epsan

# PRODUCT CATALOGUE



## EPSAN

We manufacture innovative, reliable, efficient, sustainable and environment friendly products in the field of engineering plastics, and in all industries that touch our lives, by taking into account the ever increasing global client expectations.

With more than 40 years of experience, we offer special solutions to our clients with PPA, PBT, PET, PBT/PET, PA/ABS and PBT/ASA compounds, primarily Polyamide 6 and 6.6.

We are a solution partner for a variety of industries and applications ranging from pilot productions to high tonnage applications, with our double screw extruders ranging from 26 mm to 70 mm in our large machinery park, together with our industry 4.0 compliant infrastructure and automation investments.

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| FEATURES | STANDARDS | TEST | CONDITIONS | UNIT | EPLAMID 6 GFR 10 NC Q1B001 | EPLAMID 6 GFR 15 NC Q1B501 | EPLAMID 6 GFR 15 BK Q2B502 | EPLAMID 6 GFR 25 NC Q1C502 | EPLAMID 6 GFR 30 NC ST Q1D001 | EPLAMID 6 GFR 30 BK Q2D002 | EPLAMID 6 GFR 40 NC Q1E001 | EPLAMID 6 GFR 50 NC Q1F001 | EPLAMID 6 GFR 60 NC Q1G001 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| DEFINITION | ISO 1043 | - | - | | PA6-GF10 | PA6-GF15 | PA6-GF15 | PA6-GF25 | PA6-GF30 | PA6-GF30 | PA6-GF40 | PA6-GF50 | PA6-GF60 |
| COLOUR | - | - | - | | NATURAL | NATURAL | BLACK | NATURAL | NATURAL | BLACK | NATURAL | NATURAL | NATURAL |
| DENSITY / YOĞUNLUK | ISO 1183 | 23°C | g/cm3 | | 1,19 | 1,23 | 1,23 | 1,3 | 1,36 | 1,36 | 1,44 | 1,57 | 1,69 |
| ASH CONTENT | ISO 3154-4 | - | % | | 10 | 15 | 15 | 25 | 30 | 30 | 40 | 50 | 60 |
| DETERMINATION OF WATER CONTENT | ISO 15512 | - | % | | 0,1 | 0,1 | 0,1 | 0,1 | 0,1 | 0,1 | 0,1 | 0,1 | 0,1 |
| MOLD SHRINKAGE - PARALLEL / NORMAL | ISO 294-4 | 3 mm | % | | 0,8/1,1 | 0,8/1,1 | 0,8/1,1 | 0,6/0,9 | 0,4/0,7 | 0,4/0,7 | 0,3/0,5 | 0,2/0,3 | 0,2/0,3 |
| **MECHANICAL PROPERTIES** | | | | | | | | | | | | | |
| TENSILE MODULUS (1 mm/min) | ISO 527-2 | 23°C | Mpa | | 5200 | 6000 | 6000 | 9000 | 10000 | 9500 | 12500 | 17000 | 19800 |
| TENSILE STRESS AT BREAK (5 mm/min) | ISO 527-2 | 23°C | Mpa | | 115 | 135 | 125 | 170 | 180 | 175 | 195 | 225 | 220 |
| TENSILE STRAIN AT BREAK (5 mm/min) | ISO 527-2 | 23°C | | | 3 | 3 | 4 | 3 | 3,5 | 3 | 3 | 3 | 2 |
| FLEXURAL MODULUS (2 mm/min) | ISO 178 | 23°C | Mpa | | 4400 | 5000 | 4800 | 8000 | 9000 | 8500 | 11200 | 14500 | 17000 |
| FLEXURAL STRENGTH (2 mm/min) | ISO 178 | 23°C | Mpa | | 210 | 230 | 230 | 265 | 285 | 280 | 300 | 335 | 350 |
| NOTCHED IZOD IMPACT | ISO 180/1A | 23°C | kJ/m² | | 6 | 7 | 6 | 12 | 14 | 12 | 17 | 17 | 15 |
| UNNOTCHED IZOD IMPACT | ISO 180/1U | 23°C | kJ/m² | | 45 | 50 | 45 | 70 | 85 | 70 | 95 | 100 | 95 |
| NOTCHED CHARPY IMPACT | ISO 179/1eA | 23°C | kJ/m² | | 7 | 8 | 7 | 13 | 15 | 13 | 18 | 18 | 16 |
| UNNOTCHED CHARPY IMPACT | ISO 179/1eU | 23°C | kJ/m² | | 50 | 55 | 50 | 75 | 90 | 75 | 100 | 105 | 100 |
| **THERMAL PROPERTIES** | | | | | | | | | | | | | |
| MELTING POINT | ISO 3146 | - | °C | | 220 | 220 | 220 | 220 | 220 | 220 | 220 | 220 | 220 |
| HDT/B | ISO 75-2/B | 0,45 Mpa | °C | | 210 | 210 | 210 | 215 | 215 | 220 | 215 | 215 | 215 |
| HDT/A | ISO 75-2/A | 1,80 Mpa | °C | | 185 | 185 | 185 | 205 | 205 | 205 | 205 | 210 | 210 |
| **FLAMMABILITY & ELECTRICAL PROPERTIES** | | | | | | | | | | | | | |
| FLAMMABILITY CLASSIFICATION | EN 60695-11-10 / UL94 | 0,8 mm | - | | HB | HB | HB | HB | HB | HB | HB | HB | HB |
| GLOW WIRE - GWFI | EN 60695-2-12 | - | °C | | | | | | | | | | |
| GLOW WIRE - GWIT | EN 60695-2-13 | - | °C | | | | | | | | | | |
| COMPERATIVE TRACKING INDEX | EN 60112 | SOLUTION A | V | | 550 | 550 | 550 | 550 | 550 | 550 | 500 | 500 | 500 |
| SURFACE RESISTIVITY | ASTM D257 | - | Ω/sq | | 1,00E+13 | 1,00E+13 | 1,00E+13 | 1,00E+13 | 1,00E+13 | 1,00E+13 | 1,00E+13 | 1,00E+13 | 1,00E+13 |
| US-FMVSS 302 | ISO 3795 | - | mm/min | | <100 | <100 | <100 | <100 | <100 | <100 | <100 | <100 | <100 |

| FEATURES | STANDARDS | TEST | CONDITIONS | UNIT | EPLAMID 66 GFS 15 HS NC Q1B501 | EPLAMID 66 GFS 30 HS NC Q1D001 | EPLAMID 66 GFS 30 HS BK Q2D001 | EPLAMID 66 GFS 33 HS NC Q1D301 | EPLAMID 66 GFS 35 HS BK Q2D502 | EPLAMID 66 GFS 40 HS NC Q1E001 | EPLAMID 66 GFS 50 HS NC Q2F001 | EPLAMID 66 GFS 60 HS BK Q2G001 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| DEFINITION | ISO 1043 | - | - | | PA66-GF15 | PA66-GF30 | PA66-GF30 | PA66-GF33 | PA66-GF35 | PA66-GF40 | PA66-GF50 | PA66-GF60 |
| COLOUR | - | - | - | | NATURAL | NATURAL | BLACK | NATURAL | BLACK | NATURAL | NATURAL | BLACK |
| DENSITY / YOĞUNLUK | ISO 1183 | 23°C | | g/cm3 | 1,23 | 1,36 | 1,36 | 1,4 | 1,41 | 1,46 | 1,57 | 1,69 |
| ASH CONTENT | ISO 3154-4 | - | | % | 15 | 30 | 30 | 33 | 35 | 40 | 50 | 60 |
| DETERMINATION OF WATER CONTENT | ISO 15512 | - | | % | 0,2 | 0,2 | 0,2 | 0,2 | 0,2 | 0,2 | 0,2 | 0,2 |
| MOLD SHRINKAGE - PARALLEL / NORMAL | ISO 294-4 | 3 mm | | % | 0,6/0,9 | 0,4/0,8 | 0,4/0,8 | 0,4/0,8 | 0,4/0,8 | 0,3/0,6 | 0,2/0,4 | 0,2/0,4 |
| **MECHANICAL PROPERTIES** | | | | | | | | | | | | |
| TENSILE MODULUS (1 mm/min) | ISO 527-2 | 23°C | | Mpa | 6200 | 10000 | 9700 | 11000 | 11500 | 13500 | 16800 | 20000 |
| TENSILE STRESS AT BREAK (5 mm/min) | ISO 527-2 | 23°C | | Mpa | 130 | 190 | 185 | 205 | 200 | 215 | 235 | 230 |
| TENSILE STRAIN AT BREAK (5 mm/min) | ISO 527-2 | 23°C | | | 3 | 3,2 | 3,5 | 3 | 3 | 3 | 2,5 | 2 |
| FLEXURAL MODULUS (2 mm/min) | ISO 178 | 23°C | | Mpa | 5400 | 9200 | 8600 | 10200 | 11200 | 12700 | 15100 | 15500 |
| FLEXURAL STRENGTH (2 mm/min) | ISO 178 | 23°C | | Mpa | 210 | 290 | 285 | 300 | 295 | 310 | 345 | 300 |
| NOTCHED IZOD IMPACT | ISO 180/1A | 23°C | | kJ/m² | 7 | 12 | 11 | 12 | 11 | 15 | 14 | 16 |
| UNNOTCHED IZOD IMPACT | ISO 180/1U | 23°C | | kJ/m² | 45 | 70 | 65 | 70 | 65 | 90 | 80 | 105 |
| NOTCHED CHARPY IMPACT | ISO 179/1eA | 23°C | | kJ/m² | 8 | 13 | 12 | 13 | 12 | 16 | 15 | 17 |
| UNNOTCHED CHARPY IMPACT | ISO 179/1eU | 23°C | | kJ/m² | 50 | 75 | 70 | 75 | 70 | 95 | 85 | 110 |
| **THERMAL PROPERTIES** | | | | | | | | | | | | |
| MELTING POINT | ISO 3146 | - | | °C | 260 | 260 | 260 | 260 | 260 | 260 | 260 | 260 |
| HDT/B | ISO 75-2/B | 0,45 Mpa | | °C | 250 | 255 | 255 | 255 | 255 | 255 | 255 | 255 |
| HDT/A | ISO 75-2/A | 1,80 Mpa | | °C | 245 | 250 | 250 | 250 | 250 | 250 | 250 | 250 |
| **FLAMMABILITY & ELECTRICAL PROPERTIES** | | | | | | | | | | | | |
| FLAMMABILITY CLASSIFICATION | EN 60695-11-10 / UL94 | 0,8 mm | | - | HB | HB | HB | HB | HB | HB | HB | HB |
| GLOW WIRE - GWFI | EN 60695-2-12 | - | | °C | | | | | | | | |
| GLOW WIRE - GWIT | EN 60695-2-13 | - | | °C | | | | | | | | |
| COMPERATIVE TRACKING INDEX | EN 60112 | SOLUTION A | | V | 500 | 500 | 500 | 500 | 500 | 500 | 500 | 500 |
| SURFACE RESISTIVITY | ASTM D257 | - | | Ω/sq | 1,00E+14 | 1,00E+14 | 1,00E+14 | 1,00E+14 | 1,00E+14 | 1,00E+14 | 1,00E+14 | 1,00E+14 |
| US-FMVSS 302 | ISO 3795 | - | | mm/min | <100 | <100 | <100 | <100 | <100 | <100 | <100 | <100 |

