



HIGH PERFORMANCE 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 HIGH PERFORMANCE 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, High Performance 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 grades 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.

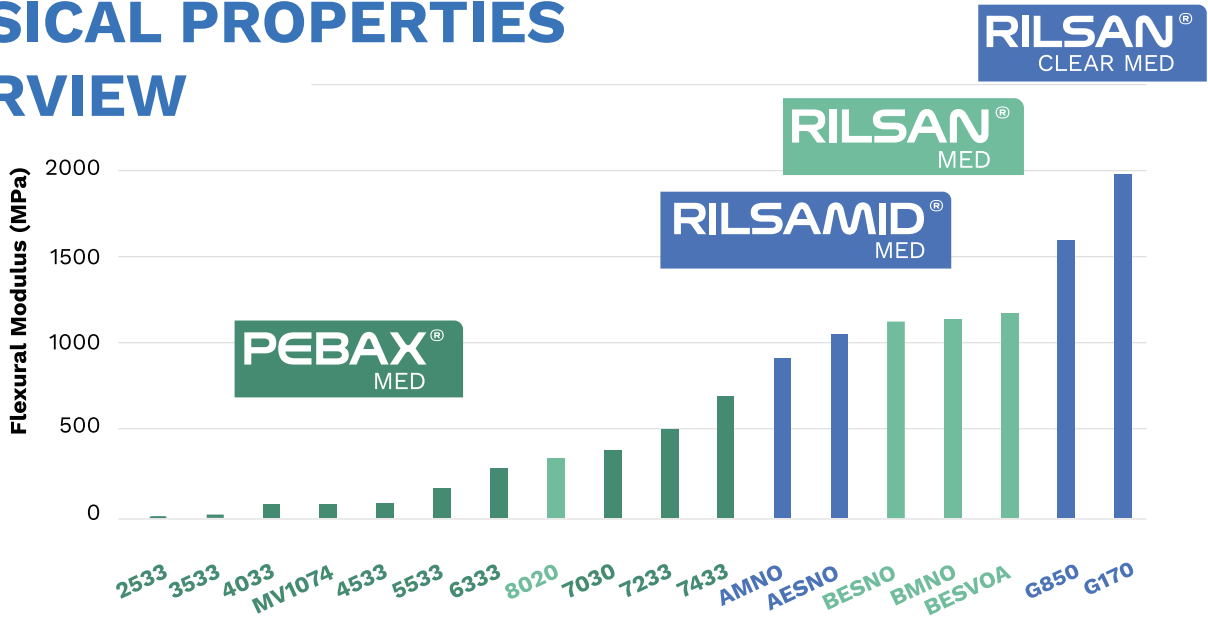


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Arkema has implemented a Medical Policy regarding the use of Arkema products in Medical Devices applications that are in contact with the body or circulating bodily fluids (<http://www.arkema.com/en/social-responsibility/responsible-product-management/medical-device-policy/index.html>). 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.

MEDICAL RANGE PHYSICAL PROPERTIES OVERVIEW

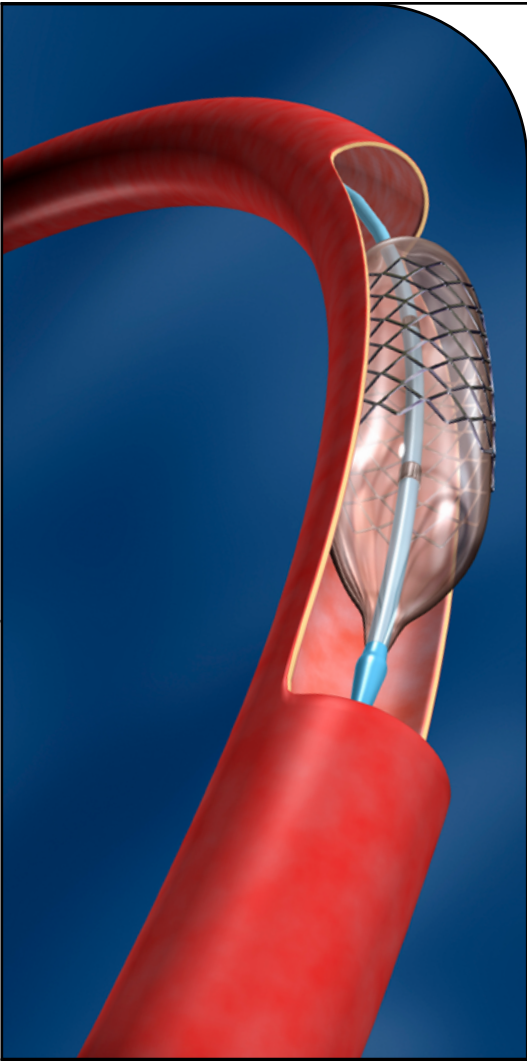


Typical applications for Pebax® MED grades:

- 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 rigid properties approaching polyamides performance characteristics.



