**atpitaly srl** s.u.
I - 25070 LAVENONE - BS - ITALY
Via del Tram, 8
p.iva IT04632590982

www.atpitaly.eu - info@atpitaly.eu

**articoli tecnici per l'industria e la casa**
**termoplastici e metalli**
**industrial and housing technical items**
**thermoplastic and metal**

# TECHNICAL DATA SHEET

**POLYMERS**

- Polyethylene (PE)
- Polypropylene (PP)
- Polyvinylchloride (PVC)
- Polystyrene (PS)
- Acrylonitrile Butadiene Styrene (ABS)
- Polymethyl Methacrylate (PMMA)
- Polyamide (PA)
- Polyacetal (POM)
- Polycarbonate (PC)
- Styrene Ethylene Butylene Styrene (SEBS)
- Copolyester

**METALS**

- Aluminium
- Brass
- Inox
- Steel
- Zamak

**atpitaly srl** s.u.
I - 25070 LAVENONE - BS - ITALY
Via del Tram, 8
p.iva IT04632590982

www.atpitaly.eu - info@atpitaly.eu



# Polyethylene (PE)

LD (Low Density) - HD (High Density)

Discrete impact strength.
Can be flexible (LD) or stiff (HD) depending on the formulation.
Mechanical properties depend on the crystallinity.
Good sliding properties.
Operation temperature from -40° C. to +80° C. depending on the type.
Low moisture absorption.
Resistant to (selection):
acids, alkaline solutions, alcohol, salt solutions, water, esters, oil, some types of petrol.
Not resistant to (selection):
strong oxidative agents, swelling caused by aliphatic hydrocarbons,
brittleness due to direct solar radiations.

## TECHNICAL DATA SHEET

## POLYETHYLENE LOW DENSITY - PE-LD -

| Properties | Testing Method | Unit | Typical Values |
|---|---|---|---|
| **PHISICAL** | | | |
| Specific Gravity | ISO 1183 | $gr/cm^3$ | 0,92 |
| **MECHANICAL** | | | |
| Yield stress | ISO 527 | MPa | 10 |
| Flexural modulus | ISO 178 | MPa | 120 |
| Hardness Shore D | ISO 868/A | | 45 |
| **THERMAL** | | | |
| Softening temperature VICAT 1kg | ISO 306/A | °C | 84 |
| Embrittlement temperature | ASTM D 746 | °C | < -20 |

NOTES:

*The information contained herein are provided for guidance*
*and are available to the user in order to allow the best use of the finished printed products.*
*Their publication does do not imply any responsability on our part.*

**atpitaly srl** s.u.
I - 25070 LAVENONE - BS - ITALY
Via del Tram, 8
p.iva IT04632590982

www.atpitaly.eu - info@atpitaly.eu



# TECHNICAL DATA SHEET

## POLYETHYLENE HIGH DENSITY - PE-HD -

| Properties | Testing Method | Unit | Typical Values |
|---|---|---|---|
| **PHISICAL** | | | |
| Specific Gravity | ISO 1183 | $gr/cm^3$ | 0,95 |
| **MECHANICAL** | | | |
| Yield stress | ISO 527 | MPa | 27 |
| Tensile strength at break | ISO 527 | MPa | 10 |
| Elongation at break | ISO 527 | % | 100 |
| Flexural modulus | ISO 178 | MPa | 1300 |
| IZOD notched impact strength | ISO 180/A | J/m | 40 |
| Hardness Shore D | ISO 868/A | | 66 |
| **THERMAL** | | | |
| Softening temperature VICAT 1kg | ISO 306/A | °C | 126 |
| Embrittlement temperature | ASTM D 746 | °C | < -60 |

NOTES:

*The information contained herein are provided for guidance*
*and are available to the user in order to allow the best use of the finished printed products.*
*Their publication does do not imply any responsability on our part.*

**atpitaly srl** s.u.
I - 25070 LAVENONE - BS - ITALY
Via del Tram, 8
p.iva IT04632590982

www.atpitaly.eu - info@atpitaly.eu



# Polypropylene (PP)

Scarce impact strength.
Discrete hardness and mechanical resistance.
Discrete sliding properties.
Operation temperature from –0° C. to +110° C. depending on the type.
Low moisture absorption.
Resistant to (selection): weak inorganic acids, alkaline solutions, alcohol, some oils, solutions of washing lyes until 100° C.
Not resistant to (selection): strong oxidative agents, petrol, benzol, halogenated hydrocarbons.

