ARKEMA
INNOVATIVE CHEMISTRY

# Technical Polymers Medical Grades and Technical Data Sheets

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# WHAT IS "MED"?

**Arkema is committed to providing the highest quality materials for the medical market. For ten years Arkema has supplied medical grades for its Technical Polymers products. An extensive range of medical grades are available for its main product lines (Pebax® SA 01 MED, Rilsan® MED, Rilsamid® MED, Rilsan® Clear MED and Kynar® MED) that Arkema sells exclusively into the medical device market worldwide.**

Pebax®, Rilsan®, Rilsamid®, Rilsan® Clear and Kynar® grades that include "MED" in the nomenclature are considered by Arkema to be medical grades. These grades offer several benefits for medical applications in comparison to standard grades. MED grades are ISO 10993 -4 and -5 and USP Class VI compliant and have distinct qualifying specifications. Additionally, Arkema ensures consistency in medical products. For example, Technical Polymers medical grades have dedicated manufacturing locations, which is not the case for standard grades. In addition, Pebax® MED, Rilsan® MED, Rilsamid® MED, Rilsan® Clear MED and Kynar® MED come with a 12 months advance notification of change to specifications or manufacturing location.

*Products that do not have MED in their name are not authorized by Arkema for use in medical applications, in accordance with Arkema's medical policy.*

# DISCLAIMER

# MEDICAL POLICY

**Within the frame of its product stewardship, Arkema specifies the conditions wherein technical information and recommendations contained in its documentations may be used.**

The statements, technical information and recommendations contained herein are believed to be accurate as of the date hereof. Since the conditions and methods of use of the product and of the information referred to herein are beyond our control, ARKEMA expressly disclaims any and all liability as to any results obtained or arising from any use of the product or reliance on such information; NO WARRANTY OF FITNESS FOR ANY PARTICULAR PURPOSE, WARRANTY OF MERCHANTABILITY OR ANY OTHER WARRANTY, EXPRESSED OR IMPLIED, IS MADE CONCERNING THE GOODS DESCRIBED OR THE INFORMATION PROVIDED HEREIN. The information provided herein relates only to the specific product designated and may not be applicable when such product is used in combination with other materials or in any process. Further, since the conditions and methods of use are beyond the control of ARKEMA, ARKEMA expressly disclaims any and all liability as to any results obtained or arising from any use of the product or reliance on such information. The user should thoroughly test any application before commercialization. Nothing contained herein constitutes a license to practice under any patent and it should not be construed as an inducement to infringe any patent and the user is advised to take appropriate steps to be sure that any proposed use of the product will not result in patent infringement. See SDS for Health & Safety Considerations.

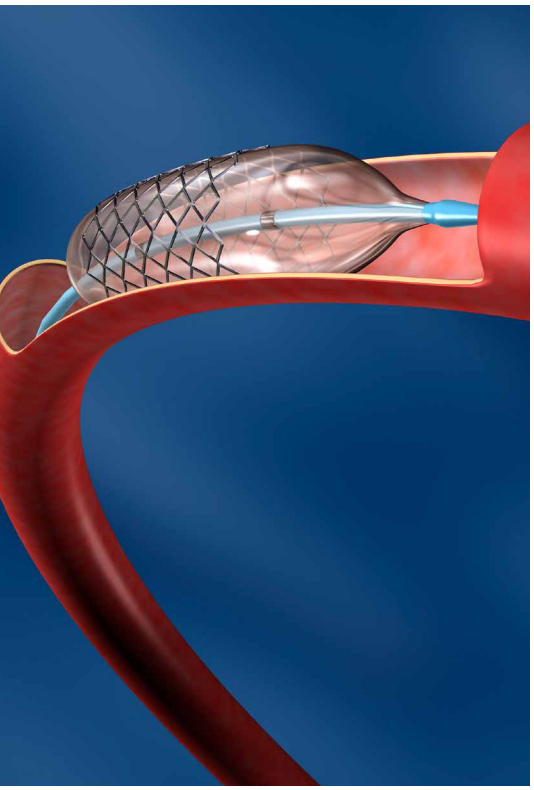
Arkema has implemented a Medical Policy regarding the use of Arkema products in Medical Devices applications that are in contact with the body or circulating bodily fluids (http://www.arkema.com/en/social-responsibility/responsible-product-management/medical-device-policy/index.html). Arkema has designated Medical grades to be used for such Medical Device applications. Products that have not been designated as Medical grades are not authorized by Arkema for use in Medical Device applications that are in contact with the body or circulating bodily fluids. In addition, Arkema strictly prohibits the use of any Arkema products in Medical Device applications that are implanted in the body or in contact with bodily fluids or tissues for greater than 30 days. The Arkema trademarks and the Arkema name shall not be used in conjunction with customers' medical devices, including without limitation, permanent or temporary implantable devices and customers shall not represent to anyone else, that Arkema allows, endorses or permits the use of Arkema products in such medical devices.

It is the sole responsibility of the manufacturer of the medical device to determine the suitability (including biocompatibility) of all raw materials, products and components, including any medical grade Arkema products, in order to ensure that the final end-use product is safe for its end use; performs or functions as intended; and complies with all applicable legal and regulatory requirements (FDA or other national drug agencies). It is the sole responsibility of the manufacturer of the medical device to conduct all necessary tests and inspections and to evaluate the medical device under actual end-use requirements and to adequately advise and warn purchasers, users, and/or learned intermediaries (such as physicians) of pertinent risks and fulfill any postmarket surveillance obligations. Any decision regarding the appropriateness of a particular Arkema material in a particular medical device should be based on the judgment of the manufacturer, seller, the competent authority, and the treating physician.

PEBAX® MED BY ARKEMA

## Typical applications for Pebax® MED :

- **Catheters (angioplasty, stent-delivery, diagnostic, ablation)**
- **Balloons**
- **Tubes (peristaltic pumps, connecting tubes, colonoscopies, hearing aids)**
- **Small-dimension molded parts**



# PEBAX® MEDICAL GRADE POLYMERS

**Medical grade Pebax® polyether block amides are plasticizer-free thermoplastic elastomers with a wide range of physical and mechanical properties achieved by varying the monomeric block types and ratios. Grades within the product range extend from soft and flexible properties similar to elastomers, to tough and rigitdproperties approaching polyamides performance characteristics.**

## Medical use

- Certifications
  - USP Class VI
  - ISO 10993-4
  - ISO 10993-5
- Sterilization feasibility (ETO, steam, gamma up to 10 Mrads)

## Processability

- Excellent processability, especially in injection molding (10-30% shorter cycle time vs other TPE)
- Bondable by adhesives or RF welding
- Easily blended with other polymers and compounded with additives

## Mechanical properties

- Excellent impact resistance and flexibility at low temperature
- Consistent hardness and flexibility at room and body temperatures
- High torque transference and kink resistance

## Physical & Chemical properties

- Good resistance to most chemicals
- Lightweight compared to TPU

## Grades available

2533 SA 01 MED, 3533 SA 01 MED, 4033 SA 01 MED, 4533 SA 01 MED, 5533 SA 01 MED, 6333 SA 01 MED, 7033 SA 01 MED, 7233 SA 01 MED, 7433 SA 01 MED, MV 1074 SA 01 MED.