MEDICAL USE

- Certifications
 - USP Class VI
 - ISO 10993-4
 - ISO 10993-5
- Sterilization feasibility (ETO, Steam, Gamma and E-Beam up to 50 kGy)

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.

Typical applications
for Rilsan® Clear MED
grades:

Rilsan® Clear MED material 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 material 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.

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

- 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 and E-Beam up to 50 kGy)
- 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 material 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.



MEDICAL USE

- Certifications
 - USP Class VI
 - ISO 10993-4
 - ISO 10993-5
- Sterilization feasibility (ETO, Steam, Gamma and E-Beam up to 50 kGy)

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

G170 MED and G850 Rnew® MED

GRADES AVAILABLE

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

Typical applications for
Kynar[®] MED grades:

- 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
- 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.

GRADES 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.

PROPERTIES	DRY / COND	UNIT	TEST STANDARD
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 strenght, +23°C	N/N	kJ/m²	ISO 179/1eU
Charpy impact strenght, -30°C	N/N	kJ/m²	ISO 179/1eU
Charpy notched impact strenght, +23°C	N/N	kJ/m²	ISO 179/1eA
Charpy notched impact strenght, -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
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, instantaneous	77/-	-	ISO 868
Shore D hardness, instantaneous	27/-	-	ISO 868
Shore A hardness, 15s	74/-	-	ISO 868
Shore D hardness, 15s	22/-	-	ISO 868

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.

PROPERTIES	DRY / COND	UNIT	TEST STANDARD
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, instantaneous	82/-	-	ISO 868
Shore D hardness, instantaneous	33/-	-	ISO 868
Shore A hardness, 15s	80/-	-	ISO 868
Shore D hardness, 15s	25/-	-	ISO 868
Charpy impact strenght, +23°C	-/N	kJ/m²	ISO 179/1eU
Charpy impact strenght, -30°C	-/N	kJ/m²	ISO 179/1eU
Charpy notched impact strenght, +23°C	-/N	kJ/m²	ISO 179/1eA
Charpy notched impact strenght, -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

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.

PROPERTIES	DRY / COND	UNIT	TEST STANDARD
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, instantaneous	90/-	-	ISO 868
Shore D hardness, instantaneous	42/-	-	ISO 868
Shore A hardness, 15s	89/-	-	ISO 868
Shore D hardness, 15s	35/-	-	ISO 868
Charpy impact strenght, +23°C	-/N	kJ/m²	ISO 179/1eU
Charpy impact strenght, -30°C	-/N	kJ/m²	ISO 179/1eU
Charpy notched impact strenght, +23°C	-/N	kJ/m²	ISO 179/1eA
Charpy notched impact strenght, -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

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.

PROPERTIES	DRY / COND	UNIT	TEST STANDARD
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, instantaneous	92/*	-	ISO 868
Shore D hardness, instantaneous	46/-	-	ISO 868
Shore A hardness, 15s	90/-	-	ISO 868
Shore D hardness, 15s	41/*	-	ISO 868
Charpy impact strenght, +23°C	-/N	kJ/m²	ISO 179/1eU
Charpy impact strenght, -30°C	-/N	kJ/m²	ISO 179/1eU
Charpy notched impact strenght, +23°C	-/N	kJ/m²	ISO 179/1eA
Charpy notched impact strenght, -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

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.

PROPERTIES	DRY / COND	UNIT	TEST STANDARD
Tensile Modulus	170/161	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, instantaneous	54/-	-	ISO 868
Shore D hardness, 15s	50/-	-	ISO 868
Charpy impact strenght, +23°C	-/N	kJ/m²	ISO 179/1eU
Charpy impact strenght, -30°C	-/N	kJ/m²	ISO 179/1eU
Charpy notched impact strenght, +23°C	-/N	kJ/m²	ISO 179/1eA
Charpy notched impact strenght, -30°C	-/N	kJ/m²	ISO 179/1eA
Melting temperature, 10°C/min	159/-	°C	ISO 11357-1/-3
Vicat softening temperature B, 50°C/h 50N	66/-	°C	ISO 306
Water absorption	1.2/-	%	Sim. to ISO 62
Humidity absorption	0.6/-	%	Sim. to ISO 62
Density	1000/1000	kg/m³	ISO 1183

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.

