PULIM

Sealing Materials

Suzhou Pulim Sealing Technology Co., Ltd

COMPANY PROFILE

SEALING MATERIALS

POLYURETHANE

TPU

- PLMPUR
- PLMPUR-H
- PLMPUR-LT
- PLMPUR-X
- PLMPUR-XH
- PLMPUR-SL
- PLMPUR-XSL

CPU

- PLMPUR-H LD

RUBBER

- PLM-N85 (PLMRUBBER-N)
- PLM-F85 (PLMRUBBER-F / PLMRUBBER-F-BLACK)
- PLM-A85 (PLMRUBBER-A)
- PLM-HN85 (PLMRUBBER-HN)
- PLM-E85 (PLMRUBBER-E)
- PLM-S85 (PLMRUBBER-S)

PTFE

- PLMFLON-1
- PLMFLON-2
- PLMFLON-3
- PLMFLON-4

PEEK

- PLMPEEK-1

POM

- PLMPOM-1

PA

- PLMPA-3
- PLMPA-4

COMPANY PROFILE

Suzhou Pulim Sealing Technology Co. Ltd. has intelligent injection molding workshops for polyurethane, rubber and thermoplastic products, workshops for PTFE mixing and molding as well as workshops for machined and energized seals products. All workshops are equipped with an integrated digital factory control system of ERP, MES, and WMS making it an advanced intelligent manufacturing enterprise.

Suzhou Pulim Sealing Technology Co., Ltd. has independent material research and development capabilities and a first-class R&D technical team, focusing on high performance materials such as polyurethane, rubber, PTFE, POM , PEEK and other polymeric materials. We develop and produce high-performance TPU granulates and use injection molding technology to produce high-quality polyurethane sealing materials and products. Furthermore we have the in-house capability of developing and producing casted PU materials, mainly used for large diameter and customized seals.

Suzhou Pulim Sealing Technology Co., Ltd. has both an enterprise-level physical and chemical laboratory as well as a dynamic laboratory, with professional testing and experimental equipment, supporting to provide high-quality sealing solutions for industries such as engineering equipment, agriculture equipment, energy equipment, transportation equipment, etc.

VISION

Commitment to becoming a world-leading manufacturer of engineering polymer products.

MISSION

Providing the highest quality of sealing materials to help the industry to achieve sustainable.

As the level of industrial development rapidly advances, the requirements for sealing products also increase. Sealing materials now face challenges such as higher temperatures, higher pressures, high rotational speeds and poor lubrication.

Additionally, media such as HFA, HFB, HFC and biodegradable oils like vegetable oil and synthetic esters create a new and more difficult operating environment for polymeric sealing materials. Therefore, choosing the right sealing material for different application conditions becomes particularly important.

We have always been committed to the forefront development of sealing materials according to the ever-changing market demands, and we can provide customers with various top-quality sealing materials mentioned in this booklet. Most of the materials are independently developed and produced by our company. Additionally, we can provide various engineering plastics such as polyoxymethylene (POM) and polyamides (PA6 and PA6.6), high-temperature resistant polymers like polyetheretherketone (PEEK) and various filled PTFE materials.

Elastomer materials are showing good elasticity behaviour, so their residual deformation under load is low compared to other polymeric materials. In general Elastomer materials are divided into two categories: rubber materials (such as nitrile rubber, fluorocarbon rubber, silicone rubber, etc.) and thermoplastic elastomers (such as polyurethane materials, abbreviated as TPU).

Rubber materials are vulcanized polymers formed by chemically crosslinking of polymeric base materials. Their chemical bonds determine that they do not easily soften or dissolve in specific media.

On the other hand, thermoplastic elastomers (such as TPU materials) are based on physical cross-linkings, means they can be processed using traditional thermoplastic processing techniques (injection molding, casting, etc.)

Through thermoplastic processing, polyurethane materials exhibit the typical characteristics of synthetic rubber materials over a wide temperature range, however softening when heated as well as have better solubility than purely chemically synthesized rubber materials and are less odorous.

Rubber and polyurethane materials are mainly used in the sealing industry for making piston seals, rod seals, wipers and static seals (O-rings, etc.). The commonly used rubber sealing materials are mainly synthetic rubbers. Since there are many types of synthetic rubber and their performances vary, when selecting, in addition to meeting the above usage requirements, the characteristics and application range of different rubber types should be considered and the appropriate choice should be made according to the operating conditions of the sealing parts.

Plastic materials (thermoplastics) are polymers that are harder than elastomer materials within their applicable temperature range. Due to their chemical structure, plastic materials can flexibly meet different hardness and strength requirements. Because they cannot recover after excessive stretching and tend to a permanent deformation after stress, they are also called plastics. In the sealing industry, plastic materials are mainly used as back-up rings, retaining rings, guide rings, bearings and bushings.

Common plastic materials include polytetrafluoroethylene (PTFE), polyamide (PA), polyoxymethylene (POM), ultra-high-molecular-weight polyethylene (UHMW-PE), polyetheretherketone (PEEK), polyimide (PI), etc.

This booklet details the various high-performance sealing materials, developed anproduced by our company, used for machined and molded seals products.

Polyurethane Materials

Polyurethane is a polymer made from raw materials such as isocyanates, polyols as well as chain extenders, commonly called cross-linking agents. By altering the types and compositions of these raw materials, the form and properties of the final product can be significantly changed, e.g. ranging from soft to hard. Fillers, self-lubricating agents and other additives can also be added. Polyurethane plays an important role in modern sealing technology. They hold a significant market share in the global sealing market and are primarily used as main sealing elements for piston and rod seals (U-cup seals or Y-rings), wipers, and composite seals.