| FEATURES | STANDARDS | TEST | CONDITIONS | UNIT | EPLAMID 6 IMP NC Q1A501 | EPLAMID 6 IMP NC Q1A801 | EPLAMID 6 IMP NC Q1B001 | EPLAMID 6 IMP NC B301 | EPLAMID 6 IMP NC Q1B801 | EPLAMID 6 IMP NC Q1C201 | EPLAMID 6 IMP NC Q1D002 | EPLAMID 6 IMP HV BK Q1D001 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| DEFINITION | ISO 1043 | - | - | | PA6-I | PA6-I | PA6-I | PA6-I | PA6-I | PA6-I | PA6-I | PA6-I |
| COLOUR | - | - | - | | NATURAL | NATURAL | BLACK | NATURAL | NATURAL | NATURAL | NATURAL | BLACK |
| DENSITY / YOĞUNLUK | ISO 1183 | 23°C | | g/cm3 | 1,1 | 1,09 | 1,08 | 1,08 | 1,07 | 1,06 | 1,04 | 1,04 |
| ASH CONTENT | ISO 3154-4 | - | | % | - | - | - | - | - | - | - | - |
| DETERMINATION OF WATER CONTENT | ISO 15512 | - | | % | 0,1 | 0,1 | 0,1 | 0,1 | 0,1 | 0,1 | 0,1 | 0,1 |
| MOLD SHRINKAGE - PARALLEL / NORMAL | ISO 294-4 | 3 mm | | % | 1,4/2 | 1,4/2 | 1,4/2 | 1,4/2 | 1,7/2,1 | 1,7/2,1 | 1,8/2,2 | 1,8/2,2 |
| **MECHANICAL PROPERTIES** | | | | | | | | | | | | |
| TENSILE MODULUS (1 mm/min) | ISO 527-2 | 23°C | | Mpa | 2400 | 2200 | 2100 | 2000 | 1800 | 1600 | 1200 | 1400 |
| TENSILE STRESS AT BREAK (5 mm/min) | ISO 527-2 | 23°C | | Mpa | 60 | 55 | 50 | 45 | 35 | 32 | 25 | 40 |
| TENSILE STRAIN AT BREAK (5 mm/min) | ISO 527-2 | 23°C | | | >40 | >45 | >50 | >50 | >50 | >100 | >100 | >100 |
| FLEXURAL MODULUS (2 mm/min) | ISO 178 | 23°C | | Mpa | 2050 | 1950 | 1750 | 1750 | 1550 | 1500 | 1150 | 500 |
| FLEXURAL STRENGTH (2 mm/min) | ISO 178 | 23°C | | Mpa | 85 | 80 | 75 | 70 | 60 | 55 | 40 | 35 |
| NOTCHED IZOD IMPACT | ISO 180/1A | 23°C | | kJ/m² | 13 | 18 | 25 | 50 | 70 | 75 | 80 | 110 |
| UNNOTCHED IZOD IMPACT | ISO 180/1U | 23°C | | kJ/m² | No Break | No Break | No Break | No Break | No Break | No Break | No Break | No Break |
| NOTCHED CHARPY IMPACT | ISO 179/1eA | 23°C | | kJ/m² | 15 | 20 | 30 | 55 | 75 | 80 | 85 | 120 |
| UNNOTCHED CHARPY IMPACT | ISO 179/1eU | 23°C | | kJ/m² | No Break | No Break | No Break | No Break | No Break | No Break | No Break | No Break |
| **THERMAL PROPERTIES** | | | | | | | | | | | | |
| MELTING POINT | ISO 3146 | - | | °C | 220 | 220 | 220 | 220 | 220 | 220 | 220 | 220 |
| HDT/B | ISO 75-2/B | 0,45 Mpa | | °C | 160 | 150 | 150 | 150 | 140 | 130 | 120 | 120 |
| HDT/A | ISO 75-2/A | 1,80 Mpa | | °C | 60 | 55 | 55 | 55 | 50 | 50 | 45 | 45 |
| **FLAMMABILITY & ELECTRICAL PROPERTIES** | | | | | | | | | | | | |
| FLAMMABILITY CLASSIFICATION | EN 60695-11-10 / UL94 | 0,8 mm | | - | HB | HB | HB | HB | HB | HB | HB | HB |
| GLOW WIRE - GWFI | EN 60695-2-12 | - | | °C | | | | | | | | |
| GLOW WIRE - GWIT | EN 60695-2-13 | - | | °C | | | | | | | | |
| COMPERATIVE TRACKING INDEX | EN 60112 | SOLUTION A | | V | 600 | 600 | 600 | 600 | 600 | 600 | 600 | 600 |
| SURFACE RESISTIVITY | ASTM D257 | - | | Ω/sq | 1,00E+13 | 1,00E+13 | 1,00E+13 | 1,00E+13 | 1,00E+13 | 1,00E+13 | 1,00E+13 | 1,00E+13 |
| US-FMVSS 302 | ISO 3795 | - | | mm/min | <100 | <100 | <100 | <100 | <100 | <100 | <100 | <100 |

| FEATURES | STANDARDS | TEST | CONDITIONS | UNIT | EPLAMID 66 IMP NC Q1A501 | EPLAMID 66 IMP NC Q1A801 | EPLAMID 66 IMP NC Q2B002 | EPLAMID 66 IMP NC Q1B301 | EPLAMID 66 IMP NC Q1B801 | EPLAMID 66 IMP NC Q1C201 | EPLAMID 66 IMP NC Q1D001 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| DEFINITION | ISO 1043 | - | - | | PA66-I | PA66-I | PA66-I | PA66-I | PA66-I | PA66-I | PA66-I |
| COLOUR | - | - | - | | NATURAL | NATURAL | BLACK | NATURAL | NATURAL | NATURAL | NATURAL |
| DENSITY / YOĞUNLUK | ISO 1183 | 23°C | | g/cm3 | 1,12 | 1,1 | 1,09 | 1,09 | 1,08 | 1,07 | 1,05 |
| ASH CONTENT | ISO 3154-4 | - | | % | - | - | - | - | - | - | - |
| DETERMINATION OF WATER CONTENT | ISO 15512 | - | | % | 0,1 | 0,1 | 0,1 | 0,1 | 0,1 | 0,1 | 0,1 |
| MOLD SHRINKAGE - PARALLEL / NORMAL | ISO 294-4 | 3 mm | | % | 1,6/2,0 | 1,6/2,0 | 1,6/2,0 | 1,6/2,0 | 1,8/2,2 | 1,9/2,3 | 2,0/2,4 |
| **MECHANICAL PROPERTIES** | | | | | | | | | | | |
| TENSILE MODULUS (1 mm/min) | ISO 527-2 | 23°C | | Mpa | 2800 | 2500 | 2600 | 2300 | 2000 | 1800 | 1500 |
| TENSILE STRESS AT BREAK (5 mm/min) | ISO 527-2 | 23°C | | Mpa | 60 | 55 | 55 | 53 | 45 | 45 | 40 |
| TENSILE STRAIN AT BREAK (5 mm/min) | ISO 527-2 | 23°C | | | >40 | >40 | >50 | >50 | >50 | >50 | >50 |
| FLEXURAL MODULUS (2 mm/min) | ISO 178 | 23°C | | Mpa | 2300 | 2200 | 2200 | 2000 | 1900 | 1700 | 1100 |
| FLEXURAL STRENGTH (2 mm/min) | ISO 178 | 23°C | | Mpa | 90 | 87 | 90 | 85 | 78 | 65 | 65 |
| NOTCHED IZOD IMPACT | ISO 180/1A | 23°C | | kJ/m² | 13 | 22 | 24 | 60 | 77 | 85 | 90 |
| UNNOTCHED IZOD IMPACT | ISO 180/1U | 23°C | | kJ/m² | No Break | No Break | No Break | No Break | No Break | No Break | No Break |
| NOTCHED CHARPY IMPACT | ISO 179/1eA | 23°C | | kJ/m² | 15 | 25 | 27 | 65 | 80 | 90 | 100 |
| UNNOTCHED CHARPY IMPACT | ISO 179/1eU | 23°C | | kJ/m² | No Break | No Break | No Break | No Break | No Break | No Break | No Break |
| **THERMAL PROPERTIES** | | | | | | | | | | | |
| MELTING POINT | ISO 3146 | - | | °C | 260 | 260 | 260 | 260 | 260 | 260 | 260 |
| HDT/B | ISO 75-2/B | 0,45 Mpa | | °C | 190 | 185 | 185 | 185 | 185 | 160 | 150 |
| HDT/A | ISO 75-2/A | 1,80 Mpa | | °C | 95 | 90 | 90 | 90 | 85 | 75 | 70 |
| **FLAMMABILITY & ELECTRICAL PROPERTIES** | | | | | | | | | | | |
| FLAMMABILITY CLASSIFICATION | EN 60695-11-10 / UL94 | 0,8 mm | | - | HB | HB | HB | HB | HB | HB | HB |
| GLOW WIRE - GWFI | EN 60695-2-12 | - | | °C | | | | | | | |
| GLOW WIRE - GWIT | EN 60695-2-13 | - | | °C | | | | | | | |
| COMPERATIVE TRACKING INDEX | EN 60112 | SOLUTION A | | V | 600 | 600 | 600 | 600 | 600 | 600 | 600 |
| SURFACE RESISTIVITY | ASTM D257 | - | | Ω/sq | 1,00E+14 | 1,00E+14 | 1,00E+14 | 1,00E+14 | 1,00E+14 | 1,00E+14 | 1,00E+14 |
| US-FMVSS 302 | ISO 3795 | - | | mm/min | <100 | <100 | <100 | <100 | <100 | <100 | <100 |

