Polybutylene Terephthalate (PBT)

# DURANEX®

702MS

ED3002

(Better Surface Appearance, Higher Gloss, HB grade)

WinTech Polymer Ltd.

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# Introduction

Standard reinforced grades of **Duranex** incorporate inorganic filler loadings of 30%, but for applications that require higher strength and stiffness, there are cases where loadings of in excess of 40% are employed. However, to this present time, excess filler loadings have caused degradation of the initial surface quality of molded parts, and when subject to exposure outdoors, problems such as color change and bleeding of the filler due to degradation of weatherability tend to occur.

Using special technology, **Duranex 702MS** is a new grade that achieves high stiffness in excess of 16,000 MPa, while realizing superior external appearance and weatherability.

Characteristics

1. High stiffness
   Flexural modulus (ASTM D790) of in excess of 16,700 Mpa

2. Excellent external appearance
   In particular, problems associated with filler bleeding and surface transfer have been resolved.

3. Excellent weatherability
   Filler bleeding and color change after exposure have been significantly restricted.

4. In addition, as a PBT resin, offers the following properties:
   Good processability (low outgassing, etc.), chemical resistance (oil resistance), moisture absorption resistance, heat resistance

# General Properties of 702MS

table1-1 General Properties（ISO）

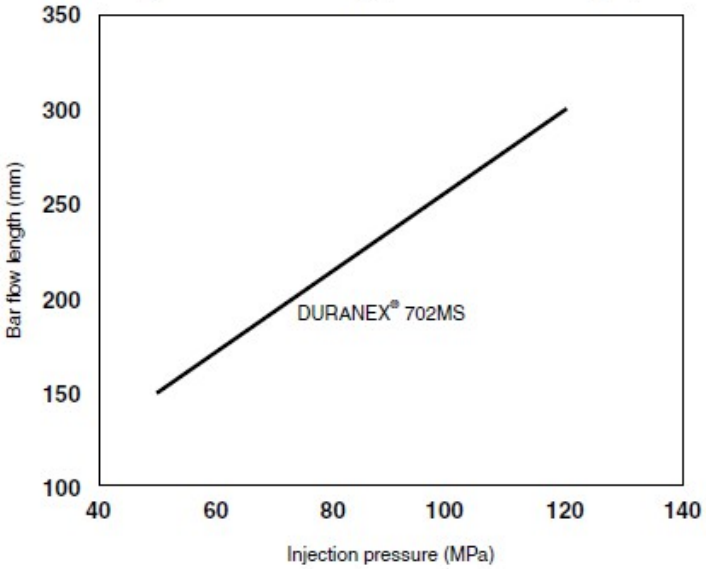
| Item | Unit | Test Method | Better Surface Appearance, Higher Gloss, HB |
|---|---|---|---|
| | | | 702MS |
| | | | GF reinforced, High rigidity, Low warpage , Less sink marks |
| Color | | | ED3002 |
| ISO(JIS)quality-of-the-material display: | | ISO11469 (JIS K6999) | >PBT+PC-(GF+PS)55< |
| Density | g/cm$^3$ | ISO 1183 | 1.73 |
| Water absorption (23℃,24hrs) | % | ISO 62 | 0.1 |
| Tensile strength | MPa | ISO 527-1,2 | 153 |
| Strain at break | % | ISO 527-1,2 | 1.3 |
| Flexural strength | MPa | ISO 178 | 205 |
| Flexural modulus | MPa | ISO 178 | 15,500 |
| Charpy impact strength (notched) | kJ/m$^2$ | ISO 179/1eA | 6.5 |
| Temperature of deflection under load (1.8MPa) | ℃ | ISO 75-1,2 | 197 |
| Coefficient of linear thermal expansion (23 - 55℃、Flow direction) | x10$^{-5}$/℃ | Our standard | 2 |
| Coefficient of linear thermal expansion (23 - 55℃、Transverse direction) | x10$^{-5}$/℃ | Our standard | 4 |
| Dielectric breakdown strength (3mmt) | kV/mm | IEC 60243-1 | - |
| Volume resistivity | Ω·cm | IEC 60093 | 6 × 10$^{15}$ |
| Tracking resistance (CTI) | V | IEC 60112 | - |
| Rockwell hardness | M(Scale) | ISO2039-2 | 100 |
| Flammability | | UL94 | HB |
| The yellow card File No. | | | E213445 |
| Appropriate List number of Ministerial Ordinance for Export Trade Control | | | Item 16 of Appendix -1 |

※1) Nominal strain at break

All figures in the table are the typical values of the material and not the minimum values of the material specifications.