Common Types of Polyurethane Elastomers

- TPU-Thermoplastic Polyurethane
- CPU-Casted Polyurethane

Advantages of Polyurethane

·High strength
·Good elasticity
·Wide range of hardness
·Excellent wear resistance
·High tear strength
·Good oil resistance

Disadvantages of Polyurethane

·High hysteresis heating
·Limited temperature resistance,
·Repeated compression deformation
·Prone to damage at high speeds

Suzhou Pulim Sealing Technology Co. Ltd. can provide our customers with high-performance injection-molded polyurethane (TPU). Our manufacturing technology ensures the development of excellent physical properties during the polymerization process, providing both, standardized as well as customized material grades, always resulting in superior material quality.

Additionally, to meet the needs of customers requiring large and extra-large specifications, we also offer high performance cast polyurethane (CPU), developed and produced in-house.

Polyurethane Materials		PLMPUR	PLMPUR -H	PLMPUR -SL	PLMPUR -LT	PLMPUR -X	PLMPUR -XH	PLMPUR -XSL	PLMPUR -H LD
Material Colour									
Hardness **Shore A / D**		95/48	95/48	95/48	95/48	97/58	97/60	97/60	95/48
Temperature [°C]	**Min.**	-30	-20	-20	-50	-30	-20	-20	-20
	Max.	110	115	115	110	110	115	115	115
Media		Mineral Oil Ozone, Microbes	Mineral based oils, Water based hydraulic fluids, Hot water Hot air Ozone, Synthetic and native Esters	Mineral based oils, Water based hydraulic fluids, Hot water Hot air Ozone, Synthetic and native Esters	Oil, Cold Water Ozone, Microbes,	Mineral oil, Ozone, Microbes	Mineral based oils, Water based hydraulic fluids, Hot water Hot air Ozone, Synthetic and native Esters	Mineral based oils, Water based hydraulic fluids, Hot water Hot air Ozone, Synthetic and native Esters	Mineral based oils, Water based hydraulic fluids, Hot water Hot air Ozone, Synthetic and native Esters

PLMPUR | P1101 (TPU)

General Information:

PLMPUR is a thermoplastic polyurethane elastomer based on polycaprolactone polyol. This material features excellent tensile properties and tear strength, low compression deformation and outstanding wear resistance. PLMPUR is primarily used in sealing applications that requiring high mechanical performance and wear resistance as well as it has very good resistance to resistance to hydraulic fluids based on mineral oil. Additionally, this material has good ozone resistance and weather resistance.

Physical properties

Color	Green		
Hardness	DIN ISO 7619 (3 sec)	ShoreA	95±2
Hardness	DIN ISO 7619 (3 sec)	ShoreD	48±2
Density	DIN EN ISO 1183-1	g/cm^3	1.18±0.02
100% Modulus	DIN 53504	N/mm^2	≥12
Tensile Strength	DIN 53504	N/mm^2	≥48
Elongation at break	DIN 53504	%	≥450
Tear Strength	DIN ISO 34-1	N/mm	≥110
Compression set: 24hrs./70°C*	DIN ISO 815	%	≤27
Compression set:24hrs./100°C**	DIN ISO 815	%	≤33
Abrasion	DIN ISO 4649	mm^3	≤17
Min. Service Temperature	——	°C	-30
Max.Service Temperature	——	°C	110

* 24 h 70°C 20% deflection/** 24 h 100°C 20% deflection

PLMPUR-H | P1201 (TPU)

General Information:

PLMPUR-H is a hydrolysis-resistant thermoplastic polyurethane elastomer based on polycarbonate polyol. Compared to PLMPUR, this material has similar mechanical properties but offers good water resistance as well as good compatibility against biologically degradable and fire resistant fluids. PLMPUR-H is mainly used in sealing applications that require hydrolysis resistance and resistance to other chemicals, such as polar hydraulic fluids, while also demanding high mechanical performance and wear resistance.

Physical properties

Color	Red		
Hardness	DIN ISO 7619 (3 sec)	ShoreA	95±2
Hardness	DIN ISO 7619 (3 sec)	ShoreD	48±2
Density	DIN EN ISO 1183-1	g/cm^3	1.18±0.02
100% Modulus	DIN 53504	N/mm^2	≥12
Tensile Strength	DIN 53504	N/mm^2	≥50
Elongation at break	DIN 53504	%	≥350
Tear Strength	DIN ISO 34-1	N/mm	≥110
Compression set: 24hrs./70°C*	DIN ISO 815	%	≤27
Compression set:24hrs./100°C**	DIN ISO 815	%	≤33
Abrasion	DIN ISO 4649	mm^3	≤17
Min. Service Temperature	——	°C	-20
Max.Service Temperature	——	°C	115

* 24 h 70°C 20% deflection/** 24 h 100°C 20% deflection

PLMPUR-LT | P1401 (TPU)

General Information:

PLMPUR-LT is a thermoplastic polyurethane elastomer based on a special grade of polycaprolactone polyol, designed to meet the demands of low-temperature applications. This material has similar mechanical properties to PLMPUR but combines them with excellent low-temperature performance. PLMPUR-LT is primarily used in sealing applications that require high mechanical performance and wear resistance, with application temperatures as low as -50°C.

