

DURAFILM®

Polymer Coating Technology

聚合物涂层技术





- 成立于1995年，总注册资本2.23亿人民币；
- 年营业额超过10亿元人民币，超1000名员工；
- 拥有5个生产基地，总占地超200000m²；
- 国家级高新技术企业，超120项专利；
- IATF16949:2016、ISO9001:2015、ISO14001:2015、ISO45001:2018认证。
- CSB was established in 1995 and its legal registered capital is 223 million RMB.
- Annual turnover more than 1 Billion RMB, more than 1000 employees.
- CSB has 5 production bases with a total area of 200000m².
- China National Hi-Tech Enterprise, more than 120 patents.
- IATF16949: 2016、ISO9001: 2015、ISO14001: 2015 and ISO45001: 2018 certifications.

...高性能聚合物技术 为客户创造价值

...High-performance Polymer Technologies
Creating Value For Customers

RoHS指令限制的十种有害物质

EC Directive 2011/65/EU (the RoHS Directive)

汞Hg、六价铬Cr⁶⁺、铅Pb、镉Cd、多溴联苯醚PBDE、多溴联苯PBB、邻苯二甲酸二正丁酯DBP、邻苯二甲酸正丁基苄酯BBP、邻苯二甲酸(2-己基)己酯DEHP、六溴环十二烷HBCDD。

This directive restricts the use of hazardous substances. Listed below are CSB products which are all RoHS compliant.



"CSB", "TEFPLAS", "TEXPLAS", "DURAPLAS", "DURARUB", "DURAFILM", "TRIBOTAPE", "DURAMOV", "FLEXMOV", "CSB-EPB", "CSB-LIN", "CSB-BAL", "CSB-RPM", "CSB-SRB", "CSB-PRB", etc. are legally protected trademarks in China. 等是中国保护商标。



Polymer-tech Solutions™

聚合物技术 解决方案



CSB-EPB®工程塑料轴承 Plastic Plain Bearings

自润滑免维护、耐腐蚀、长服务寿命、轻量化；可选：极低摩擦系数、高载荷、抗静电、高温250°C、FDA食品安全等级。

Maintenance-free dry operation, Absolute corrosion resistance, Long service time and light; Multiple choices: Lowest friction coefficient, High load, Anti-static, High temperature 250°C, FDA food safety grade.



CSB-LIN®塑料直线轴承 Plastic Linear Bearings

干运行无需供油、抗粉尘、低噪音、耐腐蚀、长服务寿命、轻量化；可选：高温250°C、多种安装方式。

Dry operation without oil, Anti-dust, Low noise, Corrosion resistance, Longer service time and light; Multiple Assemble types, Highest operation temperature 250°C.



CSB-LIN®直线导轨丝杆 Guide Rails and Lead Screws

自润滑免维护直线驱动系统，直线滑动部件及丝杆螺母均采用高耐磨EPB13材料制成，实现长期干摩擦，低噪音，长服务寿命，适合在粉尘或污水下运行。

Self-lubricating and maintenance-free linear motion system, Linear slider and screw nuts are made of high wear-resistant material EPB13, Dry operation for longer time, lower noise, longer service time and suitable for operation in dust or dirty water.



CSB-BAL®塑料关节轴承 Plastic Spherical Bearings

自润滑免维护、耐腐蚀、抗污垢、轻量化；可选：多种结构设计满足不同安装需求。

Self-lubricating and maintenance-free, Corrosion-resistant, Anti-fouling, lightweight; Multiple structural design to meet different installation requirements.



DURAFILM®纤维缠绕轴承 Filament-wound Bearings

连续长纤维复合材料、干摩擦性能更优越、极高的承载能力、最高静载荷240MPa，特别适用于高载低速下的摆动。

Long fiber composite material, The best performance for dry operation, High load capacity and max. static load 240MPa, Especially suitable for swing with high load and low speed.



