



Metal Sulfides 金属硫化物

Tribotecc®

Superior performance in solid lubrication
卓越的固体润滑剂

Development of new solid lubricants for :
特博科开发的新型固体润滑产品应用于:

- Lubricating Greases 润滑脂
- Lubricating Pastes 润滑膏
- Lubricating Coatings and Polymers 润滑涂层和聚合物



Solid lubricants are used for extreme conditions:
固体润滑剂及可以用在下列极端情况:

- Emergency running properties
紧急运行属性
- High specific loads at low hydrodynamically effective speeds
在低液体动力有效速度下的高比载荷
- High temperature applications 高温
- High vacuum applications 高真空应用
- Aggressive environments 恶劣环境



Properties of Tribotecc® solid lubricants 特博科固体润滑剂的属性

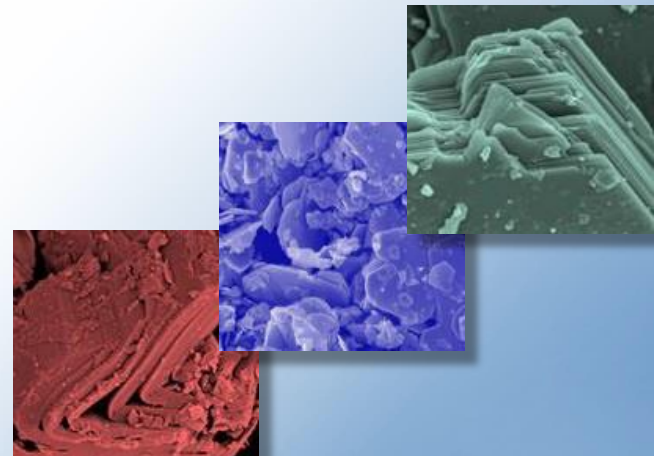
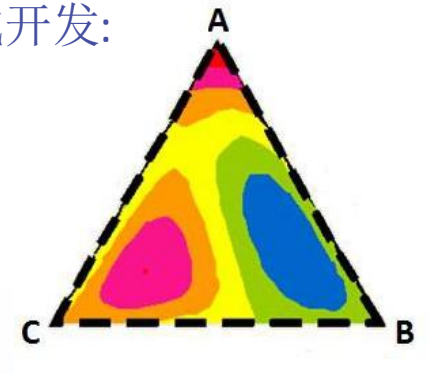
- Fully synthetic 完全合成
- Reduction of wear 减少磨损
- High load capacity 耐高压能力
- Excellent metal adhesion 卓越金属附着力
- Improvement of coefficient of friction
改善摩擦系数
- Superior oxidation resistance
良好的抗氧化性能



Development of synergistic compounds using design of experiment with high performing sulfides and other substances:

通过实验设计高性能硫化物和其他物质的合成化合物完成开发:

- Molybdenum disulfide MoS_2
- Tungsten disulfide WS_2
- Tin disulfide SnS_2
- Bismuth sulfide Bi_2S_3
- Zinc sulfide ZnS
- Manganese sulfide MnS
- Others: phosphates, fluorides
其他: 磷酸盐, 氟化物

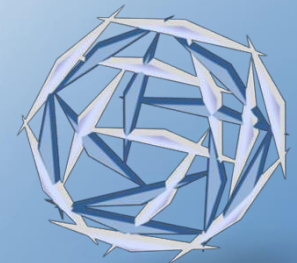
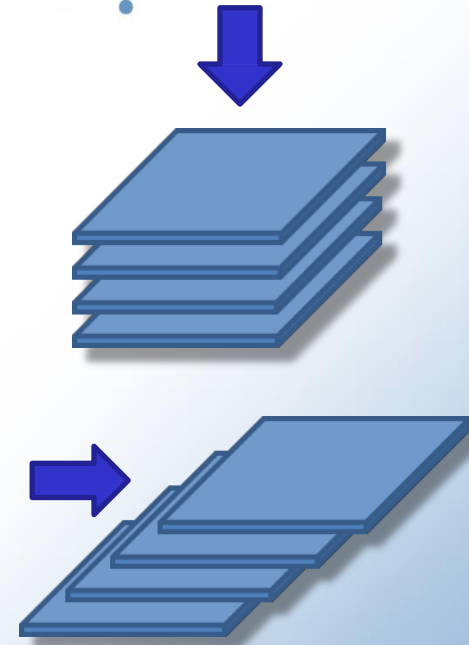