| FEATURES | STANDARDS | TEST | CONDITIONS | UNIT | EPLAMID 6 * FX0 NC Q1B301 | EPLAMID 6 * FX0 BK Q1B301 | EPLAMID 6 ** FV0 NC Q1C001 | EPLAMID 6 ** FV0 BK Q1C501 | EPLAMID 6 * GX2 20 NC Q1C0B201 | EPLAMID 6 * GX0 30 NC Q1D0B801 | EPLAMID 6 ** GV0 20 NC Q1C0C001 | EPLAMID 6 ** GV0 30 NC Q1D0C002 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| DEFINITION | ISO 1043 | - | - | | PA6 FR(30) | PA6 FR(30) | PA6 FR(17) | PA6 FR(17) | PA6-GF20 FR(30) | PA6-GF30 FR(40) | PA6-GF20 FR(17) | PA6-GF30 FR(17) |
| COLOUR | - | - | - | | NATURAL | BLACK | NATURAL | BLACK | GREY | NATURAL | NATURAL | NATURAL |
| DENSITY / YOĞUNLUK | ISO 1183 | 23°C | | g/cm3 | 1,18 | 1,16 | 1,31 | 1,35 | 1,34 | 1,4 | 1,5 | 1,62 |
| ASH CONTENT | ISO 3154-4 | - | | % | - | - | - | - | 20 | 30 | 20 | 30 |
| DETERMINATION OF WATER CONTENT | ISO 15512 | - | | % | 0,2 | 0,2 | 0,2 | 0,2 | 0,1 | 0,2 | 0,2 | 0,2 |
| MOLD SHRINKAGE - PARALLEL / NORMAL | ISO 294-4 | 3 mm | | % | 1,2/1,4 | 1,2/1,4 | 1,2/1,4 | 1,2/1,4 | 0,5/0,9 | 0,4/0,7 | 0,3/0,7 | 0,3/0,5 |
| **MECHANICAL PROPERTIES** | | | | | | | | | | | | |
| TENSILE MODULUS (1 mm/min) | ISO 527-2 | 23°C | | Mpa | 3800 | 3800 | 3300 | 3000 | 6200 | 10500 | 8900 | 10500 |
| TENSILE STRESS AT BREAK (5 mm/min) | ISO 527-2 | 23°C | | Mpa | 65 | 75 | 60 | 55 | 85 | 145 | 135 | 150 |
| TENSILE STRAIN AT BREAK (5 mm/min) | ISO 527-2 | 23°C | | | >10 | 3 | 15 | 10 | 3 | 3 | 3 | 2 |
| FLEXURAL MODULUS (2 mm/min) | ISO 178 | 23°C | | Mpa | 3300 | 3200 | 3000 | 2700 | 4700 | 9700 | 7900 | 10200 |
| FLEXURAL STRENGTH (2 mm/min) | ISO 178 | 23°C | | Mpa | 100 | 110 | 95 | 90 | 110 | 160 | 185 | 200 |
| NOTCHED IZOD IMPACT | ISO 180/1A | 23°C | | kJ/m² | 5 | <10 | 6 | 5 | 4 | 9 | 9 | 10 |
| UNNOTCHED IZOD IMPACT | ISO 180/1U | 23°C | | kJ/m² | 50 | 80 | 75 | 70 | 40 | 65 | 55 | 55 |
| NOTCHED CHARPY IMPACT | ISO 179/1eA | 23°C | | kJ/m² | 6 | <10 | 7 | 6 | 5 | 10 | 10 | 11 |
| UNNOTCHED CHARPY IMPACT | ISO 179/1eU | 23°C | | kJ/m² | 55 | 85 | 80 | 75 | 45 | 70 | 60 | 60 |
| **THERMAL PROPERTIES** | | | | | | | | | | | | |
| MELTING POINT | ISO 3146 | - | | °C | 220 | 220 | 220 | 220 | 220 | 220 | 220 | 220 |
| HDT/B | ISO 75-2/B | 0,45 Mpa | | °C | 190 | 190 | 190 | 190 | 210 | 215 | 210 | 215 |
| HDT/A | ISO 75-2/A | 1,80 Mpa | | °C | 80 | 80 | 85 | 85 | 175 | 210 | 190 | 205 |
| **FLAMMABILITY & ELECTRICAL PROPERTIES** | | | | | | | | | | | | |
| FLAMMABILITY CLASSIFICATION | EN 60695-11-10 / UL94 | - | | - | V0 (@0,8mm) | V0 (@0,8mm) | V0 (@1,6mm) | V0 (0,8mm) | V2 (0,8mm) | V0 (@0,8mm) | V0 (@0,8mm) | V0 (@0,8mm) |
| GLOW WIRE - GWFI | EN 60695-2-12 | - | | °C | 960 (@0,8mm) | 960 (@0,8mm) | 960 (@1,6mm) | 960 (@0,8mm) | 960 (@0,8mm) | 960 (@0,8mm) | 960 (@0,8mm) | 960 (@1,6mm) |
| GLOW WIRE - GWIT | EN 60695-2-13 | - | | °C | 775 (1,6mm) | 750 (@2,00mm) | 750 (0,8mm) | 725 (0,8mm) | - | - | 750 (0,8mm) | 750 (0,8mm) |
| COMPERATIVE TRACKING INDEX | EN 60112 | SOLUTION A | | V | 600 | 600 | 600 | 600 | 600 | 600 | 600 | 250 |
| SURFACE RESISTIVITY | ASTM D257 | - | | Ω/sq | 1,00E+13 | 1,00E+13 | 1,00E+13 | 1,00E+13 | 1,00E+13 | 1,00E+13 | 1,00E+13 | 1,00E+13 |
| US-FMVSS 302 | ISO 3795 | - | | mm/min | <100 | <100 | <100 | <100 | <100 | <100 | < 100 | < 100 |

# FLAME RETARDANT PA66 GRADES

* Halogen and Phosphorus Free
** Halogenated
*** Red Phosphorus

| FEATURES | STANDARDS | TEST CONDITIONS | UNIT | EPLAMID 66 * FX0 NC Q1B501 | EPLAMID 66 * GX0 25 NC Q1C5B801 | EPLAMID 66 * GX0 30 NC Q1D0B801 | EPLAMID 66 ** GV0 20 NC Q1C0C001 | EPLAMID 66 * GV0 30 NC Q1D0C001 | EPLAMID 66 *** GX0 25 RP Q1C5A901 | EPLAMID 66 *** GX0 35 RP Q1D5B001 |
|---|---|---|---|---|---|---|---|---|---|---|
| DEFINITION | ISO 1043 | - | - | PA66 FR(30) | PA66-GF25 FR(40) | PA66-GF30 FR(40) | PA66-GF20 FR(17) | PA66-GF30 FR(17) | PA66-GF25 FR(52) | PA66-GF25 FR(52) |
| COLOUR | - | - | - | NATURAL | NATURAL | NATURAL | NATURAL | NATURAL | RED | RED |
| DENSITY / YOĞUNLUK | ISO 1183 | 23°C | g/cm3 | 1,17 | 1,35 | 1,41 | 1,5 | 1,62 | 1,33 | 1,44 |
| ASH CONTENT | ISO 3154-4 | - | % | - | 25 | 30 | 20 | 30 | 25 | 35 |
| DETERMINATION OF WATER CONTENT | ISO 15512 | - | % | 0,2 | 0,2 | 0,2 | 0,2 | 0,2 | 0,2 | 0,2 |
| MOLD SHRINKAGE - PARALLEL / NORMAL | ISO 294-4 | 3 mm | % | 1,3/1,7 | 0,4/0,6 | 0,3/0,9 | 0,7/1,0 | 0,3/0,6 | 0,3/0,5 | 0,3/0,5 |
| **MECHANICAL PROPERTIES** | | | | | | | | | | |
| TENSILE MODULUS (1 mm/min) | ISO 527-2 | 23°C | Mpa | 3800 | 9200 | 10500 | 8200 | 12000 | 8500 | 11000 |
| TENSILE STRESS AT BREAK (5 mm/min) | ISO 527-2 | 23°C | Mpa | 80 | 135 | 130 | 150 | 170 | 150 | 165 |
| TENSILE STRAIN AT BREAK (5 mm/min) | ISO 527-2 | 23°C | | 6 | 2,5 | 2,5 | 2,5 | 2,5 | 3 | 3 |
| FLEXURAL MODULUS (2 mm/min) | ISO 178 | 23°C | Mpa | 3500 | 8900 | 9000 | 7000 | 11000 | 7400 | 9500 |
| FLEXURAL STRENGTH (2 mm/min) | ISO 178 | 23°C | Mpa | 115 | 220 | 190 | 190 | 230 | 190 | 220 |
| NOTCHED IZOD IMPACT | ISO 180/1A | 23°C | kJ/m² | 5 | 9 | 8 | 7 | 9 | 11 | 14 |
| UNNOTCHED IZOD IMPACT | ISO 180/1U | 23°C | kJ/m² | 70 | 55 | 55 | 45 | 55 | 65 | 80 |
| NOTCHED CHARPY IMPACT | ISO 179/1eA | 23°C | kJ/m² | 6 | 10 | 9 | 8 | 10 | 12 | 15 |
| UNNOTCHED CHARPY IMPACT | ISO 179/1eU | 23°C | kJ/m² | 75 | 65 | 60 | 50 | 60 | 70 | 90 |
| **THERMAL PROPERTIES** | | | | | | | | | | |
| MELTING POINT | ISO 3146 | - | °C | 260 | 260 | 260 | 260 | 260 | 260 | 260 |
| HDT/B | ISO 75-2/B | 0,45 Mpa | °C | 210 | 255 | 250 | 245 | 255 | 245 | 250 |
| HDT/A | ISO 75-2/A | 1,80 Mpa | °C | 95 | 240 | 225 | 230 | 240 | 235 | 245 |
| **FLAMMABILITY & ELECTRICAL PROPERTIES** | | | | | | | | | | |
| FLAMMABILITY CLASSIFICATION | EN 60695-11-10 / UL94 | - | - | V0(@0,4mm) | V0(@0,4mm) | V0(@0,8mm) | V0(@0,8mm) | V0(@0,4mm) | V0(@0,8mm) | V0(@0,8mm) |
| GLOW WIRE - GWFI | EN 60695-2-12 | - | °C | 960(@0,8mm) | 960(@0,8mm) | 960(@0,8mm) | 960(@0,8mm) | 960(@0,8mm) | 960(@0,8mm) | 960(@0,8mm) |
| GLOW WIRE - GWIT | EN 60695-2-13 | - | °C | 775(@0,8mm) | 700(@0,8mm) | 750(@0,8mm) | 750(@0,8mm) | 750(@0,8mm) | 750(@0,8mm) | 750(@0,8mm) |
| COMPERATIVE TRACKING INDEX | EN 60112 | SOLUTION A | V | 500 | 500 | 600 | 250 | 250 | 600 | 600 |
| SURFACE RESISTIVITY | ASTM D257 | - | Ω/sq | 1,00E+14 | 1,00E+14 | 1,00E+14 | 1,00E+14 | 1,00E+14 | 1,00E+14 | 1,00E+14 |
| US-FMVSS 302 | ISO 3795 | - | mm/min | <100 | <100 | <100 | <100 | <100 | <100 | <100 |