PROPERTIES	DRY / COND	UNIT	TEST STANDARD
Tensile Modulus	307/240	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, instantaneous	64/-		ISO 868
Shore D hardness, 15s	58/-	-	ISO 868
Charpy impact strenght, +23°C	-/N	kJ/m²	ISO 179/1eU
Charpy impact strenght, -30°C	-/N	kJ/m²	ISO 179/1eU
Charpy notched impact strenght, +23°C	-/N	kJ/m²	ISO 179/1eA
Charpy notched impact strenght, -30°C	-/20	kJ/m²	ISO 179/1eA
Melting temperature, 10°C/min	169/-	°C	ISO 11357-1/-3
Vicat softening temperature B, 50°C/h 50N	85/-	°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

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.

PROPERTIES	DRY / COND	UNIT	TEST STANDARD
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/-	mm³	ISO 4649
Shode D hardness, instantaneous	69/-	-	ISO 868
Shore D hardness, 15s	61/-	-	ISO 868
Charpy impact strenght, +23°C	-/N	kJ/m²	ISO 179/1eU
Charpy impact strenght, -30°C	-/N	kJ/m²	ISO 179/1eU
Charpy notched impact strenght, +23°C	-/120	kJ/m²	ISO 179/1eA
Charpy notched impact strenght, -30°C	-/20	kJ/m²	ISO 179/1eA
Melting temperature, 10°C/min	172/-	°C	ISO 11357-1/-3
Vicat softening temperature B, 50°C/h 50N	106/-	°C	ISO 306
Water absorption	1.43/*	%	Sim. to ISO 62
Humidity absorption	0.76/*	%	Sim. to ISO 62
Density	1010/-	kg/m³	ISO 1183

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.

PROPERTIES	DRY / COND	UNIT	TEST STANDARD
Tensile Modulus	-/542	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, instantaneous	69/-	-	ISO 868
Shore D hardness, 15s	61/-	-	ISO 868
Charpy impact strenght, +23°C	-/N	kJ/m²	ISO 179/1eU
Charpy impact strenght, -30°C	-/N	kJ/m²	ISO 179/1eU
Charpy notched impact strenght, +23°C	-/15	kJ/m²	ISO 179/1eA
Charpy notched impact strenght, -30°C	-/10	kJ/m²	ISO 179/1eA
Melting temperature, 10°C/min	174/-	°C	ISO 11357-1/-3
Vicat softening temperature B, 50°C/h 50N	106/-	°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

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.

PROPERTIES	DRY / COND	UNIT	TEST STANDARD
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
Abrasion Resistance	40.5/-	mm³	ISO 4649
Shore D hardness, instantaneous	73/-	-	ISO 868
Shore D hardness, 15s	66/-	-	ISO 868
Charpy impact strenght, +23°C	-/N	kJ/m²	ISO 179/1eU
Charpy impact strenght, -30°C	-/N	kJ/m²	ISO 179/1eU
Charpy notched impact strenght, +23°C	-/19	kJ/m²	ISO 179/1eA
Charpy notched impact strenght, -30°C	-/6	kJ/m²	ISO 179/1eA
Melting temperature, 10°C/min	174/-	°C	ISO 11357-1/-3
Temp. of Deflection Under Load, 1.80 MPa	67/-	°C	ISO 75-1/-2
Temp. of Deflection Under Load, 0.45 MPa	113/-	°C	ISO 75-1/-2
Vicat softening temperature B, 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/m³	ISO 1183

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.

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, instantaneous	44/-	-	ISO 868
Shore D hardness, 15s	38/-	-	ISO 868
Charpy impact strenght, +23°C	N/N	kJ/m²	ISO 179/1eU
Charpy impact strenght, -30°C	N/N	kJ/m²	ISO 179/1eU
Charpy notched impact strenght, +23°C	N/N	kJ/m²	ISO 179/1eA
Charpy notched impact strenght, -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/-3
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

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

1/2

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.

