Polymer-tech Solutions™

DURARUB®
Filament-wound Bearings
纤维缠绕轴承

- 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200000m^2；
- 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 registeredcapital 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 200000m^2.
- China National Hi-Tech Enterprise, more than 120 patents.
- IATF16949: 2016、IS09001: 2015、1S014001: 2015 and ISO45001: 2018 certifications.

...高性能聚合物技术 为客户创造价值

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

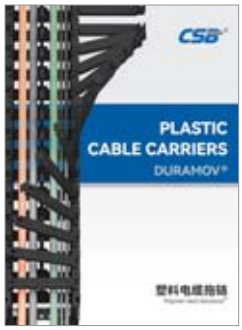
RoHS指令限制的十种有害物质
EC Directive 2011/65/EU (the RoHS Directive)

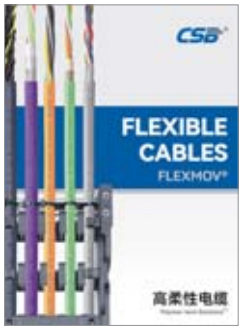
汞Hg、六价铬Cr^{+6}、铅Pb、镉Cd、多溴联苯醚PBDE、多溴联苯PBB、邻苯二甲酸二正丁酯DBP、邻苯二甲酸正丁基苄酯BBP、邻苯二甲酸（2-己基）己酯DEHP、六溴环十二烷HBCDD。

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

RoHS

FDA REACH





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℃、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℃, 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℃、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℃.

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.

DURARUB®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，特别适合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.

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CSB Product Family

CSB产品 Polymer-tech Solutions™

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

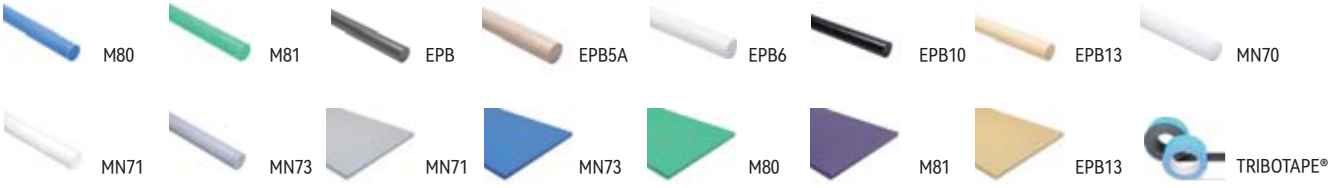
TEFPLAS®氟塑轴承 Fluoroplastic Bearing

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



DURARUB®纤维缠绕轴承 Filament-wound Bearings

DURARUB®复合材料耐磨垫 Composite sliding pads

金属自润滑轴承 Metal Sliding Bearings

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Online Tools

CSB在线工具

Polymer-tech Solutions™

在线工具 Online Tools ▶▶▶·····

▶▶▶····· 请登录我们的网站查询please visit: www.csb-ep.com

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DURARUB®

纤维缠绕轴承 Filament-wound Bearings

材料结构 Material structure

DURARUB®材料以高强度玻璃纤维增强高温环氧树脂作为承载层，以特种纤维和PTFE纤维作为滑动层，使得轴承在高载低速工况条件下具有优良的耐磨性和很低的摩擦系数，甚至可以在长时间不加油的情况下仍能发挥良好的自润滑特性和很高的轴承比压。由此我们开发了可以适合不同工况下的多种自润材料。

The back material of DURARUB® materials is high strength glass fiber with epoxy resin and the lubricating layer of it is PTFE wound fiber or special lubricating fiber. Therefore, this special structure performs an outstanding anti-wear feature and low friction coefficient under high load and low speed condition. Furthermore, this absolutely new idea gives better solution for high load and excellent wear resistance possibility.

典型特征 Typical features

- 极高的动承载能力，最高160Mpa；
- 优秀的耐磨性能；
- 极低的摩擦系数，摩擦系数<0.12；
- 长期干运行，不推荐加油。

- Very high load capacity, Max. 160Mpa;
- Very good chemical resistance;
- Lower friction and good wear properties. Friction coefficient<0.12;
- Long time dry operation without oil.

技术数据表 Technical data table

材料性能 Material properties	标准 Standard	单位 Unit	 CRB	 CRG	 CRH	 CRM	 CRP	 CRW	 CRF
密度 Density	ISO1183	g/cm^3	1.90	1.90	1.90	1.90	1.90	1.90	1.30
最大吸水率Max. water absorption	ISO62	%	0.1	0.1	0.1	0.1	0.1	0.1	0.1
极限PV值 Max. PV (dry)	ITS026	N/mm^2×m/s	1.5	1.5	1.5	1.2	1.0	1.2	1.0
摩擦系数 Coefficient of friction	ITS025	μ	0.03~0.12	0.03~0.12	0.03~0.12	0.05~0.15	0.03~0.12	0.05 ~ 0.15	0.05~0.15
连续运行温度 Long-term application temperature	ITS029	℃	+160	+160	+200	+160	+160	+160	+130
短时运行温度 Short-term application temperature	ITS029	℃	+180	+180	+260	+180	+180	+180	+160
最低运行温度 Lowest application temperature	ITS029	℃	-196	-196	-196	-196	-196	-196	-40
最高速度 Max. Speed (dry)	ITS032	m/s	0.13	0.13	0.13	0.13	0.50	0.13	0.13
抗压强度 Compressive strength	ITS033	MPa	420	420	620	420	420	420	150
最大静载荷 Max. static load	ITS027	MPa	240	240	420	240	240	240	150
最大动载荷 Max. dynamic load	ITS028	MPa	140	140	160	120	30	120	75
线性热膨胀系数(20 ~ 100℃) Linear coef. of thermal Expansion	ISO11359	10^{-6}×K^{-1}	13	13	13	13	13	13	50

*ITS: CSB内部测试标准 CSB company's internal test standards.
**除非特殊说明测试温度为23℃ Test temperatures are 23℃ unless otherwise stated.

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CRB 缠绕轴承 Bearings

■ 轴承材料结构

内衬：以PTFE纤维与高强度纤维填充内部润滑剂与高温环氧树脂作为滑动层；
衬背：以高强度玻璃纤维增强环氧树脂作为承载层。

■ **Material structure**

Sliding layer: Continuous wound PTFE and high-strength fibers encapsulated in an internally lubricated, high temperature filled epoxy resin.
Backing: Continuous wound glass fiber encapsulated in epoxy resin.

轴承技术数据 Technical data

材料性能 Material properties	标准 Standard	单位 Unit	CRB
密度 Density	ISO1183	g/cm^3	1.90
最大吸水率Max. water absorption	ISO62	%	0.1
极限PV值 Max. PV (dry)	ITS026	$N/mm^2 \times m/s$	1.5
摩擦系数 Coefficient of friction	ITS025	μ	0.03~0.12
连续运行温度 Long-term application temperature	ITS029	℃	+160
短时运行温度 Short-term application temperature	ITS029	℃	+180
最低运行温度 Lowest application temperature	ITS029	℃	-196
最高速度 Max. Speed	ITS032	m/s	0.13
抗压强度 Compressive strength	ITS033	MPa	420
最大静载荷 Max. static load	ITS027	MPa	240
最大动载荷 Max. dynamic load	ITS028	MPa	140
线性热膨胀系数(25 ~ 150℃) Linear coef. of thermal Expansion	ISO11359	$10^{-6} \times K^{-1}$	13

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典型特征 Typical features

高承载摆动应用
极好的耐磨特性
耐腐蚀能力强
低摩擦系数
不推荐加油

For high load oscillation applications
Excellent wear resistance
Very good chemical resistance
Lower friction coefficient
Oil forbidden

典型应用 Typical applications

油缸耳轴套
举升机械
起重机械、物料机械
建筑机械
港口机械

Hydraulic cylinder pivots
Boom lifts, scissor lifts
Cranes, material handling equipment
Construction machinery arm bushes
Port machinery

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DURARUB®

纤维缠绕轴承 Filament-wound Bearings　CRG

CRG 缠绕轴承 Bearings

■ 轴承材料结构

内衬：以PTFE纤维与高强度纤维填充内部润滑剂与高温高强环氧树脂作为滑动层；
衬背：以高强度玻璃纤维增强高强环氧树脂作为承载层。

■ **Material structure**

Sliding layer: Continuous wound PTFE and high-strength fibers encapsulated in an internally lubricated, high-temperature and high-strength filled epoxy resin.
Backing: Continuous wound glass fiber encapsulated in high-strength epoxy resin.

轴承技术数据 Technical data

材料性能 Material properties	标准 Standard	单位 Unit	CRG
密度 Density	ISO1183	g/cm^3	1.90
最大吸水率Max. water absorption	ISO62	%	0.1
极限PV值 Max. PV (dry)	ITS026	$N/mm^2 \times m/s$	1.5
摩擦系数 Coefficient of friction	ITS025	μ	0.03~0.12
连续运行温度 Long-term application temperature	ITS029	℃	+160
短时运行温度 Short-term application temperature	ITS029	℃	+180
最低运行温度 Lowest application temperature	ITS029	℃	-196
最高速度 Max. Speed	ITS032	m/s	0.13
抗压强度 Compressive strength	ITS033	MPa	420
最大静载荷 Max. static load	ITS027	MPa	240
最大动载荷 Max. dynamic load	ITS028	MPa	160
线性热膨胀系数(25 ~ 150℃) Linear coef. of thermal Expansion	ISO11359	$10^{-6} \times K^{-1}$	13

*ITS：CSB内部测试标准 CSB company's internal test standards.
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典型特征 Typical features

高载摆动与旋转应用
极好的耐磨特性
较强的耐腐蚀能力
低摩擦系数
不推荐加油

For high load oscillation and rotation applications
Excellent wear resistance
Very good chemical resistance
Low friction coefficient
Oil forbidden

典型应用 Typical applications

油缸耳轴
建筑机械
举升机械
起重机械、物料机械
港口机械

Hydraulic cylinder pivots
Boom lifts, scissor lifts
Cranes, material handling equipment
Construction machinery arm bushes
Port machinery

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CRH 缠绕轴承 Bearings

■ 轴承材料结构

内衬：以PTFE纤维与高强度纤维填充内部润滑剂与高温高强环氧树脂作为滑动层；
衬背：以高强度玻璃纤维增强高温高强环氧树脂作为承载层。

■ **Material structure**

Sliding layer: Continuous wound PTFE and high-strength fibers encapsulated in an internally lubricated, high temperature and high-strength filled epoxy resin.
Backing: Continuous wound glass fiber encapsulated in a high temperature epoxy resin.

轴承技术数据 Technical data

材料性能 Material properties	标准 Standard	单位 Unit	CRH
密度 Density	ISO1183	g/cm^3	1.90
最大吸水率Max. water absorption	ISO62	%	0.1
极限PV值 Max. PV (dry)	ITS026	$N/mm^2 \times m/s$	1.5
摩擦系数 Coefficient of friction	ITS025	μ	0.03~0.12
连续运行温度 Long-term application temperature	ITS029	℃	+200
短时运行温度 Short-term application temperature	ITS029	℃	+260
最低运行温度 Lowest application temperature	ITS029	℃	-196
最高速度 Max. Speed	ITS032	m/s	0.13
抗压强度 Compressive strength	ITS033	MPa	620
最大静载荷 Max. static load	ITS027	MPa	420
最大动载荷 Max. dynamic load	ITS028	MPa	160
线性热膨胀系数(25 ~ 150℃) Linear coef. of thermal Expansion	ISO11359	$10^{-6} \times K^{-1}$	13

*ITS：CSB内部测试标准 CSB company's internal test standards.
**除非特殊说明测试温度为23℃ Test temperatures are 23℃ unless otherwise stated.