Physical properties

Color	Blue		
Hardness	DIN ISO 7619 (3 sec)	ShoreA	95±2
Hardness	DIN ISO 7619 (3 sec)	ShoreD	48±2
Density	DIN EN ISO 1183-1	g/cm^3	1.16±0.02
100% Modulus	DIN 53504	N/mm^2	≥11
Tensile Strength	DIN 53504	N/mm^2	≥45
Elongation at break	DIN 53504	%	≥430
Tear Strength	DIN ISO 34-1	N/mm	≥110
Compression set: 24h/70℃*	DIN ISO 815	%	≤27
Compression set:24h/100℃**	DIN ISO 815	%	≤33
Abrasion	DIN ISO 4649	mm^3	≤17
Min. Service Temperature	——	°C	-50
Max.Service Temperature	——	°C	110

* 24 h 70°C 20% deflection/** 24 h 100°C 20% deflection

PLMPUR-X | P1104 (TPU)

General Information:

PLMPUR-X is a thermoplastic polyurethane elastomer based on polycaprolactone polyol. Compared to PLMPUR, this material has higher hardness, higher pressure resistance and excellent friction and wear performance. PLMPUR-X is primarily used in sealing applications that require superior mechanical performance combined with low friction characteristics and stick-slip free operations, such as composite seals in mineral oil hydraulic cylinders.

Physical properties

Color	Dark Green		
Hardness	DIN ISO 7619 (3 sec)	ShoreA	97±2
Hardness	DIN ISO 7619 (3 sec)	ShoreD	58±2
Density	DIN EN ISO 1183-1	g/cm^3	1.20±0.02
100% Modulus	DIN 53504	N/mm^2	≥18
Tensile Strength	DIN 53504	N/mm^2	≥48
Elongation at break	DIN 53504	%	≥400
Tear Strength	DIN ISO 34-1	N/mm	≥140
Compression set: 24h/70°C*	DIN ISO 815	%	≤27
Compression set:24h/100°C**	DIN ISO 815	%	≤33
Abrasion	DIN ISO 4649	mm^3	≤17
Min. Service Temperature	——	°C	-30
Max.Service Temperature	——	°C	110

* 24 h 70°C 20% deflection/** 24 h 100°C 20% deflection

PLMPUR-XH | P1204 (TPU)

General Information:

PLMPUR-XH is a hydrolysis-resistant thermoplastic polyurethane elastomer based on polycarbonate polyol. Compared to PLMPUR-H, this material has higher hardness, higher pressure resistance and excellent friction and wear performance. Due to its good hydrolysis resistance and chemical resistance, this material is best suited for composite seals in chemically corrosive working fluids (such as water-based pressure fluids and mineral oils with additives).

Physical properties

Color	Dark Red		
Hardness	DIN ISO 7619 (3 sec)	ShoreA	97±2
Hardness	DIN ISO 7619 (3 sec)	ShoreD	60±2
Density	DIN EN ISO 1183-1	g/cm^3	1.22±0.02
100% Modulus	DIN 53504	N/mm^2	≥20
Tensile Strength	DIN 53504	N/mm^2	≥50
Elongation at break	DIN 53504	%	≥300
Tear Strength	DIN ISO 34-1	N/mm	≥140
Compression set: 24h/70℃*	DIN ISO 815	%	≤27
Compression set:24h/100℃**	DIN ISO 815	%	≤33
Abrasion	DIN ISO 4649	mm^3	≤17
Min. Service Temperature	——	°C	-20
Max.Service Temperature	——	°C	115

* 24 h 70°C 20% deflection/** 24 h 100°C 20% deflection

PLMPUR-SL | P1203 (TPU)

General Information:

PLMPUR-SL is a polyurethane elastomer based on polycarbonate polyol, combined with solid lubricants.This material has excellent tribological properties, meaning superior sliding performance and high wear resistance under poor lubrication or even non-lubricated conditions. Other physical properties, such as tensile performance and elasticity, are similar to PLMPUR-H. PLMPUR-SL is primarily used in sealing applications with requirements for high wear resistance and low frictional loss. This material is particularly suitable for high-speed movement as well as low-speed and stationary applications, and for conditions without lubricating media. Furthermore it is recommended for use in applications with poor lubrication performance, such as pure water conditions.

Physical properties

Color	Black		
Hardness	DIN ISO 7619 (3 sec)	ShoreA	95±2
Hardness	DIN ISO 7619 (3 sec)	ShoreD	48±2
Density	DIN EN ISO 1183-1	g/cm^3	1.21±0.02
100% Modulus	DIN 53504	N/mm^2	≥15
Tensile Strength	DIN 53504	N/mm^2	≥48
Elongation at break	DIN 53504	%	≥350
Tear Strength	DIN ISO 34-1	N/mm	≥110
Compression set: 24h/70°C*	DIN ISO 815	%	≤27
Compression set:24h /100°C**	DIN ISO 815	%	≤33
Abrasion	DIN ISO 4649	mm^3	≤17
Min. Service Temperature	——	°C	-20
Max.Service Temperature	——	°C	115

* 24 h 70°C 20% deflection/*24 h 100°C 20% deflection

PLMPUR-XSL | P1205 (TPU)

General Information:

PLMPUR-XSL is a thermoplastic polyurethane elastomer based on polycarbonate polyol and filled with solid lubricants. Compared to PLMPUR-SL, this material offers higher hardness and greater compressive strength, further enhancing its sliding performance. PLMPUR-XSL can be used as a replacement for PLMPUR-X or PLMPUR-XH in conditions with poor lubrication or dry running conditions.