Properties of solid lubricants 固体润滑剂的属性

- MoS_2 , WS_2 , SnS_2 have a lamellar structure and are considered as structural lubricants.
MoS₂, WS₂, SnS₂有层状结构，被看做是结构润滑剂
- Bi_2S_3 shows high load carrying capacity. Bi₂S₃具有高承载能力。
- ZnS acts as supporting agent or catalyst by producing friction and wear reducing layers. ZnS通过产生摩擦及磨损减少层而起到支撑剂或催化剂的作用。
- MnS shows extremely positive properties in metalforming application. MnS在金属成型应用中表现良好。
- Phosphates are able to form a protective film on the sliding surfaces and belong to the chemically reactive lubricants.
磷酸盐能够在滑动表面上形成保护膜并属于化学反应性润滑剂。

Synergism 协同作用

- Interaction between two or more agents, entities, factors, or substances that produces an effect greater than the sum of their individual effects. 多物质协同效果大于各自效果的总和。

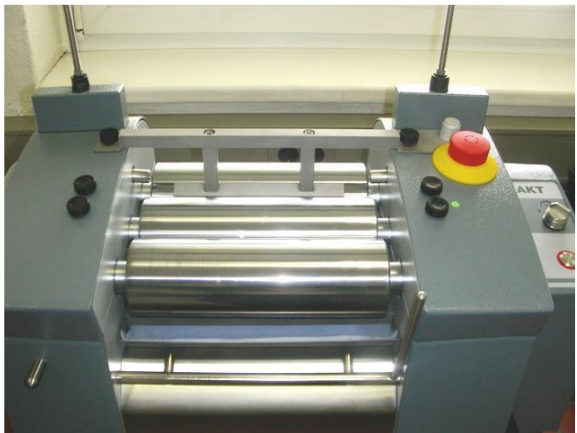


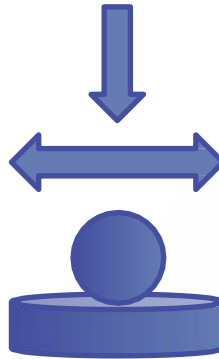
Tribotecc® – 产品系列 / 选型



Solid lubricants 固体润滑剂	Composition 成分	Feature 特点	Density 密度 [g/cm ³]	d ₅₀ [μm]	d ₉₀ [μm]	Properties 属性	Possible Application 适用应用
MoS ₂	MoS ₂	基准	4.9	4	8		多用途
SLS 17	Mix 多物质	浅色	4.4	2	8	摩擦改进	CVJ, 风力发电
SLS 21	Mix 多物质	浅色	3.3	3	12	耐磨	CVJ
SLS 22	Mix 多物质	浅色	3.2	8	24	耐磨	金属成型, CVJ
SLS 25	Mix 多物质	浅色	4.4	1	3	极压	重载, 矿山, 多用途
SLS 26	Mix 多物质	浅色	4.4	1	4	耐磨	多用途
SLS White	Mix 多物质	白色	2.9	4	60	耐磨	食品级, 高温
WS 31	Mix 多物质	多相	5.5	6	13	摩擦改进, 耐磨	CVJ
WS 44S	Mix 多物质	多相	4.8	6	12	摩擦改进, 耐磨	CVJ, 多用途
WS 52	Mix 多物质	协同	4.0	3	12	摩擦改进, 耐磨	CVJ, Dual mass flywheel
WEP 10	Mix 多物质	协同	5.0	3	8	摩擦改进, 极压	重载, 矿山, 多用途
WEP 30	Mix 多物质	协同	4.7	3	8	摩擦改进, 极压	多用途, 重载, 矿山
WEP 50	Mix 多物质	协同	4.4	2	8	极压, 无铅	7 重载, 矿山