DURAPLAS®耐磨半成品 Semi-finished Products

采用CSB-EPB®高耐磨材料制成，可实现非标轴承的快速加工、小批量制作降低成本；可选：棒材、板材、片材。

The semi-finished products are made of anti-wear and high performance materials CSB-EPB®, It can be machined non-standard bearings in short time, saving cost for small quantity; Multiple choices: Bar, sheet and tribo-tape.



DURAMOV®塑料电缆拖链 Plastic Cable Carriers

采用高强度耐磨工程塑料制成，可实现多种运动方式与行程，模块化设计易于组装和维护，适用于各类环境下低噪音长寿命运行。

The cable carriers are made of high strength and anti-wear plastics, The cable carriers are used in a variety of motion modes and strokes, modular design is easy to assemble and maintain, and it is suitable for low noise long life in various environments.



FLEXMOV®高柔性电缆 Flexible Cables

FLEXMOV® 高柔性电缆包含控制电缆、数据电缆、伺服电缆、动力电缆、总线电缆、机器人电缆等；多种护套材料如PVC、PUR和TPE可满足室内或室外等极端环境无故障运行。

FLEXMOV® flexible cables include control cables, data cables, servo cables, motor cables, bus cables, robot cables, etc.; Various jacket materials such as PVC, PUR and TPE are available to meet trouble-free operation in extreme environments such as indoors or outdoors.

CSB Product Family

CSB产品

Polymer-tech Solutions™

Products

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CSB-EPB®工程塑料轴承 Plastic Plain Bearings



CSB-LIN®塑料直线轴承 Plastic Linear Bearings



CSB-PRB®塑料滚动轴承 Plastic Ball Bearings



CSB-BAL®塑料关节轴承 Plastic Spherical Bearings



CSB-LIN®直线导轨与丝杆螺母 Guide rails & Screw nuts



CSB®自动化技术 Automation technology



CSB-SRB®回转支撑轴承 Slewing Ring Bearings



CSB-RPM®转向器轴承 Steering Rack Bearings



TEFPLAS®氟塑轴承 Fluoroplastic Bearing



KER转角轴承 Knife Edge Rollers



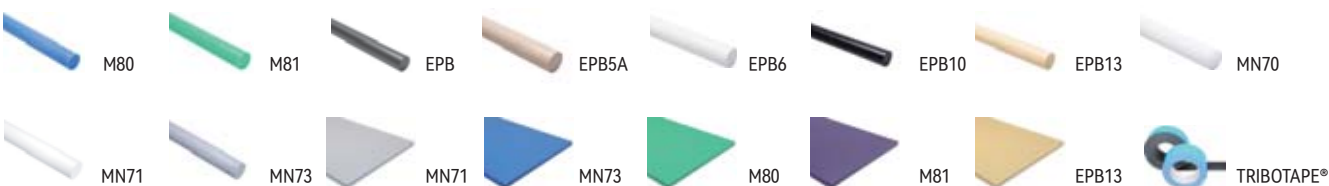
DURACHAIN®扶梯回转链 Escalator Rotary Chains



DURAMOV®电缆拖链 Cable Carriers FLEXMOV®高柔性电缆 Flexible Cables



DURAPLAS®耐磨半成品 Semi-finished Products



DURAFILM®纤维缠绕轴承 Filament-wound Bearings



DURAFILM®复合材料耐磨垫 Composite sliding pads



金属自润滑轴承 Metal Sliding Bearings



Home / CSB standard products / Plastic plan bearings tool V2.0

Bearing Forms

☐ Sleeve bearings
☒ Flange bearings
☐ Thrust washers
☐ Tin wall bearings
☐ Pinhead bearings
☐ Clip bearings
☐ Flange bearings
☐ Piston rings

Operating data

Max. static load at 23°C: 18 MPa
 Max. dynamic load at 23°C: 8 MPa
 Max. long-term operating temp.: 80 °C
 Min. long-term operating temp.: -10 °C

Other requirements

☐ Anti-static
☐ FDA certification
☐ Flammability class V0
☐ Lowest friction coefficient
☐ Cost-effective