Physical properties

Color	Black		
Hardness	DIN ISO 7619 (3 sec)	ShoreA	97±2
Hardness	DIN ISO 7619 (3 sec)	ShoreD	60±2
Density	DIN EN ISO 1183-1	g/cm^3	1.22±0.02
100% Modulus	DIN 53504	N/mm^2	≥20
Tensile Strength	DIN 53504	N/mm^2	≥48
Elongation at break	DIN 53504	%	≥300
Tear Strength	DIN ISO 34-1	N/mm	≥140
Compression set: 24h/70℃*	DIN ISO 815	%	≤27
Compression set:24h/100℃**	DIN ISO 815	%	≤33
Abrasion	DIN ISO 4649	mm^3	≤17
Min. Service Temperature	——	°C	-20
Max.Service Temperature	——	°C	115

* 24 h 70°C 20% deflection/** 24 h 100°C 20% deflection

PLMPUR-H LD (CPU)

General Information:

PLMPUR-H LD is a hydrolysis-resistant polyurethane elastomer made by casting process (CPU). The material shows similar mechanical properties and chemical resistance as PLMPUR-H, since it is based on the same raw material composition (based on Polycarbonate polyol). Therefore PLMPUR-H LD can be used in the same hydraulic fluids as PLMPUR-H. Generally, PLMPUR-H LD is used for seals with a diameter range of above 600 mm or also for special seal designs.

Physical properties

Color	Red		
Hardness	DIN ISO 7619 (3 sec)	ShoreA	95±2
Hardness	DIN ISO 7619 (3 sec)	ShoreD	48±2
Density	DIN EN ISO 1183-1	g/cm^3	1.18±0.02
100% Modulus	DIN 53504	N/mm^2	≥13
Tensile Strength	DIN 53504	N/mm^2	≥45
Elongation at break	DIN 53504	%	≥320
Tear Strength	DIN ISO 34-1	N/mm	≥110
Compression set: 24h/70°C*	DIN ISO 815	%	≤27
Compression set:24h/100°C**	DIN ISO 815	%	≤35
Abrasion	DIN ISO 4649	mm^3	≤17
Min. Service Temperature	——	°C	-20
Max.Service Temperature	——	°C	115

* 24 h 70°C 20% deflection/** 24 h 100°C 20% deflection

Rubber Materials

Rubber materials are vulcanized polymers formed by chemically cross-linking of polymeric base materials. The chemical bonds determine that they do not easily soften or dissolve in specific media.

Rubber materials are primarily used for manufacturing piston seals, rod seals, wipers and static seals (such as O-rings).

Rubber, with its unique properties, is widely used in the sealing industry. Suzhou Pulim Sealing Technology Co.,Ltd offers a variety of rubber materials and products.

Material		PLM-N85 PLMRUBBER-N	PLM-F85 PLMRUBBER-F	PLM-A85 PLMRUBBER-A	PLM-HN85 PLMRUBBER-HN	PLM-E85 PLMRUBBER-E	PLM-S85 PLMRUBBER-S
Components		Nitrile rubber	Fluoro rubber	Fluorocarbon rubber	Hydrogenated nitrile rubber	Ethylene propylene diene rubber	Silicone rubber
Colour		white, black	Brown/ black	black	black	black	Red-brown / Transparent
Hardness Shore A		85 ± 5	85 ± 5	85 ± 5	85 ± 5	85 ± 5	85 ± 5
Operating Temperature	Min	-35℃	-20℃	-10℃	-25℃	-45℃	-60℃
	Max	200℃	200℃	200℃	150℃	150℃	200℃

PLM-N85 (PLMRUBBER-N) | N851

General Information:

Nitrile rubber (NBR) is a copolymer of butadiene and acrylonitrile, commonly used for its oil resistance. The performance of nitrile rubber varies significantly with the ratio of butadiene to acrylonitrile; higher acrylonitrile content improves oil resistance and wear resistance but reduces low-temperature performance. The curing system in the formulation affects the oil resistance, heat resistance, wear resistance, tear resistance, resilience and permanent compression deformation of nitrile rubber. For wipers, nitrile rubber should be resistant to ozone aging. Additionally, it is important to consider the hardness of the material to balance compression extrusion and rebound performance.

Physical properties:

Color	Black, white		
Hardness	DIN ISO 7619 (3 sec)	ShoreA	85±5
Density	DIN EN ISO 1183-1	g/cm^3	1.28±0.03
100% Modulus	DIN 53504	N/mm^2	≥11
Tensile Strength	DIN 53504	N/mm^2	≥16
Elongation at break	DIN 53504	%	≥130
Tear Strength	DIN ISO 34-1	N/mm	≥20
Compression set: 24h/70℃*	DIN ISO 815	%	≤15
Compression set:24h/100℃**	DIN ISO 815	%	≤15
Abrasion	DIN ISO 4649	mm^3	≤90
Min. Service Temperature	——	℃	-35
Max.Service Temperature	——	℃	110

* 24 h 70°C 15% deflection/*24 h 100°C 15% deflection

PLM-F85 (PLMRUBBER-F) | F851 / F852

General Information:

Fluororubber (FKM) refers to synthetic elastomers with fluorine atoms attached to the carbon atoms in the main or side chains. The introduction of fluorine atoms imparts excellent heat resistance, oxidation resistance, oil resistance, corrosion resistance and atmospheric aging resistance to the rubber. As a result, it is widely used in aerospace, aviation, automotive and petroleum appliances.

Physical properties:

Color			Black	Brown
Hardness	DIN ISO 7619 (3 sec)	ShoreA	85±5	85±5
Density	DIN EN ISO 1183-1	g/cm^3	2.01±0.03	2.48±0.03
100% Modulus	DIN 53504	N/mm^2	≥6	≥6
Tensile Strength	DIN 53504	N/mm^2	≥10	≥10
Elongation at break	DIN 53504	%	≥130	≥130
Tear Strength	DIN ISO 34-1	N/mm	≥24	≥24
Compression set: 24h/100°C*	DIN ISO 815	%	≤15	≤15
Compression set:24h/175°C**	DIN ISO 815	%	≤20	≤20
Abrasion	DIN ISO 4649	mm^3	≤150	≤150
Min. Service Temperature	——	°C	-20	-20
Max.Service Temperature	——	°C	200	200

* 24 h 100°C 15% deflection/*24 h 175°C 15% deflection

PLM-A85 (PLMRUBBER-A) | AF851

General Information:

PLMRUBBER-A (Aflas ®) is chemical related to fluorocarbon-rubber, however with a lower fluorine content.