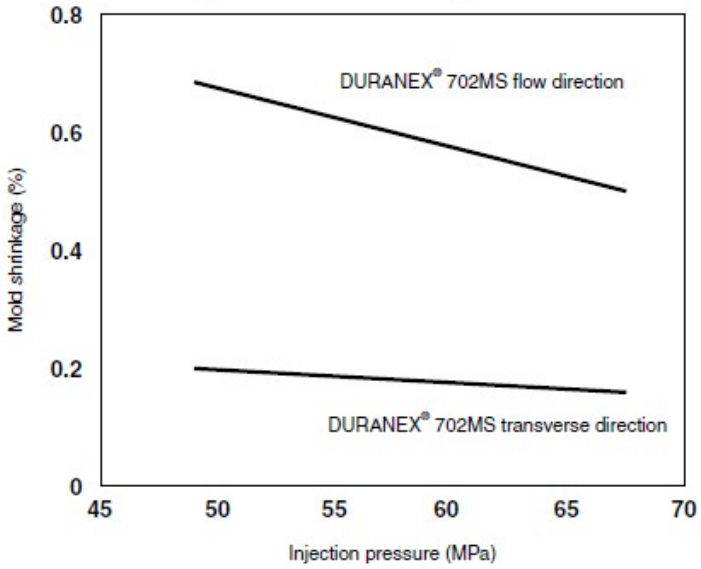
# 2. Flow characteristics of DURANEX® 702MS

Figure 2-1 Flowability (2 mmt bar flow length)




Injection machine: Sumitomo SG-150U
Mold: 2t bar flow length evaluation mold
MT = 90˚C
CT = 265-265-265-265-240˚C

Figure 2-2 Mold shrinkage ratio



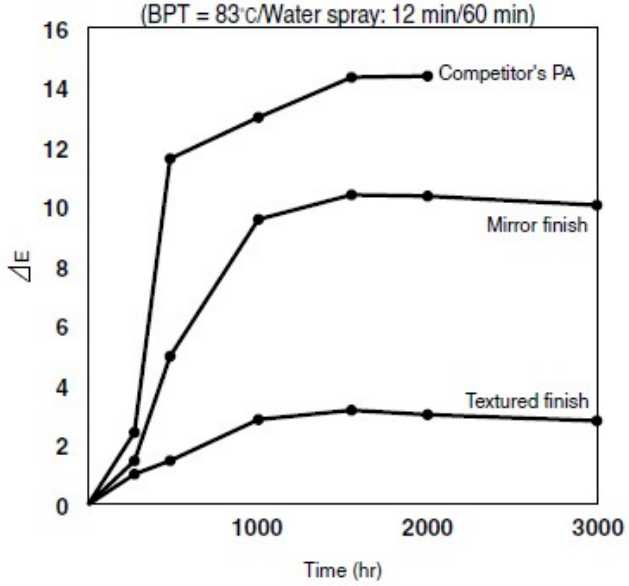

Injection machine: Sumitomo SG-150U
Mold: 120□×3 mm*t* flat plate
MT = 90˚C
CT = 265-265-265-255-240˚C

