File No. issued by UL         | —                    | —                     | E109088                | E109088            | E109088                   | E109088            | E109088            | E109088            | E109088            | E109088                            | E109088            | E109088                          |

- All figures in the table are the typical values of the material and not the minimum values of the material specifications.
- For qualified values of UL (Underwriters Laboratories Inc.) refer to the yellow card issued by UL.

All grades are subjected to Japan's Ministerial Ordinance for Export Trade Control.

- Elongation and impact strength are larger, with excellent strong toughness.
- Ionic impurities are at a low level, and application is possible in fields where demanding electrical properties are required.
- Thermal stability is excellent, and processability is good.
- Weld strength is high, and secondary processes such as screwing and press-fitting are excellent.
- A high degree of whiteness enables coloring.

| Item                                             |                         | Unit                  | Testing Method  | Glass fiber and mineral reinforced |                                                       |                    |                                  | Special            |                    |                    |                    |                         |                   |
|--------------------------------------------------|-------------------------|-----------------------|-----------------|------------------------------------|-------------------------------------------------------|--------------------|----------------------------------|--------------------|--------------------|--------------------|--------------------|-------------------------|-------------------|
|                                                  |                         |                       |                 | 6465A62                            | 6565A6                                                | 6565A7             | 6165A7S                          | 1130T6             | 6150T6             | 6150T73            | 6345A4             | 2130A1                  | 7140A4            |
|                                                  |                         |                       |                 | Low warp,<br>Higher gloss          | Moldable at low mold temperature<br>Adhesion-enhanced |                    | Low fuel<br>swelling<br>material | High impact        |                    |                    | Low wear           | Conductive,<br>Low wear |                   |
|                                                  |                         |                       |                 | GF/M60%                            | GF/M65%                                               | GF/M60%            | GF/M65%                          | GF30%              | GF/M50%            | GF/M50%            | GF30%<br>PTFE      | CF30%                   | CF30%<br>PTFE     |
| Density                                          |                         | g/cm³                 | ISO 1183        | 1.87                               | 1.96                                                  | 1.89               | 1.98                             | 1.52               | 1.71               | 1.71               | 1.68               | 1.44                    | 1.49              |
| Water absorption (23°C, 24hrs)                   |                         | %                     | ISO 62          | 0.03                               | 0.01                                                  | 0.02               | 0.01                             | 0.06               | 0.05               | 0.05               | 0.05               | 0.04                    | 0.04              |
| Melt viscosity (310°C, 1,000/sec)                |                         | Pa·s                  | ISO11443        | 250                                | 280                                                   | 200                | 260                              | 370                | 240                | 210                | 220                | 400                     | 280               |
| Mold Shrinkage<br>(80×80×2mmt)                   | Flow direction          | %                     | Our<br>standard | 0.4                                | 0.3                                                   | 0.3                | 0.2                              | 0.3                | 0.2                | 0.2                | 0.3                | 0.1                     | 0.1               |
|                                                  | Transverse<br>direction | %                     | Our<br>standard | 0.7                                | 0.5                                                   | 0.5                | 0.5                              | 0.7                | 0.6                | 0.6                | 0.7                | 0.6                     | 0.5               |
| Tensile strength                                 |                         | MPa                   | ISO527-1,2      | 130                                | 125                                                   | 140                | 140                              | 155                | 155                | 150                | 155                | 225                     | 180               |
| Strain at break                                  |                         | %                     | ISO527-1,2      | 1.3                                | 1.0                                                   | 1.0                | 1.1                              | 2.3                | 1.7                | 1.8                | 1.8                | 1.3                     | 1.1               |
| Flexural strength                                |                         | MPa                   | ISO 178         | 200                                | 185                                                   | 220                | 215                              | 230                | 225                | 220                | 220                | 330                     | 270               |
| Flexural modulus                                 |                         | MPa                   | ISO 178         | 15,300                             | 21,000                                                | 20,500             | 17,800                           | 10,000             | 13,200             | 12,200             | 11,500             | 25,200                  | 22,800            |