| FEATURES | STANDARDS | TEST | CONDITIONS | UNIT | EPLAMID HT00 GFR 30 BK Q1D001 | EPLAMID HT00 GFR 50 BK Q1F001 | EPLAMID HT01 GFR 30 BK Q1D001 | EPLAMID HT01 GFR 50 BK Q1F001 | EPLAMID HT02 GFR 30 BK Q1D001 | EPLAMID HT02 GFR 50 BK Q1F001 | EPLAMID HT03 GFR 30 BK Q1D001 | EPLAMID HT03 GFR 50 BK Q1f001 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| DEFINITION | ISO 1043 | - | - | | PA6T/X-GF30 | PA6T/X-GF50 | PA6T/6I/66-GF30 | PA6T/6I/66-GF50 | PA6T/66-GF30 | PA6T/66-GF50 | PA66/6I/X-GF30 | PA66/6I/X-GF50 |
| COLOUR | - | - | - | | NATURAL | NATURAL | NATURAL | NATURAL | NATURAL | NATURAL | NATURAL | NATURAL |
| DENSITY / YOĞUNLUK | ISO 1183 | 23°C | g/cm3 | | 1,43 | 1,63 | 1,42 | 1,62 | 1,42 | 1,61 | 1,37 | 1,57 |
| ASH CONTENT | ISO 3154-4 | - | % | | 30 | 50 | 30 | 50 | 30 | 50 | 30 | 50 |
| DETERMINATION OF WATER CONTENT | ISO 15512 | - | % | | 0,1 | 0,1 | 0,1 | 0,1 | 0,1 | 0,1 | 0,1 | 0,1 |
| MOLD SHRINKAGE - PARALLEL / NORMAL | ISO 294-4 | 3 mm | % | | 0,1/0,6 | 0,1/0,5 | 0,1/0,6 | 0,1/0,6 | 0,1/0,6 | 0,1/0,6 | 0,1/0,6 | 0,1/0,4 |
| **MECHANICAL PROPERTIES** | | | | | | | | | | | | |
| TENSILE MODULUS (1 mm/min) | ISO 527-2 | 23°C | Mpa | | 11000 | 17700 | 11500 | 17600 | 11400 | 17500 | 10000 | 17700 |
| TENSILE STRESS AT BREAK (5 mm/min) | ISO 527-2 | 23°C | Mpa | | 190 | 255 | 195 | 250 | 190 | 235 | 190 | 240 |
| TENSILE STRAIN AT BREAK (5 mm/min) | ISO 527-2 | 23°C | - | | 2 | 1,5 | 3 | 3 | 3 | 2,5 | 3 | 2,5 |
| NOTCHED IZOD IMPACT | ISO 180/1A | 23°C | kJ/m² | | - | - | - | - | - | - | - | - |
| UNNOTCHED IZOD IMPACT | ISO 180/1U | 23°C | kJ/m² | | - | - | - | - | - | - | - | - |
| NOTCHED CHARPY IMPACT | ISO 179/1eA | 23°C | kJ/m² | | 8 | 13 | 9 | 11 | 8 | 12 | 10 | 13 |
| UNNOTCHED CHARPY IMPACT | ISO 179/1eU | 23°C | kJ/m² | | 60 | 90 | 50 | 75 | 85 | 90 | 70 | 80 |
| **THERMAL PROPERTIES** | | | | | | | | | | | | |
| MELTING POINT | ISO 3146 | - | °C | | 315 | 315 | 325 | 325 | 310 | 310 | 260 | 260 |
| HDT/B | ISO 75-2/B | 8,0 Mpa | °C | | 140 | 205 | 200 | 230 | 150 | 150 | 105 | 165 |
| HDT/A | ISO 75-2/A | 1,80 Mpa | °C | | 280 | 285 | 290 | 290 | 280 | 280 | 230 | 230 |
| Maximum working temp. long term | ISO 2578 | - | °C | | 140 | 150 | 140 | 140 | 140 | 140 | 110 | 110 |
| Maximum working temp. short term | ISO 2578 | - | °C | | 250 | 250 | 270 | 270 | 250 | 250 | 215 | 215 |
| **FLAMMABILITY & ELECTRICAL PROPERTIES** | | - | | | | | | | | | | |
| FLAMMABILITY CLASSIFICATION | EN 60695-11-10 / UL94 | - | - | | HB | HB | HB | HB | HB | HB | HB | HB |
| GLOW WIRE - GWFI | EN 60695-2-12 | - | °C | | | | | | | | | |
| GLOW WIRE - GWIT | EN 60695-2-13 | - | °C | | | | | | | | | |
| COMPERATIVE TRACKING INDEX | EN 60112 | SOLUTION A | V | | 600 | 600 | 600 | 600 | 600 | 600 | 600 | 600 |
| DIELECTRIC STRENGTH | IEC 60243-1 | - | Kv/MM | | 35 | 35 | 35 | 35 | 40 | 40 | 33 | 33 |
| US-FMVSS 302 | ISO 3795 | - | mm/min | | <100 | <100 | <100 | <100 | <100 | <100 | <100 | <100 |

| FEATURES | STANDARDS | TEST | CONDITIONS | UNIT | EPLAMID 6 GFR 15 BK Q2B502 | EPLAMID 6 GFR 40 BK Q1E002 | EPLAMID 6 GFS 60 HS BK Q2G001 | EPLAMID 6 GFI 15 BK Q1B5A502 | EPLAMID 66 GFS 30 HS BK Q2D001 | EPLAMID 66 GFS 50 HS BK Q1F002 | EPLAMID 66 GFS 60 HS BK Q2G001 | EPLAMID 66 GFH 30 HS BK Q2D003 | EPLAMID 66 GFI 13 NC Q1B3A601 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| DEFINITION | ISO 1043 | - | - | | PA6-GF15 | PA6-GF40 | PA6-GF60 | PA6-I-GF15 | PA66-GF30 | PA66-GF50 | PA66-GF60 | PA66-GF30 | PA66-I-GF33 |
| COLOUR | - | - | - | | BLACK | BLACK | BLACK | BLACK | BLACK | BLACK | BLACK | BLACK | NATURAL |
| DENSITY / YOĞUNLUK | ISO 1183 | 23°C | g/cm3 | | 1,24 | 1,44 | 1,69 | 1,21 | 1,36 | 1,56 | 1,69 | 1,35 | 1,18 |
| ASH CONTENT | ISO 3154-4 | - | % | | 15 | 40 | 60 | 15 | 30 | 50 | 60 | 30 | 13 |
| DETERMINATION OF WATER CONTENT | ISO 15512 | - | % | | 0,1 | 0,1 | 0,1 | 0,1 | 0,2 | 0,2 | 0,2 | 0,1 | 0,1 |
| MOLD SHRINKAGE - PARALLEL / NORMAL | ISO 294-4 | 3 mm | % | | 0,8/1,1 | 0,3/0,5 | 0,3/0,5 | 0,7/1,0 | 0,4/0,8 | 0,2/0,4 | 0,2/0,4 | 0,2/0,7 | 0,8/0,9 |
| **MECHANICAL PROPERTIES** | | | | | | | | | | | | | |
| TENSILE MODULUS (1 mm/min) | ISO 527-2 | 23°C | Mpa | | 5600 | 13000 | 19000 | 5500 | 9700 | 16800 | 20000 | 11000 | 4800 |
| TENSILE STRESS AT BREAK (5 mm/min) | ISO 527-2 | 23°C | Mpa | | 120 | 195 | 220 | 115 | 185 | 225 | 230 | 185 | 100 |
| TENSILE STRAIN AT BREAK (5 mm/min) | ISO 527-2 | 23°C | - | | 2,5 | 3 | 2,5 | 4 | 3,5 | 2,5 | 2 | 3 | 5 |
| FLEXURAL MODULUS (2 mm/min) | ISO 178 | 23°C | Mpa | | 4500 | 11500 | 18000 | 5000 | 8600 | 15000 | 19000 | 9200 | 4100 |
| FLEXURAL STRENGTH (2 mm/min) | ISO 178 | 23°C | Mpa | | 230 | 300 | 320 | 170 | 285 | 335 | 385 | 300 | 140 |
| NOTCHED IZOD IMPACT | ISO 180/1A | 23°C | kJ/m² | | 6 | 14 | 15 | 12 | 11 | 14 | 14 | 13 | 14 |
| UNNOTCHED IZOD IMPACT | ISO 180/1U | 23°C | kJ/m² | | 45 | 85 | 90 | 55 | 65 | 95 | 95 | 85 | 72 |
| NOTCHED CHARPY IMPACT | ISO 179/1eA | 23°C | kJ/m² | | 7 | 15 | 16 | 13 | 12 | 15 | 15 | 14 | 16 |
| UNNOTCHED CHARPY IMPACT | ISO 179/1eU | 23°C | kJ/m² | | 50 | 90 | 95 | 65 | 70 | 100 | 100 | 90 | 82 |
| **THERMAL PROPERTIES** | | | | | | | | | | | | | |
| MELTING POINT | ISO 3146 | - | °C | | 220 | 220 | 220 | 220 | 260 | 260 | 260 | 260 | 260 |
| HDT/B | ISO 75-2/B | 0,45 Mpa | °C | | 215 | 215 | 220 | 210 | 255 | 255 | 255 | 250 | 240 |
| HDT/A | ISO 75-2/A | 1,80 Mpa | °C | | 210 | 210 | 215 | 190 | 250 | 250 | 250 | 245 | 230 |
| **FLAMMABILITY & ELECTRICAL PROPERTIES** | | | | | | | | | | | | | |
| FLAMMABILITY CLASSIFICATION | EN 60695-11-10 / UL94 | 0,8 mm | - | | HB | HB | HB | HB | HB | HB | HB | HB | HB |
| GLOW WIRE - GWFI | EN 60695-2-12 | - | °C | | | | | | | | | | |
| GLOW WIRE - GWIT | EN 60695-2-13 | - | °C | | | | | | | | | | |
| COMPERATIVE TRACKING INDEX | EN 60112 | SOLUTION A | V | | 550 | 550 | 550 | 550 | 500 | 500 | 500 | 400 | 600 |
| SURFACE RESISTIVITY | ASTM D257 | - | Ω/sq | | 1,00E+13 | 1,00E+13 | 1,00E+13 | 1,00E+13 | 1,00E+14 | 1,00E+14 | 1,00E+14 | 1,00E+14 | 1,00E+14 |
| US-FMVSS 302 | ISO 3795 | - | mm/min | | <100 | <100 | <100 | <100 | <100 | <100 | <100 | <100 | <100 |