典型特征 Typical features

极限载荷摆动与旋转应用
极高耐温应用
极好的耐磨特性
较强的耐腐蚀能力
不推荐加油

Extreme load applications in oscillation and rotation
High temperature applications
Extremely Wear resistance
Strong corrosion resistance
Oil forbidden

典型应用 Typical applications

油缸耳轴
举升机械
起重机械
建筑机械
港口机械

Hydraulic cylinder pivots
Boom lifts
Cranes equipment
Construction machinery arm bushes
Port machinery

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DURARUB®

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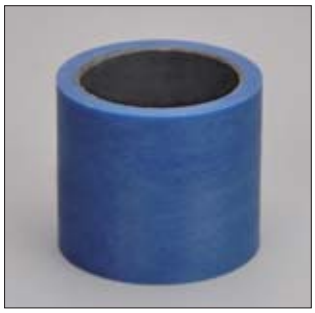
CRM 缠绕轴承 Bearings



■ 轴承材料结构

内衬：以PTFE纤维与高强度纤维填充内部润滑剂与高温环氧树脂作为滑动层；
衬背：以高强度玻璃纤维增强环氧树脂作为承载层。

■ **Material structure**

Sliding layer: Continuous wound PTFE and high-strength fibers encapsulated in an internally lubricated, high temperature filled epoxy resin.
Backing: Continuous wound glass fiber encapsulated in epoxy resin.

轴承技术数据 Technical data

材料性能 Material properties	标准 Standard	单位 Unit	CRM
密度 Density	ISO1183	g/cm^3	1.90
最大吸水率Max. water absorption	ISO62	%	0.1
极限PV值 Max. PV (dry)	ITS026	$N/mm^2 \times m/s$	1.2
摩擦系数 Coefficient of friction	ITS025	μ	0.05~0.15
连续运行温度 Long-term application temperature	ITS029	℃	+160
短时运行温度 Short-term application temperature	ITS029	℃	+180
最低运行温度 Lowest application temperature	ITS029	℃	-196
最高速度 Max. Speed	ITS032	m/s	0.13
抗压强度 Compressive strength	ITS033	MPa	420
最大静载荷 Max. static load	ITS027	MPa	240
最大动载荷 Max. dynamic load	ITS028	MPa	120
线性热膨胀系数(25 ~ 150℃) Linear coef. of thermal Expansion	ISO11359	$10^{-6} \times K^{-1}$	13

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典型特征 Typical features

高载摆动应用	For high load oscillation applications
内孔可精加工	Internal bore can be precision-finished
优良的耐污性能	Excellent contamination resistance
较好的化学抗性	Good chemical resistance
不推荐加油	Oil forbidden

典型应用 Typical applications

升降作业机械	Boom lifts, Scissor lifts
油缸耳环轴套	Hydraulic cylinder pivots
物流机械	Handling machinery
包装机械	Packager machinery

CRP 缠绕轴承 Bearings

■ 轴承材料结构

内衬：以纤维填充PTFE耐磨带作为滑动层；
衬背：以高强度玻璃纤维增强环氧树脂作为承载层。

■ **Material structure**

Sliding layer: Fibers and PTFE compound tape as internally lubricating layer.
Backing: Continuous wound glass fiber encapsulated in epoxy resin.

轴承技术数据 Technical data

材料性能 Material properties	标准 Standard	单位 Unit	CRP
密度 Density	ISO1183	g/cm^3	1.90
最大吸水率Max. water absorption	ISO62	%	0.1
极限PV值 Max. PV (dry)	ITS026	$N/mm^2 \times m/s$	1.0
摩擦系数 Coefficient of friction	ITS025	μ	0.03~0.12
连续运行温度 Long-term application temperature	ITS029	℃	+160
短时运行温度 Short-term application temperature	ITS029	℃	+180
最低运行温度 Lowest application temperature	ITS029	℃	-196
最高速度 Max. Speed	ITS032	m/s	0.50
抗压强度 Compressive strength	ITS033	MPa	420
最大静载荷 Max. static load	ITS027	MPa	240
最大动载荷 Max. dynamic load	ITS028	MPa	30
线性热膨胀系数(25 ~ 150℃) Linear coef. of thermal Expansion	ISO11359	$10^{-6} \times K^{-1}$	13

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**除非特殊说明测试温度为23℃ Test temperatures are 23℃ unless otherwise stated.

典型特征 Typical features

较低的摩擦系数	Low friction coefficient
较高的运动速度	High motion speed
适用于往复运动	Suitable for linear motion
内孔可精加工	Internal bore can be precision-finished
允许加油	Oil allowed

典型应用 Typical applications

球阀、蝶阀轴套	Ball and butterfly trunnion bearing
气泵轴套	Air pump guide bushes
水利机械轴套	Tie-bar guide bearing
油压机械导套	Hydraulic pressure machinery

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DURARUB®

纤维缠绕轴承 Filament-wound Bearings CRW

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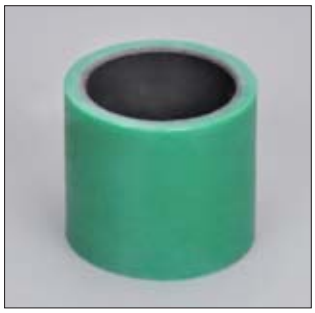
CRW 缠绕轴承 Bearings



■ 轴承材料结构

内衬：以PTFE纤维与高强度纤维填充内部水下润滑剂与高温环氧树脂作为滑动层；
衬背：以高强度玻璃纤维增强环氧树脂作为承载层。

■ **Material structure**

Sliding layer: Continuous wound PTFE and high-strength fibers encapsulated in an internally water lubricated, high temperature filled epoxy resin.
Backing: Continuous wound glass fiber encapsulated in epoxy resin.

轴承技术数据 Technical data

材料性能 Material properties	标准 Standard	单位 Unit	CRW
密度 Density	ISO1183	g/cm^3	1.90
最大吸水率Max. water absorption	ISO62	%	0.1
极限PV值 Max. PV (dry)	ITS026	$N/mm^2 \times m/s$	1.2
摩擦系数 Coefficient of friction	ITS025	μ	0.05 ~ 0.15
连续运行温度 Long-term application temperature	ITS029	℃	+160
短时运行温度 Short-term application temperature	ITS029	℃	+180
最低运行温度 Lowest application temperature	ITS029	℃	-196
最高速度 Max. Speed	ITS032	m/s	0.13
抗压强度 Compressive strength	ITS033	MPa	420
最大静载荷 Max. static load	ITS027	MPa	240
最大动载荷 Max. dynamic load	ITS028	MPa	120
线性热膨胀系数(25 ~ 150℃) Linear coef. of thermal Expansion	ISO11359	$10^{-6} \times K^{-1}$	13

*ITS: CSB内部测试标准 CSB company's internal test standards.
**除非特殊说明测试温度为23℃ Test temperatures are 23℃ unless otherwise stated.

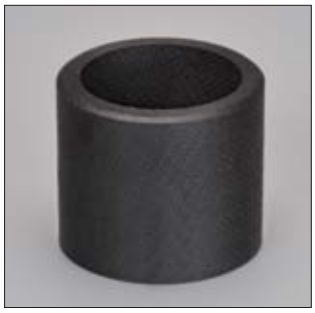
典型特征 Typical features

极好的水下耐磨性能	Excellent anti-wear property under water
高承载能力	High load capacity
优良的耐污性能	Excellent dirty resistance
较好的化学抗性	Good chemical resistance
非常低的摩擦系数	Very lowest friction coefficient

典型应用 Typical applications

船舶机械	Marine machinery
港口机械	Port machinery
水电设备	Hydropower equipment
清洗设备	Cleaning equipment

CRF 缠绕轴承 Bearings



■ 轴承材料结构

CRF轴承是采用特种高强树脂和高强度纤维浸渍缠绕而成，并填充专用内部耐磨剂。

■ Material structure

Materials: Continuous wound high-strength fiber encapsulated in a special internally lubricated, high-strength filled resin.

轴承技术数据 Technical data

材料性能 Material properties	标准 Standard	单位 Unit	CRF
密度 Density	ISO1183	g/cm^3	1.30
最大吸水率Max. water absorption	ISO62	%	0.1
极限PV值 Max. PV (dry)	ITS026	$N/mm^2 \times m/s$	1.0
摩擦系数 Coefficient of friction	ITS025	μ	0.05~0.15
连续运行温度 Long-term application temperature	ITS029	℃	+130
短时运行温度 Short-term application temperature	ITS029	℃	+160
最低运行温度 Lowest application temperature	ITS029	℃	-40
最高速度 Max. Speed	ITS032	m/s	0.13
抗压强度 Compressive strength	ITS033	MPa	150
最大静载荷 Max. static load	ITS027	MPa	150
最大动载荷 Max. dynamic load	ITS028	MPa	75
线性热膨胀系数(25 ~ 150℃) Linear coef. of thermal Expansion	ISO11359	$10^{-6} \times K^{-1}$	50

*ITS: CSB内部测试标准 CSB company's internal test standards.
**除非特殊说明测试温度为23℃ Test temperatures are 23℃ unless otherwise stated.

典型特征 Typical features

特别适用于油和水润滑应用	Suitable for oil and water lubricating applications
极好流体润滑耐磨性	Excellent wear resistance in liquids
内外径可机加工	Completely machinable
允许加油	Oil allowed

典型应用 Typical applications

船舶与水利设备	Marine and hydraulic machinery
门闸衬套	Door bushes
油缸导向衬套	Cylinder guide bushing
活塞导向环	Piston guide ring

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DURARUB®

纤维缠绕轴承 Filament-wound Bearings

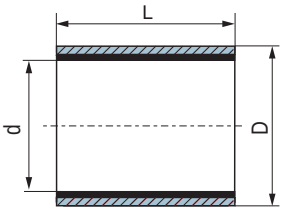
DURARUB® 纤维缠绕轴承尺寸表(壁厚2.5mm) Standard specifications (wall 2.5mm)

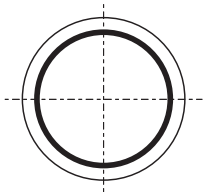
■ 可供规格 Specifications:

产品编码 Part No.:

CRB-20 25-30

- 长度 Length
- 外径 Outer diameter
- 内径 Inner diameter
- 材料 Materials: CRM, CRB, CRG, CRH, CRP, CRW, CRF





长度公差表 Langth tolerance table		L ≤75 mm	L > 75 to < 150 mm	L ≥150 mm
d	≤75 mm	-0.50 mm	-1.00 mm	-1.50 mm
	> 75 to ≤120 mm	-1.00 mm	-1.00 mm	-1.50 mm
	> 120 to ≤150 mm	-1.00 mm	-1.50 mm	-1.50 mm