RILSAN® CLEAR MED BY ARKEMA

## Typical applications for Rilsan® Clear MED :

**Rilsan® Clear MED is the choice material for medical device applications in which patient comfort is required. Properties such as lightness and flexibility are critical to patient receptivity of many home health care medical devices. For example, Rilsan® Clear MED is commonly used in the design of breathing masks or hearing aids.**

# RILSAN® CLEAR MEDICAL GRADE POLYAMIDES

**Rilsan® Clear G170 MED and Rilsan® Clear G850 Rnew® MED polyamides offer the best combination of transparency, light-weight, and flexibility of transparent polymers commonly used in medical applications. It is more transparent than glass and more flexible than polycarbonate.**

## Medical use

- Certifications
  - USP Class VI
  - ISO 10993-4
  - ISO 10993-5
- Sterilization feasibility
- BPA and plasticizer free

## Key Properties

- **Transparent:** Light transmittance of 91% exceeding that of glass and polycarbonate
- **Light:** Specific gravity of 1.05, Rilsan® Clear MED is about 15% lighter than traditional transparent medical plastics, such as acrylics or polycarbonates or PSU
- **Flexibility:** Flexural modulus of 1,980 MPa (287,000 psi), representing a 18% improvement in flexibility compared to polycarbonate
- **Durable:** High temperature resistance [Tg=168°C (334°F)], good surface and wear resistance, good chemical resistance

## Grades available

G170 MED and G850 Rnew® MED

RILSAN® MED BY ARKEMA

RILSAMID® MED BY ARKEMA

## Typical applications for Rilsan® MED and Rilsamid® MED :

- **Medical Tubing**
- **Catheters**
- **Medical molded components such as needle fittings for syringes**
- **Minimally invasive devices**
- **Nutritional bags**

# RILSAN® AND RILSAMID® MEDICAL GRADE POLYAMIDES

**Medical grade Rilsan® polyamide 11 and Rilsamid® polyamide 12 are thermoplastic polymers used in applications that require the strength and performance characteristics of a true thermoplastic, while also offering sufficient flexibility and elongation approaching that of some elastomers. Rilsan® and Rilsamid® polymers are easy to process by most methods including extrusion, extrusion blow molding, injection molding, and rotomolding. The product matrix accommodates countless additives and filling agents, such as plasticizers, stabilizers, colorants, lubricants, impact modifiers, glass fiber and carbon fiber.**


## Medical use

- Certifications
  - USP Class VI
  - ISO 10993-4
  - ISO 10993-5
- Sterilization feasibility (ETO, steam, gamma up to 10 Mrads)

## Key Properties

- Excellent resistance to chemicals (particularly hydrocarbons)
- Ease of processing
- Wide range of working temperatures [-40°C-130°C (-40°F-266°F)]
- High dimensional stability and low density

## Grades available

- Rilsan® MED: BMNO MED, BESNO MED, BESVOA MED, 8020
- Rilsamid® MED: AMNO MED, AESNO MED

KYNAR® MED BY ARKEMA

## Typical applications for Kynar® :

- **Medical Tubing**
- **Medical molded components such as needle fittings for syringes**
- **Single use films for bioreactors**

# KYNAR® MEDICAL GRADE FLUOROPOLYMERS

**Kynar® MED PVDF offers extreme performance where sterilization chemical resistance, high temperatures, and high purity are required. Readily processable via extrusion and injection molding, Kynar® MED PVDF has the properties and characteristics of other medical grade fluoropolymers and compliments the other polymers in the Arkema MED portfolio.**


## Medical use

- Certifications
  - USP Class VI
  - ISO 10993-4
  - ISO 10993-5
- Sterilization feasibility (ETO, steam, gamma up to 10 Mrads)
- BPA and plasticizer free

## Key Properties

- **Excellent chemical resistance:** Kynar® MED PVDF is inherently inert to all sterilization chemistries, as well as organic chemistries for drug delivery systems.
- **High-purity:** Containing no fillers, additives, or stabilizers, Kynar® MED PVDF is a high purity polymer with limited leachables and extractables.
- **High-thermal stability:** 150°C (302°F) rated, Kynar® MED PVDF is able to be autoclaved.
- **Easily Processible:** Kynar® MED PVDF can be easily injection molded and extruded into films, tubes, and other profiles.

## Grade available

Kynar® 720 MED

# TECHNICAL DATA SHEETS

# **PEBAX**® 2533 SA 01 MED
# TECHNICAL DATA SHEET

**Polyether block amide Pebax® 2533 SA 01 MED resin is a thermoplastic elastomer made of flexible polyether and rigid polyamide.**

**This grade offers the highest quality and it is specially designed to meet the stringent requirements of the medical applications such as minimally invasive devices.**

## MAIN CHARACTERISTICS

| PROPERTIES | DRY / COND | UNIT | TEST STANDARD |
|---|---|---|---|
| Molding shrinkage, parallel | 0.5 / * | % | ISO 294-4, 2577 |
| Molding shrinkage, normal | 0.8 / * | % | ISO 294-4, 2577 |
| Tensile Modulus | 12 / 10 | MPa | ISO 527-1/-2 |
| Stress at 50% strain | 3 / 3 | MPa | ISO 527-1/-2 |
| Strain at break | >50 / >50 | % | ISO 527-1/-2 |
| Charpy impact strength, +23°C | N / N | kJ/m² | ISO 179/1eU |
| Charpy impact strength, -30°C | N / N | kJ/m² | ISO 179/1eU |
| Charpy notched impact strength, +23°C | N / N | kJ/m² | ISO 179/1eA |
| Charpy notched impact strength, -30°C | N / N | kJ/m² | ISO 179/1eA |
| Melting temperature, 10°C/min | 134 / * | °C | ISO 11357-1/-3 |
| Vicat softening temperature, 50°C/h 50N | 58 / * | °C | ISO 306 |
| Water absorption | 1.2 / * | % | Sim. to ISO 62 |
| Humidity absorption | 0.4 / * | % | Sim. to ISO 62 |
| Density | 1000 / 1000 | kg/m³ | ISO 1183 |
| Injection Molding, melt temperature | 210 | °C | ISO 294 |
| Injection Molding, mold temperature | 30 | °C | ISO 10724 |
| Stress at 10% elongation | 1 / * | MPa | ISO 527-1/-2 |
| Stress at 100% elongation | 4 / * | MPa | ISO 527-1/-2 |
| Stress at 300% elongation | 5 / * | MPa | ISO 527-1/-2 |
| Strain at break TPE | >300 / * | % | ISO 527-1/-2 |
| Stress at break TPE | 32 / * | MPa | ISO 527-1/-2 |
| Shore A hardness, 3s | 77 / * | - | ISO 7619-1 |
| Shore D hardness, 15s | 22 / * | - | ISO 7619-1 |

**Processing conditions:**

**- Typical melt temperature (Min / Recommended / Max): 180°C / 210°C / 240°C.**

**- Typical mold temperature: 10 – 30°C.**

**- Drying time and temperature** *(only necessary for bags opened for more than two hours)***: 4-8 hours at 55-65°C.**

# PEBAX® 3533 SA 01 MED
# TECHNICAL DATA SHEET

**Polyether block amide Pebax® 3533 SA 01 MED resin is a thermoplastic elastomer made of flexible polyether and rigid polyamide.**

**This grade offers the highest quality and it is specially designed to meet the stringent requirements of the medical applications such as minimally invasive devices.**

## MAIN CHARACTERISTICS

| PROPERTIES | DRY / COND | UNIT | TEST STANDARD |
|---|---|---|---|
| Molding Shrinkage, parallel | 0.5 / * | % | ISO 294-4, 2577 |
| Molding Shrinkage, normal | 0.8 / * | % | ISO 294-4, 2577 |
| Tensile Modulus | 19 / 18 | MPa | ISO 527-1/-2 |
| Stress at 50% Strain | 4 / 4 | MPa | ISO 527-1/-2 |
| Strain at Break | >50 / >50 | % | ISO 527-1/-2 |
| Strain at Break TPE | >300 / * | % | ISO 527-1/-2 |
| Stress at Break TPE | 39 / * | MPa | ISO 527-1/-2 |
| Shore A Hardness, 3s | 82 / * | - | ISO 7619-1 |
| Shore D Hardness, 15s | 25 / * | - | ISO 7619-1 |
| Charpy Impact Strength, +23°C | - / N | kJ/m² | ISO 179/1eU |
| Charpy Impact Strength, -30°C | - / N | kJ/m² | ISO 179/1eU |
| Charpy Notched Impact Strength, +23°C | - / N | kJ/m² | ISO 179/1eA |
| Charpy Notched Impact Strength, -30°C | - / N | kJ/m² | ISO 179/1eA |
| Melting Temperature, 10°C/min | 144 / * | °C | ISO 11357-1/-3 |
| Vicat Softening Temperature, 50°C/h 50N | 77 / * | °C | ISO 306 |
| Water Absorption | 1.2 / * | % | Sim. to ISO 62 |
| Humidity Absorption | 0.4 / * | % | Sim. to ISO 62 |
| Density | 1000 / 1000 | kg/m³ | ISO 1183 |
| Injection Molding, melt temperature | 210 | °C | ISO 294 |
| Injection Molding, mold temperature | 30 | °C | ISO 10724 |