| FEATURES | STANDARDS | TEST | CONDITIONS | UNIT | EPIMIX PBT NC 10 | EPIMIX PBT GFR 10 NC Q1B001 | EPIMIX PBT GFR 15 NC Q1B501 | EPIMIX PBT GFR 30 NC Q1D0A301 | EPIMIX PBT * FV0 NC Q1B501 | EPIMIX PBT * GV0 15 NC Q1B5A901 | EPIMIX PBT * GV0 30 NC Q1D0B001 | EPIMIX PBT IMP NC Q1A501 | EPIMIX PBT IMP NC Q1C001 | EPIMIX PBT IMP NC Q1C201 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| DEFINITION | ISO 1043 | - | - | | PBT | PBT-GF10 | PBT-GF15 | PBT-GF30 | PBT FR | PBT GF15 FR | PBT GF30 FR | PBT-I | PBT-I | PBT-I |
| COLOUR | - | - | - | | NATURAL | NATURAL | NATURAL | NATURAL | NATURAL | NATURAL | NATURAL | NATURAL | NATURAL | NATURAL |
| DENSITY / YOĞUNLUK | ISO 1183 | 23°C | g/cm3 | | 1,31 | 1,35 | 1,38 | 1,51 | 1,44 | 1,52 | 1,64 | 1,28 | 1,25 | 1,22 |
| ASH CONTENT | ISO 3154-4 | - | % | | | 10 | 15 | 30 | | 15 | 30 | | | |
| DETERMINATION OF WATER CONTENT | ISO 15512 | - | % | | | | | | | | | | | |
| MOLD SHRINKAGE - PARALLEL / NORMAL | ISO 294-4 | 3 mm | % | | 1,8/2,0 | 0,3/1,0 | 0,3/1,0 | 0,3/1,0 | 0,3/1,0 | 0,3/1,0 | 0,3/1,0 | 1,7/1,9 | 1,8/2,0 | 1,8/2,0 |
| **MECHANICAL PROPERTIES** | | | | | | | | | | | | | | |
| TENSILE MODULUS (1 mm/min) | ISO 527-2 | 23°C | Mpa | | 2900 | 4700 | 6300 | 10000 | 3200 | 7000 | 11000 | 2300 | 2000 | 1800 |
| TENSILE STRESS AT BREAK (5 mm/min) | ISO 527-2 | 23°C | Mpa | | 60 | 95 | 100 | 135 | 60 | 90 | 130 | 50 | 50 | 35 |
| TENSILE STRAIN AT BREAK (5 mm/min) | ISO 527-2 | 23°C | - | | 200 | 3,5 | 3,5 | 3 | 10 | 2 | 2,5 | >30 | >50 | >50 |
| FLEXURAL MODULUS (2 mm/min) | ISO 178 | 23°C | Mpa | | 2500 | 3500 | 4800 | 9200 | 2800 | 6500 | 9500 | 1900 | 1700 | 1500 |
| FLEXURAL STRENGTH (2 mm/min) | ISO 178 | 23°C | Mpa | | 80 | 130 | 155 | 200 | 100 | 135 | 185 | 75 | 60 | 55 |
| NOTCHED IZOD IMPACT | ISO 180/1A | 23°C | kJ/m² | | 10 | 5 | 7 | 10 | 5 | 5 | 7 | 8 | 45 | 62 |
| UNNOTCHED IZOD IMPACT | ISO 180/1U | 23°C | kJ/m² | | 150 | 35 | 45 | 60 | 40 | 20 | 50 | No break | No break | No break |
| NOTCHED CHARPY IMPACT | ISO 179/1eA | 23°C | kJ/m² | | 10 | 6 | 8 | 11 | 6 | 6 | 8 | 10 | 50 | 80 |
| UNNOTCHED CHARPY IMPACT | ISO 179/1eU | 23°C | kJ/m² | | 220 | 40 | 50 | 65 | 45 | 25 | 55 | No break | No break | No break |
| **THERMAL PROPERTIES** | | | | | | | | | | | | | | |
| MELTING POINT | ISO 3146 | - | °C | | 225 | 225 | 225 | 225 | 220 | 220 | 220 | 225 | 225 | 225 |
| HDT/B | ISO 75-2/B | 0,45 Mpa | °C | | 160 | 220 | 220 | 220 | 175 | 215 | 200 | 120 | 120 | 140 |
| HDT/A | ISO 75-2/A | 1,80 Mpa | °C | | 60 | 190 | 190 | 210 | 70 | 195 | 195 | 60 | 60 | 55 |
| **FLAMMABILITY & ELECTRICAL PROPERTIES** | | | | | | | | | | | | | | |
| FLAMMABILITY CLASSIFICATION | EN 60695-11-10 / UL94 | 0,8 mm | - | | HB | HB | HB | HB | V0 (1,6 mm) | V0 (1,6 mm) | V0 (1,6 mm) | HB | HB | HB |
| GLOW WIRE - GWFI | EN 60695-2-12 | - | °C | | | | | | 960 (1,6 mm) | 960 (1,6 mm) | 960 (1,6 mm) | | | |
| GLOW WIRE - GWIT | EN 60695-2-13 | - | °C | | | | | | 550 (1,6 mm) | | | | | |
| COMPERATIVE TRACKING INDEX | EN 60112 | SOLUTION A | V | | 600 | 400 | 400 | 350 | 225 | 200 | 200 | 600 | 600 | 600 |
| SURFACE RESISTIVITY | ASTM D257 | - | Ω/sq | | 1,00E+13 | 1,00E+13 | 1,00E+13 | 1,00E+13 | 1,00E+13 | 1,00E+15 | 1,00E+15 | 1,00E+13 | 1,00E+13 | 1,00E+13 |
| US-FMVSS 302 | ISO 3795 | - | mm/min | | | | | | <100 | <100 | <100 | | | |

| FEATURES | STANDARDS | TEST | CONDITIONS | UNIT | EPIMIX PA66/PP BK Q101 | EPIMIX PA6 /PP GFR 30 NC Q1D001 | EPLAMID 6 CFR 10 BK Q1B001 | EPLAMID 6 CFR 30 BK Q1D001 | EPLAMID 66 CFR 20 BK Q1C001 | EPLAMID 6 GCF 20 BK Q1B0B001 |
|---|---|---|---|---|---|---|---|---|---|---|
| DEFINITION | ISO 1043 | - | - | | PA66/PP | PA6/PP GF30 | PA6 CF10 | PA6 CF30 | PA66 CF20 | PA 6 GF+CF |
| COLOUR | - | - | - | | BLACK | NATURAL | BLACK | BLACK | BLACK | BLACK |
| DENSITY / YOĞUNLUK | ISO 1183 | 23°C | | g/cm3 | 1,04 | 1,22 | 1,17 | 1,27 | 1,22 | 1,24 |
| ASH CONTENT | ISO 3154-4 | - | | % | | 30 | 10 | 30 | 20 | 20 |
| DETERMINATION OF WATER CONTENT | ISO 15512 | - | | % | | 0,1 | 0,1 | 0,1 | 0,1 | 0,1 |
| MOLD SHRINKAGE - PARALLEL / NORMAL | ISO 294-4 | 3 mm | | % | 2,5/1,8 | 0,3/0,8 | 0,5/0,8 | 0,3/0,8 | 0,4/0,6 | 0,4/0,7 |
| **MECHANICAL PROPERTIES** | | | | | | | | | | |
| TENSILE MODULUS (1 mm/min) | ISO 527-2 | 23°C | | Mpa | 2400 | 8200 | 8500 | 21000 | 16700 | 11500 |
| TENSILE STRESS AT BREAK (5 mm/min) | ISO 527-2 | 23°C | | Mpa | 55 | 120 | 120 | 220 | 200 | 175 |
| TENSILE STRAIN AT BREAK (5 mm/min) | ISO 527-2 | 23°C | | - | >20 | 3 | 2 | 2 | 2 | 2,5 |
| FLEXURAL MODULUS (2 mm/min) | ISO 178 | 23°C | | Mpa | 2000 | 7800 | 7000 | 19000 | 15200 | 10500 |
| FLEXURAL STRENGTH (2 mm/min) | ISO 178 | 23°C | | Mpa | 85 | 180 | 210 | 330 | 260 | 280 |
| NOTCHED IZOD IMPACT | ISO 180/1A | 23°C | | kJ/m² | 5 | 11 | 5 | 8 | 7 | 9 |
| UNNOTCHED IZOD IMPACT | ISO 180/1U | 23°C | | kJ/m² | No break | 60 | 25 | 38 | 55 | 60 |
| NOTCHED CHARPY IMPACT | ISO 179/1eA | 23°C | | kJ/m² | 7 | 12 | 6 | 9 | 8 | 10 |
| UNNOTCHED CHARPY IMPACT | ISO 179/1eU | 23°C | | kJ/m² | No break | 65 | 30 | 48 | 60 | 65 |
| **THERMAL PROPERTIES** | | | | | | | | | | |
| MELTING POINT | ISO 3146 | - | | °C | 260 | 220 | 220 | 220 | 260 | 220 |
| HDT/B | ISO 75-2/B | 0,45 Mpa | | °C | 150 | 185 | 210 | 215 | 255 | 215 |
| HDT/A | ISO 75-2/A | 1,80 Mpa | | °C | 65 | 160 | 190 | 195 | 250 | 200 |
| **FLAMMABILITY & ELECTRICAL PROPERTIES** | | | | | | | | | | |
| FLAMMABILITY CLASSIFICATION | EN 60695-11-10 / UL94 | 0,8 mm | | - | HB | HB | HB | HB | HB | HB |
| GLOW WIRE - GWFI | EN 60695-2-12 | - | | °C | | | | | | |
| GLOW WIRE - GWIT | EN 60695-2-13 | - | | °C | | | | | | |
| COMPERATIVE TRACKING INDEX | EN 60112 | SOLUTION A | | V | | 600 | | 100 | 100 | |
| SURFACE RESISTIVITY | ASTM D257 | - | | Ω/sq | 1,00E+13 | 1,00E+13 | 1,00E+06 | 1,00E+03 | 1,00E+03 | >1,00E+06 |
| US-FMVSS 302 | ISO 3795 | - | | mm/min | <100 | <100 | <100 | <100 | <100 | <100 |

| FEATURES | STANDARDS | TEST CONDITIONS | UNIT | EPLAMID 6 NC EC Q101 | EPLAMID 6 EC BK Q1E001 | EPLAMID 6 CFR 5 BK Q1A5D001 | EPLAMID 6 CFR 10 EC BK Q1B0D001 | EPLAMID 66 GCF 30 BK Q1B5B501 | EPLAMID 66 GCF 30 BK Q1B5B502 | EPLAMID 66 IMP EC BK Q1B0G001 |
|---|---|---|---|---|---|---|---|---|---|---|
| DEFINITION | ISO 1043 | - | - | PA6 + SPECIAL ADDITIVE | PA6 + SPECIAL ADDITIVE | PA6-CF5 + SPECIAL ADDITIVE | PA6-CF10 + SPECIAL ADDITIVE | PA66-(GF+CF)30 | PA66-(GF+CF)30 | PA66-I |
| COLOUR | - | - | - | NATURAL | BLACK | BLACK | BLACK | BLACK | BLACK | BLACK |
| DENSITY / YOĞUNLUK | ISO 1183 | 23°C | g/cm3 | 1,13 | 1,4 | 1,32 | 1,21 | 1,32 | 1,31 | 1,15 |
| ASH CONTENT | ISO 3154-4 | - | % | | | 5 | 10 | 30 | 30 | |
| DETERMINATION OF WATER CONTENT | ISO 15512 | - | % | 0,1 | 0,1 | 0,1 | 0,1 | 0,1 | 0,1 | 0,1 |
| MOLD SHRINKAGE - PARALLEL / NORMAL | ISO 294-4 | 3 mm | % | 1,1/1,4 | 1,1/1,4 | 0,3/0,4 | 0,3/0,4 | 0,2/0,6 | 0,2/0,6 | 1,1/1,4 |
| **MECHANICAL PROPERTIES** | | | | | | | | | | |
| TENSILE MODULUS (1 mm/min) | ISO 527-2 | 23°C | Mpa | 2400 | 9600 | 7500 | 16000 | 12600 | 12600 | 2100 |
| TENSILE STRESS AT BREAK (5 mm/min) | ISO 527-2 | 23°C | Mpa | 50 | 80 | 110 | 135 | 200 | 200 | 40 |
| TENSILE STRAIN AT BREAK (5 mm/min) | ISO 527-2 | 23°C | - | 15 | 2 | 2 | 2 | 2 | 2 | >20 |
| FLEXURAL MODULUS (2 mm/min) | ISO 178 | 23°C | Mpa | 2000 | 9300 | 6000 | 15000 | 10500 | 10400 | 1000 |
| FLEXURAL STRENGTH (2 mm/min) | ISO 178 | 23°C | Mpa | 85 | 110 | 160 | 185 | 265 | 280 | 70 |
| NOTCHED IZOD IMPACT | ISO 180/1A | 23°C | kJ/m² | 5 | 4 | 9 | 4 | 9 | 10 | 11 |
| UNNOTCHED IZOD IMPACT | ISO 180/1U | 23°C | kJ/m² | 90 | 30 | 45 | 25 | 50 | 60 | No break |
| NOTCHED CHARPY IMPACT | ISO 179/1eA | 23°C | kJ/m² | 6 | 4 | 10 | 5 | 10 | 11 | 12 |
| UNNOTCHED CHARPY IMPACT | ISO 179/1eU | 23°C | kJ/m² | 100 | 35 | 50 | 30 | 55 | 65 | No break |
| **THERMAL PROPERTIES** | | | | | | | | | | |
| MELTING POINT | ISO 3146 | - | °C | 220 | 220 | 220 | 220 | 260 | 260 | 260 |
| HDT/B | ISO 75-2/B | 0,45 Mpa | °C | 150 | 150 | 210 | 210 | 255 | 255 | 185 |
| HDT/A | ISO 75-2/A | 1,80 Mpa | °C | 50 | 50 | 190 | 190 | 245 | 245 | 90 |
| **FLAMMABILITY & ELECTRICAL PROPERTIES** | | | | | | | | | | |
| FLAMMABILITY CLASSIFICATION | EN 60695-11-10 / UL94 | 0,8 mm | - | HB | HB | HB | HB | HB | HB | HB |
| GLOW WIRE - GWFI | EN 60695-2-12 | - | °C | | | | | | | |
| GLOW WIRE - GWIT | EN 60695-2-13 | - | °C | | | | | | | |
| COMPERATIVE TRACKING INDEX | EN 60112 | SOLUTION A | V | 550 | 500 | | | | | 600 |
| SURFACE RESISTIVITY | ASTM D257 | - | Ω/sq | 1,00E+08 | 1,00E+05 | 1,00E+05 | 1,00E+04 | <1,00E+04 | <1,00E+04 | 1,00E+06 |
| US-FMVSS 302 | ISO 3795 | - | mm/min | <100 | <100 | <100 | <100 | <100 | <100 | <100 |