产品编码 Part No.	轴承尺寸 Bearing Size		推荐尺寸 Recommend		装配间隙 Assembly Interference	标准长度 Standard Length L
	内径 d	外径 D	轴 Shaft D_s h7	孔 Housing H7 D_H		
CRB-2025-L	$20^{+0.200}_{+0.120}$	$25^{+0.100}_{+0.050}$	$20^{0}_{-0.021}$	$25^{+0.021}_{0}$	0.029-0.100	15、20、30
CRB-2227-L	$22^{+0.200}_{+0.120}$	$27^{+0.100}_{+0.050}$	$22^{0}_{-0.021}$	$27^{+0.021}_{0}$	0.029-0.100	15、20、30
CRB-2530-L	$25^{+0.200}_{+0.120}$	$30^{+0.100}_{+0.050}$	$25^{0}_{-0.021}$	$30^{+0.021}_{0}$	0.029-0.100	20、30、40
CRB-2833-L	$28^{+0.200}_{+0.120}$	$33^{+0.100}_{+0.050}$	$28^{0}_{-0.021}$	$33^{+0.025}_{0}$	0.025-0.100	20、30、40
CRB-3035-L	$30^{+0.200}_{+0.120}$	$35^{+0.100}_{+0.050}$	$30^{0}_{-0.021}$	$35^{+0.025}_{0}$	0.025-0.100	20、30、40
CRB-3540-L	$35^{+0.200}_{+0.120}$	$40^{+0.100}_{+0.050}$	$35^{0}_{-0.025}$	$40^{+0.025}_{0}$	0.025-0.100	30、40、50
CRB-4045-L	$40^{+0.200}_{+0.120}$	$45^{+0.100}_{+0.050}$	$40^{0}_{-0.025}$	$45^{+0.025}_{0}$	0.025-0.100	30、40、60
CRB-4550-L	$45^{+0.230}_{+0.130}$	$50^{+0.105}_{+0.055}$	$45^{0}_{-0.025}$	$50^{+0.025}_{0}$	0.030-0.105	30、40、60
CRB-5055-L	$50^{+0.230}_{+0.130}$	$55^{+0.105}_{+0.055}$	$50^{0}_{-0.025}$	$55^{+0.030}_{0}$	0.025-0.100	40、50、60
CRB-5560-L	$55^{+0.245}_{+0.145}$	$60^{+0.120}_{+0.070}$	$55^{0}_{-0.030}$	$60^{+0.030}_{0}$	0.040-0.120	40、55、70
CRB-6065-L	$60^{+0.245}_{+0.145}$	$65^{+0.120}_{+0.070}$	$60^{0}_{-0.030}$	$65^{+0.030}_{0}$	0.040-0.120	40、60、80
CRB-6570-L	$65^{+0.245}_{+0.145}$	$70^{+0.120}_{+0.070}$	$65^{0}_{-0.030}$	$70^{+0.030}_{0}$	0.040-0.120	50、60、80
CRB-7075-L	$70^{+0.245}_{+0.145}$	$75^{+0.120}_{+0.070}$	$70^{0}_{-0.030}$	$75^{+0.030}_{0}$	0.040-0.120	50、70、90
CRB-7580-L	$75^{+0.275}_{+0.175}$	$80^{+0.120}_{+0.070}$	$75^{0}_{-0.030}$	$80^{+0.030}_{0}$	0.040-0.120	50、70、90
CRB-8085-L	$80^{+0.275}_{+0.175}$	$85^{+0.125}_{+0.075}$	$80^{0}_{-0.030}$	$85^{+0.035}_{0}$	0.040-0.125	60、80、100
CRB-8590-L	$85^{+0.275}_{+0.175}$	$90^{+0.125}_{+0.075}$	$85^{0}_{-0.035}$	$90^{+0.035}_{0}$	0.040-0.125	60、80、100
CRB-9095-L	$90^{+0.275}_{+0.175}$	$95^{+0.125}_{+0.075}$	$90^{0}_{-0.035}$	$95^{+0.035}_{0}$	0.040-0.125	60、80、120
CRB-95100-L	$95^{+0.310}_{+0.185}$	$100^{+0.125}_{+0.075}$	$95^{0}_{-0.035}$	$100^{+0.035}_{0}$	0.040-0.125	60、80、120
CRB-100105-L	$100^{+0.310}_{+0.185}$	$105^{+0.125}_{+0.075}$	$100^{0}_{-0.035}$	$105^{+0.035}_{0}$	0.040-0.125	80、100、120
CRB-110115-L	$110^{+0.315}_{+0.190}$	$115^{+0.135}_{+0.085}$	$110^{0}_{-0.035}$	$115^{+0.035}_{0}$	0.050-0.135	80、100、120
CRB-120125-L	$120^{+0.340}_{+0.215}$	$125^{+0.135}_{+0.085}$	$120^{0}_{-0.035}$	$125^{+0.040}_{0}$	0.045-0.135	100、120、150
CRB-130135-L	$130^{+0.340}_{+0.215}$	$135^{+0.165}_{+0.090}$	$130^{0}_{-0.040}$	$135^{+0.040}_{0}$	0.050-0.165	100、120、150
CRB-140145-L	$140^{+0.340}_{+0.215}$	$145^{+0.165}_{+0.090}$	$140^{0}_{-0.040}$	$145^{+0.040}_{0}$	0.050-0.165	100、150、180
CRB-150155-L	$150^{+0.340}_{+0.215}$	$155^{+0.165}_{+0.090}$	$150^{0}_{-0.040}$	$155^{+0.040}_{0}$	0.050-0.165	120、150、180

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DURARUB® 纤维缠绕轴承尺寸表(壁厚5mm) Standard specifications (wall 5mm)

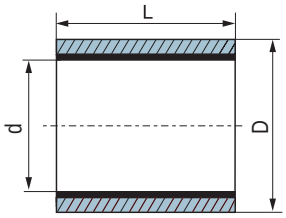
可供规格 Specifications:

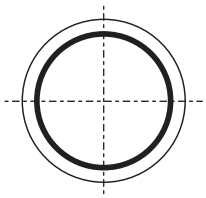
产品编码 Part No.:

CRB-20 30-30

- 长度 Length
- 外径 Outer diameter
- 内径 Inner diameter
- 材料 Materials:

CRM, CRB, CRG, CRH, CRP, CRW, CRF





长度公差表 Langth tolerance table		L ≤75 mm	L > 75 to < 150 mm	L ≥150 mm
d	≤75 mm	-0.50 mm	-1.00 mm	-1.50 mm
	> 75 to ≤120 mm	-1.00 mm	-1.00 mm	-1.50 mm
	> 120 to ≤150 mm	-1.00 mm	-1.50 mm	-1.50 mm

产品编码 Part No.	轴承尺寸 Bearing Size		推荐尺寸 Recommend		装配间隙 Assembly Interference	标准长度 Standard Length L
	内径 d	外径 D	轴 Shaft D_s h7	孔 Housing H7 D_H		
CRB-2030-L	$20^{+0.200}_{+0.120}$	$30^{+0.100}_{+0.050}$	$20^{0}_{-0.021}$	$30^{+0.021}_{0}$	0.029-0.100	15、20、30
CRB-2232-L	$22^{+0.200}_{+0.120}$	$32^{+0.100}_{+0.050}$	$22^{0}_{-0.021}$	$32^{+0.025}_{0}$	0.025-0.100	15、20、30
CRB-2535-L	$25^{+0.200}_{+0.120}$	$35^{+0.100}_{+0.050}$	$25^{0}_{-0.021}$	$35^{+0.025}_{0}$	0.025-0.100	20、30、40
CRB-2838-L	$28^{+0.200}_{+0.120}$	$38^{+0.100}_{+0.050}$	$28^{0}_{-0.021}$	$38^{+0.025}_{0}$	0.025-0.100	20、30、40
CRB-3040-L	$30^{+0.200}_{+0.120}$	$40^{+0.100}_{+0.050}$	$30^{0}_{-0.021}$	$40^{+0.025}_{0}$	0.025-0.100	20、30、40
CRB-3545-L	$35^{+0.200}_{+0.120}$	$45^{+0.100}_{+0.050}$	$35^{0}_{-0.025}$	$45^{+0.025}_{0}$	0.025-0.100	30、40、50
CRB-4050-L	$40^{+0.200}_{+0.120}$	$50^{+0.100}_{+0.050}$	$40^{0}_{-0.025}$	$50^{+0.025}_{0}$	0.025-0.100	30、40、60
CRB-4555-L	$45^{+0.230}_{+0.130}$	$55^{+0.105}_{+0.055}$	$45^{0}_{-0.025}$	$55^{+0.030}_{0}$	0.025-0.105	30、40、60
CRB-5060-L	$50^{+0.230}_{+0.130}$	$60^{+0.105}_{+0.055}$	$50^{0}_{-0.025}$	$60^{+0.030}_{0}$	0.025-0.105	40、50、60
CRB-5565-L	$55^{+0.245}_{+0.145}$	$65^{+0.120}_{+0.070}$	$55^{0}_{-0.030}$	$65^{+0.030}_{0}$	0.040-0.120	40、55、70
CRB-6070-L	$60^{+0.245}_{+0.145}$	$70^{+0.120}_{+0.070}$	$60^{0}_{-0.030}$	$70^{+0.030}_{0}$	0.040-0.120	40、60、80
CRB-6575-L	$65^{+0.245}_{+0.145}$	$75^{+0.120}_{+0.070}$	$65^{0}_{-0.030}$	$75^{+0.030}_{0}$	0.040-0.120	50、60、80
CRB-7080-L	$70^{+0.245}_{+0.145}$	$80^{+0.120}_{+0.070}$	$70^{0}_{-0.030}$	$80^{+0.030}_{0}$	0.040-0.120	50、70、90
CRB-7585-L	$75^{+0.275}_{+0.175}$	$85^{+0.125}_{+0.075}$	$75^{0}_{-0.030}$	$85^{+0.035}_{0}$	0.040-0.125	50、70、90
CRB-8090-L	$80^{+0.275}_{+0.175}$	$90^{+0.125}_{+0.075}$	$80^{0}_{-0.030}$	$90^{+0.035}_{0}$	0.040-0.125	60、80、100
CRB-8595-L	$85^{+0.275}_{+0.175}$	$95^{+0.125}_{+0.075}$	$85^{0}_{-0.035}$	$95^{+0.035}_{0}$	0.040-0.125	60、80、100
CRB-90100-L	$90^{+0.275}_{+0.175}$	$100^{+0.125}_{+0.075}$	$90^{0}_{-0.035}$	$100^{+0.035}_{0}$	0.040-0.125	60、80、120
CRB-95105-L	$95^{+0.310}_{+0.185}$	$105^{+0.125}_{+0.075}$	$95^{0}_{-0.035}$	$105^{+0.035}_{0}$	0.040-0.125	60、80、120
CRB-100110-L	$100^{+0.310}_{+0.185}$	$110^{+0.135}_{+0.085}$	$100^{0}_{-0.035}$	$110^{+0.035}_{0}$	0.050-0.135	80、100、120
CRB-110120-L	$110^{+0.315}_{+0.190}$	$120^{+0.135}_{+0.085}$	$110^{0}_{-0.035}$	$120^{+0.035}_{0}$	0.050-0.135	80、100、120
CRB-120130-L	$120^{+0.340}_{+0.215}$	$130^{+0.165}_{+0.090}$	$120^{0}_{-0.035}$	$130^{+0.040}_{0}$	0.050-0.165	100、120、150
CRB-130140-L	$130^{+0.340}_{+0.215}$	$140^{+0.165}_{+0.090}$	$130^{0}_{-0.040}$	$140^{+0.040}_{0}$	0.050-0.165	100、120、150
CRB-140150-L	$140^{+0.340}_{+0.215}$	$150^{+0.165}_{+0.090}$	$140^{0}_{-0.040}$	$150^{+0.040}_{0}$	0.050-0.165	100、150、180
CRB-150160-L	$150^{+0.340}_{+0.215}$	$160^{+0.165}_{+0.090}$	$150^{0}_{-0.040}$	$160^{+0.040}_{0}$	0.050-0.165	120、150、180

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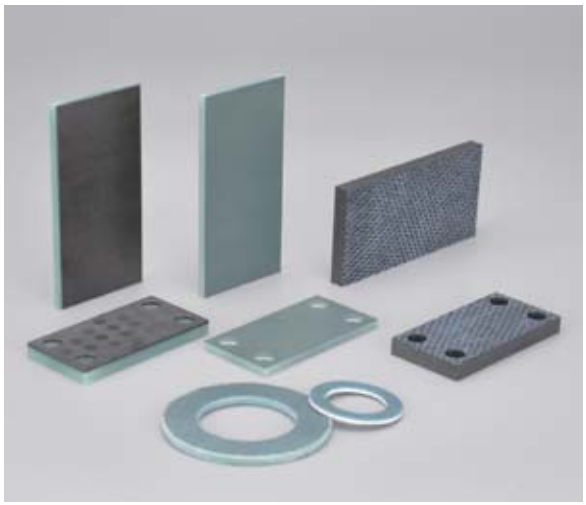
DURARUB®

复合材料耐磨垫 Composite sliding pads



材料特性 Material properties

高性能耐磨材料作为滑动层结合高强度纤维增强的承载层；DURARUB® 材料适用于持续高静态和动态负载、相对较低滑动速度的应用，它们还适用于不可能或禁止常规润滑的应用。DURARUB® 材料为客户实现机械和设备零维护运行。

High-performance wear-resistant materials serve as sliding layers combined with high-strength fiber-reinforced load-bearing layers; DURARUB® materials are suitable for applications with consistently high static and dynamic loads, relatively low sliding speeds, and they are also suitable for applications where conventional lubrication is not possible or prohibited. DURARUB® materials enable maintenance-free operation of machinery and equipment for customers.