**Processing conditions Injection:**

**- Typical melt temperature (Min / Recommended / Max): 180°C / 210°C / 240°C.**

**- Typical mold temperature: 10 – 30°C.**

**- Drying time and temperature** *(only necessary for bags opened for more than two hours)* **: 4-8 hours at 55-65°C.**

**Processing conditions Extrusion:**

**- Typical melt temperature (Min / Recommended / Max): 190°C / 205°C / 220°C.**

**- Drying time and temperature** *(only necessary for bags opened for more than two hours)***: 4-8 hours at 55-65°C.**

# **PEBAX**® 4033 SA 01 MED
# TECHNICAL DATA SHEET

**Polyether block amide Pebax® 4033 SA 01 MED resin is a thermoplastic elastomer made of flexible polyether and rigid polyamide.**

**This grade offers the highest quality and it is specially designed to meet the stringent requirements of the medical applications such as minimally invasive devices.**

## MAIN CHARACTERISTICS

| PROPERTIES | DRY / COND | UNIT | TEST STANDARD |
|---|---|---|---|
| Molding Shrinkage, parallel | 0.4 / * | % | ISO 294-4, 2577 |
| Molding Shrinkage, normal | 1.1 / * | % | ISO 294-4, 2577 |
| Tensile Modulus | 73 / 71 | MPa | ISO 527-1/-2 |
| Stress at 50% Strain | 9 / 9 | MPa | ISO 527-1/-2 |
| Strain at Break | >50 / >50 | % | ISO 527-1/-2 |
| Shore A Hardness, 3s | 90 / * | - | ISO 7619-1 |
| Shore D Hardness, 15s | 35 / * | - | ISO 7619-1 |
| Charpy Impact Strength, +23°C | - / N | kJ/m² | ISO 179/1eU |
| Charpy Impact Strength, -30°C | - / N | kJ/m² | ISO 179/1eU |
| Charpy Notched Impact Strength, +23°C | - / N | kJ/m² | ISO 179/1eA |
| Charpy Notched Impact Strength, -30°C | - / N | kJ/m² | ISO 179/1eA |
| Melting Temperature, 10°C/min | 160 / * | °C | ISO 11357-1/-3 |
| Vicat Softening Temperature, 50°C/h 50N | 131 / * | °C | ISO 306 |
| Water Absorption | 1.2 / * | % | Sim. to ISO 62 |
| Humidity Absorption | 0.5 / * | % | Sim. to ISO 62 |
| Density | 1000 / 1000 | kg/m³ | ISO 1183 |
| Shore D Hardness, 15s | 35 / * | - | ISO 7619-1 |

**Processing conditions Injection:**

**- Typical melt temperature (Min / Recommended / Max): 200°C / 240°C / 270°C.**

**- Typical mold temperature: 10 – 30°C.**

**- Drying time and temperature** *(only necessary for bags opened for more than two hours)***: 4-6 hours at 60-70°C.**

**Processing conditions Extrusion:**

**- Typical melt temperature (Min / Recommended / Max): 210°C / 220°C / 230°C.**

**- Drying time and temperature** *(only necessary for bags opened for more than two hours)***: 4-6 hours at 60-70°C.**

# PEBAX® 4533 SA 01 MED
# TECHNICAL DATA SHEET

**Polyether block amide Pebax® 4533 SA 01 MED resin is a thermoplastic elastomer made of flexible polyether and rigid polyamide.**

**This grade offers the highest quality and it is specially designed to meet the stringent requirements of the medical applications such as minimally invasive devices.**

## MAIN CHARACTERISTICS

| PROPERTIES | DRY / COND | UNIT | TEST STANDARD |
|---|---|---|---|
| Molding Shrinkage, parallel | 0.4 / * | % | ISO 294-4, 2577 |
| Molding Shrinkage, normal | 1.1 / * | % | ISO 294-4, 2577 |
| Tensile Modulus | 88 / 81 | MPa | ISO 527-1/-2 |
| Stress at 50% Strain | 9 / 9 | MPa | ISO 527-1/-2 |
| Strain at Break | >50 / >50 | % | ISO 527-1/-2 |
| Shore A Hardness, 3s | 92 / * | - | ISO 7619-1 |
| Shore D Hardness, 15s | 41 / * | - | ISO 7619-1 |
| Charpy Impact Strength, +23°C | - / N | kJ/m² | ISO 179/1eU |
| Charpy Impact Strength, -30°C | - / N | kJ/m² | ISO 179/1eU |
| Charpy Notched Impact Strength, +23°C | - / N | kJ/m² | ISO 179/1eA |
| Charpy Notched Impact Strength, -30°C | - / N | kJ/m² | ISO 179/1eA |
| Melting Temperature, 10°C/min | 147 / * | °C | ISO 11357-1/-3 |
| Vicat Softening Temperature, 50°C/h 50N | 111 / * | °C | ISO 306 |
| Water Absorption | 1.2 / * | % | Sim. to ISO 62 |
| Humidity Absorption | 0.4 / * | % | Sim. to ISO 62 |
| Density | 1010 / 1010 | kg/m³ | ISO 1183 |
| Shore D Hardness, 15s | 41 / * | - | ISO 7619-1 |

**Processing conditions Injection:**

**- Typical melt temperature (Min / Recommended / Max): 200°C / 240°C / 270°C.**

**- Typical mold temperature: 10 – 30°C.**

**- Drying time and temperature** *(only necessary for bags opened for more than two hours)***: 4-6 hours at 60-70°C.**

**Processing conditions Extrusion:**

**- Typical melt temperature (Min / Recommended / Max): 210°C / 220°C / 230°C.**

**- Drying time and temperature** *(only necessary for bags opened for more than two hours)***: 4-6 hours at 60-70°C.**

# **PEBAX**® 5533 SA 01 MED
# TECHNICAL DATA SHEET

**Polyether block amide Pebax® 5533 SA 01 MED resin is a thermoplastic elastomer made of flexible polyether and rigid polyamide.**

**This grade offers the highest quality and it is specially designed to meet the stringent requirements of the medical applications such as minimally invasive devices.**
**Pebax® 5533 SA 01 MED resin also offers an excellent combination of properties such as: kink resistance, low friction coefficient and superior dynamic response.**

## MAIN CHARACTERISTICS

| PROPERTIES | DRY / COND | UNIT | TEST STANDARD |
|---|---|---|---|
| Molding Shrinkage, parallel | 1.2 / * | % | ISO 294-4, 2577 |
| Molding Shrinkage, normal | 1.4 / * | % | ISO 294-4, 2577 |
| Tensile Modulus | 170 / 165 | MPa | ISO 527-1/-2 |
| Yield stress | 12 / 12 | MPa | ISO 527-1/-2 |
| Yield strain | 25 / 25 | % | ISO 527-1/-2 |
| Nominal Strain at Break | >50 / >50 | % | ISO 527-1/-2 |
| Shore D Hardness, 15s | 50 / * | - | ISO 7619-1 |
| Charpy Impact Strength, +23°C | - / N | kJ/m² | ISO 179/1eU |
| Charpy Impact Strength, -30°C | - / N | kJ/m² | ISO 179/1eU |
| Charpy Notched Impact Strength, +23°C | - / N | kJ/m² | ISO 179/1eA |
| Charpy Notched Impact Strength, -30°C | - / N | kJ/m² | ISO 179/1eA |
| Melting Temperature, 10°C/min | 159 / * | °C | ISO 11357-1/-3 |
| Vicat Softening Temperature, 50°C/h 50N | 142 / * | °C | ISO 306 |
| Water Absorption | 1.2 / * | % | Sim. to ISO 62 |
| Humidity Absorption | 0.6 / * | % | Sim. to ISO 62 |
| Density | 1010 / 1010 | kg/m³ | ISO 1183 |
| Injection Molding, melt temperature | 240 | °C | ISO 294 |
| Injection Molding, mold temperature | 60 | °C | ISO 10724 |

**Processing conditions Injection:**
**- Typical melt temperature (Min / Recommended / Max): 200°C / 240°C / 270°C.**
**- Typical mold temperature: 25 – 60°C.**
**- Drying time and temperature** *(only necessary for bags opened for more than two hours)***: 4-6 hours at 65-75°C.**