| Charpy notched impact strength                   |                         | kJ/m²                 | ISO179/1eA      | 5.5                                | 6.0                                                   | 7.5                | 6.0                              | 12.0               | 9.5                | 10.5               | 9.0                | 5.5                     | 4.5               |
| Temperature of deflection<br>under load (1.8MPa) |                         | °C                    | ISO 75-1,2      | 270                                | 275                                                   | 275                | 270                              | 255                | 270                | 270                | 265                | 265                     | 270               |
| Coefficient of<br>linear thermal<br>expansion    | Flow direction          | ×10 <sup>-5</sup> /°C | Our<br>standard | 2                                  | 1                                                     | 1                  | 2                                | 2                  | 1                  | 2                  | 2                  | 1                       | 1                 |
|                                                  | Transverse<br>direction | ×10 <sup>-5</sup> /°C |                 | 3                                  | 3                                                     | 3                  | 3                                | 4                  | 4                  | 4                  | 4                  | 4                       | 4                 |
| Relative permittivity (1kHz)                     |                         |                       | IEC 60250       | 4.9                                | 5.4                                                   | 4.9                | 5.4                              | 3.9                | 4.5                | 4.5                | 4.2                | —                       | —                 |
| Relative permittivity (1MHz)                     |                         |                       | IEC 60250       | 4.9                                | 5.4                                                   | 4.7                | 5.4                              | 3.9                | 4.4                | 4.4                | 4.2                | —                       | —                 |
| Dielectric dissipation<br>factor (1kHz)          |                         |                       | IEC 60250       | 0.002                              | 0.013                                                 | 0.014              | 0.001                            | 0.003              | 0.004              | 0.002              | 0.001              | —                       | —                 |
| Dielectric dissipation<br>factor (1MHz)          |                         |                       | IEC 60250       | 0.001                              | 0.005                                                 | 0.006              | 0.002                            | 0.004              | 0.005              | 0.006              | 0.002              | —                       | —                 |
| Electric strength<br>(3mmt)                      |                         | kV/mm                 | IEC 60243-1     | 16                                 | 16                                                    | 16                 | —                                | 18                 | 16                 | 17                 | 19                 | —                       | —                 |
| Volume resistivity                               |                         | Ω·cm                  | IEC 60093       | 3×10 <sup>16</sup>                 | 2×10 <sup>16</sup>                                    | 7×10 <sup>15</sup> | —                                | 8×10 <sup>15</sup> | 2×10 <sup>16</sup> | 6×10 <sup>15</sup> | 4×10 <sup>15</sup> | 2×10 <sup>3</sup>       | 8×10 <sup>2</sup> |
| Surface resistivity                              |                         | Ω                     | IEC 60093       | 1×10 <sup>16</sup>                 | 2×10 <sup>16</sup>                                    | 1×10 <sup>17</sup> | —                                | 4×10 <sup>16</sup> | 5×10 <sup>16</sup> | 4×10 <sup>17</sup> | 8×10 <sup>15</sup> | 2×10 <sup>2</sup>       | 2×10 <sup>2</sup> |
| Tracking resistance<br>(CTI )                    |                         | V                     | IEC 60112       | 125                                | 225                                                   | 175                | —                                | 125                | 150                | 150                | 125                | —                       | —                 |
| Flammability                                     |                         | —                     | UL94            | V-0                                | V-0                                                   | V-0                | —                                | V-0<br>(1.6mm)     | —                  | V-0                | V-0                | V-0                     | V-0               |
| The yellow card<br>File No. issued by UL         |                         | —                     | —               | E109088                            | E109088                                               | E109088            | —                                | E109088            | —                  | E109088            | E109088            | E109088                 | E109088           |

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- This brochure has been prepared based on our own experiences and laboratory test data, and therefore all data shown here are not always applicable to parts used under different conditions. We do not guarantee that these data are directly applicable to the application conditions of users and we ask each user to make his own decision on the application.
- It is the users' responsibility to investigate patent rights, service life and potentiality of applications introduced in this brochure.  
Materials we supply are not intended for the implant applications in the medical and dental fields, and therefore are not recommended for such uses.
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