技术数据表 Technical data table

材料性能 Material properties	标准 Standard	单位 Unit	DR11	DR12	DR21	DR22	DR30	DR33	DR50
密度 Density	ISO1183	g/cm^3	1.90	1.90	1.90	1.90	1.30	1.90	1.56
最大吸水率 Max. water absorption	ISO62	%	0.1	0.1	0.1	0.1	0.1	0.1	0.1
极限PV值 Max. PV (dry)	ITS026	$N/mm^2 \times m/s$	1.2	1.2	0.7	0.7	1.2	1.2	1.5
摩擦系数 Coefficient of friction	ITS025	μ	0.05~0.20	0.05~0.15	0.10-0.25	0.10-0.25	0.05-0.20	0.05-0.20	0.10-0.25
连续运行温度 Long-term application temperature	ITS029	℃	+120	+120	+120	+120	+160	+120	+250
短时运行温度 Short-term application temperature	ITS029	℃	+160	+160	+160	+160	+200	+160	+310
最低运行温度 Lowest application temperature	ITS029	℃	-60	-60	-60	-60	-60	-60	-100
最高速度 Max. Speed	ITS032	m/s	0.15	0.15	0.50	0.50	0.15	0.15	1.0
抗压强度 Compressive strength	ITS033	MPa	200	200	200	200	150	200	550
最大静载荷 Max. static load	ITS027	MPa	150	150	20	20	150	150	550
最大动载荷 Max. dynamic load	ITS028	MPa	75	75	10	10	75	100	225
线性热膨胀系数 Coefficient of thermal expansion	ISO11359	$10^{-6} \times K^{-1}$	13	13	13	13	50	13	15
对偶件硬度 Mating part hardness	-	HB	≥180	≥180	≥120	≥120	≥180	≥180	≥480
对偶件表面粗糙度 Mating part surface finish	-	Ra	0.2-0.8	0.2-0.8	0.2-0.8	0.2-0.8	0.2-0.8	0.2-0.8	0.2-0.8

*ITS: CSB内部测试标准 CSB company's internal test standards.
**除非特殊说明测试温度为23℃ Test temperatures are 23℃ unless otherwise stated.

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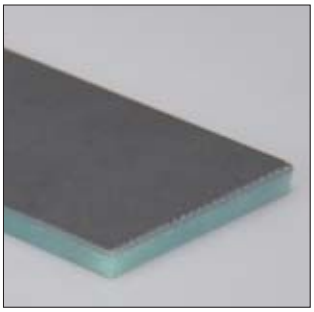
DURARUB®11 耐磨垫 Sliding plates



■ 材料结构

DR11 耐磨垫由两层组成，结合了低摩擦与高承载特性的滑动层和高强度玻璃纤维填充的衬背承载层。
滑动层由填充由固体润滑剂的环氧树脂与高耐磨纤维编织物组成，旨在确保良好的摩擦性能。

■ Material structure

DR11 sliding plates consist of two layers combining the excellent bearing properties of low-friction sliding layer with the high strength of a load carrying glass-fibre filled backing. The silding layer consists of an epoxy resin filled with solid lubricants and high performance weaves, designed to ensure good tribological properties.

典型特征 Typical features

- 适用于干摩擦
- 高承载能力
- 低摩擦系数
- 高化学抗性
- 连续使用温度120℃

- For dry applications
- High load capability
- Low friction coefficient
- good chemical resistance
- Continuous working temperature 120℃

标准规格 Standard specifications

产品编码 Part No.:

DR11-050-0500-0600

- L 长度 Length
- W 宽度 Width
- T 厚度 Thickness
- 材料 Material

产品编码 Part No.	S_1 ±0.15 ① [mm]	S_2 [mm]	W max. [mm]	L max. [mm]
DR11-020-0500-0600	2.0	1.0	500	600
DR11-030-0500-0600	3.0	1.0	500	600
DR11-040-0500-0600	4.0	1.0	500	600
DR11-050-0500-0600	5.0	1.0	500	600
DR11-060-0500-0600	6.0	1.0	500	600
DR11-080-0500-0600	8.0	2.0	500	600
DR11-100-0500-0600	10	2.0	500	600
DR11-120-0500-0600	12	2.0	500	600
DR11-150-0500-0600	15	3.0	500	600
DR11-200-0500-0600	20	5.0	500	600

①更多厚度可根据要求 More thicknesses availabe upon request.

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DURARUB®12 耐磨垫片 Sliding washers

材料结构

DR12 耐磨垫片由三层组成，结合了低摩擦与高承载特性的滑动层和高强度玻璃纤维填充的中心承载层。
滑动层由环氧树脂填充高耐磨纤维编织物组成，旨在确保良好的摩擦性能。

Material structure

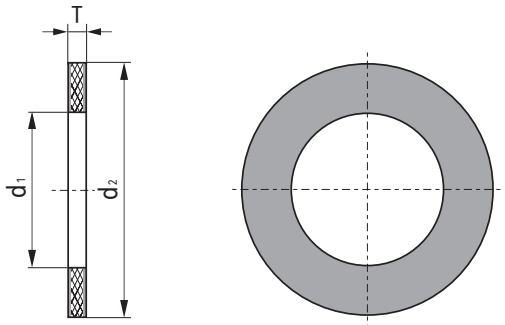
DR12 sliding washers consist of three layers combining the excellent bearing properties of low-friction sliding layer with the high strength of a load carrying glass-fibre filled core layer. The core layer consists of an epoxy resin filled with high performance weaves, designed to ensure good tribological properties.

典型特征 Typical features

- 适用于干摩擦
- 高承载能力
- 低摩擦系数
- 高化学抗性
- 连续使用温度120℃

- For dry applications
- High load capability
- Low friction coefficient
- good chemical resistance
- Continuous working temperature 120℃

标准规格 Standard specifications



产品编码 Part No.:

DR12W-1020-015

- T 厚度 Thickness
- d_2 外径 Outer diameter
- d_1 内径 Inner diameter
- 材料 Material

产品编码 Part No.	T±0.15 [mm]	d_1 +0.25 [mm]	d_2 -0.25 [mm]
DR12W-1020-015	1.5-3.0	10	20
DR12W-1224-015	1.5-3.0	12	24
DR12W-1426-015	1.5-3.0	14	26
DR12W-1530-015	1.5-3.0	15	30
DR12W-1630-015	1.5-3.0	16	30
DR12W-1832-015	1.5-3.0	18	32
DR12W-2036-015	1.5-3.0	20	36
DR12W-2238-015	1.5-3.0	22	38
DR12W-2442-015	1.5-3.0	24	42
DR12W-2546-015	1.5-3.0	25	46
DR12W-2640-015	1.5-3.0	26	40
DR12W-2644-015	1.5-3.0	26	44
DR12W-2848-015	1.5-3.0	28	48

产品编码 Part No.	T±0.15 [mm]	d_1 +0.25 [mm]	d_2 -0.25 [mm]
DR12W-3050-015	1.5-3.0	30	50
DR12W-3254-015	1.5-3.0	32	54
DR12W-3560-015	1.5-3.0	35	60
DR12W-3862-015	1.5-3.0	38	62
DR12W-4065-015	1.5-3.0	40	65
DR12W-4266-015	1.5-3.0	42	66
DR12W-4570-015	1.5-3.0	45	70
DR12W-4874-015	1.5-3.0	48	74
DR12W-5075-015	1.5-3.0	50	75
DR12W-5278-015	1.5-3.0	52	78
DR12W-5685-015	1.5-3.0	56	85
DR12W-6085-015	1.5-3.0	60	85
DR12W-6290-015	1.5-3.0	62	90

*更多尺寸根据需求 More dimensions availabe upon request.

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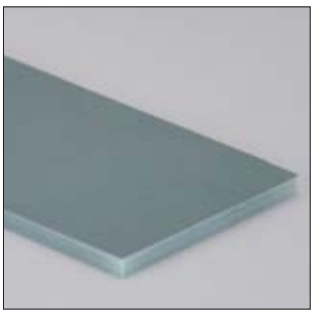
DURARUB®21 耐磨垫 Sliding plates



■ 材料结构

DR21 耐磨垫由两层组成，结合了低摩擦与高承载特性的滑动层和高强度玻璃纤维填充的衬背承载层。
滑动层由填充摩擦改良的PTFE带材组成，旨在确保良好的摩擦性能与较低的启动摩擦力。

■ Material structure

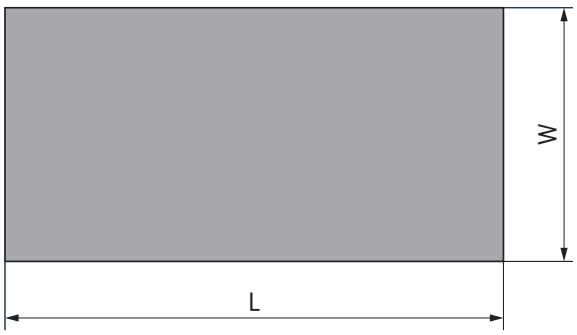
DR21 sliding plates consist of two layers combining the excellent bearing properties of low-friction sliding layer with the high strength of a load carrying glass-fibre filled backing. The silding layer consists of an fluoroplastic filled with solid lubricants, designed to ensure good tribological properties and lower starting friction force.

典型特征 Typical features

- 适用于干摩擦
- 可配合硬化表面铝轴
- 低启动摩擦力
- 高化学抗性
- 连续使用温度120℃

- For dry applications
- Available hardened surface aluminum shafts
- Low starting friction force
- good chemical resistance
- Continuous working temperature 120℃

标准规格 Standard specifications



产品编码 Part No.:

DR21-050-0300-0600

- L 长度 Length
- W 宽度 Width
- T 厚度 Thickness
- 材料 Material

产品编码 Part No.	S_1 ±0.15 ① [mm]	S_2 [mm]	W max. [mm]	L max. [mm]
DR21-020-0300-0600	2.0	0.5	300	600
DR21-030-0300-0600	3.0	0.5	300	600
DR21-040-0300-0600	4.0	0.5	300	600
DR21-050-0300-0600	5.0	0.5	300	600
DR21-060-0300-0600	6.0	0.5	300	600
DR21-080-0300-0600	8.0	0.5	300	600
DR21-100-0300-0600	10	0.5	300	600
DR21-120-0300-0600	12	0.5	300	600
DR21-150-0300-0600	15	0.5	300	600
DR21-200-0300-0600	20	0.5	300	600

①更多厚度可根据要求 More thicknesses availabe upon request.

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DURARUB®22 耐磨垫片 Sliding washers

■ 材料结构

DR22 耐磨垫片由三层组成，结合了低摩擦与高承载特性的滑动层和高强度玻璃纤维填充的中心承载层。
滑动层由填充摩擦改良的PTFE带材组成，旨在确保良好的摩擦性能与较低的启动摩擦力。

■ Material structure

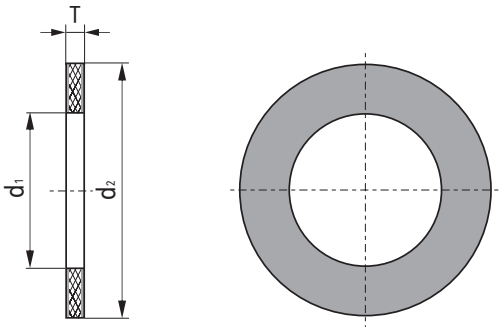
DR22 sliding washers consist of three layers combining the excellent bearing properties of low-friction sliding layer with the high strength of a load carrying glass-fibre filled core layer. The silding layer consists of an fluoroplastic filled with solid lubricants, designed to ensure good tribological properties and lower starting friction force.