CSB suitable products

CSB-EPB	CSB-EPB1	CSB-EPB2	CSB-EPB3	CSB-EPB4
CSB-EPB5	CSB-EPB6	CSB-EPB7	CSB-EPB8	CSB-EPB9
CSB-EPB10	CSB-EPB11	CSB-EPB12	CSB-EPB13	CSB-EPB14
CSB-EPB15	CSB-EPB16	CSB-EPB17	CSB-EPB18	CSB-EPB19
CSB-EPB20	CSB-EPB21	CSB-EPB22	CSB-EPB23	CSB-EPB24
CSB-EPB25	CSB-EPB26	CSB-EPB27	CSB-EPB28	CSB-EPB29
CSB-EPB30	CSB-EPB31	CSB-EPB32	CSB-EPB33	CSB-EPB34
CSB-EPB35	CSB-EPB36	CSB-EPB37	CSB-EPB38	CSB-EPB39
CSB-EPB40	CSB-EPB41	CSB-EPB42	CSB-EPB43	CSB-EPB44
CSB-EPB45	CSB-EPB46	CSB-EPB47	CSB-EPB48	CSB-EPB49

轴承结构形式

☒ 直筒轴承
☐ 法兰轴承
☐ 过盈轴承
☐ 耐磨滑环

运行参数

最大静载荷23°C: 18 MPa
 最大动载荷23°C: 8 MPa
 长期运行最高温度: 80 °C
 最低运行环境温度: -10 °C

运行环境

☒ 干燥
☐ 潮湿
☐ 强腐蚀
☐ 弱腐蚀

滑动副

☒ 滑动
☐ 滚动
☐ 直线
☐ 特殊要求

特殊要求

☐ 不含PFAS
☐ 良好电学性能
☐ 耐磨损/耐腐蚀加工

CSB适配产品

CSB	CRG	CRM	CRM	CRM	CRM
CRM	CRM	CRM	CRM	CRM	CRM
CRM	CRM	CRM	CRM	CRM	CRM

在线工具 Online Tools

Home / CSB standard products / Plastic plan bearings tool V2.0
 轴承结构形式
 运行参数
 运行环境
 特殊要求
 CSB适配产品

Home / CSB standard products / Plastic plan bearings tool V2.0
 产品选择
 产品目录
 安装方式
 设计分析



涂层特性 Coating characteristics

DURAFILM® 聚合物涂层包含热塑性与热固性复合涂层，可为极端环境下工作的零部件提供优越的润滑性能；在给摩擦面提供良好耐磨层的同时对金属部件具备防锈、防腐功能。根据应用我们开发了适用于低摩擦系数、高负荷、高温与导电等不同高性能涂层。

DURAFILM® polymer coatings combine thermoplastic and thermosetting composite layers, providing superior lubrication performance for components operating in extreme environments. They offer excellent wear-resistant layers on friction surfaces while delivering anti-rust and anti-corrosion protection for metal parts. Based on application requirements, we have developed specialized high-performance coatings tailored for low friction coefficients, high loads, high temperatures, conductivity, and other demanding conditions.

工作原理 Working principle

聚合物涂层含有固体润滑颗粒，分散在不同的树脂混合物中。润滑剂的体积浓度和品种的选择对润滑与腐蚀防护性能非常重要。液体涂层通过不同涂覆工艺使得基体树脂与基材紧紧结合，工作过程中涂层减摩材料释放与摩擦副表面形成良好的润滑界面。

The polymer coating contains solid lubricant particles dispersed within a resin matrix. The volume concentration and selection of lubricant types are critical to achieving optimal lubrication and corrosion resistance. The liquid coating is applied through various processes, ensuring the base resin adheres firmly to the substrate. During operation, the friction-reducing materials in the coating are released, forming a stable lubricating interface between friction pairs.