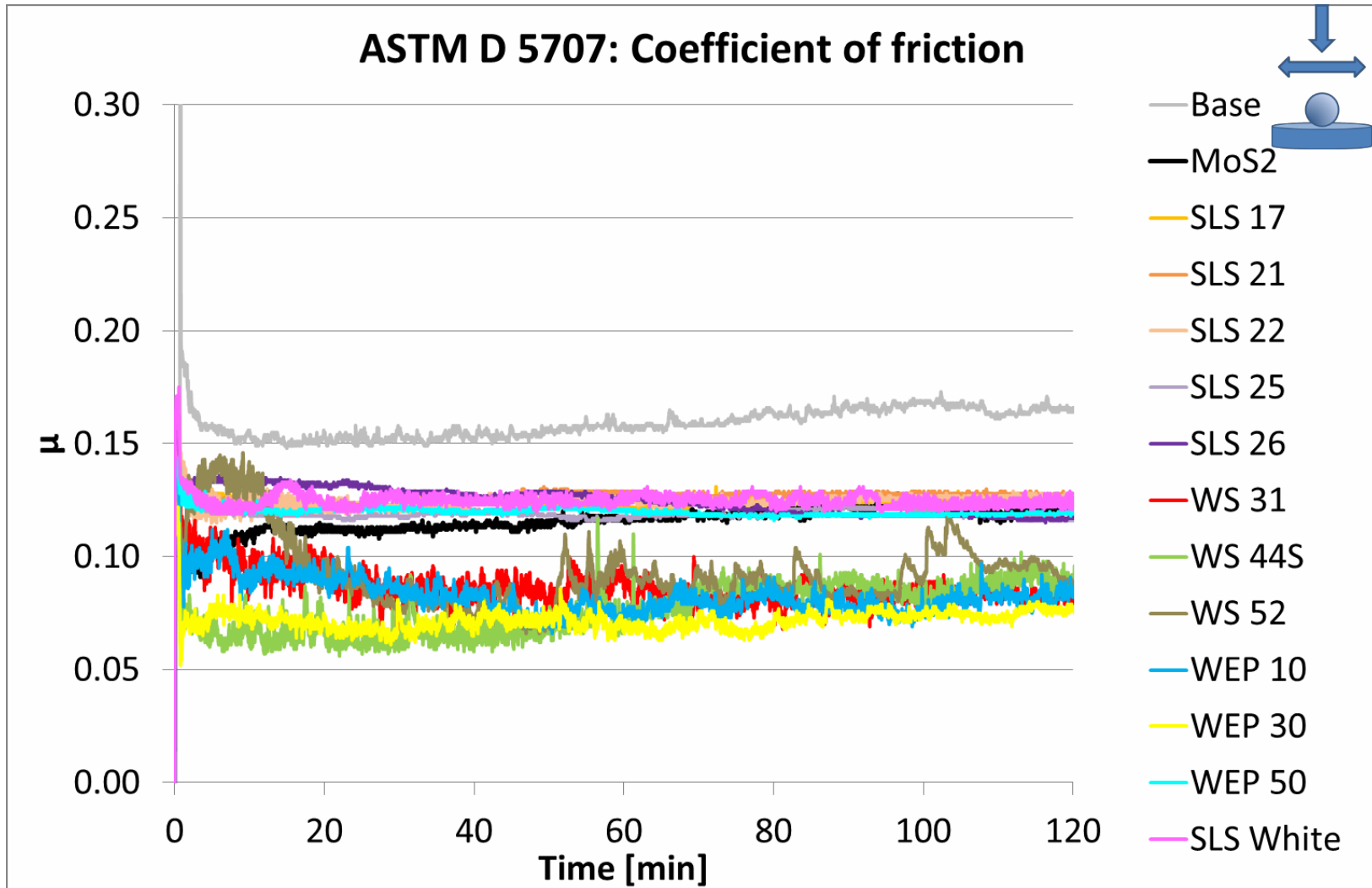
- 将固体润滑剂以3%(重量)的处理比例混合到锂基润滑脂中。
- 将润滑脂在辊磨机 (x3) 中均化。