**Processing conditions Extrusion:**
**- Typical melt temperature (Min / Recommended / Max): 210°C / 220°C / 230°C.**
**- Drying time and temperature** *(only necessary for bags opened for more than two hours)***: 4-6 hours at 65-75°C.**

# PEBAX® 6333 SA 01 MED
# TECHNICAL DATA SHEET

**Polyether block amide Pebax® 6333 SA 01 MED resin is a thermoplastic elastomer made of flexible polyether and rigid polyamide.**

**This grade offers the highest quality and it is specially designed to meet the stringent requirements of the medical applications such as minimally invasive devices.**
**Pebax® 6333 SA 01 MED resin also offers an excellent combination of properties such as: kink resistance, low friction coefficient and superior dynamic response.**

## MAIN CHARACTERISTICS

| PROPERTIES | DRY / COND | UNIT | TEST STANDARD |
|---|---|---|---|
| Molding Shrinkage, parallel | 1.2 / * | % | ISO 294-4, 2577 |
| Molding Shrinkage, normal | 1.4 / * | % | ISO 294-4, 2577 |
| Tensile Modulus | 307 / 285 | MPa | ISO 527-1/-2 |
| Yield stress | 19 / 18 | MPa | ISO 527-1/-2 |
| Yield strain | 22 / 22 | % | ISO 527-1/-2 |
| Nominal Strain at Break | >50 / >50 | % | ISO 527-1/-2 |
| Shore D Hardness, 15s | 58 / * | - | ISO 7619-1 |
| Charpy Impact Strength, +23°C | - / N | kJ/m² | ISO 179/1eU |
| Charpy Impact Strength, -30°C | - / N | kJ/m² | ISO 179/1eU |
| Charpy Notched Impact Strength, +23°C | - / N | kJ/m² | ISO 179/1eA |
| Charpy Notched Impact Strength, -30°C | - / 20 | kJ/m² | ISO 179/1eA |
| Melting Temperature, 10°C/min | 169 / * | °C | ISO 11357-1/-3 |
| Vicat Softening Temperature, 50°C/h 50N | 157 / * | °C | ISO 306 |
| Water Absorption | 1.1 / * | % | Sim. to ISO 62 |
| Humidity Absorption | 0.7 / * | % | Sim. to ISO 62 |
| Density | 1010 / - | kg/m³ | ISO 1183 |
| Shore D Hardness, 15s | 58 / * | - | ISO 7619-1 |

**Processing conditions Injection:**
**- Typical melt temperature (Min / Recommended / Max): 230°C / 260°C / 290°C.**
**- Typical mold temperature: 25 – 60°C.**
**- Drying time and temperature** *(only necessary for bags opened for more than two hours)***: 4-6 hours at 65-75°C.**

**Processing conditions Extrusion:**
**- Typical melt temperature (Min / Recommended / Max): 210°C / 225°C / 240°C.**
**- Drying time and temperature** *(only necessary for bags opened for more than two hours)***: 4-6 hours at 65-75°C.**

# **PEBAX**® 7033 SA 01 MED
# TECHNICAL DATA SHEET

**Polyether block amide Pebax® 7033 SA 01 MED resin is a thermoplastic elastomer made of flexible polyether and rigid polyamide.**

**This grade offers the highest quality and it is specially designed to meet the stringent requirements of the medical applications such as minimally invasive devices.**
**Pebax® 7033 SA 01 MED resin also offers an excellent combination of properties such as: kink resistance, low friction coefficient and superior dynamic response.**

## MAIN CHARACTERISTICS

| PROPERTIES | DRY / COND | UNIT | TEST STANDARD |
|---|---|---|---|
| Molding Shrinkage, parallel | 1.2 / * | % | ISO 294-4, 2577 |
| Molding Shrinkage, normal | 1.5 / * | % | ISO 294-4, 2577 |
| Tensile Modulus | 414 / 390 | MPa | ISO 527-1/-2 |
| Yield stress | 23 / 22 | MPa | ISO 527-1/-2 |
| Yield strain | 22 / 20 | % | ISO 527-1/-2 |
| Nominal Strain at Break | >50 / >50 | % | ISO 527-1/-2 |
| Abrasion Resistance | 41 / * | $mm^3$ | ISO 4649 |
| Shore D Hardness, 15s | 61 / * | - | ISO 7619-1 |
| Charpy Impact Strength, +23°C | - / N | $kJ/m^2$ | ISO 179/1eU |
| Charpy Impact Strength, -30°C | - / N | $kJ/m^2$ | ISO 179/1eU |
| Charpy Notched Impact Strength, +23°C | - / 120 | $kJ/m^2$ | ISO 179/1eA |
| Charpy Notched Impact Strength, -30°C | - / 20 | $kJ/m^2$ | ISO 179/1eA |
| Melting Temperature, 10°C/min | 172 / * | °C | ISO 11357-1/-3 |
| Vicat Softening Temperature, 50°C/h 50N | 129 / * | °C | ISO 306 |
| Water Absorption | 1.43 / * | % | Sim. to ISO 62 |
| Humidity Absorption | 0.76 / * | % | Sim. to ISO 62 |
| Density | 1010 / - | $kg/m^3$ | ISO 1183 |
| Injection Molding, melt temperature | 260 | °C | ISO 294 |
| Injection Molding, mold temperature | 60 | °C | ISO 10724 |

**Processing conditions Injection:**
**- Typical melt temperature (Min / Recommended / Max): 230°C / 260°C / 290°C**
**- Typical mold temperature: 25 – 60°C.**
**- Drying time and temperature** *(only necessary for bags opened for more than two hours)***: 5-7 hours at 70-80°C**

**Processing conditions Extrusion:**
**- Typical melt temperature (Min / Recommended / Max): 220°C / 235°C / 250°C.**
**- Drying time and temperature** *(only necessary for bags opened for more than two hours)***: 5-7 hours at 70-80°C.**

# PEBAX® 7233 SA 01 MED
# TECHNICAL DATA SHEET

**Polyether block amide Pebax® 7233 SA 01 MED resin is a thermoplastic elastomer made of flexible polyether and rigid polyamide.**

**This grade offers the highest quality and it is specially designed to meet the stringent requirements of the medical applications such as minimally invasive devices.**
**Pebax® 7233 SA 01 MED resin also offers an excellent combination of properties such as: kink resistance, low friction coefficient and superior dynamic response.**

## MAIN CHARACTERISTICS

| PROPERTIES | DRY / COND | UNIT | TEST STANDARD |
|---|---|---|---|
| Molding Shrinkage, parallel | 1.2 / * | % | ISO 294-4, 2577 |
| Molding Shrinkage, normal | 1.5 / * | % | ISO 294-4, 2577 |
| Tensile Modulus | - / 510 | MPa | ISO 527-1/-2 |
| Yield stress | - / 26 | MPa | ISO 527-1/-2 |
| Yield strain | - / 18 | % | ISO 527-1/-2 |
| Nominal Strain at Break | - / >50 | % | ISO 527-1/-2 |
| Shore D Hardness, 15s | 61 / * | - | ISO 7619-1 |
| Charpy Impact Strength, +23°C | - / N | kJ/m² | ISO 179/1eU |
| Charpy Impact Strength, -30°C | - / N | kJ/m² | ISO 179/1eU |
| Charpy Notched Impact Strength, +23°C | - / 15 | kJ/m² | ISO 179/1eA |
| Charpy Notched Impact Strength, -30°C | - / 10 | kJ/m² | ISO 179/1eA |
| Melting Temperature, 10°C/min | 174 / * | °C | ISO 11357-1/-3 |
| Vicat Softening Temperature, 50°C/h 50N | 164 / * | °C | ISO 306 |
| Water Absorption | 0.9 / * | % | Sim. to ISO 62 |
| Humidity Absorption | 0.7 / * | % | Sim. to ISO 62 |
| Density | 1010 / - | kg/m³ | ISO 1183 |
| Injection Molding, melt temperature | 260 | °C | ISO 294 |
| Injection Molding, mold temperature | 60 | °C | ISO 10724 |

**Processing conditions Injection:**
**- Typical melt temperature (Min / Recommended / Max): 230°C / 260°C / 290°C**
**- Typical mold temperature: 25 – 60°C.**
**- Drying time and temperature** *(only necessary for bags opened for more than two hours)***: 5-7 hours at 70-80°C**