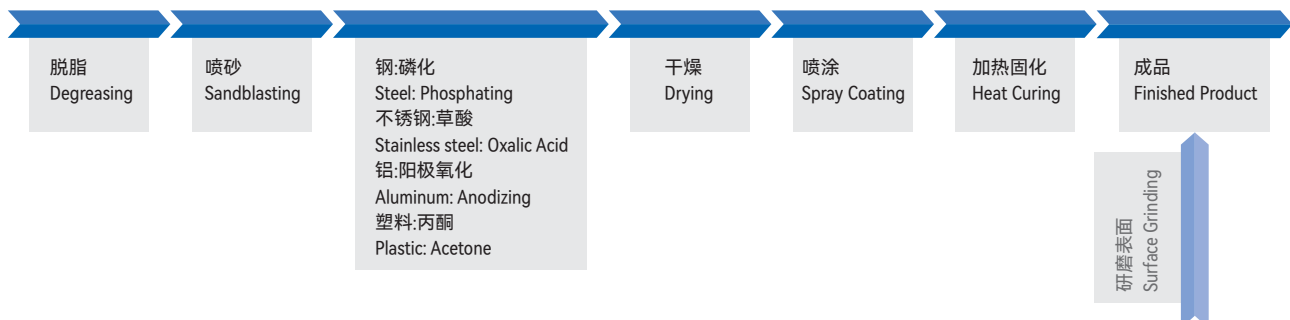
涂覆工艺 Application process

为确保DURAFILM聚合物涂层的有效性与其使用寿命，必须遵照正确的涂覆工艺。表面预处理非常重要，根据材料不同可采取脱脂、喷砂、磷化、阳极氧化、酸洗或其他表面处理。

预处理部件干燥后，即可采用不同方式加工聚合物涂层，然后对涂层进行干燥和固化，使得带有润滑剂的涂层与基材表面结合牢靠。对使用表面要求比较高的场合可增加表面研磨工艺，而对于油润滑或脂润滑等带有润滑介质的部件不建议对涂层表面进行抛光或研磨加工。

To ensure the effectiveness and longevity of DURAFILM polymer coatings, strict adherence to the correct application process is essential. Surface pretreatment is crucial and may include degreasing, sandblasting, phosphating, anodizing, pickling, or other treatments, depending on the substrate material.

After the pretreated components are dried, the polymer coating is applied using suitable methods, followed by drying and curing to ensure strong adhesion between the lubricant-rich coating and the substrate. For applications requiring high surface precision, surface grinding may be added. However, polishing or grinding is not recommended for coatings on components already lubricated with oil or grease, as it may compromise performance.



摩擦系统性能 Friction system performance

在考虑提升摩擦系统性能的方法时，工程师必须考虑多种因素：

When looking for ways to improve system performance, engineers must consider a number of factors including:

- 润滑
- 热传递与运行环境的影响
- 两个相互摩擦表面
- Lubrication
- Heat transfer and effect of the operating environment
- Two interacting frictional surfaces

运行环境的影响(热传递)

Effect of the Environment (Heat transfer)



典型优势 Advantiage

■ 涂料研发 Coating R&D

具备聚合物涂层的自主配方设计与定制能力，以精准调控表面特性

Possessing in-house formulation design and customization capabilities for polymer coatings to precisely regulate surface properties.

■ 设计简化 Design Simplification

可在传统轴承难以触及的复杂曲面结构中实现更简化的设计——减少零部件数量、简化组装流程

Enables simplified design in complex-shaped surfaces inaccessible to traditional bearings, reducing component quantity and simplifying assembly processes.

■ 适用基材广泛 Broad Substrate Compatibility

兼容钢、不锈钢、铝等金属基材（亦可拓展至聚合物及复合材料基材）

Compatible with metallic substrates such as steel, stainless steel, and aluminum (with potential extension to polymeric and composite substrates too).

■ 卓越的化学与防腐保护 Chemical and Corrosion Protection

具备出色的化学稳定性及抗腐蚀能力，可在接触面间形成惰性材料隔离层，从而显著延长部件寿命

Exhibits exceptional chemical stability and corrosion resistance, forming an inert material barrier between contact surfaces to extend component lifespan.

■ 自润滑性能 Self-Lubrication

通过嵌入固体润滑剂实现自润滑特性，可减少甚至彻底免除机械部件对额外润滑剂的需求

Incorporate solid lubricants to deliver self-lubricity that can help reduce and sometimes eliminate the need for additional lubrication in machine parts.