## TECHNICAL DATA SHEET

## POLYPROPYLENE COPOLYMER - PP-C -

| Properties | | Testing Method | Unit | Typical Values |
|---|---|---|---|---|
| **PHISICAL** | | | | |
| Specific Gravity | | ASTM D792 | $gr/cm^3$ | 0,90 |
| Water absorption ( 24 h – 23°C ) | | ASTM D570 | % | |
| **MECHANICAL** | | | | |
| Tensile modulus | | ISO 527-2 | MPa | 1400 |
| Yield stress | | ISO 527-2 | MPa | 28 |
| Elongation at yield | | ISO 527-2 | % | 6 |
| Elongation at break | | ISO 527-2 | % | >50 |
| Unnotched Charpy impact strength | +23°C<br>0°C<br>-20°C | ISO 179/1eU | $kJ/m^2$ | Does not break<br>120<br>80 |
| Charpy notched impact strength | +23°C<br>0°C<br>-20°C | ISO 179/1eA | $kJ/m^2$ | 7<br>3,5<br>3 |
| **THERMAL** | | | | |
| Heat distortion temperature HDT/B | | ISO 75/2 | °C | 90 |
| Softening temperature VICAT<br><br>VST/b50 | VST/A50 | ISO 306 | °C | 151<br>68 |

NOTES:

*The information contained herein are provided for guidance*
*and are available to the user in order to allow the best use of the finished printed products.*
*Their publication does do not imply any responsability on our part.*

**atpitaly srl** s.u.
I - 25070 LAVENONE - BS - ITALY
Via del Tram, 8
p.iva IT04632590982

www.atpitaly.eu - info@atpitaly.eu



# TECHNICAL DATA SHEET

## POLYPROPYLENE HOMOPOLYMER - PP-H -

| Properties | Testing Method | Unit | Typical Values |
|---|---|---|---|
| **PHISICAL** | | | |
| Specific Gravity | ASTM 1505 | $gr/cm^3$ | 0,9 |
| Water absorption ( 24 h – 23°C ) | ASTM D570 | % | 1,5 ÷ 2,5 |
| **MECHANICAL** | | | |
| Tensile yield strength | ASTM D638 | MPa | 35 |
| Elongation at maximum tensile | ASTM D638 | % | 14 |
| Flexural modulus ( 1,3 mm/min) 1% sec | ASTM D790 | MPa | 1650 |
| IZOD impact strength a 23°C | ASTM D256-A | J/m | 34 |
| ROCKWELL hardness | ASTM D785 | R | 111 |
| **THERMAL** | | | |
| Heat distortion temperature 455 kPa<br>1820 kPa | ASTM D648 | °C | 82<br>54 |
| Softening temperature VICAT 9,81 N<br>49,05 N | ASTM D1525-A | °C | 154<br>95 |

NOTES:

*The information contained herein are provided for guidance*
*and are available to the user in order to allow the best use of the finished printed products.*
*Their publication does do not imply any responsability on our part.*

⇧

## Polyvinylchloride (PVC)

Plasticized

Excellent impact strength, flexible.
Scarce tear strength. Not suitable for sliding.
Becomes fragile from -10° C. to –50° C. depending on the amount of plasticizer added.
Maximum extended operation temperature under low stress, circa +60° C.
Low moisture absorption.
Resistant to (selection): partly to petrol, medium concentrated inorganic acids, alcohol, salt solutions; good fastness to light and good ageing resistance.
Not resistant to (selection): organic solvents and aqueous solutions (brittleness), benzol,
All the mechanical characteristics are strongly affected depending on the percentage of plasticizer added.