PROPERTIES	DRY / COND	UNIT	TEST STANDARD
Melt Volume-Flow Rate, MVR	2/-	cm³/10min	ISO 1133
Temperature	275/-	°C	-
Load	2.16/-	kg	-
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 strenght, +23°C	-/N	kJ/m²	ISO 179/1eU
Charpy impact strenght, -30°C	N/N	kJ/m²	ISO 179/1eU
Charpy notched impact strenght, +23°C	-/13	kJ/m²	ISO 179/1eA
Charpy notched impact strenght, -30°C	-/13	kJ/m²	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 B, 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	0hm*m	IEC 60093
Surface Resistivity	-/ 1E12	0hm	IEC 60093

RILSAN® CLEAR G170 MED

TECHNICAL DATA SHEET

2/2

PROPERTIES	DRY / COND	UNIT	TEST STANDARD
Electric Strength	-/50	kV/mm	IEC 60243-1
Comparative Tracking Index	-/600	°C	IEC 60112
Water absorption	3.8/-	%	Sim. to ISO 62
Humidity absorption	1.7/-	%	Sim. to ISO 62
Density	1050/1050	kg/m³	ISO 1183
Luminous Transmittance	91		ISO 13468-1,-2

PROCESSING CONDITIONS:

- Typical melt temperature (Min / Recommended / Max): 270°C / 290°C / 310°C.
- Typical mold temperature: 40 – 80°C.
- Drying time and temperature (only necessary for bags opened for more than two hours): 4-6 hours at 90°C

PROCESSING CONDITIONS EXTRUSION:

- Typical melt temperature (Min / Recommended / Max): 270°C / 280°C / 290°C.
- Drying time and temperature (only necessary 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.

PROPERTIES	DRY / COND	UNIT	TEST STANDARD
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 868
Charpy impact strenght, +23°C	-/N	kJ/m²	ISO 179/1eU
Charpy impact strenght, -30°C	-/N	kJ/m²	ISO 179/1eU
Charpy notched impact strenght, +23°C	-/7.5	kJ/m²	ISO 179/1eA
Charpy notched impact strenght, -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
%Bio-Based	45	-	ASTM D6866

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.

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 868
Charpy impact strenght, +23°C	-/N	kJ/m²	ISO 179/1eU
Charpy impact strenght, -30°C	-/N	kJ/m²	ISO 179/1eU
Charpy notched impact strenght, +23°C	-/15	kJ/m²	ISO 179/1eA
Charpy notched impact strenght, -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.

PROPERTIES	DRY / COND	UNIT	TEST STANDARD
Melt Volume-Flow Rate, MVR	6/-	cm³/10min	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 868
Charpy impact strenght, +23°C	-/N	kJ/m²	ISO 179/1eU
Charpy impact strenght, -30°C	-/N	kJ/m²	ISO 179/1eU
Charpy notched impact strenght, +23°C	-/15	kJ/m²	ISO 179/1eA
Charpy notched impact strenght, -30°C	-/13	kJ/m²	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 B, 50°C/h 50N	160/-	°C	ISO 306
Oxygen Index	25/-	%	ISO 4589-1/-2
Electric Strength	-/30	kV/mm	IEC 60243-1
Water absorption	1.9/-	%	Sim. to ISO 62
Density	1030/1030	kg/m³	ISO 1183

PROCESSING CONDITIONS:

- Typical melt temperature (Min / Recommended / 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.

PROPERTIES	DRY / COND	UNIT	TEST STANDARD
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 868
Charpy impact strenght, +23°C	-/N	kJ/m²	ISO 179/1eU
Charpy impact strenght, -30°C	-/N	kJ/m²	ISO 179/1eU
Charpy notched impact strenght, +23°C	-/8.3	kJ/m²	ISO 179/1eA
Charpy notched impact strenght, -30°C	-/10.5	kJ/m²	ISO 179/1eA
Melting temperature, 10°C/min	189/-	°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
Density	1030/1030	kg/m³	ISO 1183
%Bio-based	98	-	ASTM D6866

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.

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 strenght, +23°C	-/N	kJ/m²	ISO 179/1eU
Charpy impact strenght, -30°C	-/N	kJ/m²	ISO 179/1eU
Charpy notched impact strenght, +23°C	-/N	kJ/m²	ISO 179/1eA
Charpy notched impact strenght, -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.

PROPERTIES	DRY / COND	UNIT	TEST STANDARD
Melt Volume-Flow Rate, MVR	8/-	cm³/10min	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 strenght, +23°C	-/N	kJ/m²	ISO 179/1eU
Charpy impact strenght, -30°C	-/N	kJ/m²	ISO 179/1eU
Charpy notched impact strenght, +23°C	-/11	kJ/m²	ISO 179/1eA
Charpy notched impact strenght, -30°C	-/6	kJ/m²	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 B, 50°C/h 50N	142/-	°C	ISO 306
Coeff. of Liner Thermal Expansion, parallel	100/-	E-6/K	ISO 11359-1/-2
Volume Resistivity	-/ 1E12	0hm*m	IEC 60093
Surface Resistivity	-/ 1E14	0hm	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/m³	ISO 1183

PROCESSING CONDITIONS:

- Typical melt temperature (Min / Recommended / 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.