典型特征 Typical features

- 适用于干摩擦
- 可配合硬化表面铝轴
- 低启动摩擦力
- 高化学抗性
- 连续使用温度120℃

- For dry applications
- Available hardened surface aluminum shafts
- Low starting friction force
- good chemical resistance
- Continuous working temperature 120℃

标准规格 Standard specifications



产品编码 Part No.:

DR22W-1020-015

- T 厚度 Thickness
- d_2 外径 Outer diameter
- d_1 内径 Inner diameter
- 材料 Material

产品编码 Part No.	T±0.15 [mm]	d_1 +0.25 [mm]	d_2 -0.25 [mm]
DR22W-1020-015	1.5-3.0	10	20
DR22W-1224-015	1.5-3.0	12	24
DR22W-1426-015	1.5-3.0	14	26
DR22W-1530-015	1.5-3.0	15	30
DR22W-1630-015	1.5-3.0	16	30
DR22W-1832-015	1.5-3.0	18	32
DR22W-2036-015	1.5-3.0	20	36
DR22W-2238-015	1.5-3.0	22	38
DR22W-2442-015	1.5-3.0	24	42
DR22W-2546-015	1.5-3.0	25	46
DR22W-2640-015	1.5-3.0	26	40
DR22W-2644-015	1.5-3.0	26	44
DR22W-2848-015	1.5-3.0	28	48

产品编码 Part No.	T±0.15 [mm]	d_1 +0.25 [mm]	d_2 -0.25 [mm]
DR22W-3050-015	1.5-3.0	30	50
DR22W-3254-015	1.5-3.0	32	54
DR22W-3560-015	1.5-3.0	35	60
DR22W-3862-015	1.5-3.0	38	62
DR22W-4065-015	1.5-3.0	40	65
DR22W-4266-015	1.5-3.0	42	66
DR22W-4570-015	1.5-3.0	45	70
DR22W-4874-015	1.5-3.0	48	74
DR22W-5075-015	1.5-3.0	50	75
DR22W-5278-015	1.5-3.0	52	78
DR22W-5685-015	1.5-3.0	56	85
DR22W-6085-015	1.5-3.0	60	85
DR22W-6290-015	1.5-3.0	62	90

*更多尺寸根据需求 More dimensions availabe upon request.

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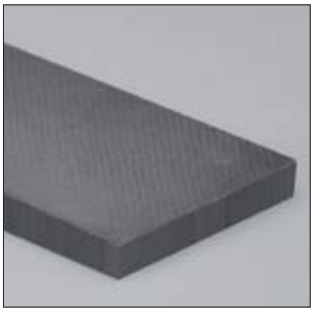
DURARUB®30 耐磨垫 Sliding plates



■ 材料结构

DR30耐磨垫仅由滑动层构成，低摩擦系数材料组合构成了优异的轴承性能。
滑动层是由高强度纤维，固体润滑剂和环氧树脂基体构成，从而确保了滑板出色的摩擦性能。

■ Material structure

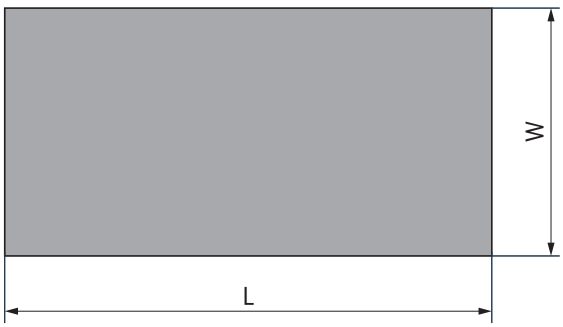
DR30 sliding plates only consist of one layer, combining the excellent bearing properties of low-friction sliding layer with the low-friction coefficient materials. The sliding layer is composed of high-strength fibers, solid lubricants, and an epoxy resin matrix, designed to ensure the pad's outstanding friction characteristics.

典型特征 Typical features

- 适用于干摩擦
- 极好的尺寸稳定性
- 低摩擦系数
- 高化学抗性
- 连续使用温度160℃

- For dry applications
- Excellent dimensional stability
- Low friction coefficient
- Good chemical resistance
- Continuous working temperature 160℃

标准规格 Standard specifications



产品编码 Part No.:

DR30-010-0500-0600

- L 长度 Length
- W 宽度 Width
- T 厚度 Thickness
- 材料 Material

产品编码 Part No.	S_1 ±0.15 ① [mm]	W max. [mm]	L max. [mm]
DR30-010-0500-0600	1.0	500	600
DR30-020-0500-0600	2.0	500	600
DR30-030-0500-0600	3.0	500	600
DR30-040-0500-0600	4.0	500	600
DR30-050-0500-0600	5.0	500	600
DR30-060-0500-0600	6.0	500	600
DR30-080-0500-0600	8.0	500	600
DR30-100-0500-0600	10	500	600
DR30-120-0500-0600	12	500	600
DR30-150-0500-0600	15	500	600
DR30-200-0500-0600	20	500	600

①更多厚度可根据要求 More thicknesses availabe upon request.

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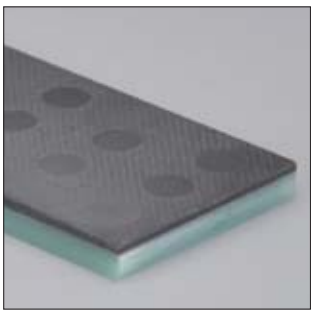
DURARUB®

复合材料耐磨垫 Composite sliding pads　　DURARUB®33

DURARUB®33 耐磨垫 Sliding plates



■ 材料结构

DR33耐磨垫由两层组成，结合了低摩擦与高承载特性的滑动层和高强度玻璃纤维填充的衬背承载层。
滑动层由填充高强度固体润滑柱的环氧树脂与高耐磨纤维编织物组成，旨在确保极高承载性能与良好的摩擦性能。

■ **Material structure**

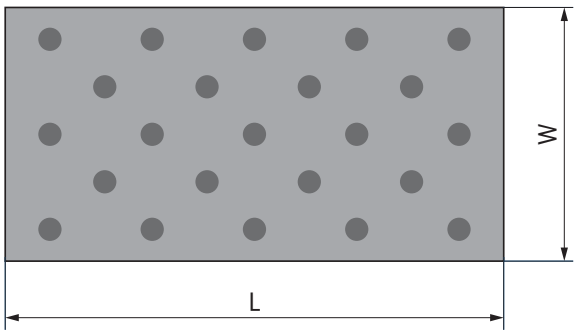
DR33 sliding plates consist of two layers combining the excellent bearing properties of low-friction sliding layer with the high strength of a load carrying glass-fibre filled backing. The silding layer consists of an epoxy resin filled with high strength solid lubricant columns and high performance weaves, designed to ensure high load and good tribological properties.

典型特征 Typical features

- 适用于干摩擦与水下应用
- 不含氟、硅材料
- 极好的尺寸稳定性
- 高承载能力
- 低摩擦系数
- 高化学抗性
- 滑动层可加工
- 连续使用温度120℃

- For dry and underwater applications
- Fluorine and silicon free
- Excellent dimensional stability
- High load capability
- Low friction coefficient
- Good chemical resistance
- Sliding layer machined available
- Continuous working temperature 120℃

标准规格 Standard specifications



产品编码 Part No.:

DR33-050-0500-0600

- L 长度 Length
- W 宽度 Width
- T 厚度 Thickness
- 材料 Material

产品编码 Part No.	S_1 ±0.15 ① [mm]	S_2 [mm]	W max. [mm]	L max. [mm]
DR33-050-0500-0600	5.0	1.0	500	600
DR33-060-0500-0600	6.0	1.0	500	600
DR33-080-0500-0600	8.0	2.0	500	600
DR33-100-0500-0600	10	2.0	500	600
DR33-120-0500-0600	12	2.0	500	600
DR33-150-0500-0600	15	3.0	500	600
DR33-200-0500-0600	20	5.0	500	600

①更多厚度可根据要求 More thicknesses availabe upon request.

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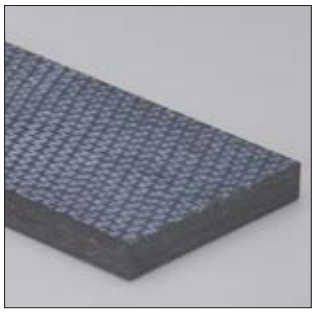
DURARUB®50 耐磨垫 Sliding plates



■ 材料结构

DR50滑动垫仅由滑动层组成，结合了低摩擦滑动层的优异承载性能和高强度。
滑动层含有特殊碳纤维织物填充PEEK树脂，旨在确保良好的机械与摩擦学性能。

■ Material structure

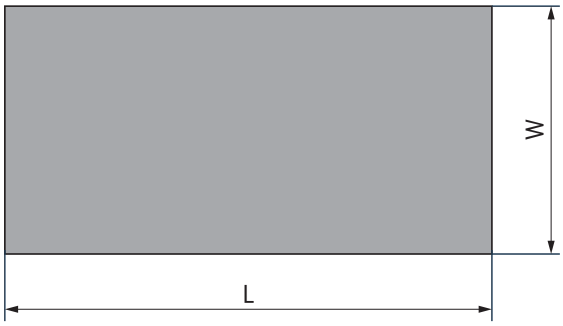
DR50 sliding plates consists only of a sliding layer, combining the excellent load performance and high strength of a low-friction sliding layer. The sliding layer consists of a special carbon fiber fabric filled with PEEK resin, designed to ensure good mechanical and tribological properties.

典型特征 Typical features

- 适用于干摩擦、油脂或水下应用
- 不含氟、硅材料
- 极好的尺寸稳定性
- 高承载能力
- 高化学抗性
- 滑动层可加工
- 连续使用温度250℃

- For dry, oil, grease or underwater applications
- Fluorine and silicon free
- Excellent dimensional stability
- High load capability
- Good chemical resistance
- Sliding layer machined available
- Continuous working temperature 250℃

标准规格 Standard specifications



产品编码 Part No.:

DR50-010-0200-0400

- L 长度 Length
- W 宽度 Width
- T 厚度 Thickness
- 材料 Material

产品编码 Part No.	S_1 ±0.15 [mm]	W max. [mm]	L max. [mm]
DR50-010-0200-0400	1.0	200	400
DR50-015-0200-0400	1.5	200	400
DR50-020-0200-0400	2.0	200	400
DR50-025-0200-0400	2.5	200	400
DR50-030-0200-0400	3.0	200	400
DR50-050-0600-1000	5.0	600	1000
DR50-060-0600-1000	6.0	600	1000

产品编码 Part No.	S_1 ±0.15 [mm]	W max. [mm]	L max. [mm]
DR50-080-0600-1000	8.0	600	1000
DR50-100-0600-1000	10.0	600	1000
DR50-120-0600-1000	12.0	600	1000
DR50-150-0600-1000	15.0	600	1000
DR50-200-0600-1000	20.0	600	1000
DR50-250-0600-1000	25.0	600	1000
DR50-300-0600-1000	30.0	600	1000

*所有尺寸与公差根据需求 All dimensions and tolerances upon request.

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DURARUB® 化学抗性表 Chemical resistance table