**TECHNICAL DATA SHEET**

**POLYVINYLCHLOIDE plasticized - PVC-P -**

| Properties | Testing Method | Unit | Typical Values |
|---|---|---|---|
| **PHISICAL** | | | |
| Specific Gravity | ISO 1183 | $kg/dm^3$ | 1,15 ÷ 1,2 |
| Hardness Shore D | ISO 868 | | 51 |
| Tensile strength at break | ISO R527 | $N/mm^2$ | 10 |
| Elongation at break | ISO R527 | % | 420 |
| Cold flex | ISO 458/2 | °C | -50 |

NOTES:

*The information contained herein are provided for guidance*
*and are available to the user in order to allow the best use of the finished printed products.*
*Their publication does do not imply any responsability on our part.*

⇧

**atpitaly srl** s.u.
I - 25070 LAVENONE - BS - ITALY
Via del Tram, 8
p.iva IT04632590982

www.atpitaly.eu - info@atpitaly.eu



# Polystyrene (PS)

- PS Shockproof
  Good impact strength. Discrete hardness and mechanical resistance.
  Scarce sliding properties. Low moisture absorption.
  Operation temperature from –40° C. to +70° C. depending on the type.
  Resistant to (selection): only under certain conditions to acids and alkaline solutions.
  Not resistant to (selection): petrol, solvents, certain oils, UV radiations.

| TECHNICAL DATA SHEET<br>POLYSTYRENE (shockproof) - PS-I - | | | | |
|---|---|---|---|---|
| **Properties** | | **Testing Method** | **Unit** | **Typical Values** |
| **PHISICAL** | | | | |
| Specific Gravity | | ISO 1183 | $gr/cm^3$ | 1,04 |
| Water absorption ( 24 h – 23°C ) | | ISO 62 | % | >0,1 |
| **MECHANICAL** | | | | |
| Tensile yield strength | (5 mm/min) | ISO 527 | MPa | 18 |
| Tensile modulus at break | (5 mm/min) | ISO 527 | MPa | 17 |
| Tensile elongation at break | (5 mm/min) | ISO 527 | % | 55 |
| Tensile modulus | (1 mm/min) | ISO 527 | MPa | 1700 |
| Flexural modulus | (2 mm/min) | ISO 178 | MPa | 32 |
| IZOD notched impact strength | (+ 23°C – thickness 3,2 mm)<br>(+ 23°C – thickness 4 mm )<br>(- 30°C – thickness 4 mm ) | ISO 180/4A<br>ISO 180/1A<br>ISO 180/1A | J/m<br>$kJ/m^2$<br>$kJ/m^2$ | 110<br>9<br>6.5 |
| ROCKWELL hardness | (scale L/M) | ISO 2039/2 | | L60 |
| **THERMAL** | | | | |
| Heat distortion temperature<br>(1.8 Mpa – 120°C/h) | | ASTM D648 | °C | 81 |
| Softening temperature VICAT | (10 N/50°C/h)<br>(50 N/50°C/h) | ISO 306/A<br>ISO 306/B | °C<br>°C | 90<br>82 |
| **ELECTRICAL** | | | | |
| Dielectric strength | | IEC 60243 | kV/mm | 65 |
| Tracking index (CTI) | sol.A | IEC 60112 | - | 500 |
| **OTHER** | | | | |
| Fire behavior (thickness 1,5 mm) | | UL94 | Classe | HB |

NOTES:
*The information contained herein are provided for guidance*
*and are available to the user in order to allow the best use of the finished printed products.*
*Their publication does do not imply any responsability on our part.*

- PS Crystal
  Stiff, hard and fragile. Low impact strength, discrete transparency.
  Scarce sliding properties. Low moisture absorption.
  Operation temperature from –40° C. to +70° C. depending on the type.
  Resistant to (selection): only under certain conditions to acids and alkaline solutions, fair resistance to ageing.
  Not resistant to (selection): petrol, acetone, benzol, solvents, certain oils, UV radiations.

| **TECHNICAL DATA SHEET<br>POLYSTYRENE (crystal) - PS -** | | | | |
|---|---|---|---|---|
| **Properties** | | **Testing Method** | **Unit** | **Typical Values** |
| **PHISICAL** | | | | |
| Specific Gravity | | ISO 1183 | $gr/cm^3$ | 1,05 |
| Water absorption ( 24 h – 23°C ) | | ISO 62 | % | >0,1 |
| **MECHANICAL** | | | | |
| Tensile yield strength | (5 mm/min) | ISO 527 | MPa | - |
| Tensile modulus at break | (5 mm/min) | ISO 527 | MPa | 37 |
| Elongation tensile at break | (5 mm/min) | ISO 527 | % | 1,3 |
| Tensile modulus | (1 mm/min) | ISO 527 | MPa | 3200 |
| Flexural modulus | (2 mm/min) | ISO 178 | MPa | 60 |
| IZOD notched impact strength | (+ 23°C – thickness 3,2 mm )<br>(+ 23°C – thickness 4 mm )<br>(- 30°C – thickness 4 mm ) | ISO 180/4A<br>ISO 180/1A<br>ISO 180/1A | J/m<br>$kJ/m^2$<br>$kJ/m^2$ | -<br>1,7<br>1,5 |
| ROCKWELL hardness | (scale L/M) | ISO 2039/2 | | M80 |
| **THERMAL** | | | | |
| Heat distortion temperature (1.8 Mpa – 120°C/h) | | ASTM D648 | °C | 82 |
| Softening temperature VICAT | (10 N/50°C/h)<br>(50 N/50°C/h) | ISO 306/A<br>ISO 306/B | °C<br>°C | 89<br>83 |
| **ELECTRICAL** | | | | |
| Dielectric strength | | IEC 60243 | kV/mm | 70 |
| Tracking index (CTI) | sol.A | IEC 60112 | - | 375 |
| **OTHER** | | | | |
| Fire behavior | (thickness 1,5 mm) | UL94 | Classe | HB |