**Processing conditions Extrusion:**
**- Typical melt temperature (Min / Recommended / Max): 220°C / 235°C / 250°C.**
**- Drying time and temperature** *(only necessary for bags opened for more than two hours)***: 5-7 hours at 70-80°C.**

# **PEBAX**® 7433 SA 01 MED
# TECHNICAL DATA SHEET

**Polyether block amide 7433 SA 01 MED resin is a thermoplastic elastomer made of flexible polyether and rigid polyamide.**

**This grade offers the highest quality and it is specially designed to meet the stringent requirements of the medical applications such as minimally invasive devices.**
**Pebax® 7433 SA 01 MED resin also offers an excellent combination of properties such as: kink resistance, low friction coefficient and superior dynamic response.**

## MAIN CHARACTERISTICS

| PROPERTIES | DRY / COND | UNIT | TEST STANDARD |
|---|---|---|---|
| Molding Shrinkage, parallel | 0.2 / * | % | ISO 294-4, 2577 |
| Molding Shrinkage, normal | 0.7 / * | % | ISO 294-4, 2577 |
| Tensile Modulus | - / 700 | MPa | ISO 527-1/-2 |
| Yield stress | - / 30 | MPa | ISO 527-1/-2 |
| Yield strain | - / 17 | % | ISO 527-1/-2 |
| Nominal Strain at Break | - / >50 | % | ISO 527-1/-2 |
| Stress at Break TPE | 46 / * | MPa | ISO 527-1/-2 |
| Abrasion Resistance | 40.5 / * | $mm^3$ | ISO 4649 |
| Shore D Hardness, 15s | 66 / * | - | ISO 7619-1 |
| Charpy Impact Strength, +23°C | - / N | $kJ/m^2$ | ISO 179/1eU |
| Charpy Impact Strength, -30°C | - / N | $kJ/m^2$ | ISO 179/1eU |
| Charpy Notched Impact Strength, +23°C | - / 19 | $kJ/m^2$ | ISO 179/1eA |
| Charpy Notched Impact Strength, -30°C | - / 6 | $kJ/m^2$ | ISO 179/1eA |
| Melting Temperature, 10°C/min | 174 / * | °C | ISO 11357-1/-3 |
| Temp. of Deflection Under Load, 1.80 MPa | 113 / * | °C | ISO 75-1/-2 |
| Temp. of Deflection Under Load, 0.45 MPa | 67 / * | °C | ISO 75-1/-2 |
| Vicat Softening Temperature, 50°C/h 50N | 129 / * | °C | ISO 306 |
| Water Absorption | 1.43 / * | % | Sim. to ISO 62 |
| Humidity Absorption | 0.76 / * | % | Sim. to ISO 62 |
| Density | 1010 / - | $kg/m^3$ | ISO 1183 |
| Injection Molding, melt temperature | 260 | °C | ISO 294 |
| Injection Molding, mold temperature | 60 | °C | ISO 10724 |

**Processing conditions Injection:**
**- Typical melt temperature (Min / Recommended / Max): 230°C / 260°C / 290°C**
**- Typical mold temperature: 25 – 60°C.**
**- Drying time and temperature** *(only necessary for bags opened for more than two hours)***: 5-7 hours at 70-80°C**

**Processing conditions Extrusion:**
**- Typical melt temperature (Min / Recommended / Max): 220°C / 235°C / 250°C.**
**- Drying time and temperature** *(only necessary for bags opened for more than two hours)***: 5-7 hours at 70-80°C.**

# PEBAX® MV 1074 SA 01 MED
# TECHNICAL DATA SHEET

**Polyether block amide Pebax® MV 1074 SA 01 MED resin is a thermoplastic elastomer made of flexible and hydrophilic polyether and rigid polyamide. Hydrophilic Pebax® MV 1074 SA 01 MED resin is suitable for extrusion or coextrusion and offers excellent high moisture absorption properties in wet environments, enhancing lubricity against bodily tissue.**

**Pebax® MV 1074 SA 01 MED resin is also an inherently dissipative polymer and can be dry blended or compounded with a polymer matrix to lower the surface resistivity of the final part.**

**This grade offers the highest quality and it is specially designed to meet the stringent requirements of the medical applications such as minimally invasive devices.**

## MAIN CHARACTERISTICS

| PROPERTIES | DRY / COND | UNIT | TEST STANDARD |
|---|---|---|---|
| Tensile Modulus | 97 / 80 | MPa | ISO 527-1/-2 |
| Stress at 50% Strain | 10 / 10 | MPa | ISO 527-1/-2 |
| Strain at Break | >50 / >50 | % | ISO 527-1/-2 |
| Strain at Break TPE | >300 / * | % | ISO 527-1/-2 |
| Stress at Break TPE | 30 / * | MPa | ISO 527-1/-2 |
| Shore D Hardness, 15s | 40 / * | - | ISO 7619-1 |
| Charpy Impact Strength, +23°C | N / N | kJ/m² | ISO 179/1eU |
| Charpy Impact Strength, -30°C | N / N | kJ/m² | ISO 179/1eU |
| Charpy Notched Impact Strength, +23°C | N / N | kJ/m² | ISO 179/1eA |
| Charpy Notched Impact Strength, -30°C | N / N | kJ/m² | ISO 179/1eA |
| Maximum Stress, parallel | 32 / * | MPa | ISO 527-3 |
| Maximum Stress, normal | 34 / * | MPa | ISO 527-3 |
| Maximum Strain, parallel | 500 / * | % | ISO 527-3 |
| Maximum Strain, normal | 700 / * | % | ISO 527-3 |
| Melting Temperature, 10°C/min | 158 / * | °C | ISO 11357-1/-3 |
| Glass Transition Temperature, 10°C/min | -40 / * | °C | ISO 11357-1/-2 |
| Oxygen Index | 19 / * | % | ISO 4589-1/-2 |
| Volume Resistivity | 1.5E9 / 2.5E7 | Ohm*m | IEC 60093 |
| Surface Resistivity | * / 3E9 | Ohm | IEC 60093 |
| Electric Strength | 5 / - | kV/mm | IEC 60243-1 |
| Humidity Absorption | 1.4 / * | % | Sim. to ISO 62 |
| Density | 1070 / - | kg/m³ | ISO 1183 |
| Shore D Hardness, 15s | 40 / * | - | ISO 7619-1 |

**Processing conditions Injection:**

**- Typical melt temperature (Min / Recommended / Max): 200°C / 240°C / 270°C**

**- Typical mold temperature: 25 – 60°C.**

**- Drying time and temperature** *(only necessary for bags opened for more than two hours)***: 4-6 hours at 65-75°C**

**Processing conditions Extrusion:**

**- Typical melt temperature (Min / Recommended / Max): 210°C / 220°C / 230°C.**

**- Drying time and temperature** *(only necessary for bags opened for more than two hours)***: 4-6 hours at 65-75°C.**

# **RILSAN**® CLEAR G170 MED
# TECHNICAL DATA SHEET



**Rilsan® Clear G170 MED is a high performance transparent polyamide resin with outstanding thermal resistance. This grade offers the highest quality and is specifically designed to meet the stringent requirements of the medical applications.**