# 3. Weatherability of DURANEX® 702MS

Characteristics of test results

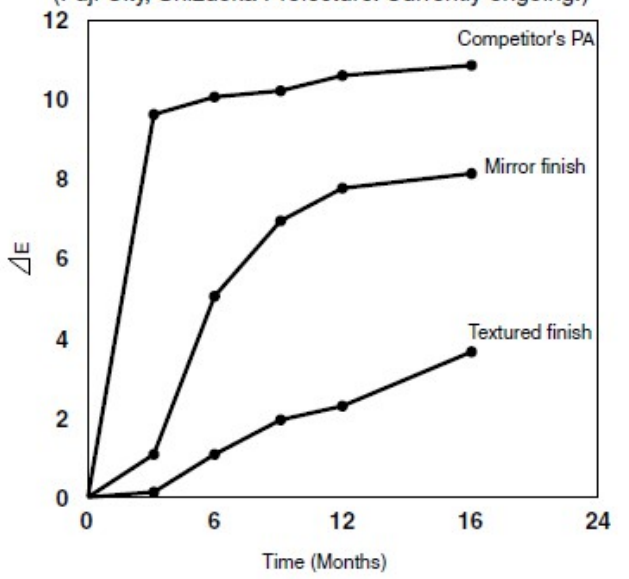
- Almost no bleeding out of filler was observed in sunshine weather meter (SWOM) and outdoor exposure tests.
- In the case of PBT, the acceleration ratio for SWOM is high, and after 1000 hours, a trend towards color change can be observed.
- For textured surfaces, a more than sufficient level of weatherability (color change) is maintained.
- An equivalent degree of weatherability to **Duranex 7307**, a grade that has been proven in external use, is achieved.

Figure 3-1 Sunshine weather meter test
(BPT = 83°C/Water spray: 12 min/60 min)




| | | DURANEX® 702MS | | Competitor's PA |
|---|---|---|---|---|
| | | Mirror finish | Textured finish | Mirror finish |
| Initial gloss (%) (45-45°) | | 77.0 | 1.5 | 93.7 |
| Gloss retention ratio (%) (45-45°) | 200hrs | 96.0 | 100 | – |
| | 400hrs | 71.2 | 100 | 67.2 |
| | 1000hrs | 2.3 | 33.3 | 3.7 |
| | 1500hrs | 1.4 | 26.7 | 2.2 |
| | 2000hrs | 1.3 | 33.3 | 1.6 |
| | 3000hrs | 1.0 | 18.5 | – |
| | 200hrs | 1.5 | 1.0 | – |
| | 400hrs | 5.0 | 1.6 | 11.4 |
| | 1000hrs | 9.7 | 3.6 | 13.5 |
| Color difference ⊿E | 1500hrs | 10.4 | 3.9 | 14.7 |
| | 2000hrs | 10.5 | 4.0 | 14.8 |
| | 3000hrs | 10.0 | 3.2 | – |

Figure 3-2 Outdoor exposure test
(Fuji City, Shizuoka Prefecture. Currently ongoing.)




| | | DURANEX® 702MS | | Competitor's PA |
|---|---|---|---|---|
| | | Mirror finish | Textured finish | Mirror finish |
| Initial gloss (%) (45-45°) | | 77.0 | 1.5 | 98.3 |
| Gloss retention ratio (%) (45-45°) | 3 months | 85.5 | 100 | 12.2 |
| | 6 months | 38.1 | 73.3 | 5.1 |
| | 9 months | 16.9 | 60.1 | 3.0 |
| | 12 months | 10.5 | 50.0 | 1.5 |
| | 18 months | 1.8 | 53.3 | 0.9 |
| Color difference ⊿E | 3 months | 1.0 | 0.0 | 9.6 |
| | 6 months | 4.9 | 1.0 | 10.2 |
| | 9 months | 7.0 | 1.8 | 10.4 |
| | 12 months | 7.8 | 2.2 | 11.0 |
| | 18 months | 8.5 | 3.1 | 12.5 |

WinTech Polymer Ltd.

## NOTES TO USERS

- All property values shown in this brochure are the typical values obtained under varying conditions prescribed by applicable standards and test methods.
- 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.
- For all works done properly, it is advised to refer to the appropriate "**Technical Catalog**" for specific material processing.
- For safe handling of materials we supply, it is advised to refer to the Safety Data Sheet "**SDS**" of the proper material.
- This brochure is edited based on reference literatures, information and data currently available to us. So the contents of this brochure are subject to change without notice due to new data.
- Please contact our office for any questions about products we supply, descriptive literatures or any description in this brochure.

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