NOTES:
*The information contained herein are provided for guidance*
*and are available to the user in order to allow the best use of the finished printed products.*
*Their publication does do not imply any responsability on our part.*

**atpitaly srl** s.u.
I - 25070 LAVENONE - BS - ITALY
Via del Tram, 8
p.iva IT04632590982

www.atpitaly.eu - info@atpitaly.eu



# Acrylonitrile Butadiene Styrene (ABS)

Stiff and strong even at low temperatures.
High hardness and good scratch resistance
Scarce sliding properties.
Operation temperature from –40° C. to +80° C. depending on the type
Low moisture absorption.
Resistant to (selection): only under certain conditions to acids and alkaline solutions, fair resistance to ageing.
Not resistant to (selection): petrol, acetone, benzol, solvents, certain oils, UV radiations.

**TECHNICAL DATA SHEET**
**ACRYLONITRILE-BUTADIENE-STYRENE - ABS -**

| Properties | Testing Method | Unit | Typical Values |
|---|---|---|---|
| **PHYSICAL** | | | |
| Specific Gravity | ASTM D792 | $gr/cm^3$ | 1,07 |
| Water absorption ( 24 h – 23°C ) | ASTM D570 | % | 0,3 |
| **MECHANICAL** | | | |
| Tensile strength at break | ASTM D638 | MPa | 35 |
| Tensile modulus | ASTM D638 | MPa | 2800 |
| Elongation at maximum tensile | ASTM D638 | % | 30 |
| Flexural modulus | ASTM D790 | MPa | 2700 |
| IZOD impact c.i. 6,4 mm | ASTM D256 | J/m | 100 |
| ROCKWELL hardness | ASTM D795 | R | - |
| **THERMAL** | | | |
| Heat distortion temperature HDT 1,82 $N/mm^2$ | ASTM D648 | °C | 86 |
| Softening temperature VICAT 49N | ASTM D1525 | °C | 97 |
| **ELECTRICAL** | | | |
| Dielectric strength | ASTM D149 | kV/mm | - |
| Tracking index (CTI) | IEC 112 | V | - |
| **OTHER** | | | |
| Self-extinguishing | UL94 | 3,2 mm | HB |

NOTES:
*The information contained herein are provided for guidance*
*and are available to the user in order to allow the best use of the finished printed products.*
*Their publication does do not imply any responsability on our part.*

**atpitaly srl** s.u.
I - 25070 LAVENONE - BS - ITALY
Via del Tram, 8
p.iva IT04632590982

www.atpitaly.eu - info@atpitaly.eu



# Polymethyl Methacrylate (PMMA)

Optimal transparency.
Hard, stiff, good resistance to tensile stress, optimal scratch resistance.
Scarce impact strength. Scarce sliding properties.
Good resistance at low temperatures. Low moisture absorption.
Maximum extended operation temperature +60° C.
Resistant to (selection): aliphatic hydrocarbons, acids and aqueous alkaline solutions, fats, alcohol until 30%, good fastness to light, good ageing resistance and weatherproof.
Not resistant to (selection): fluoridized hydrocarbons, alcohol higher than 30%, benzol, nitro paint, diluent, concentrated acids.