■ 替代硬铬电镀 Hard Chrome Replacement

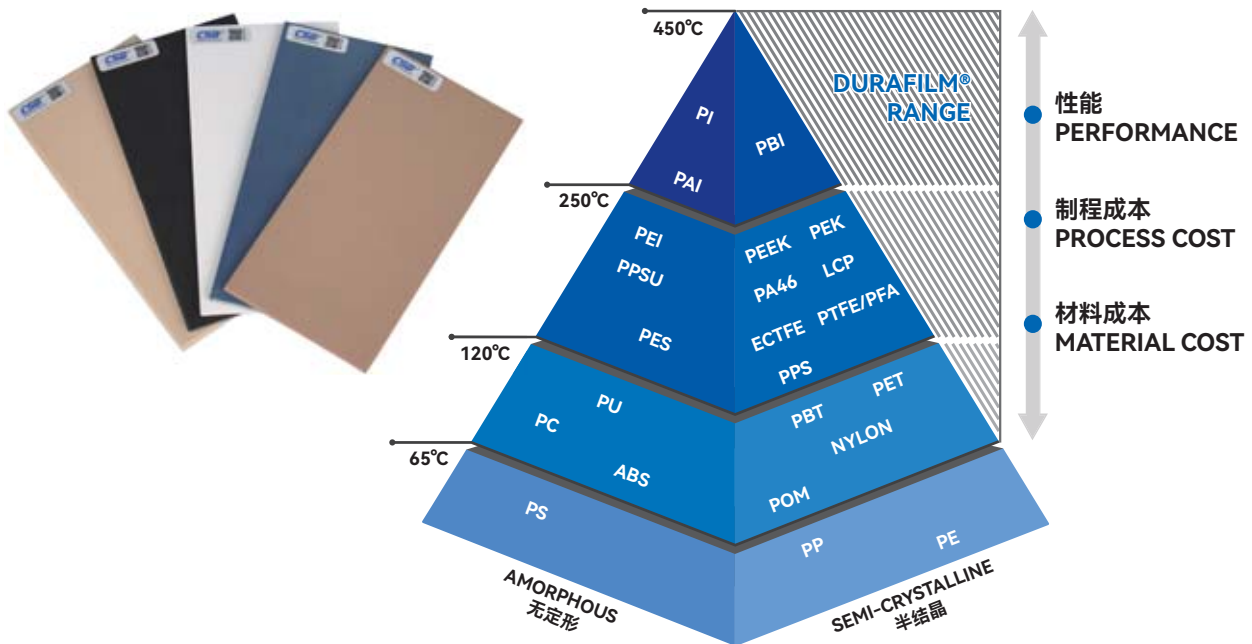
由于化学硬铬电镀存在毒性问题以及高昂成本被逐步淘汰。DURAFILM®聚合物涂层不仅环保特性还能提供更优的耐磨与耐腐蚀性能，为工业表面处理提供可持续的升级方案

Hard chrome plating is being phased out due to toxicity and high costs. DURAFILM® polymer coatings offer an eco-friendly alternative with superior wear and corrosion resistance, delivering a sustainable upgrade for industrial surface treatment.

DURAFILM®聚合物涂层解决方案 Polymer coating solutions

随着设备制造商零件设计多样化与复杂化，传统自润滑烧结复合轴承、耐磨复合塑料通过注塑或挤出机加工已无法满足工业发展需求。CSB在自润滑材料与产品领域研究超二十年技术积累，DURAFILM®聚合物涂层技术专为解决传统制造工艺无法实现的耐磨部件开发。DURAFILM®聚合物涂层可减少摩擦，延长磨损寿命，降低系统噪音和提高耐腐蚀性能。CSB通过DURAFILM®聚合物涂层技术为您提供完整的摩擦涂层服务，包括摩擦学和设计专业知识，根据应用定制涂层解决方案。

As equipment manufacturers face increasing design diversity and complexity of components, traditional self-lubricating sintered composite bearings and wear-resistant composite plastics processed via injection molding or extrusion can no longer meet industrial demands. With over 20 years of expertise in self-lubricating materials and products, CSB developed DURAFILM® polymer coating technology to address the limitations of conventional manufacturing methods in developing high-performance wear-resistant components. DURAFILM® polymer coatings reduce friction, extend wear life, lower system noise, and enhance corrosion resistance. CSB delivers complete friction coating services through DURAFILM® polymer coating technology, combining tribological and design expertise to provide customized coating solutions tailored to your specific application requirements.