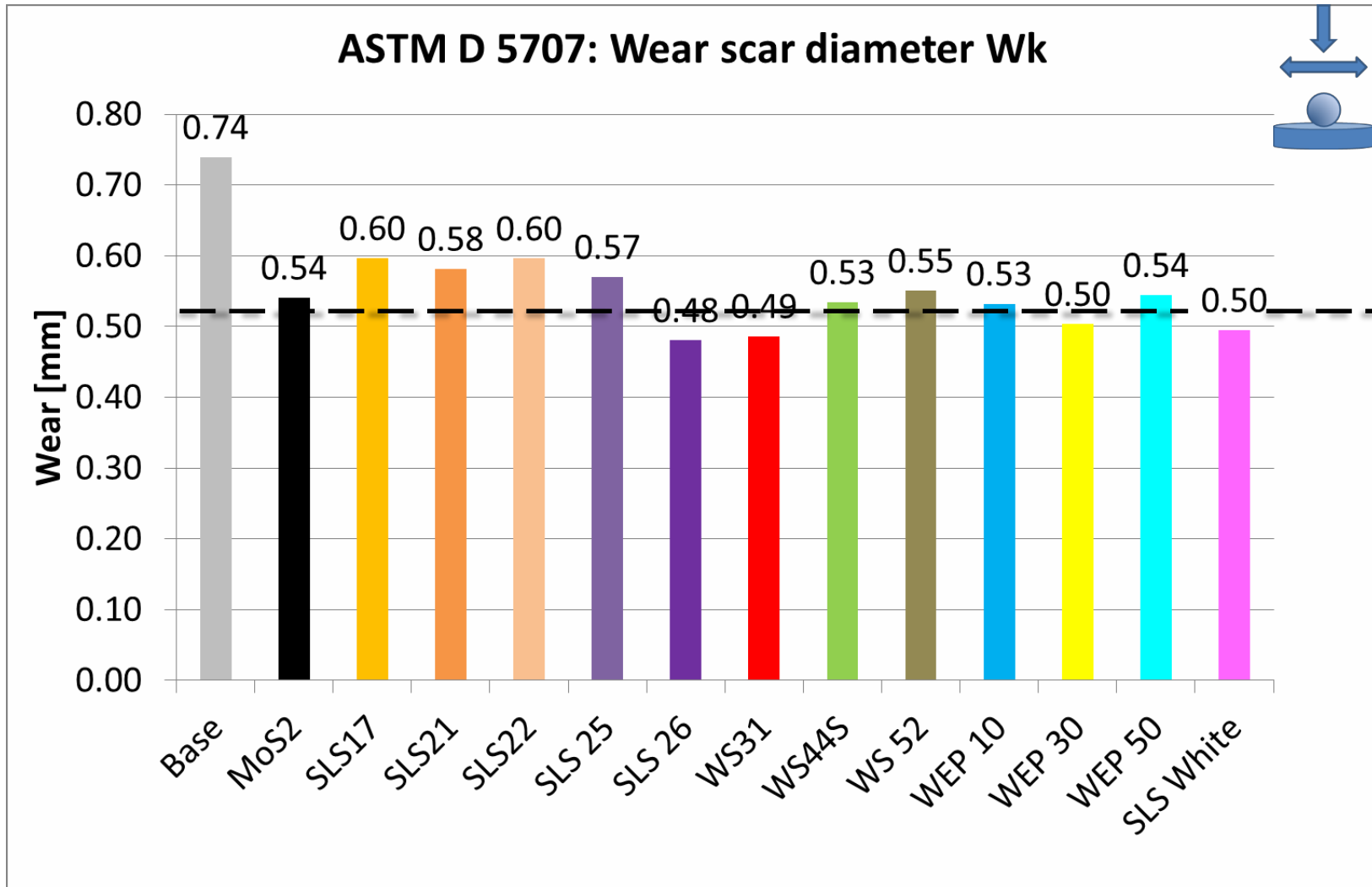


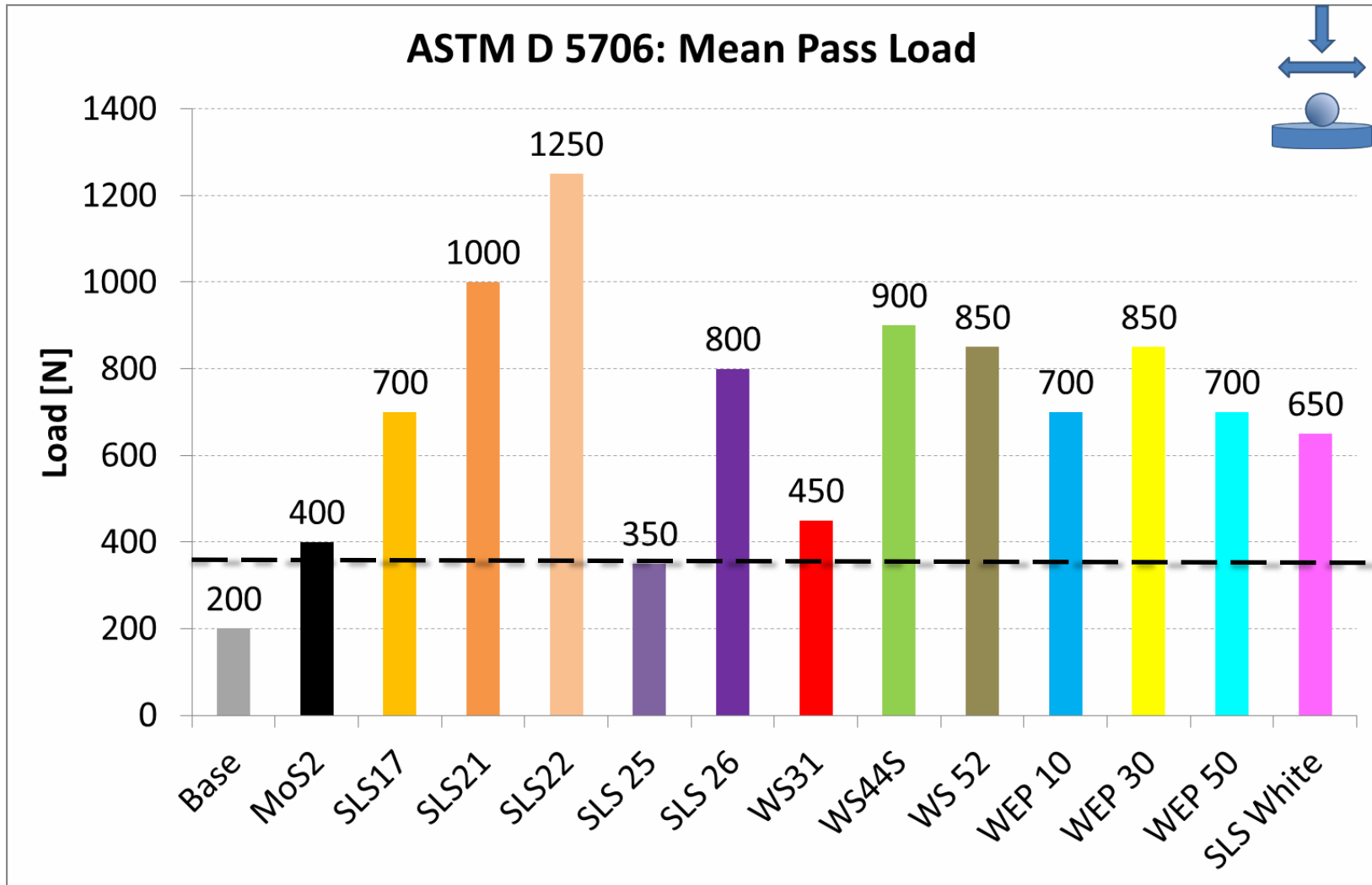


正常负荷: 1 – 2000 N
 频率: 1 – 511 Hz
 行程: 0.01 – 5 mm
 温度: RT – 350°C

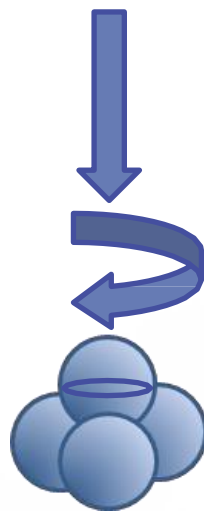
方法	结果	温度 [°C]	频率 [Hz]	行程 [mm]	时间 [min]	负荷
ASTM D 5707	摩擦系数 磨损	50	50	1	120	200 N
ASTM D 5706	通过负荷	50	50	1	~40	+100 N/2 min