## MAIN CHARACTERISTICS

| PROPERTIES | DRY / COND | UNIT | TEST STANDARD |
|---|---|---|---|
| Melt Volume-Flow Rate, MVR | 2 / * | $cm^3$/10min | ISO 1133 |
| Temperature | 275 / * | °C | - |
| Load | 2.16 / * | kg | - |
| Molding Shrinkage, parallel | 0.7 / * | % | ISO 294-4, 2577 |
| Molding Shrinkage, normal | 0.7 / * | % | ISO 294-4, 2577 |
| Tensile Modulus | 2100 / 2020 | MPa | ISO 527-1/-2 |
| Yield stress | 76 / 74 | MPa | ISO 527-1/-2 |
| Yield strain | 8 / 9 | % | ISO 527-1/-2 |
| Nominal Strain at Break | >50 / >50 | % | ISO 527-1/-2 |
| Shore D Hardness, 15s | 79 / * | - | ISO 7619-1 |
| Charpy Impact Strength, +23°C | - / N | $kJ/m^2$ | ISO 179/1eU |
| Charpy Impact Strength, -30°C | N / N | $kJ/m^2$ | ISO 179/1eU |
| Charpy Notched Impact Strength, +23°C | - / 13 | $kJ/m^2$ | ISO 179/1eA |
| Charpy Notched Impact Strength, -30°C | - / 13 | $kJ/m^2$ | ISO 179/1eA |
| Glass Transition Temperature, 10°C/min | 168 / * | °C | ISO 11357-1/-2 |
| Temp. of Deflection Under Load, 1.80 MPa | 136 / * | °C | ISO 75-1/-2 |
| Temp. of Deflection Under Load, 0.45 MPa | 150 / * | °C | ISO 75-1/-2 |
| Vicat Softening Temperature, 50°C/h 50N | 160 / * | °C | ISO 306 |
| Coeff. of Linear Thermal Expansion, parallel | 70 / * | E-6/K | ISO 11359-1/-2 |
| Burning Behav. at 1.5 mm Nominal Thickness | V-2 / * | class | IEC 60695-11-10 |
| Thickness Tested | 1.6 / * | mm | - |
| Burning Behav. at Thickness h | HB / * | class | IEC 60695-11-10 |
| Thickness Tested | 0.8 / * | mm | - |
| Oxygen Index | 26 / * | % | ISO 4589-1/-2 |
| Volume Resistivity | - / 1E11 | Ohm*m | IEC 60093 |
| Surface Resistivity | * / 1E12 | Ohm | IEC 60093 |

# **RILSAN®** CLEAR G170 MED
# TECHNICAL DATA SHEET

## MAIN CHARACTERISTICS

| PROPERTIES | DRY / COND | UNIT | TEST STANDARD |
|---|---|---|---|
| **Electric Strength** | - / 50 | kV/mm | IEC 60243-1 |
| **Comparative Tracking Index** | * / 600 | - | IEC 60112 |
| **Water Absorption** | 3.8 / * | % | Sim. to ISO 62 |
| **Humidity Absorption** | 1.7 / * | % | Sim. to ISO 62 |
| **Density** | 1050 / 1050 | kg/m$^3$ | ISO 1183 |
| **Luminous Transmittance** | 91 | % | ISO 13468-1, -2 |
| **Injection Molding, melt temperature** | 270 | °C | ISO 294 |
| **Injection Molding, mold temperature** | 60 | °C | ISO 10724 |
| **Injection Molding, pressure at hold** | 19 | MPa | ISO 294 |

**Processing conditions:**

**- Typical melt temperature (Min / Recommanded / Max): 270°C / 280°C / 290°C**

**- Drying time and temperature (only for bags opened for more than two hours): 4 - 6 hours at 90°C**

# **RILSAN®** CLEAR G850 RNEW® MED
# TECHNICAL DATA SHEET

**Rilsan® Clear G850 Rnew® MED is a high performance transparent copolyamide having outstanding purity level, partially based on renewable resources.**

**This grade offers highest quality and is specifically designed to meet the stringent requirements of the medical applications.**

## MAIN CHARACTERISTICS

| PROPERTIES | DRY / COND | UNIT | TEST STANDARD |
|---|---|---|---|
| Molding Shrinkage, parallel | 0.6 / * | % | ISO 294-4, 2577 |
| Molding Shrinkage, normal | 0.8 / * | % | ISO 294-4, 2577 |
| Tensile Modulus | - / 1670 | MPa | ISO 527-1/-2 |
| Yield stress | - / 61 | MPa | ISO 527-1/-2 |
| Yield strain | - / 8 | % | ISO 527-1/-2 |
| Nominal Strain at Break | - / >50 | % | ISO 527-1/-2 |
| Shore D Hardness, 15s | 78 / * | - | ISO 7619-1 |
| Charpy Impact Strength, +23°C | - / N | kJ/m² | ISO 179/1eU |
| Charpy Impact Strength, -30°C | - / N | kJ/m² | ISO 179/1eU |
| Charpy Notched Impact Strength, +23°C | - / 7.5 | kJ/m² | ISO 179/1eA |
| Charpy Notched Impact Strength, -30°C | - / 7 | kJ/m² | ISO 179/1eA |
| Glass Transition Temperature, 10°C/min | 150 / * | °C | ISO 11357-1/-2 |
| Temp. of Deflection Under Load, 1.80 MPa | 120 / * | °C | ISO 75-1/-2 |
| Temp. of Deflection Under Load, 0.45 MPa | 135 / * | °C | ISO 75-1/-2 |
| Water Absorption | 4 / * | % | Sim. to ISO 62 |
| Humidity Absorption | 1.7 / * | % | Sim. to ISO 62 |
| Density | 1010 / 1010 | kg/m³ | ISO 1183 |
| Luminous Transmittance | 92 | % | ISO 13468-1, -2 |
| Injection Molding, melt temperature | 280 | °C | ISO 294 |
| Injection Molding, mold temperature | 60 | °C | ISO 10724 |

**Processing conditions:**

**- Typical melt temperature (Min / Recommanded / Max): 250°C / 280°C / 300°C**

**- Typical mold temperature: 20 - 80 °C**

**- Drying time and temperature** *(only for bags opened for more than two hours)***: 4 - 6 hours at 90°C**

# **RILSAN®** BESNO MED
# TECHNICAL DATA SHEET

**Rilsan® BESNO MED resin is a polyamide 11 produced from a renewable source. This grade dedicated to extrusion offers the highest quality and it is specifically designed to meet the stringent requirements of the medical applications such as minimally invasive devices.**

## MAIN CHARACTERISTICS

| PROPERTIES | DRY / COND | UNIT | TEST STANDARD |
|---|---|---|---|
| Tensile Modulus | - / 1200 | MPa | ISO 527-1/-2 |
| Yield stress | - / 40 | MPa | ISO 527-1/-2 |
| Yield strain | - / 6 | % | ISO 527-1/-2 |
| Nominal Strain at Break | - / >50 | % | ISO 527-1/-2 |
| Shore D Hardness, 15s | 71 / * | - | ISO 7619-1 |
| Charpy Impact Strength, +23°C | - / N | kJ/m² | ISO 179/1eU |
| Charpy Impact Strength, -30°C | - / N | kJ/m² | ISO 179/1eU |
| Charpy Notched Impact Strength, +23°C | - / 15 | kJ/m² | ISO 179/1eA |
| Charpy Notched Impact Strength, -30°C | - / 13 | kJ/m² | ISO 179/1eA |
| Melting Temperature, 10°C/min | 186 / * | °C | ISO 11357-1/-3 |
| Density | 1020 / 1020 | kg/m³ | ISO 1183 |

**Processing conditions:**

**- Typical melt temperature (Min / Recommended / Max): 230°C / 250°C / 280°C.**

**- Drying time and temperature** *(only necessary for bags opened for more than two hours)***: 4-8 hours at 65-80°C.**

# **RILSAN®** BESVO A MED
# TECHNICAL DATA SHEET

**Rilsan® BESVO A MED resin is a polyamide 11 produced from a renewable source. This natural grade, dedicated to extrusion, contains a negligible amount of oligomers. Rilsan® BESVO A MED resin offers the highest quality and it is specially designed to meet the stringent requirements of the medical applications such as minimally invasive devices.**