■ DURAFILM® DF100

设计在低-中等载荷下低摩擦系数与高耐磨应用
Designed for low friction and high wear resistance at low to medium loads

■ DURAFILM® DF200

高载荷脂润滑下的低摩擦应用
Offers very high load capacity and low friction with grease lubrication

■ DURAFILM® DF509

设计用于耐磨应用的同时具备导电功能
High performance low friction polymer coating with integrated electrical conductivity

■ DURAFILM® DF501

高性能聚合物涂层在中-高载荷自润滑应用
High performance polymer coating for lubricated applications at medium to high loads

■ DURAFILM® DF508

专为介质润滑设计高温与高载荷摩擦涂层
Special coating for liquid lubricated applications at high temperature and high load

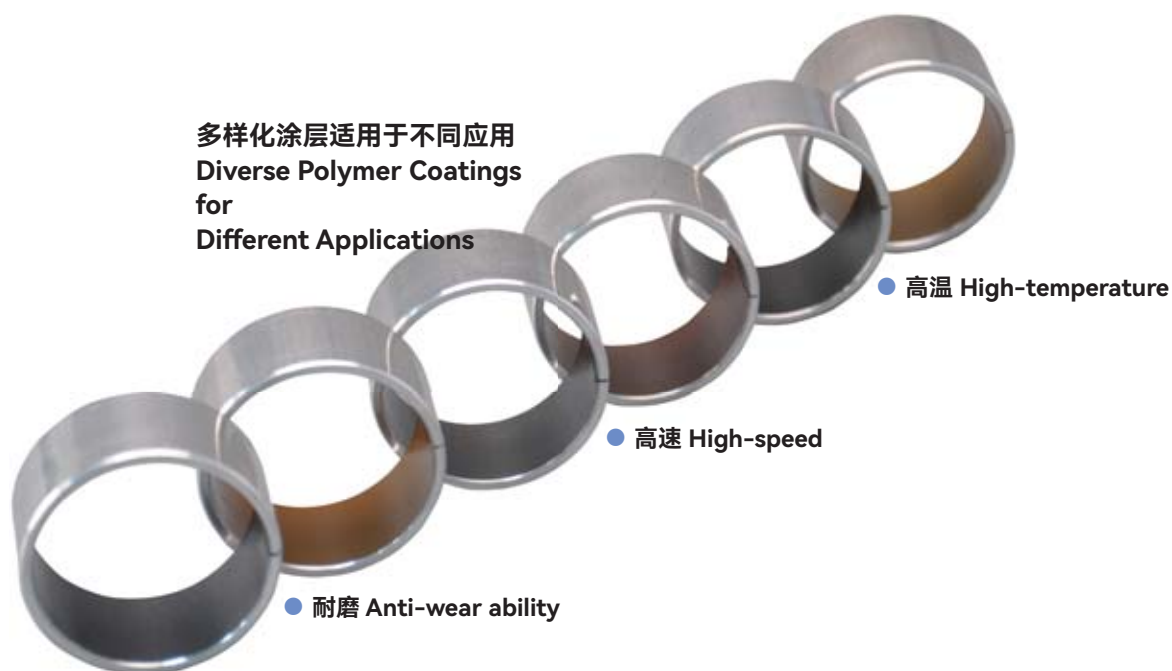
■ DURAFILM® DF601

极端高温下耐磨应用的高性能聚合物涂层
High-performance polymer coating for wear-resistant applications in extreme high-temperature