化学名 Chem	CRM	CRB	CRG	CRH	CRP	CRW	CRF	DR11	DR12	DR21	DR22	DR30	DR33	DR50
醋酸10% Acetic 10%	●	●	●	●	●	●	●	●	●	●	●	●	●	●
砷10% Arsenic 10%	○	○	○	○	●	○	○	○	○	●	●	○	○	●
硼酸10% Boric 10%	●	●	●	●	●	●	●	●	●	●	●	●	●	●
碳10% Carbonic 10%	○	○	○	○	○	○	○	○	○	○	○	○	○	○
柠檬酸10% Citric 10%	●	●	●	●	●	●	●	●	●	●	●	●	●	●
盐酸10% Hydrochloric 10%	●	●	●	●	●	●	●	●	●	●	●	●	●	●
水电氟10% Hydro-fluoric 10%	○	○	○	○	○	○	○	○	○	○	○	○	○	○
硝酸10% Nitric 10%	○	○	○	○	○	○	○	○	○	○	○	○	○	○
硫酸10% Sulfuric 10%	●	●	●	●	●	●	●	●	●	●	●	●	●	○
铝10% Aluminum 10%	●	●	●	●	●	●	●	●	●	●	●	●	●	●
钙10% Calcium 10%	●	●	●	●	●	●	●	●	●	●	●	●	●	●
镁10% Magnesium 10%	●	●	●	●	●	●	●	●	●	●	●	●	●	●
氢氧化钾10% Potassium Hydroxide 10%	●	●	●	●	●	●	●	●	●	●	●	●	●	●
氢氧化钠10% Sodium Hydroxide 10%	●	●	●	●	●	●	●	●	●	●	●	●	●	●
三氯化铝 Aluminum Chloride	●	●	●	●	●	●	●	●	●	●	●	●	●	●
硝酸铝 Aluminum Nitrate	●	●	●	●	●	●	●	●	●	●	●	●	●	●
硫酸铝 Aluminum Sulfate	●	●	●	●	●	●	●	●	●	●	●	●	●	●
氯化钙 Calcium Chloride	●	●	●	●	●	●	●	●	●	●	●	●	●	●
三氯化铁 Ferric Chloride	●	●	●	●	●	●	●	●	●	●	●	●	●	●
碳酸镁 Magnesium Carbonate	●	●	●	●	●	●	●	●	●	●	●	●	●	●
氯化镁 Magnesium Chloride	●	●	●	●	●	●	●	●	●	●	●	●	●	●
硫酸镁 Magnesium Sulfate	●	●	●	●	●	●	●	●	●	●	●	●	●	●
醋酸钠 Sodium Acetate	●	●	●	●	●	●	●	●	●	●	●	●	●	●
碳酸氢钠 Sodium Bicarbonate	●	●	●	●	●	●	●	●	●	●	●	●	●	●
硫酸氢钠 Sodium Bisulfate	●	●	●	●	●	●	●	●	●	●	●	●	●	●
氯化钠 Sodium Chloride	●	●	●	●	●	●	●	●	●	●	●	●	●	●
硝酸钠 Sodium Nitrate	●	●	●	●	●	●	●	●	●	●	●	●	●	●
硫酸锌 Zinc Sulfate	●	●	●	●	●	●	●	●	●	●	●	●	●	●
丙酮醇 Acetol	●	●	●	●	●	●	●	●	●	●	●	●	●	●
烯丙基 Allyl	○	○	○	○	○	○	○	○	○	○	○	○	○	●
丁基 Butyl	○	○	○	○	○	○	○	○	○	○	○	○	○	●
甲酸乙酯 Ethyl	●	●	●	●	●	●	●	●	●	●	●	●	●	●
异丁基 Iso Butyl	●	●	●	●	●	●	●	●	●	●	●	●	●	●
异丙基 Iso Propyl	●	●	●	●	●	●	●	●	●	●	●	●	●	●
甲基 Methyl	●	●	●	●	●	●	●	●	●	●	●	●	●	●
丙烷基 Propyl	●	●	●	●	●	●	●	●	●	●	●	●	●	●
丙酮 Acetone	●	●	●	●	●	●	●	●	●	●	●	●	●	○
苯 Benzene	○	○	○	○	○	○	○	○	○	○	○	○	○	●

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DURARUB® 化学抗性表 Chemical resistance table

化学名 Chem	CRM	CRB	CRG	CRH	CRP	CRW	CRF	DR11	DR12	DR21	DR22	DR30	DR33	DR50
四氯化碳 Carbon Tetrachloride	●	●	●	●	●	●	●	●	●	●	●	●	●	●
二氯甲烷 Methylene Chloride	○	○	○	○	○	○	○	○	○	○	○	○	○	○
甲乙酮 Methyl Ethyl Ketone	●	●	●	●	●	●	●	●	●	●	●	●	●	○
石脑油 Naphtha	●	●	●	●	●	●	●	●	●	●	●	●	●	●
甲苯 Toluol	●	●	●	●	●	●	●	●	●	●	●	●	●	●
三氯乙烷 Trichlorethane	○	○	○	○	●	○	○	○	○	●	●	○	○	●
棉籽 Cottonseed	●	●	●	●	●	●	●	●	●	●	●	●	●	●
原油 Crude Oil	●	●	●	●	●	●	●	●	●	●	●	●	●	●
液压油 Hydraulic Fluids	●	●	●	●	●	●	●	●	●	●	●	●	●	●
亚麻籽油 Linseed Oil	●	●	●	●	●	●	●	●	●	●	●	●	●	●
机油 Motor Oil	●	●	●	●	●	●	●	●	●	●	●	●	●	●
变速箱油 Transmission Fluids	●	●	●	●	●	●	●	●	●	●	●	●	●	●
柴油 Diesel	●	●	●	●	●	●	●	●	●	●	●	●	●	●
汽油 Gasoline	●	●	●	●	●	●	●	●	●	●	●	●	●	●
喷气燃料 Jet Fuel	●	●	●	●	●	●	●	●	●	●	●	●	●	●
煤油 Kerosene	●	●	●	●	●	●	●	●	●	●	●	●	●	●
乙炔溴 Acetylene Bromine	○	○	○	○	○	○	○	○	○	○	○	○	○	○
丁烷 Butane	●	●	●	●	●	●	●	●	●	●	●	●	●	●
二氧化碳 Carbon Dioxide	●	●	●	●	●	●	●	●	●	●	●	●	●	●
氯 Chlorine	○	○	○	○	●	○	○	○	○	●	●	○	○	○
醚 Ethers	●	●	●	●	●	●	●	●	●	●	●	●	●	●
氟 Fluorine	○	○	○	○	○	○	○	○	○	○	○	○	○	○
氢 Hydrogen	●	●	●	●	●	●	●	●	●	●	●	●	●	●
天然气 Natural Gas	●	●	●	●	●	●	●	●	●	●	●	●	●	●
氮 Nitrogen	●	●	●	●	●	●	●	●	●	●	●	●	●	●
臭氧 Ozone	●	●	●	●	●	●	●	●	●	●	●	●	●	○
丙烷 Propane	●	●	●	●	●	●	●	●	●	●	●	●	●	●
二氧化硫 Sulfur Dioxide	●	●	●	●	●	●	●	●	●	●	●	●	●	●
无水氨 Anhydrous Ammonia	○	○	○	○	○	○	○	○	○	○	○	○	○	○
洗涤剂 Detergents	●	●	●	●	●	●	●	●	●	●	●	●	●	●
乙二醇 Ethylene Glycol	●	●	●	●	●	●	●	●	●	●	●	●	●	●
甲醛 Formaldehyde	●	●	●	●	●	●	●	●	●	●	●	●	●	●
氟利昂 Freon	●	●	●	●	●	●	●	●	●	●	●	●	●	○
过氧化氢 Hydrogen Peroxide	○	○	○	○	○	○	○	○	○	○	○	○	○	○
石灰 Lime	●	●	●	●	●	●	●	●	●	●	●	●	●	●
水 Water	●	●	●	●	●	●	●	●	●	●	●	●	●	●

● 完全抵抗 Resistant
○ 无抵抗 Not Resistant

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轴承摩擦系数 Friction coefficient

缠绕轴承的摩擦系数为0.03 ~ 0.12，影响摩擦系数的主要因素有承载、运动方式、速度以及相配轴的表面粗糙度等。

图1显示了缠绕轴承在PV旋转载荷下的摩擦系数随着载荷的升高而降低。

Friction Coefficient of filament Bearing is 0.03 ~ 0.12. The main factors affect the Friction Coefficient are Load, Moving method, Speed and Roughness of mating surfaces. Graph 1 shows the friction coefficient is going down while load is increasing under the rotation method.

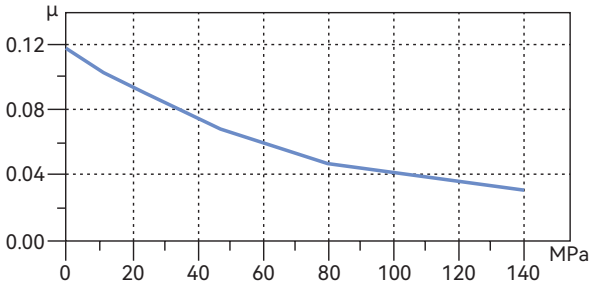

图1：纤维缠绕轴承的载荷与摩擦系数曲线
Graph 1: Load vs Friction Coefficient

轴承规格：CRB-6070-50	Specification: CRB-6070-50
轴：45# HRC50，Ra=0.4	Shaft: 45# HRC50, Ra=0.4
轴承载荷：20~140MPa	Load: 20~140MPa
速度：1.0m/min	Speed: 1.0m/min
润滑：干	Lubricate: Dry

轴承的磨损 The anti-wear property

轴承磨损的影响因素有承载、运动方式、速度以及相配轴的表面粗糙度等；图2说明了缠绕轴承在50MPa载荷、室温的条件下摇摆运动中的磨损情况。根据图表我们可以看出在最初的时间内轴承磨损很快，在这段时间内，内衬中的润滑物质逐渐向相配轴上转移并均匀分布在运动方向上，从而形成光滑的摩擦表面，之后保持很长时间的稳定不磨损阶段。

The main factors affect the anti-wear property are the load, moving method, speed and roughness of mating surfaces. Graph 2 shows the bearing wear off under room temperature with the load of 50MPa when the bearing is swinging. It is found the wear off increases sharply during the initial running-in while the lubricant is transferred from the inner liner and a smooth surface is created there of to form the lubricating surface. After running-in period, it will maintain stable without wear off.

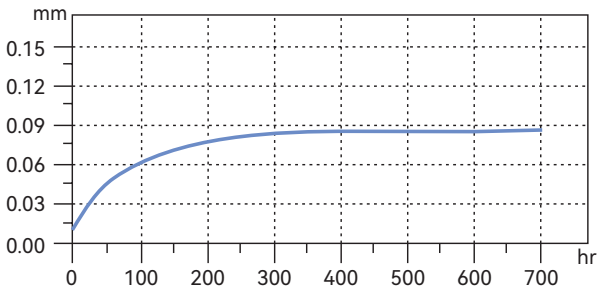

图2： 纤维缠绕轴承工作时间与磨损量的曲线
Graph 2: Duration vs Wear off amount

轴承规格：CRB-4050-30	Specification: CRB-4050-30
轴：45# HRC50，Ra=0.4	Shaft: 45# HRC50, Ra=0.4
轴承载荷：50MPa	Load: 50MPa
速度：1.0m/min, ±45°	Speed: 1.0m/min, ±45°
润滑：干	Lubrication: Dry

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工作温度与负载能力 Operating temperature and load capacity

由于温度会直接影响轴承的负载能力和耐磨特性，在选择轴承时，工作温度是一个非常重要的考虑因素。
DURARUB®纤维缠绕轴承在高温下滑动面会软化导致承载能力下降，特别是CRP、DR21、DR22和DR50，但这些轴承可用于低温应用。
纤维缠绕轴承在稳定负载下可达到标准最高负载；然而动态负载或振动应用会给轴承带来疲劳应力，从而削弱负载能力。
纤维缠绕轴承标准最大静载荷和动载荷是根据壁厚5.0mm轴承而定。薄壁轴承特别是壁厚低于2.5mm由于支撑材料的纤维交叉数量减少导致负载能力会降低。

Operating temperature is an important consideration when specifying bearing products since temperature will have a direct affect on bearing load capacity and wear resistance.
At elevated temperatures DURARUB® bearings have reduced load carrying capabilities due to the softening of the self-lubricating surfaces, particularly in CRP, DR21, DR22, and DR50. However, these bearings suitable for low-temperature applications.
The standard maximum static and dynamic loads for DURARUB® bearings are determined based on bearings with the 5.0mm wall thickness. Thin-walled bearings, especially those with wall thicknesses below 2.5mm, exhibit reduced load capacity because of the reduced number of fiber reinforced composite fiber crossovers that constitute the backing material

尺寸设计 Dimension design

壁厚 Wall thickness

由于薄壁会减小负载能力（大约比DURARUB®纤维缠绕轴承的额定负载能力低50%），因此避免选用壁厚小于2.5mm的轴承。
推荐的最小壁厚为1.5mm。壁厚大于5.0mm的轴承负载能力增加较小。

Thin walls reduce load capacity (approximately 50% lower than the rated load capacity of DURARUB® filament-wound bearings). Therefore, avoid selecting bearings with a wall thickness less than 2.5 mm.
The recommended minimum wall thickness is 1.5mm. For bearings with wall thicknesses greater than 5.0mm, the increase in load capacity become relatively small.

轴承长度 Length

设计轴承时，轴直径通常取决于结构稳定性或刚度，因此必须根据工作压力和要求的使用寿命确定轴承长度。
短轴承应限制在长度-轴径比最小为0.25，以确保在轴承座孔中充分固定。
由于潜在轴偏斜和偏心问题，不推荐使用长轴承。重载下的长轴承，由于轴偏斜，轴承两端会产生不均衡的高单位负载。为此，建议长度-轴径比不得超过2.0。

During bearing design, shaft diameter is typically determined by structural stability or stiffness. Therefore, bearing length must be determined based on working pressure and required service life.
Short bearings should be limited to a minimum length-to-shaft diameter ratio of 0.25 to ensure secure fixation within the housing bore.
Long bearings are not recommended due to potential shaft deflection and eccentricity issues. Under heavy loads, long bearings may generate uneven high unit loads at both ends due to shaft deflection. Therefore, the length-to-shaft diameter ratio should not exceed 2.0.