## MAIN CHARACTERISTICS

| PROPERTIES | DRY / COND | UNIT | TEST STANDARD |
|---|---|---|---|
| Melt Volume-Flow Rate, MVR | 6 / * | $cm^3$/10min | ISO 1133 |
| Temperature | 235 / * | °C | - |
| Load | 10 / * | kg | - |
| Tensile Modulus | - / 1180 | MPa | ISO 527-1/-2 |
| Yield stress | - / 36 | MPa | ISO 527-1/-2 |
| Yield strain | - / 5 | % | ISO 527-1/-2 |
| Nominal Strain at Break | - / >50 | % | ISO 527-1/-2 |
| Shore D Hardness, 15s | 71 / * | - | ISO 7619-1 |
| Charpy Impact Strength, +23°C | - / N | $kJ/m^2$ | ISO 179/1eU |
| Charpy Impact Strength, -30°C | - / N | $kJ/m^2$ | ISO 179/1eU |
| Charpy Notched Impact Strength, +23°C | - / 15 | $kJ/m^2$ | ISO 179/1eA |
| Charpy Notched Impact Strength, -30°C | - / 13 | $kJ/m^2$ | ISO 179/1eA |
| Melting Temperature, 10°C/min | 186 / * | °C | ISO 11357-1/-3 |
| Temp. of Deflection Under Load, 1.80 MPa | 50 / * | °C | ISO 75-1/-2 |
| Temp. of Deflection Under Load, 0.45 MPa | 145 / * | °C | ISO 75-1/-2 |
| Vicat Softening Temperature, 50°C/h 50N | 160 / * | °C | ISO 306 |
| Coeff. of Linear Thermal Expansion, parallel | 85 / * | E-6/K | ISO 11359-1/-2 |
| Burning Behav. at 1.5 mm Nominal Thickness | V-2 / * | class | IEC 60695-11-10 |
| Thickness Tested | 1.6 / * | mm | - |
| Burning Behav. at Thickness h | V-2 / * | class | IEC 60695-11-10 |
| Thickness Tested | 3.2 / * | mm | - |
| Oxygen Index | 25 / * | % | ISO 4589-1/-2 |
| Electric Strength | - / 30 | kV/mm | IEC 60243-1 |
| Water Absorption | 1.9 / * | % | Sim. to ISO 62 |
| Density | 1020 / 1020 | $kg/m^3$ | ISO 1183 |
| Injection Molding, melt temperature | 260 | °C | ISO 294 |
| Injection Molding, mold temperature | 50 | °C | ISO 10724 |
| Injection Molding, pressure at hold | 16 | MPa | ISO 294 |

**Processing conditions:**

**- Typical melt temperature (Min / Recommanded / Max): 230°C / 250°C / 280°C.**

**- Drying time and temperature** *(only for bags opened for more than two hours)***: 4-6 hours at 65-80°C.**

# **RILSAN®** BMNO MED
# TECHNICAL DATA SHEET

**Rilsan® BMNO MED resin is a polyamide 11 produced from a renewable source. This natural grade dedicated to injection offers the highest quality and it is specially designed to meet the stringent requirements of the medical applications such as minimally invasive devices.**

## MAIN CHARACTERISTICS

| PROPERTIES | DRY / COND | UNIT | TEST STANDARD |
|---|---|---|---|
| Molding Shrinkage, parallel | 0.4 / * | % | ISO 294-4, 2577 |
| Molding Shrinkage, normal | 0.8 / * | % | ISO 294-4, 2577 |
| Tensile Modulus | - / 1280 | MPa | ISO 527-1/-2 |
| Yield stress | - / 41 | MPa | ISO 527-1/-2 |
| Yield strain | - / 5 | % | ISO 527-1/-2 |
| Nominal Strain at Break | - / >50 | % | ISO 527-1/-2 |
| Shore D Hardness, 15s | 68 / * | - | ISO 7619-1 |
| Charpy Impact Strength, +23°C | - / N | kJ/m² | ISO 179/1eU |
| Charpy Impact Strength, -30°C | - / N | kJ/m² | ISO 179/1eU |
| Charpy Notched Impact Strength, +23°C | - / 9 | kJ/m² | ISO 179/1eA |
| Charpy Notched Impact Strength, -30°C | - / 4 | kJ/m² | ISO 179/1eA |
| Melting Temperature, 10°C/min | 189 / * | °C | ISO 11357-1/-3 |
| Density | 1030 / 1030 | kg/m³ | ISO 1183 |
| Injection Molding, melt temperature | 260 | °C | ISO 294 |
| Injection Molding, mold temperature | 50 | °C | ISO 10724 |
| Injection Molding, pressure at hold | 16 | MPa | ISO 294 |

**Processing conditions:**

**- Typical melt temperature (Min / Recommended / Max): 240°C / 270°C / 290°C.**

**- Mold temperature: 25 - 60°C**

**- Drying time and temperature** *(only necessary for bags opened for more than two hours)***: 4-6 hours at 80-90°C.**

# **RILSAN®** 8020
# TECHNICAL DATA SHEET

**Rilsan® 8020 resin is a translucent copolyamide based on renewable resources and without plasticizer. This grade is specially designed for medical uses.**

## MAIN CHARACTERISTICS

| PROPERTIES | DRY / COND | UNIT | TEST STANDARD |
|---|---|---|---|
| Yield stress | - / 24 | MPa | ISO 527-1/-2 |
| Yield strain | - / 21 | % | ISO 527-1/-2 |
| Nominal Strain at Break | - / >50 | % | ISO 527-1/-2 |
| Charpy Impact Strength, +23°C | - / N | kJ/m² | ISO 179/1eU |
| Charpy Impact Strength, -30°C | - / N | kJ/m² | ISO 179/1eU |
| Charpy Notched Impact Strength, +23°C | - / N | kJ/m² | ISO 179/1eA |
| Charpy Notched Impact Strength, -30°C | - / N | kJ/m² | ISO 179/1eA |
| Melting Temperature, 10°C/min | 172 / * | °C | ISO 11357-1/-3 |
| Water Absorption | 0.8 / * | % | Sim. to ISO 62 |
| Density | 1020 / - | kg/m³ | ISO 1183 |

**Processing conditions:**

**- Typical melt temperature (Min / Recommanded / Max): 220°C / 235°C / 250°C.**

**- Drying time and temperature** *(only for bags opened for more than two hours)***: 4-6 hours at 80°C.**

# **RILSAMID®** AESNO MED
# TECHNICAL DATA SHEET

**Rilsamid® AESNO MED is a rigid polyamide 12 with high viscosity designed for tube extrusion. This grade, dedicated to extrusion, offers the highest quality and it is specifically designed to meet the stringent requirements of the medical applications such as minimally invasive devices.**

## MAIN CHARACTERISTICS

| PROPERTIES | DRY / COND | UNIT | TEST STANDARD |
|---|---|---|---|
| Melt Volume-Flow Rate, MVR | 8 / * | $cm^3$/10min | ISO 1133 |
| Temperature | 235 / * | °C | - |
| Load | 5 / * | kg | - |
| Tensile Modulus | 1500 / 1440 | MPa | ISO 527-1/-2 |
| Yield stress | 50 / 43 | MPa | ISO 527-1/-2 |
| Yield strain | 5 / 5 | % | ISO 527-1/-2 |
| Nominal Strain at Break | >50 / >50 | % | ISO 527-1/-2 |
| Charpy Impact Strength, +23°C | - / N | $kJ/m^2$ | ISO 179/1eU |
| Charpy Impact Strength, -30°C | - / N | $kJ/m^2$ | ISO 179/1eU |
| Charpy Notched Impact Strength, +23°C | - / 11 | $kJ/m^2$ | ISO 179/1eA |
| Charpy Notched Impact Strength, -30°C | - / 6 | $kJ/m^2$ | ISO 179/1eA |
| Puncture - Maximum Force, -30°C | - / 4800 | N | ISO 6603-2 |
| Puncture Energy, -30°C | - / 60 | J | ISO 6603-2 |
| Melting Temperature, 10°C/min | 180 / * | °C | ISO 11357-1/-3 |
| Temp. of Deflection Under Load, 1.80 MPa | 55 / * | °C | ISO 75-1/-2 |
| Temp. of Deflection Under Load, 0.45 MPa | 135 / * | °C | ISO 75-1/-2 |
| Vicat Softening Temperature, 50°C/h 50N | 142 / * | °C | ISO 306 |
| Coeff. of Linear Thermal Expansion, parallel | 100 / * | E-6/K | ISO 11359-1/-2 |
| Burning Behav. at 1.5 mm Nominal Thickness | HB / * | class | IEC 60695-11-10 |
| Thickness Tested | 1.6 / * | mm | - |
| Burning Behav. at Thickness h | V-2 / * | class | IEC 60695-11-10 |
| Thickness Tested | 3.2 / * | mm | - |
| Oxygen Index | 22 / * | % | ISO 4589-1/-2 |
| Volume Resistivity | - / 1E12 | Ohm*m | IEC 60093 |
| Surface Resistivity | * / 1E14 | Ohm | IEC 60093 |
| Electric Strength | - / 30 | kV/mm | IEC 60243-1 |
| Comparative Tracking Index | - / 600 | - | IEC 60112 |
| Water Absorption | 1.6 / * | % | Sim. to ISO 62 |
| Density | 1010 / - | $kg/m^3$ | ISO 1183 |