DURAFILM®选择涂层面 Coating surface selection

CSB推荐摩擦副的两个对偶面均采用涂层为最佳方案，然而在一般应用中考虑成本因素仅一个摩擦面带涂层也可以满足使用要求。结合工艺成本因素我们建议薄壁衬套可以采用带涂层板材卷制而成，对内径小于20mm或长径比 > 2的衬套我们建议在对磨轴表面做涂层，非规则形状对磨面优先选择外表面为摩擦面的零件表面做涂层。

CSB recommends coating both opposing surfaces of the friction pair as the optimal solution. However, considering cost factors in general applications, coating only one friction surface can also meet performance requirements. Balancing process and cost considerations, we suggest that thin-walled bushings can be manufactured by rolling coated sheets into shape. For bushings with an inner diameter smaller than 20mm or a length-to-diameter ratio greater than 2, we recommend applying coating to the mating shaft surface. For irregularly shaped mating surfaces, priority should be given to coating the component surface where the external face serves as the friction surface.



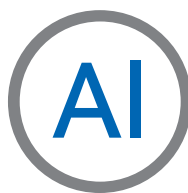
适用范围 Application



钢Steel



不锈钢Stainless Steel



铝Aluminium



塑料Plastics

技术数据表 Technical data table

涂层型号 Coating Type		DF100	DF200	DF501	DF508	DF509	DF601
外观 Color		黑灰色 Dark gray	黑灰色 Dark gray	黑灰色 Dark gray	深灰色 Charcoal gray	黑色 Black	褐色 Brown
应用 Usage	干摩擦 dry	优 Excellent	优 Excellent	优 Excellent	一般 Fair	一般 Fair	优 Excellent
	油润滑 oil lubricated	良好 Good	良好 Good	优 Excellent	优 Excellent	良好 Good	优 Excellent
	脂润滑 grease lubricated	一般 Fair	优 Excellent	良好 Good	优 Excellent	良好 Good	优 Excellent
	水润滑 water lubricated	不推荐 Poor	不推荐 Poor	一般 Fair	优 Excellent	良好 Good	一般 Fair
高温下的机械性能 Mechanical properties at high temperature		一般 Fair	优 Excellent	优 Excellent	优 Excellent	优 Excellent	优 Excellent
耐化学性能 Chemical resistance		优 Excellent	良好 Good	优 Excellent	优 Excellent	优 Excellent	优 Excellent
烟雾/毒性 Smoke/toxicity		一般 Fair	良好 Good	优 Excellent	优 Excellent	优 Excellent	优 Excellent
耐辐射性 Radiation resistance		一般 Fair	优 Excellent	优 Excellent	优 Excellent	优 Excellent	优 Excellent
释气 Outgassing		一般 Fair	优 Excellent	优 Excellent	优 Excellent	优 Excellent	优 Excellent
脱模性 Release properties		优 Excellent	一般 Fair	优 Excellent	优 Excellent	良好 Good	优 Excellent
连续使用温度 Long-term application temperature [°C]		+260	+250	+260	+260	+260	+380
短期使用温度 Short-term application temperature [°C]		+280	+315	+315	+315	+315	+400
最低使用温度 Lowest application temperature [°C]		-196	-100	-100	-100	-100	-100
典型特性 Typical properties		低摩擦系数 干摩擦 高耐腐蚀性 高温260°C Low coefficient of friction Dry friction High corrosion resistance High temperature 260°C	高载低速应用 干摩擦 脂润滑 不含PFAS 高温250°C High-load, low-speed applications Dry friction Grease lubrication PFAS-free High temperature 250°C	干摩擦 油润滑 水润滑 高载荷 高温260°C Dry friction Oil lubrication Water lubrication High load High temperature 260°C	脂润滑 水润滑 高载荷 耐腐蚀 不含PFAS 高温260°C Grease lubrication Water lubrication High load Corrosion resistant PFAS-free High temperature 260°C	导电 $\leq 10^3$ 耐腐蚀 不含PFAS 高温260°C Electrical conductivity $\leq 10^3$ Corrosion resistant PFAS-free High temperature 260°C	低摩擦系数 高强度 耐腐蚀 高温380°C Low friction coefficient High strength Corrosion resistant High temperature 380°C

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