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工作间隙 Operating clearance

恰当的运行间隙是保证轴承性能的关键因素。低速摆动枢轴应用中，纤维缠绕轴承的推荐可能最小间隙为0.013mm。装配过程中，轴或销几乎接近线配合。由于低速摆动操作中产生很少或者没有产生热量，无需额外间隙。
对于高速或高环境温度情况下连续转动等更多动载应用，最小间隙可能为单位直径0.005mm/mm。
CRB、CRG和CRH轴承无法加工内径，受到滑动层成分限制。然而，CRP、CRM和CRF轴承可以加工获取更紧的公差带。
标准CRP轴承具有0.40mm厚特殊添加剂改性PTFE带状滑动层，如有必要，装配时可以加工内孔。
CRP轴承还可制作更厚的滑动层，以获取更大的加工深度。获取更多信息，请联系CSB。

Proper running clearance is critical to ensure bearing performance. In low-speed oscillating pivot applications, the recommended minimum possible clearance for filament-wound bearings is 0.013mm. During assembly, the shaft or pin is nearly close to a line fit. Since low-speed oscillating operations generate little or no heat, no additional clearance is required.
For more dynamic applications involving continuous rotation at high speeds or in high ambient temperatures, the minimum clearance may be 0.005 mm/mm of the unit diameter.
CRB、CRG and CRH bearings cannot be machined in the inner diameter due to limitations in the sliding layer composition. However, CRP、CRM and CRF bearings can be machined to achieve tighter tolerance bands.
Standard CRP bearings feature a 0.40mm thick sliding layer made of specially modified PTFE tape. If necessary, the inner bore can be machined during assembly.
CRP bearings can also be produced with thicker sliding layers to allow for greater machining depths. For more information, contact CSB.

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润滑 Lubrication

推荐DURARUB®纤维缠绕轴承用于干摩擦环境。尽管油脂可以用于保护和/或清洗被腐蚀或污染的轴承区域,在经过较长时间的高循环振动后，滑动层纤维会受到油脂的流体静力腐蚀。需进行监控以确保设备使用周期中滑动层的完整性。
CRP轴承可浸入润滑油或其它液体润滑剂中使用，液体润滑剂可降低摩擦系数和轴承磨损。然而，润滑剂必须定期维护，防止污染物进入。不推荐CRP轴承使用润滑脂。
CRW和CRF轴承专门用于水电应用，可用于陆上和水下。建议使用硬化不锈钢轴（如440不锈钢），以最小化轴腐蚀。

DURARUB® filament-wound bearings are recommended for dry friction environments. However, grease can be used to protect and/or clean corroded or contaminated bearing areas. After prolonged high-cycle vibration, the sliding layer fibers may suffer from hydrostatic erosion caused by grease. Monitoring is required to ensure the integrity of the sliding layer throughout the equipment's service life.
CRP bearings can be immersed in lubricating oil or other liquid lubricants to reduce the coefficient of friction and bearing wear. However, lubricants must be regularly maintained to prevent contamination. The use of grease is not recommended for CRP bearings.
CRW and CRF bearings are specifically designed for hydropower applications and can be used both on land and underwater. It is advised to use hardened stainless steel shafts (e.g., 440 stainless steel) to minimize shaft corrosion.

轴材料和表面粗糙度 Shaft materials and surface roughness

作为整个装配的一部分，合理的轴设计对于获取轴承满意的工作性能至关重要。大多数合金钢都可以作为轴材料。在高负载应用或由于外界污染物进入需要对配合面进行保护的场合，淬火钢轴可以表现出很好的性能。
当轴承工作压力超过大约14N/mm^2，最小轴硬度至少为480HB[50HRC]。通常不需要使用淬透的轴。
纤维缠绕轴承在存在污染物时能够很好的嵌入，然而，我们强烈推荐使用密封。推荐需要防腐的情况下使用硬化不锈钢或硬镀铬材料。
与材料选择同等重要的是轴表面粗糙度。粗糙度值介于Ra0.2-Ra0.6，可以获得最优的轴承性能，提高轴承耐磨性能和降低摩擦系数。可以使用较粗糙表面，但是会缩短轴承使用寿命。由于轴粗糙表面会损轴承的相对较软的滑动层。
我们推荐轴端倒角或者倒圆以便于装配并最大程度减小轴承产生划伤的风险。

As part of the entire assembly, proper shaft design is critical to achieving satisfactory bearing performance. Most alloy steels can be used as shaft materials. In high-load applications or situations requiring protection of mating surfaces due to external contaminants, quenched steel shafts can exhibit excellent performance.
When bearing working pressure exceeds approximately 14 N/mm^2, the minimum shaft hardness should be at least 480 HB [50 HRC]. Through-hardened shafts are generally not required.
CSB filament-wound bearings can effectively embed contaminants, but we strongly recommend using seals. For corrosion resistance, hardened stainless steel or hard chrome-plated materials are recommended.
Equally important to material selection is shaft surface roughness. A roughness value between Ra0.2-Ra0.6 provides optimal bearing performance by improving wear resistance and reducing the coefficient of friction. Rougher surfaces can be used but will shorten bearing service life, as rough shaft surfaces wear down the relatively soft sliding layer of the bearing.
We recommend chamfering or rounding shaft ends to facilitate assembly and minimize the risk of scoring the bearing.

轴承座材料 Shaft materials and surface roughness

标准DURARUB®纤维缠绕轴承的工作间隙是基于正常环境温度下钢或铸铁轴承座安装得出的。如果外壳采用非铁合金（如铝），由于轴承座热膨胀，会导致轴承固定不良。
在温度较高且使用非铁合金轴承座的场合，轴承与轴承座孔之间的过盈量需要增加，以确保将轴承恰当固定在轴承座孔中。为了防止装配中轴干涉，轴直径必须相应减小，以抵消额外装配干涉。获取更多信息，请联系CSB。

The operating clearance for standard DURARUB® filament-wound bearings is based on installations with steel or cast iron housings at normal ambient temperatures. If non-ferrous alloy housings (e.g., aluminum) are used, poor bearing retention may occur due to thermal expansion of the housing.
In high-temperature environments with non-ferrous alloy housings, the interference fit between the bearing and housing bore must be increased to ensure proper fixation of the bearing within the housing. To prevent shaft interference during assembly, the shaft diameter should be reduced accordingly to compensate for the additional assembly interference. For more information, please contact CSB.

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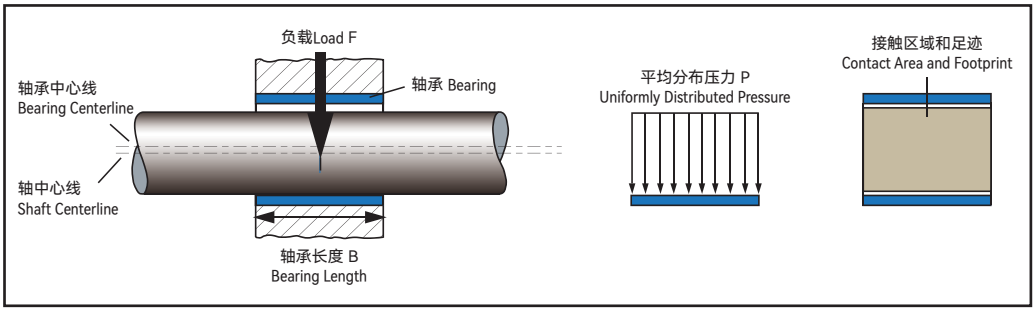
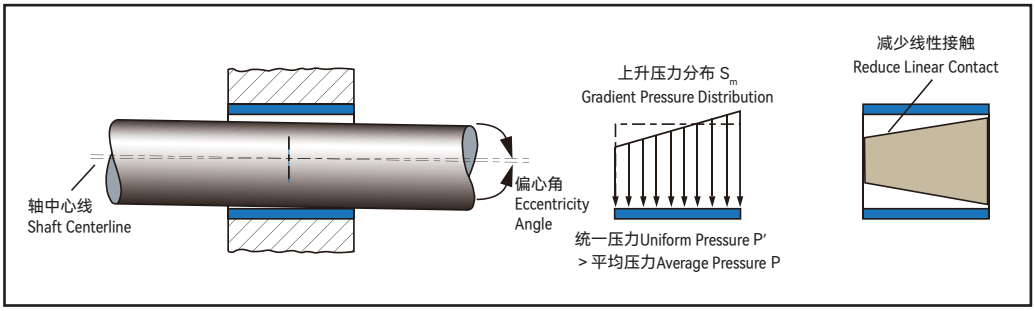
偏心 Eccentricity

图A显示沿着轴承长度均匀负载的轴承，轴对中性良好。图A右侧为接触区域俯视图。图B显示轴偏心造成接触面积减少，轴承负载偏向某一端。出现严重偏心使接触区域呈现抛物线形状，如图C所示。严重位置不准产生的集中边缘压力会造成轴承故障。当边缘压力增大接近或超过材料的压缩强度，可能发生断裂。

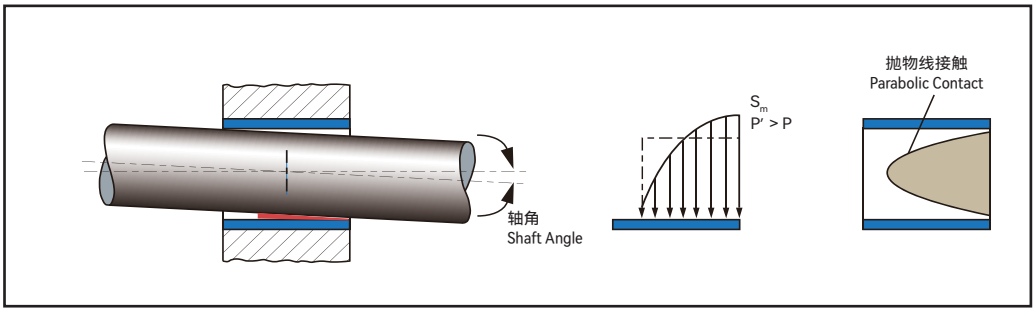
Figure A shows a bearing with a uniform load distributed along its length, where the shaft is well-aligned. The right side of Figure A displays a top view of the contact area. Figure B demonstrates that shaft eccentricity reduces the contact area and shifts the bearing load toward one end. Severe eccentricity causes the contact area to assume a parabolic shape, as illustrated in Figure C. Significant misalignment-induced concentrated edge pressure can lead to bearing failure. If the edge pressure approaches or exceeds the material's compressive strength, fractures or structural breaks may occur.