| FEATURES | STANDARDS | TEST | CONDITIONS | UNIT | EPIMIX PBT FW NC Q101 | EPLAMID 6 GFR 30 FW BK Q1D001 | EPLAMID 66 GFS 30 FW BK Q1D001 | EPLAMID 66 GFS 30 FW NC Q1D002 | EPLAMID 66 NC FW L K B4.0 | EPLAMID HT00 GFR 40 FW BK Q1E001 |
|---|---|---|---|---|---|---|---|---|---|---|
| DEFINITION | ISO 1043 | - | - | | PBT | PA6-GF30 | PA66-GF30 | PA66-GF30 | PA66 | PA6T/X-GF40 |
| COLOUR | - | - | - | | NATURAL | BLACK | BLACK | NATURAL | NATURAL | BLACK |
| DENSITY / YOĞUNLUK | ISO 1183 | 23°C | | g/cm3 | 1,3 | 1,35 | 1,35 | 1,36 | 1,14 | 1,52 |
| ASH CONTENT | ISO 3154-4 | - | | % | | 30 | 30 | 30 | | 40 |
| DETERMINATION OF WATER CONTENT | ISO 15512 | - | | % | | 0,1 | 0,2 | 0,2 | 0,1 | 0,1 |
| MOLD SHRINKAGE - PARALLEL / NORMAL | ISO 294-4 | 3 mm | | % | 0,5/1,9 | 0,4/0,7 | 0,4/0,8 | 0,4/0,8 | 1,4/1,6 | 0,1/0,6 |
| **MECHANICAL PROPERTIES** | | | | | | | | | | |
| TENSILE MODULUS (1 mm/min) | ISO 527-2 | 23°C | | Mpa | 2700 | 9800 | 10000 | 10400 | 3200 | 14700 |
| TENSILE STRESS AT BREAK (5 mm/min) | ISO 527-2 | 23°C | | Mpa | 65 | 165 | 180 | 190 | 85 | 215 |
| TENSILE STRAIN AT BREAK (5 mm/min) | ISO 527-2 | 23°C | | - | 8 | 3 | 3,5 | 3 | 10 | 2 |
| FLEXURAL MODULUS (2 mm/min) | ISO 178 | 23°C | | Mpa | 2600 | 8700 | 9000 | 9400 | 2900 | |
| FLEXURAL STRENGTH (2 mm/min) | ISO 178 | 23°C | | Mpa | 85 | 245 | 240 | 290 | 95 | |
| NOTCHED IZOD IMPACT | ISO 180/1A | 23°C | | kJ/m² | 7 | 16 | 10 | 11 | 6 | |
| UNNOTCHED IZOD IMPACT | ISO 180/1U | 23°C | | kJ/m² | 70 | 95 | 70 | 70 | No break | |
| NOTCHED CHARPY IMPACT | ISO 179/1eA | 23°C | | kJ/m² | 8 | 17 | 11 | 12 | 6 | 9 |
| UNNOTCHED CHARPY IMPACT | ISO 179/1eU | 23°C | | kJ/m² | 75 | 100 | 75 | 75 | No break | 70 |
| **THERMAL PROPERTIES** | | | | | | | | | | |
| MELTING POINT | ISO 3146 | - | | °C | 225 | 220 | 260 | 260 | 260 | 315 |
| HDT/B | ISO 75-2/B | 0,45 Mpa | | °C | 160 | 215 | 255 | 255 | 205 | 175 |
| HDT/A | ISO 75-2/A | 1,80 Mpa | | °C | 60 | 205 | 250 | 250 | 66 | 280 |
| **FLAMMABILITY & ELECTRICAL PROPERTIES** | | | | | | | | | | |
| FLAMMABILITY CLASSIFICATION | EN 60695-11-10 / UL94 | 0,8 mm | | - | HB | HB | HB | HB | V2 (0,4 mm) | HB |
| GLOW WIRE - GWFI | EN 60695-2-12 | - | | °C | | | | | | |
| GLOW WIRE - GWIT | EN 60695-2-13 | - | | °C | | | | | | |
| COMPERATIVE TRACKING INDEX | EN 60112 | SOLUTION A | | V | 600 | 550 | 500 | 500 | 600 | 600 |
| SURFACE RESISTIVITY | ASTM D257 | - | | Ω/sq | 1,00E+13 | 1,00E+13 | 1,00E+14 | 1,00E+14 | 1,00E+14 | |
| US-FMVSS 302 | ISO 3795 | - | | mm/min | <100 | <100 | <100 | <100 | <100 | <100 |

| FEATURES | STANDARDS | TEST | CONDITIONS | UNIT | EPLAMID 6 SPRINT GFR 25 NC Q2C501 | EPLAMID 6 SPRINT GFR 35 BK Q2D501 | EPLAMID 6 SPRINT GFR 50 NC Q1F001 | EPLAMID 66 SPRINT GFR 30 NC Q2D001 |
|---|---|---|---|---|---|---|---|---|
| DEFINITION | ISO 1043 | - | - | | PA6-GF25 | PA6-GF35 | PA6-GF50 | PA66-GF30 |
| COLOUR | - | - | - | | NATURAL | BLACK | NATURAL | NATURAL |
| DENSITY / YOĞUNLUK | ISO 1183 | 23°C | | g/cm3 | 1,3 | 1,4 | 1,57 | 1,36 |
| ASH CONTENT | ISO 3154-4 | - | | % | 25 | 35 | 50 | 30 |
| DETERMINATION OF WATER CONTENT | ISO 15512 | - | | % | 0,1 | 0,1 | 0,1 | 0,2 |
| MOLD SHRINKAGE - PARALLEL / NORMAL | ISO 294-4 | 3 mm | | % | 0,6/0,9 | 0,4/0,6 | 0,2/0,3 | 0,4/0,8 |
| **MECHANICAL PROPERTIES** | | | | | | | | |
| TENSILE MODULUS (1 mm/min) | ISO 527-2 | 23°C | | Mpa | 8300 | 11000 | 17000 | 10600 |
| TENSILE STRESS AT BREAK (5 mm/min) | ISO 527-2 | 23°C | | Mpa | 165 | 175 | 225 | 190 |
| TENSILE STRAIN AT BREAK (5 mm/min) | ISO 527-2 | 23°C | | - | 3 | 2,5 | 3 | 3 |
| FLEXURAL MODULUS (2 mm/min) | ISO 178 | 23°C | | Mpa | 7500 | 9600 | 14500 | 9600 |
| FLEXURAL STRENGTH (2 mm/min) | ISO 178 | 23°C | | Mpa | 260 | 270 | 335 | 305 |
| NOTCHED IZOD IMPACT | ISO 180/1A | 23°C | | kJ/m² | 10 | 11 | 15 | 11 |
| UNNOTCHED IZOD IMPACT | ISO 180/1U | 23°C | | kJ/m² | 60 | 75 | 90 | 70 |
| NOTCHED CHARPY IMPACT | ISO 179/1eA | 23°C | | kJ/m² | 11 | 12 | 16 | 12 |
| UNNOTCHED CHARPY IMPACT | ISO 179/1eU | 23°C | | kJ/m² | 65 | 80 | 95 | 75 |
| **THERMAL PROPERTIES** | | | | | | | | |
| MELTING POINT | ISO 3146 | - | | °C | 220 | 220 | 220 | 260 |
| HDT/B | ISO 75-2/B | 0,45 Mpa | | °C | 215 | 215 | 215 | 255 |
| HDT/A | ISO 75-2/A | 1,80 Mpa | | °C | 205 | 205 | 210 | 250 |
| **FLAMMABILITY & ELECTRICAL PROPERTIES** | | | | | | | | |
| FLAMMABILITY CLASSIFICATION | EN 60695-11-10 / UL94 | 0,8 mm | | - | HB | HB | HB | HB |
| GLOW WIRE - GWFI | EN 60695-2-12 | - | | °C | | | | |
| GLOW WIRE - GWIT | EN 60695-2-13 | - | | °C | | | | |
| COMPERATIVE TRACKING INDEX | EN 60112 | SOLUTION A | | V | 550 | 500 | 500 | 500 |
| SURFACE RESISTIVITY | ASTM D257 | - | | Ω/sq | 1,00E+13 | 1,00E+13 | 1,00E+13 | 1,00E+14 |
| US-FMVSS 302 | ISO 3795 | - | | mm/min | <100 | <100 | <100 | <100 |