## TECHNICAL DATA SHEET

## POLYMETHYL METHACRYLATE - PMMA -

| Properties | Testing Method | Unit | Typical Values |
|---|---|---|---|
| **PHYSICAL** | | | |
| Specific Gravity | ISO 1183 | $gr/cm^3$ | 1,19 |
| Water absorption ( 24 h – 23°C ) | ASTM D570 | % | 0,20 ÷ 0,27 |
| **MECHANICAL** | | | |
| Tensile strength at break | ISO 527 | MPa | 77 |
| Tensile modulus | ISO 527 | MPa | 3300 |
| Elongation at break | ISO 527 | % | 5,5 |
| Flexural modulus | ASTM D790 | MPa | |
| Charpy notched impact strength | ISO 180 | $kJ/m^2$ | 20 |
| ROCKWELL hardness | ASTM D795 | M | 90 ÷ 104 |
| **THERMAL** | | | |
| Softening temperature VICAT 5 kg | ASTM D1525 | °C | 90 ÷ 110 |
| **ELECTRICAL** | | | |
| Dielectric strength | ASTM D149 | kV/mm | 18 |
| **OTHERS** | | | |
| Self-extinguishing | IEC 707 | 1,6 mm | HB |

NOTES:
*The information contained herein are provided for guidance*
*and are available to the user in order to allow the best use of the finished printed products.*
*Their publication does do not imply any responsability on our part.*

**atpitaly srl** s.u.
I - 25070 LAVENONE - BS - ITALY
Via del Tram, 8
p.iva IT04632590982

www.atpitaly.eu - info@atpitaly.eu



## Polyamide (types used: PA6 & PA66)

Good impact strength. Good general mechanical resistance. Good sliding properties.
Becomes fragile at -40° C. High moisture absorption.
Maximum extended operation temperature from +80° C. to +120° C. depending on the type.
Resistant to (selection): aliphatic and aromatic hydrocarbons, petrol, oils, fats, some alcohols, esters, ketones, ethers, many chlorinated hydrocarbons, weak alkaline solutions.
Sufficient ageing resistance and sufficiently weatherproof.
Not resistant to (selection): mineral acids, strong alkaline solutions,
solutions of oxidative agents, formic acid, phenols, cresols, glycols, chloroforms.
The mechanical characteristics are affected depending on the type of PA,
on the percentage of water absorption and on the crystallinity.

| TECHNICAL DATA SHEET<br>POLYAMIDE 6 - PA6 - | | | |
|---|---|---|---|
| **Properties** | **Testing Method** | **Unit** | **Typical Values** |
| **PHYSICAL** | | | |
| Specific Gravity | ASTM D792 | $gr/cm^3$ | 1,14 |
| Water absorption ( 24 h – 23°C ) | ASTM D570 | % | 1,5 ÷ 2,5 |
| **MECHANICAL** | | | |
| Tensile yield strength | ASTM D638 | MPa | 80 |
| Tensile modulus | ASTM D638 | MPa | 2950 |
| Elongation at maximum tensile | ASTM D638 | % | 60 |
| Flexural modulus | ASTM D790 | MPa | 2800 |
| IZOD impact strength c.i. 3,2 mm | ASTM D256 | J/m | 50 |
| ROCKWELL hardness | ASTM D795 | R | 118 |
| **THERMAL** | | | |
| Heat distortion temperature HDT 1,82 $N/mm^2$ | ASTM D648 | °C | 75 |
| Softening temperature VICAT 49N | ASTM D1525 | °C | 210 |
| **ELECTRICAL** | | | |
| Dielectric strength | ASTM D149 | kV/mm | 17 |
| Tracking index (CTI) | IEC 112 | V | 600 |
| **OTHER** | | | |
| Self-extinguishing | UL94 | 3,2 mm | V2 |

NOTES:
*The information contained herein are provided for guidance*
*and are available to the user in order to allow the best use of the finished printed products.*
*Their publication does do not imply any responsability on our part.*