Compared to Fluorocarbon rubber material, PLMRUBBER-A shows higher tensile strength and quite similar heat resistance.

Generally Aflas ® rubber material can be seen as a combination of FKM and EPDM rubber material, resulting in outstanding resistance to hot water and hot steam.

Furthermore PLMRUBBER-A shows excellent chemical resistance to sour gas (H2S) and amines, various kind of brake fluids and fire resistant hydraulic fluids as well as outstanding radiation resistance.

Physical properties:

Color			Black
Hardness	DIN ISO 7619 (3 sec)	ShoreA	85 ±/-5
Density	DIN EN ISO 1183-1	g/cm3	1.80±/-0.05
100% Modulus	DIN 53504	N/mm2	≥10
Tensile strength	DIN 53504	N/mm2	≥20
Elongation at break	DIN 53504	%	≥160
Tear Strength	DIN ISO 34-1	N/mm	≥20
Compression set: 24h/175°C	DIN ISO 815	%	≤35
Min.service temperature	ISO 11357-2	°C	-10
Max.service temperature	ISO 11357-2	°C	200

*24 h 175°C 15% deflection

PLM-HN85 (PLMRUBBER-HN) | HN851

General Information:

Hydrogenated nitrile rubber (HNBR) is the product of hydrogenating the carbon-carbon double bonds in the molecular chain of nitrile rubber, also known as highly saturated nitrile rubber. HNBR possesses excellent oil resistance (good resistance to fuel oils, lubricating oils and aromatic solvents). Its highly saturated structure provides good heat resistance, excellent chemical corrosion resistance (resistant to freon, acids and bases) and outstanding ozone resistance. Additionally, HNBR features high strength, superior tear resistance and excellent wear resistance making it one of the rubbers with the most outstanding comprehensive properties.

Physical properties:

Color	Black		
Hardness	DIN ISO 7619 (3 sec)	ShoreA	85±5
Density	DIN EN ISO 1183-1	g/cm^3	1.23±0.03
100% Modulus	DIN 53504	N/mm^2	≥10
Tensile Strength	DIN 53504	N/mm^2	≥18
Elongation at break	DIN 53504	%	≥180
Tear Strength	DIN ISO 34-1	N/mm	≥24
Compression set: 24h/70°C*	DIN ISO 815	%	≤15
Compression set:24h/100°C**	DIN ISO 815	%	≤20
Abrasion	DIN ISO 4649	mm^3	≤90
Min. Service Temperature	——	°C	-25
Max.Service Temperature	——	°C	150

* 24 h 70°C 15% deflection/** 24 h 100°C 15% deflection

PLM-E85 (PLMRUBBER-E) | E851

General Information:

Ethylene propylene diene rubber (EPDM) is a copolymer of ethylene, propylene and a small amount of non-conjugated diene. It is a type of ethylene-propylene rubber. Because its main chain consists of chemically stable saturated hydrocarbons and only the side chains contain unsaturated double bonds, EPDM exhibits excellent aging properties including ozone resistance, heat resistance and weather resistance. It is widely used in automotive components, construction waterproofing materials and automotive seals.

Physical properties:

Color	Black		
Hardness	DIN ISO 7619 (3 sec)	ShoreA	85±5
Density	DIN EN ISO 1183-1	g/cm^3	1.22±0.03
100% Modulus	DIN 53504	N/mm^2	≥6
Tensile Strength	DIN 53504	N/mm^2	≥12
Elongation at break	DIN 53504	%	≥110
Tear Strength	DIN ISO 34-1	N/mm	≥20
Compression set: 24h/70℃*	DIN ISO 815	%	≤15
Compression set:24h/100℃**	DIN ISO 815	%	≤16
Abrasion	DIN ISO 4649	mm^3	≤120
Min. Service Temperature	——	°C	-45
Max.Service Temperature	——	°C	150

* 24 h 70°C 15% deflection/** 24 h 100°C 15% deflection

PLM-S85 (PLMRUBBER-S) | S851

General Information:

Silicone rubber (MVQ) is a type of rubber where the main chain alternates between silicon and oxygen atoms, with silicon atoms typically bonded to two organic groups. Ordinary silicone rubber is mainly composed of silicon-oxygen chains with methyl and a small amount of vinyl groups. Silicone rubber has excellent low temperature performance, typically remaining functional at -60°C. Its heat resistance is also notable, with the ability to operate continuously at 180°C, withstand slightly higher temperatures of around 200°C for several weeks or longer while still retaining elasticity, and tolerate short-term exposure to temperatures above 300°C. Silicone rubber has high permeability, with the highest oxygen permeability among synthetic polymers.