Eplamid Sprint Product Range

**%80***
**BETTER FLOW**

* Compared to Standart Grades

Eplamid Sprint Product Range

**UP TO %40***
**SHORTER CYCLE TIME**

*Depending on the material and applications

Eplamid Sprint Product Range

- **SMOOTER SURFACE**
- **LOWER MOLDING TEMPERATURE**
- **SHORTER CYCLE TIME**
- **EASY DEMOLDING**

| FEATURES | STANDARDS | TEST | CONDITIONS | UNIT | EPLAMID 66 GFS 40 MOS2 NC Q1E0A201 | EPLAMID 66 TFL NC Q1C001 | EPLAMID 66 GFT 30 NC Q1D0B501 | EPLAMID 66 CFT 30 BK Q1B0C001 | EPLAMID 66 GCF 30 BK Q1B5B501 |
|---|---|---|---|---|---|---|---|---|---|
| DEFINITION | ISO 1043 | - | - | | PA66 GF40 | PA66 PTFE | PA66 GF-PTFE | PA66 CF-PTFE | PA66 GF+CF30 |
| COLOUR | - | - | - | | NATURAL | NATURAL | NATURAL | BLACK | BLACK |
| DENSITY / YOĞUNLUK | ISO 1183 | 23°C | | g/cm3 | 1,45 | 1,26 | 1,48 | 1,32 | 1,32 |
| ASH CONTENT | ISO 3154-4 | - | | % | 40 | | 30 | 30 | 30 |
| DETERMINATION OF WATER CONTENT | ISO 15512 | - | | % | 0,1 | 0,1 | 0,1 | 0,1 | 0,1 |
| MOLD SHRINKAGE - PARALLEL / NORMAL | ISO 294-4 | 3 mm | | % | 0,5/0,8 | 1,5/1,6 | 0,4 | 0,2/0,6 | 0,2/0,6 |
| **MECHANICAL PROPERTIES** | | | | | | | | | |
| TENSILE MODULUS (1 mm/min) | ISO 527-2 | 23°C | | Mpa | 13600 | 2700 | 10000 | 101000 | 12600 |
| TENSILE STRESS AT BREAK (5 mm/min) | ISO 527-2 | 23°C | | Mpa | 210 | 65 | 170 | 165 | 200 |
| TENSILE STRAIN AT BREAK (5 mm/min) | ISO 527-2 | 23°C | | - | 3 | 20 | 3 | 3 | 2 |
| FLEXURAL MODULUS (2 mm/min) | ISO 178 | 23°C | | Mpa | 11000 | 2400 | 8500 | 8700 | 10500 |
| FLEXURAL STRENGTH (2 mm/min) | ISO 178 | 23°C | | Mpa | 270 | 95 | 210 | 235 | 265 |
| NOTCHED IZOD IMPACT | ISO 180/1A | 23°C | | kJ/m² | 14 | 4 | 11 | 7 | 9 |
| UNNOTCHED IZOD IMPACT | ISO 180/1U | 23°C | | kJ/m² | 90 | 98 | 65 | 50 | 50 |
| NOTCHED CHARPY IMPACT | ISO 179/1eA | 23°C | | kJ/m² | 15 | 5 | 13 | 8 | 10 |
| UNNOTCHED CHARPY IMPACT | ISO 179/1eU | 23°C | | kJ/m² | 95 | 105 | 70 | 55 | 55 |
| **THERMAL PROPERTIES** | | | | | | | | | |
| MELTING POINT | ISO 3146 | - | | °C | 260 | 260 | 260 | 260 | 260 |
| HDT/B | ISO 75-2/B | 0,45 Mpa | | °C | 250 | 220 | 255 | 250 | 255 |
| HDT/A | ISO 75-2/A | 1,80 Mpa | | °C | 240 | 85 | 250 | 245 | 245 |
| **FLAMMABILITY & ELECTRICAL PROPERTIES** | | | | | | | | | |
| FLAMMABILITY CLASSIFICATION | EN 60695-11-10 / UL94 | 0,8 mm | | - | HB | HB | HB | HB | HB |
| GLOW WIRE - GWFI | EN 60695-2-12 | - | | °C | | | | | |
| GLOW WIRE - GWIT | EN 60695-2-13 | - | | °C | | | | | |
| COMPERATIVE TRACKING INDEX | EN 60112 | SOLUTION A | | V | 600 | 600 | 600 | 100 | |
| SURFACE RESISTIVITY | ASTM D257 | - | | Ω/sq | 1,00E+14 | 1,00E+14 | 1,00E+14 | 1,00E+03 | <1,00E+04 |
| US-FMVSS 302 | ISO 3795 | - | | mm/min | | | | | |

# MOLDING GUIDE

## PRE DRYING

Instead of PPA, Polyamide and PBT are hygroscopic and moisture sensitive, so pre-drying is recommended as a matter of rule. Material that is not pre-dried to a moisture level below 0,1 % will degrade, causing surface defects, parts that are out of dimension and brittle. Below are the recommended drying temperatures and time periods in a desiccant dryer with more than one desiccant element.

For **PPA** 7 to 9 hours at **100-120 °C**
For **PA6** and **PA66** 2 to 4 hours at **80-85 °C**
For **PBT** 2 to 4 hours at **120-140 °C**

**A few tips to ensure proper operation of the dryer:**

- Ensure the thermocouple that regulates the temperature is placed immediately before the entry of the air into the dryer. There can be a significant temperature drop in the air-conveyance system.
- The temperature of the air going out of the dryer silo should not be more than 30°C lower than the air entering the system. If this is the case, you have insufficient air capacity.
- From time to time, monitor the dew point of the dry air to ensure the desiccant elements are functioning properly.
- Often, less air runs through the very bottom part of a dryer silo. Therefore, it is recommended that you take the material out of the bottom of the dryer and feed back into the top when you start up your process.

## MOULDING TEMPERATURES

Recommended Moulding Temperatures for PPA

| Material | HT00 | HT01 | HT02 | HT03 |
|---|---|---|---|---|
| Pref. Melt Temp. | 300-330°C | 300-325°C | 300-320°C | 265-300°C |
| Rear | 310-325°C | 305-325°C | 305-320°C | 280-290°C |
| Center | 305-325°C | 315-325°C | 310-320°C | 280-290°C |
| Front | 320-325°C | 320-330°C | 320-325°C | 285-290°C |
| Nozzle | 320-330°C | 320-330°C | 320-330°C | 285-300°C |

Recommended Moulding Temperatures for PA6

| Material | Zone1 (Hopper) | Zone2 | Zone3 | Zone4 (Nozzle) |
|---|---|---|---|---|
| Unfilled Grades | 220-260°C | 225-270°C | 225-270°C | 225-275°C |
| Impact M. Grades | 220-265°C | 225-260°C | 225-265°C | 230-275°C |
| Flame Ret. Grades | 225-260°C | 230-260°C | 235-265°C | 235-265°C |
| Reinforced Grades | 240-280°C | 240-290°C | 240-290°C | 240-295°C |

Recommended Moulding Temperatures for PA66

| Material | Zone1 (Hopper) | Zone2 | Zone3 | Zone4 (Nozzle) |
|---|---|---|---|---|
| Unfilled Grades | 260-275°C | 260-280°C | 270-280°C | 275-285°C |
| Impact M. Grades | 260-280°C | 260-280°C | 270-280°C | 275-285°C |
| Flame Ret. Grades | 260-295°C | 270-295°C | 275-290°C | 275-295°C |
| Reinforced Grades | 270-290°C | 270-295°C | 270-295°C | 275-295°C |

Recommended Moulding Temperatures for PBT

| Material | Zone1 (Hopper) | Zone2 | Zone3 | Zone4 (Nozzle) |
|---|---|---|---|---|
| Unfilled Grades | 230-240°C | 235-250°C | 235-250°C | 240-260°C |
| Impact M. Grades | 220-235°C | 225-240°C | 225-240°C | 235-255°C |
| Flame Ret. Grades | 220-230°C | 225-240°C | 230-245°C | 235-260°C |
| Reinforced Grades | 235-260°C | 240-260°C | 250-265°C | 260-270°C |

## TOOL TEMPERATURE

Mould temperature is always a compromise. Moreover, tool temperature should be as high as possible to give optimum crystallization, dimensional, good surface finish and excellent mechanical performance. On the other hand, lower tool temperature can significantly cut cycle time. Below are the recommended temperatures according to polymers.

- For HT00, mold temp → 135 °C - oil heaters needed.
- For HT01, HT02,HT03, mold temp → 100 °C - water heated mold are OK.
- For Polyamide 6 and Polyamide 66, 80°C should be maintained as a minimum.
- For reinforced grades values of 90-110°C are preferred.
- For PBT, 80°C should be maintained as a minimum. For different grades values of 90-110°C are preferred.

| Screw Diameter (mm) | Max RPM |
|---|---|
| 20 | 150 |
| 30 | 100 |
| 40 | 70 |
| 50 | 60 |
| 60 | 50 |
| 70 | 40 |
| 80 | 35 |
| >80 | 30 |

- For glassfibre reinforced compounds, the screw speed should be kept low, a rough indication is as follows, for Polyamides

| Screw Diameter (mm) | Max RPM |
|---|---|
| 20 | 100 |
| 30 | 95 |
| 40 | 70 |
| 50 | 60 |
| 60 | 50 |
| 70 | 40 |
| 80 | 35 |
| >80 | 30 |

- For glassfibre reinforced compounds, the screw speed should be kept low, a rough indication is as follows, for PBT

## PRESSURE AND SPEED

- For Polyamides, injection pressure should generally be around 70 to 100 Mpa.
- For PBT injection pressure should generally be around 70 to 100 Mpa; this results in a minimum clamping force of the moulding machine in tonnes of 0,7 times the projected surface area in cm2.
- Holding pressure is generally in the area of 90 Mpa for Polaymides and 80 Mpa for PBT.
- Back pressure should be kept to a practical minimum both for Polyamides and PBT.

## USE OF REGRIND

- Regrind sprues and runners can be used on most materials. It is not recommended to use regrind on FR grades. When regrind is used, observe these simple rules:
- Use a constant ratio of regrind and virgin material. When a material has been processed once, its viscosity and fibre length have been decreased. Using varying rations of regrind can lead to variations in dimensions, mechanical performance and processing characteristics.
- Either feed the regrind straight back into the machine or pre-dry the regrind before usage.
- Store regrind in a dry, clean place to avoid contamination and excess moisture.
- Ensure sharp cutting blades to keep dust generation to a minimum; cut glass fibre reinforced material when it is still hot.
- Clean the grinder regularly to avoid build up of dust.
- Do not use splayed, discoloured or degraded parts and runners.

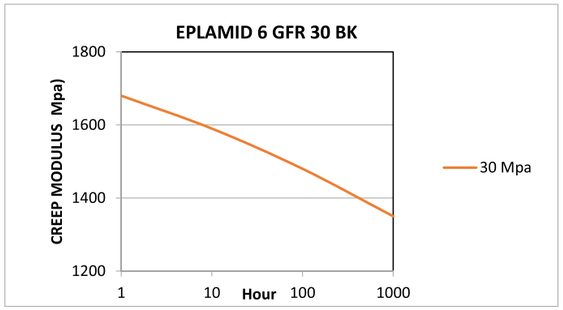
# CREEP FATIGUE

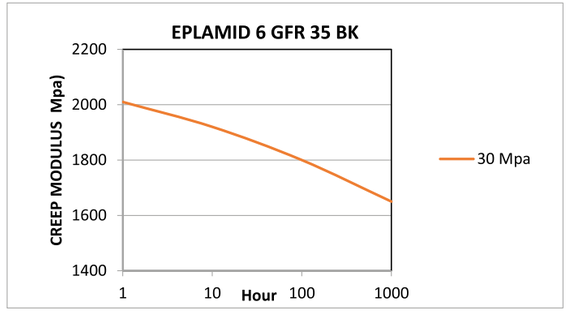
Creep indicates the behavior of plastics under persistent(constant) mechanical stress. The graph of creep modulus versus time is affected by continuing stress.