**atpitaly srl** s.u.
I - 25070 LAVENONE - BS - ITALY
Via del Tram, 8
p.iva IT04632590982

www.atpitaly.eu - info@atpitaly.eu



# TECHNICAL DATA SHEET

## POLYAMIDE 66 - PA66 -

| Properties | Testing Method | Unit | Typical Values |
|---|---|---|---|
| **PHYSICAL** | | | |
| Specific Gravity | ASTM D792 | $gr/cm^3$ | 1,14 |
| Water absorption ( 24 h – 23°C ) | ASTM D570 | % | 0,8 ÷ 1,0 |
| **MECHANICAL** | | | |
| Tensile strength at break | ASTM D638 | MPa | 160 |
| Tensile modulus | ASTM D638 | MPa | 3000 |
| Elongation at maximum tensile | ASTM D638 | % | 50 |
| Flexural modulus | ASTM D790 | MPa | 2850 |
| IZOD impact strength c.i. 3,2 mm | ASTM D256 | J/m | 45 |
| ROCKWELL hardness | ASTM D795 | R | 118 |
| **THERMAL** | | | |
| Heat distortion temperature HDT 1,82 $N/mm^2$ | ASTM D648 | °C | 95 |
| Softening temperature VICAT 49N | ASTM D1525 | °C | 245 |
| **ELECTRICAL** | | | |
| Dielectric strength | ASTM D149 | kV/mm | 17 |
| Tracking index (CTI) | IEC 112 | V | 600 |
| **OTHERS** | | | |
| Self-extinguishing | UL94 | 3,2 mm | V2 |

NOTES:

*The information contained herein are provided for guidance*
*and are available to the user in order to allow the best use of the finished printed products.*
*Their publication does do not imply any responsability on our part.*

⇧

**atpitaly srl** s.u.
I - 25070 LAVENONE - BS - ITALY
Via del Tram, 8
p.iva IT04632590982

www.atpitaly.eu - info@atpitaly.eu



# Polyacetal (POM)

High mechanical resistance and stiffness with good strength even at low temperatures.
Good resilience (elastic memory).
Optimal sliding properties.
Operation temperature from –40° C. to +80° C. depending on the type.
Does not absorb moisture.
Resistant to (selection): alcohol, aldehyde, esters, ethers, glycols, petrol, mineral oil, weak alkaline solutions, weak acids. Good resistance to hydrolysis.
Not resistant to (selection): chemical agents with oxidative effects, strong acids pH<4.

| **TECHNICAL DATA SHEET**<br>**POLYACETAL - COPOLYMER - POM -** | | | |
|---|---|---|---|
| **Properties** | **Testing Method** | **Unit** | **Typical Values** |
| **PHISICAL** | | | |
| Specific Gravity | ASTM D792 | $gr/cm^3$ | 1,41 |
| Water absorption ( 24 h – 23°C ) | ASTM D570 | % | 0,22 |
| **MECHANICAL** | | | |
| Tensile strength | ASTM D638 | MPa | 58 |
| Elongation at maximum tensile | ASTM D638 | % | 40 |
| Flexural strength | ASTM D638 | MPa | 78 |
| Flexural modulus | ASTM D790 | MPa | 2256 |
| IZOD notched impact strength | ASTM D256 | J/m | 49 |
| ROCKWELL hardness scale M | ASTM D785 | | 80 |
| **THERMAL** | | | |
| Heat distortion temperature<br>HDT/A 4,6 $kg/cm^2$ (0,45 MPa)<br>HDT/A 18,6 $kg/cm^2$ (1,81 MPa) | ASTM D648 | °C | <br>160<br>110 |
| Softening temperature VICAT 49N | ASTM D1525 | °C | 162 |
| **ELECTRICAL** | | | |
| Dielectric strength | ASTM D149 | kV/mm | 19 |
| **OTHER** | | | |
| Self-extinguishing | UL94 | | HB |

NOTES:
*The information contained herein are provided for guidance*
*and are available to the user in order to allow the best use of the finished printed products.*
*Their publication does do not imply any responsability on our part.*

U.V. stabilized grade suitable for out door applications.

| Properties | | Test Method | Unit | Value |
|---|---|---|---|---|
| **Physical** | | | | |
| Specific Gravity | | ISO 1183 | - | 1.41 |
| Melt Index (190℃, 2.16kg) | | ISO 1133 | g/10min | 10.0 |
| Shrinkage | Flow/Transverse | ISO 294 | % | 2.32/2.43 |
| Water Absorption | 23℃, $H_2O$, 24hr | ISO 62 | % | 0.93 |
| **Mechanical** | | | | |
| Tensile Strength | 23℃ | ISO 527-1/2 | MPa | 62 |
| Tensile Elongation | 23℃ | ISO 527-1/2 | % | 40 |
| Flexural Strength | 23℃ | ISO 178 | MPa | 83 |
| Flexural Modulus | 23℃ | ISO 178 | MPa | 2,600 |
| Notched Charpy Impact Strength | 23℃ | ISO 179/1eA | $kJ/m^2$ | 7.0 |
| Rockwell Hardness | | ISO 2039-2 | M scale | 80 |
| **Thermal** | | | | |
| Melting Point | | ISO 11357-1 | ℃ | 166 |
| Heat Deflection Temperature | | ISO 75 | | |
| | 1.8 MPa | | ℃ | 90 |
| Flammability(0.8mm) | | UL94 | | HB |