Physical properties:

Color	Red		
Hardness	DIN ISO 7619 (3 sec)	ShoreA	85±5
Density	DIN EN ISO 1183-1	g/cm^3	1.52±0.03
100% Modulus	DIN 53504	N/mm^2	≥4.5
Tensile Strength	DIN 53504	N/mm^2	≥6.5
Elongation at break	DIN 53504	%	≥130
Tear Strength	DIN ISO 34-1	N/mm	≥9
Compression set: 24h/100°C*	DIN ISO 815	%	≤20
Compression set:24h/175°C**	DIN ISO 815	%	≤25
Min. Service Temperature	——	°C	-60
Max.Service Temperature	——	°C	200

* 24 h 100°C 15% deflection/*24 h 175°C 15% deflection

Chemical Resistance and Compatibility Guide:

Material / Chemical & Environmental Resistan	Temperature	Polyurethanes Rubber grades							
		PLMPUR PLMPUR-LT PLMPUR-X	PLMPUR-H PLMPUR-SL PLMPUR-XH PLMPUR-XSL	PLMPUR-H LD	PLMRUBBER-N PLMRUBBER-N 75A	PLMRUBBER-F PLMRUBBER-F black	PLMRUBBER- HN	PLMRUBBER-E	PLMRUBBER-S
		TPU	TPU hydrolysis resistant	CPU	NBR	FKM, FPM	H-NBR	EPDM	MVQ
Oil hydraulic fluids									
- mineral oil based	RT	+	+	+	+	+	+	-	o
	60°C	+	+	+	+	+	+	-	-
- Synthetic oils									
HETG	RT	+	+	+	o	+	o	-	o
(triglyceride)	60°C	o	+	+	o	+	o	-	o
HEES	RT	+	+	+	o	+	o	-	-
(synthetic ester)	60°C	o	+	+	o	+	o	-	-
HEPG	RT	o	+	+	+	+	+	+	o
(polyglycols)	60°C	-	o	o	+	+	+	+	o
PAO	RT	+	+	+	+	+	+	-	o
(polyalphaolefines	60°C	o	+	+	o	+	o	-	o
Fire resistant hydraulie fluids and water hydraulics									
- HFA (water - oil emulsion)									
HFA-E	RT	o	+	+	+	+	+	-	o
	60°C	-	+	+	+	o	+	-	-
HFA-S	RT	o	+	+	+	+	+	+	+
	60°C	-	+	+	o	o	o	o	+
- HFB (oil - water emulsion)	RT	o	+	+	+	+	+	-	o
	60°C	-	+	+	+	+	+	-	-
- HFC (water - glycol)	RT	-	+	+	+	o	+	+	o
	60°C	-	o	o	+	-	+		o
- HFD (water free)									
HFD-R	RT	-	-	-	-	o	-	+	o
	60°C	-	-	-	-	o	-	+	o
HFD-S	RT	-	-	-	-	+	-	-	+
	60°C	-	-	-	-	+	-	-	+
HFD-T	RT	-	-	-	-	+	-	-	+
	60°C	-	-	-	-	+	-	-	+
HFD-U	RT	+	+	+	+	+	+	-	-
	60°C	o	+	+	o	+	o	-	-
Chemicals & solvents									
Acids - inorganic diluted	RT	-	+	+	o	+	o	+	o
- inorganic concentrated	RT	-	-	-	-	+	-	+	o
- organic diluted	RT	o	+	+	+	+	+	+	o
- organic concentrated	RT	-	o	o	-	-	-	+	o
Alkalies - general	RT	-	o	o	o	o	o	+	o
Alcohols - general (except Methanol)	RT	-	+	+	+	+	+	+	+
Glycols - general	RT	-	o	o	+	+	+	+	+
Hydrocarbons									
- aliphatc	RT	+	+	+	+	+	+	-	-
- aromatic	RT	-	-	-	o	+	o	-	-
Methanol									
- diluted	RT	-	+	+	+	o	+	+	+
- concentrated	RT	-	-	-	o	-	+	+	+
Solvents									
- Toluene	RT	-	-	-	-	+	-	-	-
- Acetone	RT	-	-	-	-	-	-	+	-
- MEK	RT	-	-	-	-	-	-	+	-
Steam		-	-	-	-	-	-	+	-
Water	RT	+	+	+	+	+	+	+	+
	60°C	-	+	+	+	+	+	+	o

Sumbolic of the rating:

+	Excellent
o	Good/fair
-	Poor

Long Tube Materials for Bar Feeder

PULIM newly developed Long Tube Materials, specifically engineered to meet the feeding requirements of bar feeder equipment. Available in two high-performance material options: PLMPUR-H and PLM-N85 (PLMRUBBER-N). These long tube materials maintain the same exceptional performance standards as our standard-length materials, with the only modification being an extended length to perfectly meet the operational needs of bar feeders.

Available sizes for PLMPUR-H | P1201:

0*25*780	0*33*780	0*42*780	0*46*780
13*33*780	13*46*780	22*46*780	22*55*780
22*62*780	25*46*780	25*55*780	25*62*780
27*46*780	27*55*780	27*62*780	30*55*780
30*62*780	37*55*780	37*62*780	

Available sizes for PLM-N85 (PLMRUBBER-N) | N851:

0*20*780	0*25*780	0*32*780	0*42*780
18*32*600	18*47*600	27*45*600	27*53*600

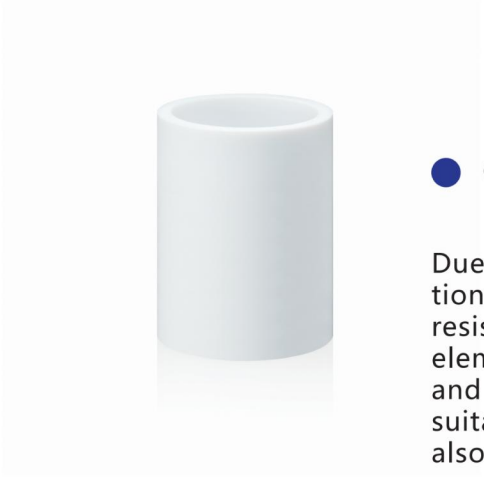
Thermoplastics

Polytetrafluorothylene

Polytetrafluorothylene (PTFE) is enhanced by incorporating various fillers to improve and expand their overall physical and mechanical properties, thereby broadening their application range. As a result, PTFE sealing materials can be used for sealing work media such as petroleum-based hydraulic oils, water-oil emulsions, water-glycol-based hydraulic fluids and phosphate-ester-based hydraulic fluids.