**Processing conditions:**

**- Typical melt temperature (Min / Recommanded / Max): 190°C / 210°C / 230°C.**

**- Drying time and temperature** *(only for bags opened for more than two hours)***: 4-6 hours at 65-80°C.**

# **RILSAMID®** AMNO MED
# TECHNICAL DATA SHEET

**Rilsamid® AMNO MED is a thermoplastic polyamide 12. This grade dedicated to injection offers highest quality and it is specifically designed to meet the stringent requirements of the medical applications such as minimally invasive devices.**

## MAIN CHARACTERISTICS

| PROPERTIES | DRY / COND | UNIT | TEST STANDARD |
|---|---|---|---|
| Melt Volume-Flow Rate, MVR | 57 / * | $cm^3$/10min | ISO 1133 |
| Temperature | 235 / * | °C | - |
| Load | 2.16 / * | kg | - |
| Tensile Modulus | - / 1100 | MPa | ISO 527-1/-2 |
| Yield stress | - / 37 | MPa | ISO 527-1/-2 |
| Yield strain | - / 8 | % | ISO 527-1/-2 |
| Nominal Strain at Break | - / >50 | % | ISO 527-1/-2 |
| Shore D Hardness, 15s | 69 / * | - | ISO 7619-1 |
| Charpy Impact Strength, +23°C | - / N | $kJ/m^2$ | ISO 179/1eU |
| Charpy Impact Strength, -30°C | - / N | $kJ/m^2$ | ISO 179/1eU |
| Charpy Notched Impact Strength, +23°C | - / 5 | $kJ/m^2$ | ISO 179/1eA |
| Charpy Notched Impact Strength, -30°C | - / 6 | $kJ/m^2$ | ISO 179/1eA |
| Melting Temperature, 10°C/min | 180 / * | °C | ISO 11357-1/-3 |
| Density | 1010 / - | $kg/m^3$ | ISO 1183 |
| Injection Molding, melt temperature | 210 | °C | ISO 294 |
| Injection Molding, mold temperature | 30 | °C | ISO 10724 |

**Processing conditions:**

**- Typical melt temperature (Min / Recommanded / Max): 230°C / 270°C / 290°C.**

**- Drying time and temperature** *(only for bags opened for more than two hours)***: 4-6 hours at 80-90°C.**

# KYNAR® 720 MED
# TECHNICAL DATA SHEET

**Kynar® 720 MED is a fluorinated thermoplastic homopolymers.**

**Outstanding characteristics: chemical resistance, imperviousness to UV, high barrier properties, high purity, good mechanical and thermo-mechanical properties, resistant to gamma, steam and ETO sterilization.**

**Kynar® 720 MED resin is a dedicated grade of granules for extrusion and injection molding for the medical market. This product is compliant with the EU positive list.**

## MAIN CHARACTERISTICS

| PROPERTIES | VALUE | UNIT | TEST STANDARD |
|---|---|---|---|
| Melt Flow Rate | 14 - 26.5 | g/10min | ASTM D1238 |
| Temperature | 230 | °C | - |
| Load | 3.8 | kg | - |
| Tensile Modulus, 73 °F | 200000 - 335000 | psi | ASTM D638 |
| Tensile Strength at Yield, 73 °F | 6500 - 8000 | psi | ASTM D638 |
| Hardness, Shore D, 73 °F | 76 - 80 | - | ASTM D2240 |
| Flexural Modulus, 73 °F | 200000 - 335000 | psi | ASTM D790 |
| Flexural Stength @ 5% Strain, 73 °F | 8500 - 11000 | psi | ASTM D790 |
| Unnotched Impact Strength, 73 °F | 20 - 80 | ftlb/in | ASTM D256 |
| Notched Impact Strength, 73 °F | 1.5 - 4 | ftlb/in | ASTM D256 |
| Melting Point | 329 - 342 | °F | ASTM D3418 |
| Water Absorption | 0.02 | % | Sim. to ISO 62 |
| Specific Gravity, 73 °F | 1.77 - 1.79 | - | ASTM D792 |

**Processing conditions Injection:**
**- Typical melt temperature (Min / Recommended / Max): 190°C / 210-220°C / 250°C**
**- Typical mold temperature: 50°C.**
**- Drying time and temperature : Not necessary.**

**Processing conditions Extrusion:**
**- Typical melt temperature (Min / Recommended / Max): 190°C / 220-230°C / 250°C.**
**- Drying time and temperature : Not necessary.**

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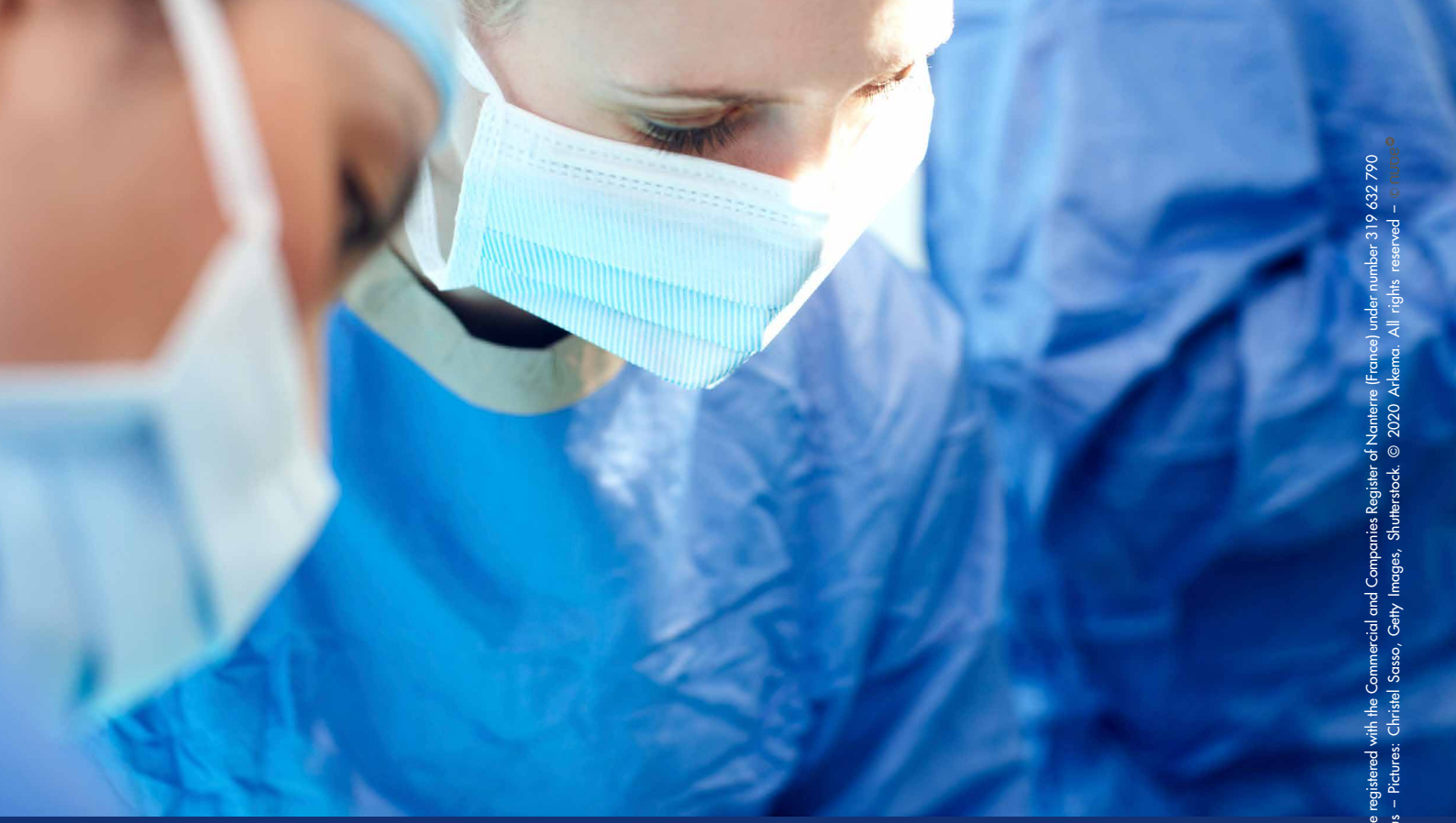

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