图Figure A： 无偏差No Deviation



图Figure B： 轻微偏差Minor Deviation



图Figure C： 严重偏差Severe Deviation

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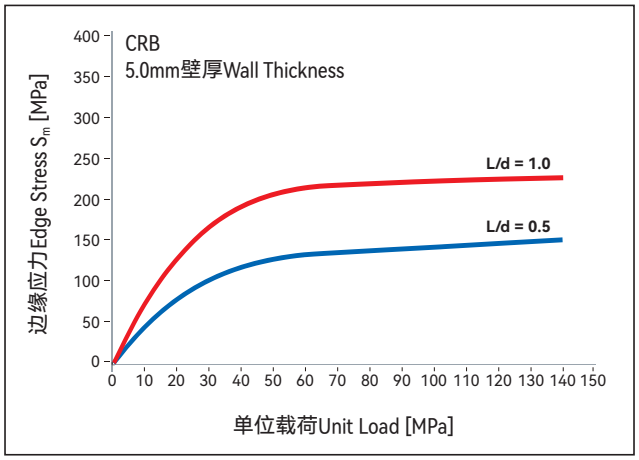
根据经验，对于高负载超低速应用中，偏心和/或轴偏斜较小，低于0.2%（单位轴长偏心量0.002 mm/mm），那么偏心问题可忽略不计。

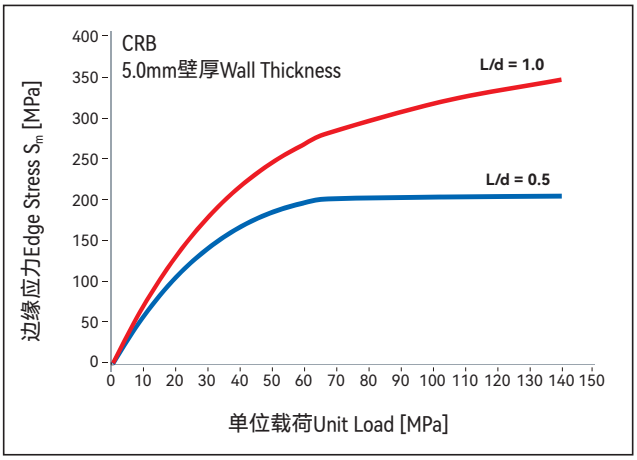
对于静载荷或存在冲击载荷的静载荷，如果边缘应力超过DURARAB®许可最大静载荷，需要重新设计轴承。特别指出的是CRP轴承、DR21滑板以及DR22止推垫片不推荐用于预计会出现严重偏心的场合。

Based on empirical knowledge, in high-load, ultra-low-speed applications, if eccentricity and/or shaft deflection is minimal—below 0.2% (eccentricity per unit shaft length: 0.002 mm/mm)—the eccentricity issue can be considered negligible.

For static loads or static loads with impact loads present, if the edge stress exceeds the allowable maximum static load of DURARAB®, the bearing must be redesigned. It is specifically noted that CRP bearings, DR21 sliding plates, and DR22 thrust washers are not recommended for applications where severe eccentricity is anticipated.



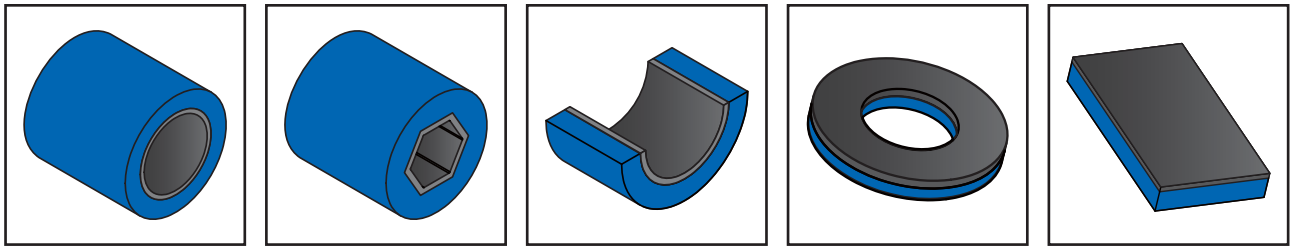
边缘应力Edge Stress 0.6%



边缘应力Edge Stress 1.0%

尺寸与形状 Sizes and Shapes

- 圆柱轴承 Cylindrical bearings: 内径 linner diameter 20-500mm, 最大长度 Max. length 800mm
- 止推垫片 Thrust washers: 厚度 Thickness 1.5-20mm, 最大外径 Max. outer diameter 500mm
- 滑板 Sliding pads: 厚度 Thickness 1.5-20mm, 最大长度 Max. length 600mm



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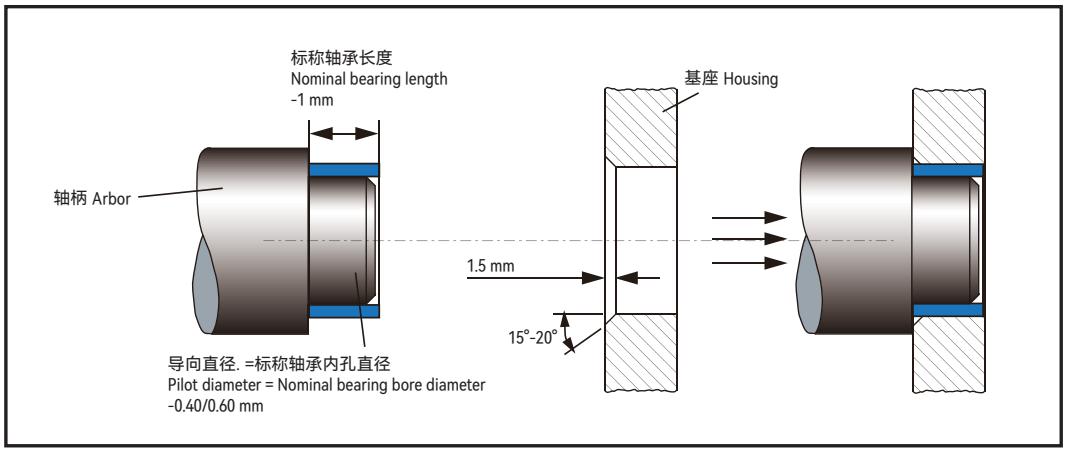
安装和机加工 Installation and Machining

■ 安装 Installation

由于材料具有很高的刚性，并且热膨胀率与钢类似，装入金属轴承座的DURARUB®纤维缠绕轴承尺寸稳定性很好。
轴承在安装时与轴承座孔之间存在一定的过盈量。计算轴承安装尺寸和配合轴尺寸时，必须考虑过盈量的问题。

DURARUB® filament-wound bearings installed in metal housings achieve excellent dimensional stability due to the material's high rigidity and thermal expansion coefficient similar to that of steel.
During installation, a specific interference fit exists between the bearing and the housing bore. Interference fit requirements must be considered when calculating both bearing installation dimensions and mating shaft dimensions.



轴承的安装 Bearing Installation

■ DURARUB® 可采用螺旋压入设备，液压压入设备，或者压入式心轴等多种设备安装到轴承座孔内，但不允许用敲打轴承的方式安装
■ 标准轴承座公差为H7
■ 轴承座内孔的粗糙度为： Ra = 3.2 µm
■ 轴承座内孔应提供 20 - 40° 倒角有利于装配
■ DURARUB® 轴承内径超过150mm的滑动轴承可以通过液氮进行超冷安装

■ DURARUB® can be installed into the bearing housing bore using helical press-in equipment, hydraulic press-in equipment, or mandrel press-in devices. However, hammering the bearing during installation is strictly prohibited.
■ The standard tolerance for bearing housings is H7.
■ The surface roughness of the housing bore should be Ra = 3.2 µm.
■ A 20-40° chamfer should be provided on the housing bore to facilitate assembly.
■ DURARUB® bearings with an inner diameter exceeding 150 mm, cryogenic installation using liquid nitrogen is applicable.

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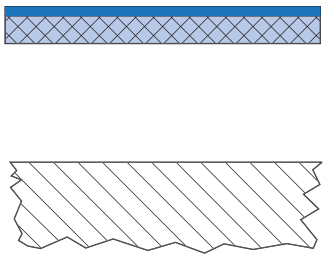
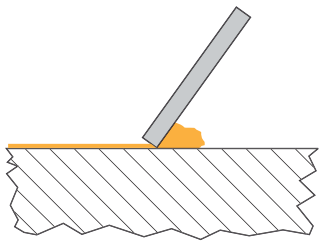
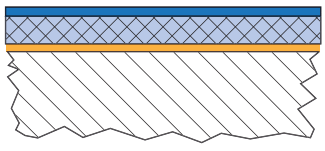
机加工 Machining

DURARUB®轴承滑动层便于采用常用单点刀具加工。标准CRM最大允许加工深度为0.5mm，CRP最大允许加工深度为0.2mm，特别要求可增加至1.0mm。要求加工在无冷却液条件下进行。
硬质合金刀具的刀尖圆角半径为3-10mm，以1.25 - 3.5m/s的线速度和0.13mm/转的横向进给加工滑动层。
给DURARUB®轴承钻孔应采用硬质合金平头钻或平头铣刀，且内径必须采用芯棒支撑避免撕裂耐磨层。

The DURARUB® bearing sliding layer is compatible with machining using standard single-point cutting tools. For standard CRM bearings, the maximum allowable machining depth is 0.5mm, while CRP bearings also permit a maximum machining depth of 0.2mm, extendable to 1.0mm under special requirements. Machining must be performed without coolant.
Carbide tools with a nose radius of 3-10mm are recommended, operating at a cutting speed of 1.25–3.5m/s and a transverse feed rate of 0.13mm per revolution for machining the sliding layer.
When drilling DURARUB® bearings, carbide flat head drills or flat end mills must be used, and the inner diameter should be supported with a mandrel to prevent tearing of the wear-resistant layer.

滑板粘合剂安装 Sliding plates installation using adhesive

准备 Preparation: 打磨增加表面粗糙度以利于粘结 (例如采用砂纸，颗粒度120)。 彻底清洁表面 Roughen the surface to increase roughness for better adhesion (e.g., using 120-grit sandpaper).Thoroughly clean the surface.	粘合剂的使用 Adhesive Application: 采用有齿抹刀涂抹粘结剂。 齿间(0,5 - 1 mm). Apply the adhesive using a notched trowel. Notch size: 0.5–1 mm.	装配 Assembly: 用较轻压力粘结滑板表面和装配基体表面，并静置粘合 Press the sliding plate surface and the assembly base surface together with light pressure and allow the adhesive to cure.
1 	2 	3 
建议的粘结剂 Recommended adhesives Loctite 496 / 3425 (遵守制造商的指导 follow the manufacturer's guidelines)		

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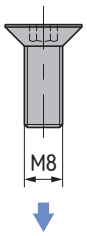
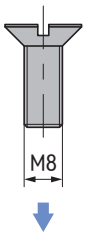
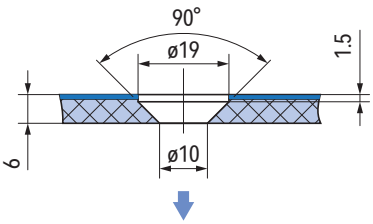
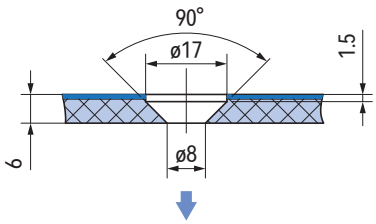
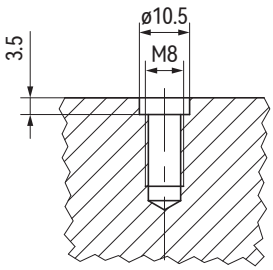
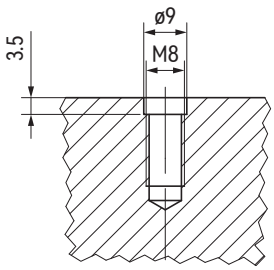
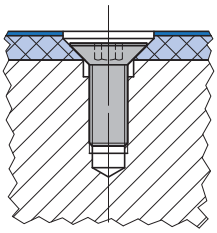
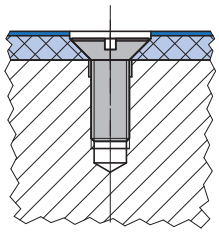
使用 M8 螺钉安装说明 Installation with M8 countersunk screws

M8 内六角沉头螺钉（符合 EN ISO 10642 标准）也适用于十字槽沉头螺钉 Countersunk socket screw M8 (according to EN ISO 10642) also valid for torx screw	M8 一字槽沉头螺钉（符合 ISO 2009 标准） Slotted countersunk screw M8 (according to ISO 2009)
A1 	B1 
DURARUB® 耐磨垫 Sliding plates	DURARUB® 耐磨垫 Sliding plates
A2 	B2 
基础材料 Base material	基础材料 Base material
A3 	B3 
安装后的DURARUB® 耐磨垫 DURARUB® sliding plates after installation	安装后的DURARUB® 耐磨垫 DURARUB® sliding plates after installation
A4 	B4 

安装Mounting
安装时，使用金属粘合剂 “Loctite 243”（中等强度）或 “Loctite 278”（高强度）固定螺钉。必须遵守工作温度限制和制造商的详细说明。
During mounting, secure the screws with metal adhesive "Loctite 243" for intermediate strength or Loctite 278" for high-strengthbolting. The operating temperature limits and manufacturer's details must be observed.

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