PULIM Material Code	Material	Color	Working Temperature
PLMFLON-1	PTFE VIRGIN		-200℃-260℃
PLMFLON-2	PTFE + 15% GLASS + 5% MoS_2		-200℃-260℃
PLMFLON-3	PTFE + 40% BRONZE		-200℃-260℃
PLMFLON-4	PTFE + 23% Carbon + 2% Graphite		-200℃-260℃

PLMFLON-1



General Information:

PLMFLON-1 is based on polytetrafluoroethylene(PTFE). Due to its composition, it offers the widest range of applications among sealing materials. It has outstanding chemical resistance, being only affected by molten alkali metals and elemental fluorine at high temperatures. PTFE tends to creep and can handle relatively low-pressure loads. PLMFLON-1 is suitable for applications in contact with foodstuffs and is also used in various applications in the healthcare and pharmaceutical industries.

Physical properties:

Property	Unit	Value	Standard
Standard colour		White	
Durometer hardness	Shore D	58	ISO 868
Density	g/cm^3	2,16	DIN EN ISO 1183-1
Tensile Strength	MPa	≥28	ASTM D4894
Elongation at break	%	≥300	ASTM D4894
Coefficient of thermal expansion, 25°C	K^{-1}	16×10^{-5}	DIN ISO 7991
Coefficient of sliding	-	0.1	-
Coefficient of thermal conductivity	W/mK	0.23	DIN 52612
Min. Service Temperature	°C	-200	-
Max. Service Temperature	°C	260	-

PLMFLON-2

General Information:

PLMFLON-2 is a PTFE material filled with 15% glass fiber and 5% MoS_2 to improve its compressive strength, extrusion resistance and wear properties compared to PTFE virgin. Chemical resistance remains similar to PLMFLON-1. Glass-filled PTFE compounds have an abrasive effect on their mating surfaces, especially in rotating applications.

Physical properties:

Property	Unit	Value	Standard
Standard colour		Grey	
Durometer hardness	Shore D	63	ISO 868
Density	g/cm^3	2,27	DIN EN ISO 1183-1
Tensile Strength	MPa	≥22	ASTM D4894
Elongation at break	%	≥250	ASTM D4894
Coefficient of thermal expansion, 25°C	K^{-1}	11×10^{-5}	DIN ISO 7991
Coefficient of thermal conductivity	W/mK	0.48	DIN 52612
Min. Service Temperature	°C	-200	-
Max. Service Temperature	°C	260	-

PLMFLON-3

General Information:

PLMFLON-3 is a PTFE material filled with 40% bronze to increase its compressive strength, it has better thermal conductivity and excellent wear resistance compared to PTFE virgin. Bronze-filled PTFE has higher friction and poorer chemical resistance than other filled PTFE compounds.

Physical properties:

Property	Unit	Value	Standard
Standard colour		Dark Brown	
Durometer hardness	Shore D	62	ISO 868
Density	g/cm^3	3,12	DIN EN ISO 1183-1
Tensile Strength	MPa	≥25	ASTM D4894
Elongation at break	%	≥250	ASTM D4894
Coefficient of thermal-expansion, 25°C	K^{-5}	6×10	DIN ISO 7991
Min. Service Temperature	°C	-200	-
Max. Service Temperature	°C	260	-

PLMFLON-4

General Information:

PLMFLON-4 is polytetrafluoroethylene filled with 25% Carbon (23%hard carbon, 2% soft carbon), which gives it excellent compressive strength, good thermal conductivity and low permeability. Carbon-filled PTFE is less abrasive than glass-filled PTFE compound and has excellent wear and friction properties, especially when combined with graphite.

Physical properties:

Property	Unit	Value	Standard
Standard colour		Black	
Durometer hardness	Shore D	64	ISO 868
Density	g/cm^3	2,10	DIN EN ISO 1183-1
Tensile Strength	MPa	≥22	ASTM D4894
Elongation at break	%	≥210	ASTM D4894
Coefficient of thermal expansion, 25℃	K^{-1}	9×10^{-5}	DIN ISO 7991
Coefficient of thermal conductivity	W/mK	0.60	DIN 52612
Min. Service Temperature	℃	-200	-
Max. Service Temperature	℃	260	-

PLMPEEK-1

General Information:

PEEK (polyetheretherketone) material is an aromatic, thermoplastic polymer material, belonging to the group of partly crystalline thermoplastics. PLMPEEK is showing high tensile properties and stiffness, good impact and fatigue resistance as well as excellent wear properties. Furthermore this polymeric material is showing good electrical properties, high temperature and radiation resistance as well as outstanding chemical resistance, in specific against e.g. acids and alkalis.

Physical properties:

Property	Unit	Value	Standard
Standard colour	-	Cream	-
Durometer hardness	Shore D	87	ISO 868
Density	g/cm^3	1,3	DIN EN ISO 1183-1
Yield Stress	MPa	≥110	ISO 527
Elongation at break	%	≥45	ISO 527
Tensile Modulus	MPa	≥4500	ISO 527
Charpy Notch Impact Strength, 23°C	KJ/m^2	≥8	ISO 179/leA
WaterAbsorption 24h, 23°C	%	0.1	ISO 62-1
Min. Service Temperature	°C	-100	-
Max. Service Temperature	°C	260	-

PLMPOM-1

General Information:

POM (Polyoxymethylene) material has a low dynamic and static friction coefficient, is resistant to organic solvents and chemical corrosion and has good mechanical properties and creep resistance. Its performance can be improved by adding various kind of fillers. It is suitable for making retaining rings and guide support rings for reciprocating seals.