**atpitaly srl** s.u.
I - 25070 LAVENONE - BS - ITALY
Via del Tram, 8
p.iva IT04632590982

www.atpitaly.eu - info@atpitaly.eu



# Polycarbonate (PC)

Optimal transparency.
High mechanical resistance and hardness with good strength.
High impact strength. Scarce sliding properties.
Operation temperature from –190° C. to +130° C. depending on the type. Low moisture absorption.
Resistant to (selection): thinned mineral acids, aliphatic saturated hydrocarbons, petrol, fats, oils, water (lower than 60° C.), alcohols (except methyl alcohol), weatherproof.
Stabilized types: resistant to UV radiations.
Not resistant to (selection): alkaline solutions, ammonia, ethylene chloride, aromatic hydrocarbons, benzol, amines, ozone.

**TECHNICAL DATA SHEET**
**POLYCARBONATE - PC -**

| Properties | Testing Method | Unit | Typical Values |
|---|---|---|---|
| **PHISICAL** | | | |
| Specific Gravity | ASTM D792 | $gr/cm^3$ | 1,2 |
| Water absorption ( 24 h – 23°C ) | ASTM D570 | % | 0,23 |
| **MECHANICAL** | | | |
| Tensile strength at break | ASTM D638 | MPa | 68 |
| Elongation at yield | ASTM D638 | MPa | 63 |
| Tensile modulus | ASTM D638 | MPa | 2300 |
| Elongation at break | ASTM D638 | % | 90 |
| Flexural strength | ASTM D790 | MPa | 90 |
| Flexural modulus | ASTM D790 | MPa | 2350 |
| IZOD notched impact strength, 3,2 mm | ASTM D256 | J/m | 640 |
| ROCKWELL hardness scale M<br>scale R | ASTM D785 | M<br>R | 75<br>120 |
| **THERMAL** | | | |
| Heat distortion temperature HDT 1,80 MPa | ASTM D648 | ℃ | 128 |
| **ELECTRICAL** | | | |
| Dielectric strength | ASTM D149 | kV/mm | 29 |
| **OTHER** | | | |
| Self-extinguishing | UL94 | 1,5 mm | HB |

NOTES:
*The information contained herein are provided for guidance*
*and are available to the user in order to allow the best use of the finished printed products.*
*Their publication does do not imply any responsability on our part.*

## Styrene Ethylene Butylene Styrene (SEBS)

High toughness and optimal impact strength.
Mechanical resistance very variable depending on the type.
Scarce sliding properties. Low moisture absorption.
Operation temperature from –50° C. to +150° C. depending on the type.
Resistant to (selection): weak acids and alkaline solutions, oils, fuels, oxidation.
Not resistant to (selection): concentrated sulpheric acid, dichloromethane, chlorinated hydrocarbons, phenols.

**TECHNICAL DATA SHEET**

**SEBS 65**

| Properties | Testing Method | Unit | Typical Values |
|---|---|---|---|
| Specific Gravity | ISO 1183 | $gr/cm^3$ | 0,98 |
| Tensile strength at break | ISO 37 | MPa | 4,0 |
| Stress at 100% elongation | ISO 37 | MPa | 2,0 |
| Stress at 300% elongation | ISO 37 | MPa | 3,0 |
| Tensile elongation at break | ISO 37 | % | 570 |
| Tear strength | ISO 34 | kN/m | 27 |
| Tear strength with nick | ISO 34 | kN/m | 15 |
| Shore hardness | ISO 868 | Sh A | 65 |

NOTES:

*The information contained herein are provided for guidance*
*and are available to the user in order to allow the best use of the finished printed products.*
*Their publication does do not imply any responsability on our part.*