PROPERTIES	DRY / COND	UNIT	TEST STANDARD
Melt Volume-Flow Rate, MVR	57/-	cm³/10min	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 868
Charpy impact strenght, +23°C	-/N	kJ/m²	ISO 179/1eU
Charpy impact strenght, -30°C	-/N	kJ/m²	ISO 179/1eU
Charpy notched impact strenght, +23°C	-/5	kJ/m²	ISO 179/1eA
Charpy notched impact strenght, -30°C	-/6	kJ/m²	ISO 179/1eA
Melting temperature, 10°C/min	180/-	°C	ISO 11357-1/-3
Density	1010/-	kg/m³	ISO 1183

PROCESSING CONDITIONS:

- Typical melt temperature (Min / Recommanded / Max): 230°C / 250°C / 280°C.
- Mold temperature : 40°C
- Drying time and temperature (only for bags opened for more than two hours): 4-6 hours at 60-80°C.

KYNAR® 720 MED

TECHNICAL DATA SHEET

Kynar® 720 MED resin 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.

PROPERTIES	DRY / COND	UNIT	TEST STANDARD
Melt Volume-Flow Rate, MVR	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 strenght, 73°F	20 - 80	ftlb/in	ASTM D256
Notched impact strenght, 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:

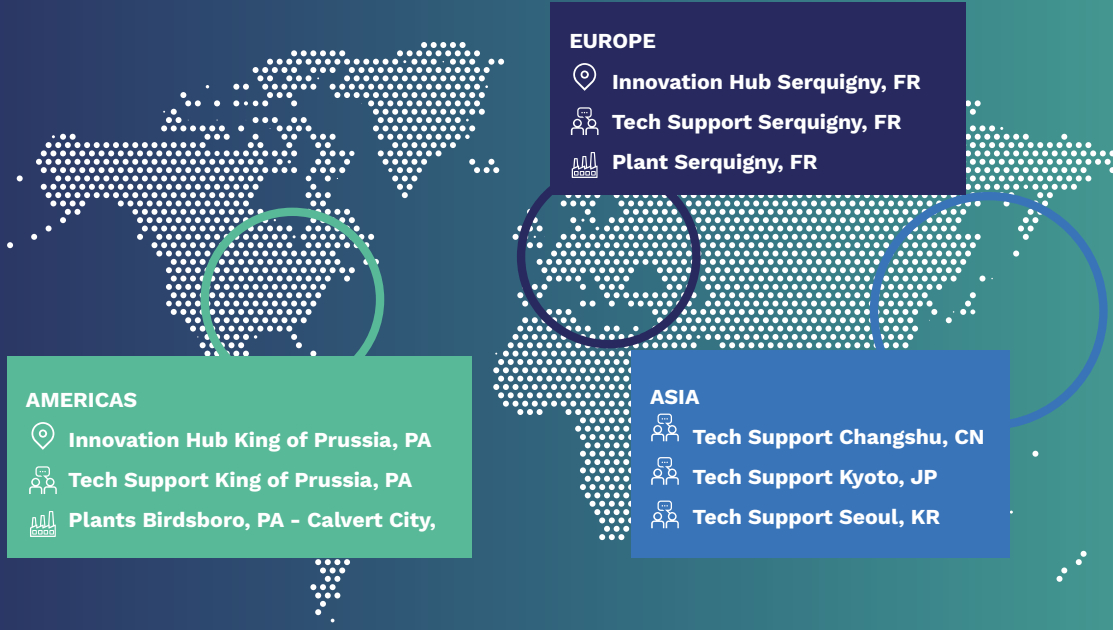
- Typical melt temperature (Min / Recommended / Max): 190°C / 210-220°C / 250°C
- Typical mold temperature: 50°C.
- Drying time and temperature: Not necessary.

PROCESSING CONDITIONS EXTRUSION:

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



GLOBAL MANUFACTURING, TECHNICAL SUPPORT, AND R&D



Building on its unique set of expertise in materials science, Arkema offers a portfolio of first-class technologies to address ever-growing demand for new and sustainable materials. With the ambition to become in 2024 a pure player in Specialty Materials, the Group is structured into 3 complementary, resilient and highly innovative segments dedicated to Specialty Materials - Adhesive Solutions, Advanced Materials, and Coating Solutions - accounting for some 80% of Group sales, and a well-positioned and competitive Intermediates segment. Arkema offers cutting-edge technological solutions to meet the challenges of, among other things, new energies, access to water, recycling, urbanization and mobility, and fosters a permanent dialogue with all its stakeholders.



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