Physical properties:

Property	Unit	Value	Standard
Standard colour	-	Black, White	-
Durometer hardness	Shore D	80	ISO 868
Density	g/cm^3	1,41	DIN EN ISO 1183-1
Yield Stress	MPa	≥70	ISO 527
Yield Elongation	%	≥10	ISO 527
Elongation at break	%	≥30	ISO 527
Tensile Modulus	MPa	≥2500	ISO 527
Charpy Notch Impact Strength,+23℃	KJ/m^2	≥7	ISO 179-1
Charpy Notch Impact Strength,-30℃	KJ/m^2	8	ISO 179-1
Water Absorption..23℃ saturated	%	0.65	ISO 62
Coefficient of Friction	-	0.25-0.32	-
Min. Service Temperature	℃	-50	-
Max. Service Temperature	℃	100	-

PLMPA-3

General Information:

PLMPA-3 (Polyamide 6 with 40% Glass fiber and 15% PTFE) is a high-performance engineering plastic material that combines excellent mechanical strength, low friction properties and good dimensional stability.

The glass fiber reinforcement provides high stiffness, outstanding wear and creep resistance, while the PTFE filler ensures outstanding sliding behavior and low coefficient of friction. This material also maintains good chemical resistance and thermal stability.

PLMPA-3 (PA3) is typically used for sliding and guide ring elements, wear and bearing bushes as well as wear-resistant components, especially where low friction, high load capacity and long

Physical properties:

Colour			Black
Hardness	ASTM D785	M scale	105
Density	ASTM D792	g/cm3	1.6±0.03
Tensile Strength	ASTM D638	MPa	≥150
Tensile Elongation	ASTM D638	%	≥2
Tensile Modulus	ASTM D638	MPa	≥12000
Flexural Strength	ASTM D790	MPa	241
Flexural Modulus	ASTM D790	MPa	11722
Izod impact strength, notched, +23°C	ASTM D256	J/m	128
Izod impact strength, unnotched, +23°C	ASTM D4812	J/m	908
Min.service temperature	-	°C	-40
Max.service temperature	-	°C	135

PLMPA-4

General Information:

PLMPA-4 (Polyamide 6 with 40% Glass fiber) is a high-performance engineering plastic material that combines high mechanical strength, stiffness and good dimensional stability.

The incorporation of glass fibers significantly improves wear and creep resistance and increases load-bearing capacity compared to unreinforced PA6. The material also provides good thermal stability and resistance to many lubricants and chemicals.

PLMPA-4 (PA4) is typically used for sliding and guide ring elements, wear and bearing bushes as well as wear-resistant components, where high strength and durability under mechanical stress are required.

Physical properties:

Colour			Black
Hardness	ASTM D785	M scale	95
Density	ASTM D792	g/cm3	1.46±0.03
Tensile Strength	ASTM D638	MPa	≥150
Tensile Elongation	ASTM D638	%	≥2
Tensile Modulus	ASTM D638	MPa	≥12000
Flexural Strength	ASTM D790	MPa	290
Flexural Modulus	ASTM D790	MPa	11722
Izod impact strength, notched, +23°C	ASTM D256	J/m	160
Izod impact strength, unnotched, +23°C	ASTM D4812	J/m	1175
Min.service temperature	-	°C	-40
Max.service temperature	-	°C	135

Chemical Resistance and Compatibility Guide:

Material / Chemical & Environmental Resistance	Thermoplastics					
	PLMPOM POM - C	PLMPEEK PEEK	PLMFLON-1 PTFE virgin	PLM FLON-2 PTFE +15% glass fiber	PLMFLON-3 PTFE +40% bronze	PLMFLON-4 PTFE +20% carbon
Oil hydraulic fluids						
- mineral oil based	+	+	+	+	+	+
- synthetic oils	+	+	+	+	+	+
- HETG	+	+	+	+	+	+
- HEES	+	+	+	+	+	+
- HEPG	+	+	+	+	+	+
- PAO	+	+	+	+	+	+
Fire resistant hydraulic fluids and water hydraulics						
- HFA (water - oil emulsion)	+	+	+	+	+	+
HFA-E	+	+	+	+	+	+
HFA-S	+	+	+	+	+	+
- HFB (oil - water emulsion)	+	+	+	+	+	+
- HFC (water - glycol)	+	+	+	+	+	+
- HFD (water free)						
HFD-R	+	+	+	+	+	+
HFD-S	+	+	+	+	+	+
HFD-T	+	+	+	+	+	+
HFD-U	+	+	+	+	+	+
Chemicals & solvents						
Acids - inorganic diluted	o	+	+	+	+	+
- inorganic concentrated	-	o	+	+	+	+
- organic diluted	o	+	+	+	+	+
- organic concentrated	o	+	+	+	+	+
Alkalies - general	o	+	+	o	o	o
Alcohols - general (except Methanol)	+	o	+	+	+	+
Glycols - general	+	+	o	o	o	o
Hydrocarbons						
- aliphatc	+	+	+	+	+	+
- aromatic	+	+	+	+	+	+
Methanol						
- diluted	+	+	+	+	+	+
- concentrated	+	+	+	+	+	+
Solvents						
- Toluene	+	+	+	+	+	+
- Acetone	+	+	+	+	+	+
- MEK	o	+	+	+	+	+
Steam	+	+	+	+	+	+
Water	+	+	+	+	+	+

Sumbolic of the rating:	
+	Excellent
o	Good/fair
-	Poor

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