⇧

**atpitaly srl** s.u.
I - 25070 LAVENONE - BS - ITALY
Via del Tram, 8
p.iva IT04632590982

www.atpitaly.eu - info@atpitaly.eu



## TECHNICAL DATA SHEET

## SEBS 95

| Properties | Testing Method | Unit | Typical Values |
|---|---|---|---|
| Specific Gravity | ISO 1183 | $gr/cm^3$ | 0,98 |
| Tensile strength at break | ISO 37 | MPa | 9,5 |
| Stress at 100% elongation | ISO 37 | MPa | 6,6 |
| Stress at 300% elongation | ISO 37 | MPa | 7,4 |
| Tensile elongation at break | ISO 37 | % | 630 |
| Tear strength | ISO 34 | kN/m | 60 |
| Tear strength with nick | ISO 34 | kN/m | 38 |
| Shore hardness | ISO 868 | Sh A | 95 |

NOTES:

*The information contained herein are provided for guidance*
*and are available to the user in order to allow the best use of the finished printed products.*
*Their publication does do not imply any responsability on our part.*

## Copolyester

Clear with a high shiny surface;
good clarity;
good resistance to light, heat, water;
good impact resistance.

| Property[a] | Test[b] Method | Typical Value, Units[c] |
|---|---|---|
| | | |
| Specific Gravity | D 792 | 1.18 |
| Mold Shrinkage | D 955 | 0.005-0.007 mm/mm (0.005-0.007 in./in.) |
| | | |
| Tensile Stress @ Yield | D 638 | 43 MPa (6200 psi) |
| Tensile Stress @ Break | D 638 | 52 MPa (7500 psi) |
| Elongation @ Yield | D 638 | 7% |
| Elongation @ Break | D 638 | 210% |
| Tensile Modulus | D 638 | 1575 MPa (2.28 ) |
| Flexural Modulus | D 790 | 1575 MPa (2.28 ) |
| Flexural Yield Strength | D 790 | 64 MPa (9300 psi) |
| Rockwell Hardness, R Scale | D 785 | 111 |
| Izod Impact Strength, Notched @ 23°C (73°F) | D 256 | 860 J/m (16.1 ft·lbf/in.) |
| Impact Strength, Unnotched @ 23°C (73°F) | D 4812 | NB |
| | | |
| Deflection Temperature | | |
| @ 0.455 MPa (66 psi) | D 648 | 94°C (201°F) |
| @ 1.82 MPa (264 psi) | D 648 | 81°C (178°F) |
| | | |
| Total Transmittance | D 1003 | 91% |
| Haze | D 1003 | <1% |
| | | |
| Drying Temperature | | 88°C (190°F) |
| Drying Time | | 4-6 hrs |
| Processing Melt Temperature | | 260-282°C (500-540°F) |
| Mold Temperature | | 38-66°C (100-150°F) |

[a] *Unless noted otherwise, all tests are run at 23°C (73°F) and 50% relative humidity.*
[b] *Unless noted otherwise, the test method is ASTM.*
[c] *Units are in SI or US customary units.*

## Aluminium

- Used for the production of roses and selvages trimmed from sheet

  Aluminium H26
  EN AW 1050
  ¾ raw

⇧

## Brass

- Used for the production of roses and selvages trimmed from sheet

  Brass OT63 ½ hard
  Cu 63% Zn 37%
  EN 1652

- Used for the production of roses and selvages turned from brass bar

  Brass OT 58
  UNI-EN- 12164

- Used for the production of die-casted roses and selvages

  EN 12165.98 CW 617 N

⇧

## Inox

- Used for the production of roses and selvages trimmed from sheet

  Stainless steel degree: AISI 304 - EN 10088

- Used for the production of springs with wire of stainless steel.

  EN 10270-3-1.4310

⇧

## Steel

- Used for the production of roses and selvages trimmed from sheet

  Iron sheet steely,
  cold-rolled, not clad, suitable to deep-drawing.
  DC04 EN 10020

- Used for the production of spheres

  Carbon steel degree B for industrial applications: AISI 1010 EN 52100

- Used for the production of springs with flat wire

  C 82 D EN 10016-2

- Used for the production of springs with round wire for spring-loaded roses 52x10 mm.

  C 72 EN 10270/1 class SM

- Used for the production of springs with round wire except for the roses 52x10 mm.

  C 98 EN 10270/1 class DH

⇧

## Zamak

| ALLOY | European standard | Symbol Alloy | Number Alloy |
|---|---|---|---|
| ZAMAS 15 | EN 1774 | ZnAl4Cu1 | ZL0410 |

⇧