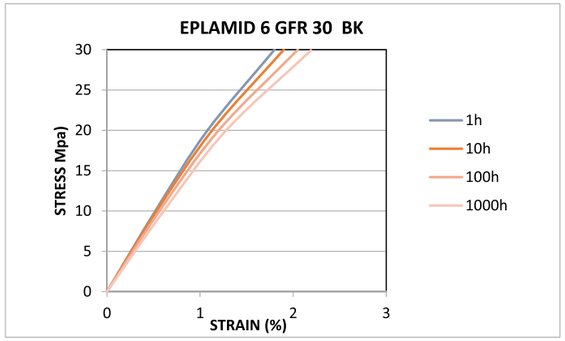
As can be seen from the graph of EPLAMID 6 GF30 BK, the value of the creep modulus decreases with the passing of the time. **Test Method : ISO 899-1**

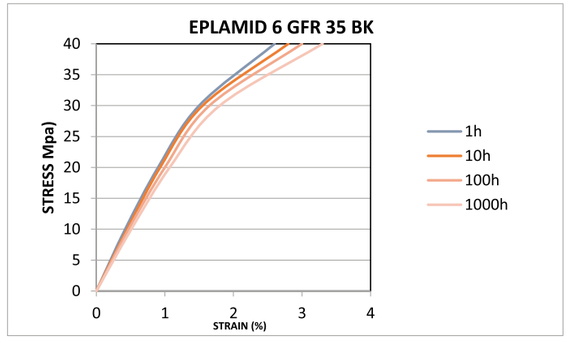
Fatigue is the weakening of a material caused by cyclic loading that results in progressive and localized structural damage and the growth of cracks. BK.

Fatigue data provides an information about the resistance of stress.
Figure X shows the effect of temperature on the fatigue properties of EPLAMID 66 GF30.
**Test Method : ISO 13003**




# LIGHTWEIGHT SOLUTIONS

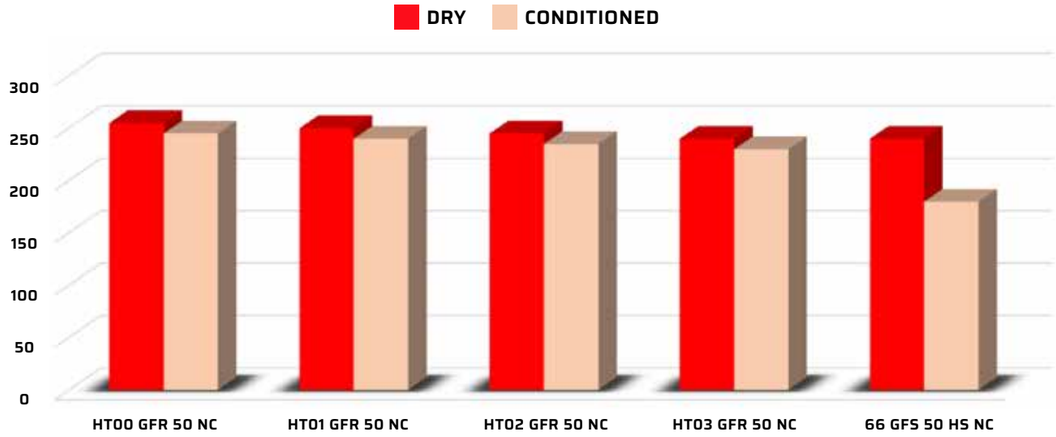
In the near future, it is expected that the amount of plastic parts in the automotive industry will increase rapidly.

With this increase, in order to provide lightness, studies on the exchange of metal components with plastics will accelerate.

Beside lighter parts, metal substitution offers lower costs both on raw materials and production side. So that, it is becoming more popular on some other industries such as sanitary installations and general machinery building etc.

Highly reinforced PA66, PPA and PA66/PPA blends are being widely used for metal replacement applications. One of the biggest advantages of PPA materials is, its low moisture absorption compared to most common used engineering plastic

Polyamide. On below table you can see the tensile stress value comparison of PA66 GF 50 and different type of PPA GF 50 grades as conditioned and dry as moulded.



Metal replacement is not the only way to reduce weights on the final parts. Also it is possible to offer lower density raw materials as alternatives to plastics. Below are the most common weight reductions methods :

- **PA/PP BLENDS**
- **GLASS BUBBLES**
- **CARBON FIBER REINFORCEMENT**

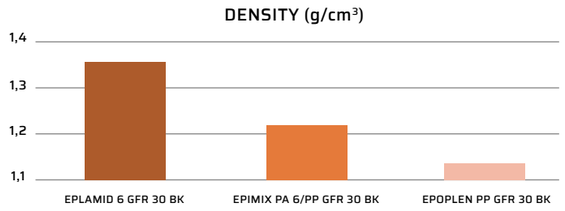
Polyamides and Polypropylenes are totally 2 different materials and usually it is not possible replace these 2 materials with each other. However, a good combination of these 2 materials can turn into a new alternative for many applications.

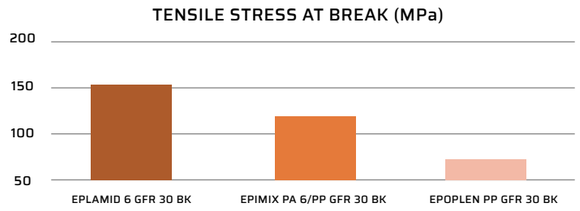
Polypropylene (PP) is excellent in properties of the thermoplastic, it has high strength, wear resistance, flex fatigue, high temperature heat, moisture, and excellent chemical resistance, easy molding process, low cost, etc.;

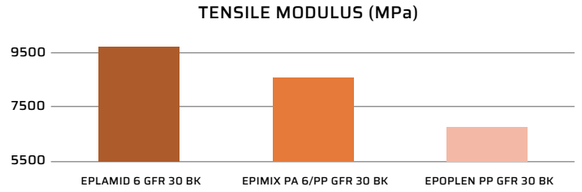
Nylon (PA) is a better mechanical properties of the polymer, however, since having many polar groups on the polymer chain thereof, it has good hydrophilicity, so it is easy to absorb water, dimensional stability poor.

Nylon and polypropylene (PP) combination can improve the strength of PP, PP reduce mold shrinkage of pure product, but also added to affect the processing properties of nylon polypropylene, PP and PA because of different melting points, a difference of more large, so the processing temperature PP / PA alloy is higher than that of pure PP can be processed.

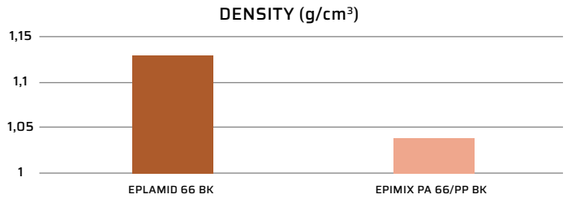
On below tables you can see some property comparisons between PA6 GF 30, PP GF 30 and PA6/PP GF 30 grades.

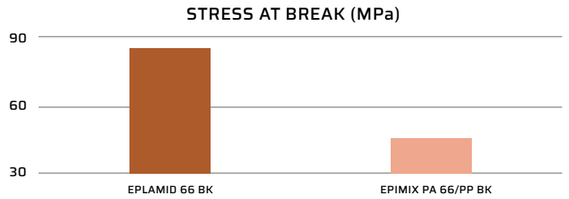


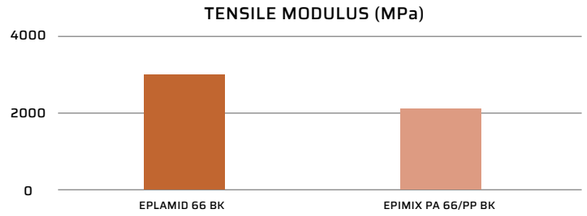




It is also possible to combine PA66 with PP and below are the comparison graphics for unfilled PA66 and unfilled PA66/PP alloys.



# CARBON & GLASS FIBER MIXTURES

Polymers can be strength by adding reinforced materials. Generally, glass fiber reinforcement has been used for improving mechanical properties and it has also cost advantage.

With changing market trends; lightweight and high performance; carbon fiber reinforced materials are attracting attention; however, these advantages come with extra cost.

By using carbon fibers and glass fibers as reinformcements for Polyamides, it is possible to get cost/perfomance effective products.

On below tables you can see the advantages and disadvantages of both carbon and glass fiber reinforced grades.

| Advantages of Carbon Fibers | Disadvantages of Carbon Fibers |
|---|---|
| Lightweight | Low impact resistance |
| Greater stiffness and strength than glass fiber | Very high cost |
| Low thermal expansion coefficient | |
| Electrical and thermal conductivity | |

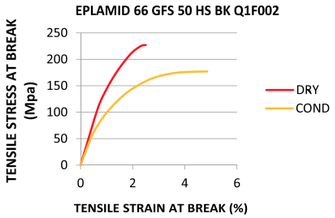
| Advantages of Glass Fibers | Disadvantages of Glass Fibers |
|---|---|
| Low cost | Higher density |
| Good tensile strength and modulus | Lower tensile properties than carbon fiber |
| Good impact resistance | |

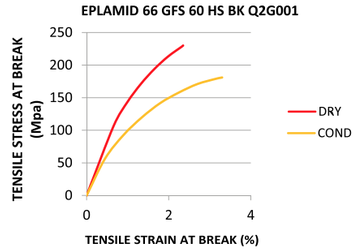
# AUTOMOTIVE GRADES

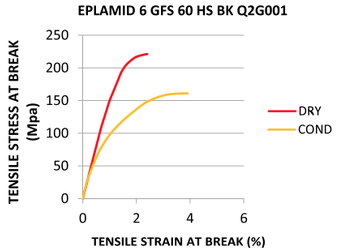
Very high safety standards and quality expectations of end users in modern automotive engineering make high demands on the materials used. Epsan offers high thermal stability, dynamic strength, impact resistance and long-term performance with its PA, PBT and PPA grades.

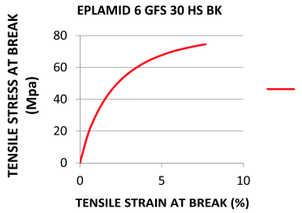
Special about polyamide as a material is its ideal combination of strength, rigidity and toughness together with excellent durability across a wide temperature range. These advantages can be attributed to the partially crystalline structure of the polyamide: strong hydrogen bridge bonds between molecules give strength to the crystalline areas and allow high operating temperatures, while more flexible molecule chains in the amorphous regions ensure exceptional toughness.

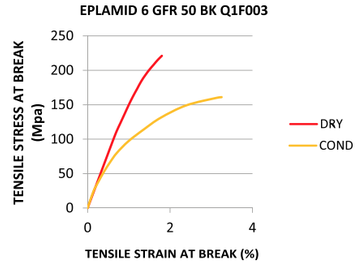
In the following graphics, stress - strain diagrams are shown for some of the most common used grades for automotive industry.

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