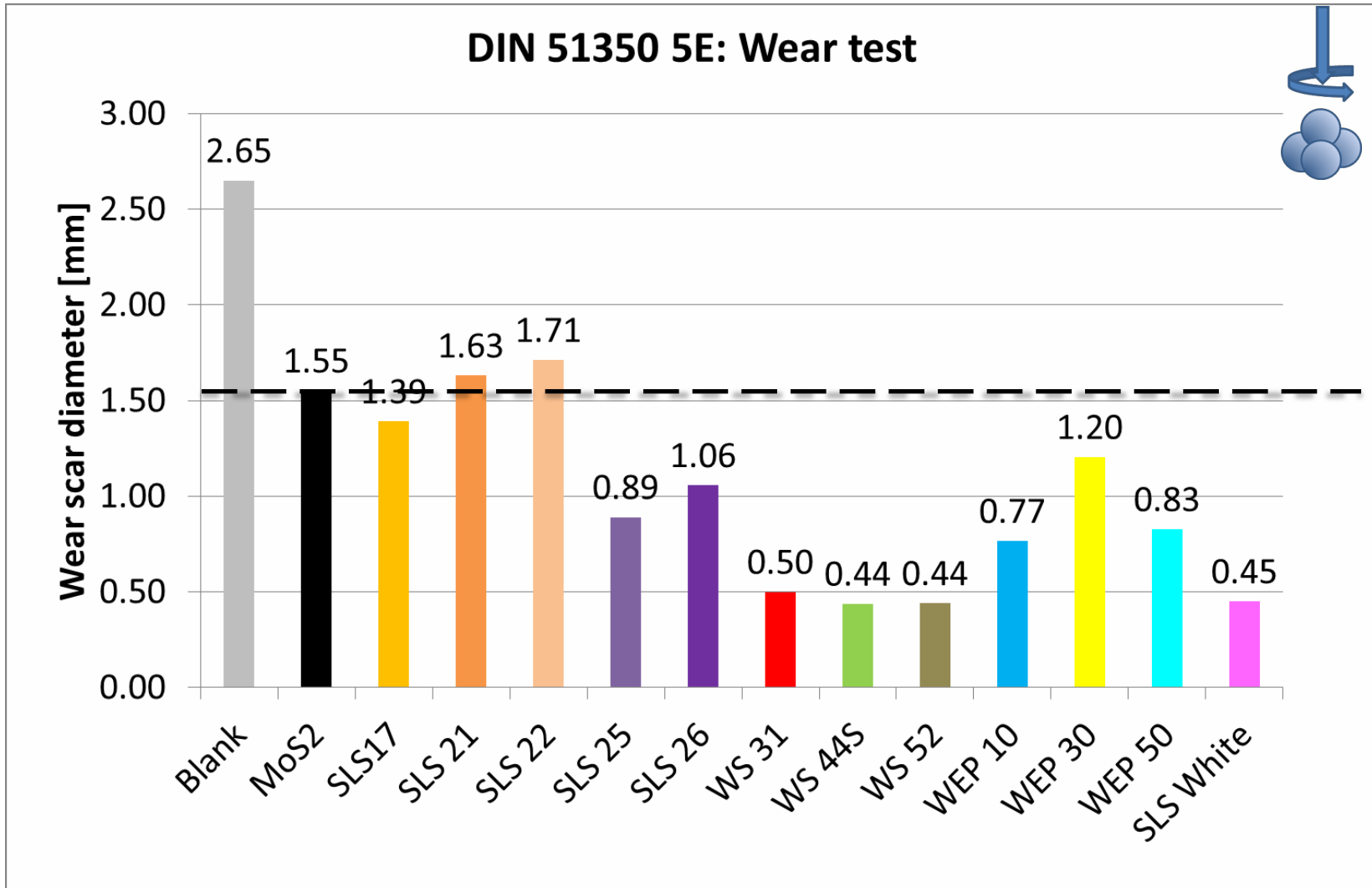
Tribotecc® – Rotating Tests – 四球实验

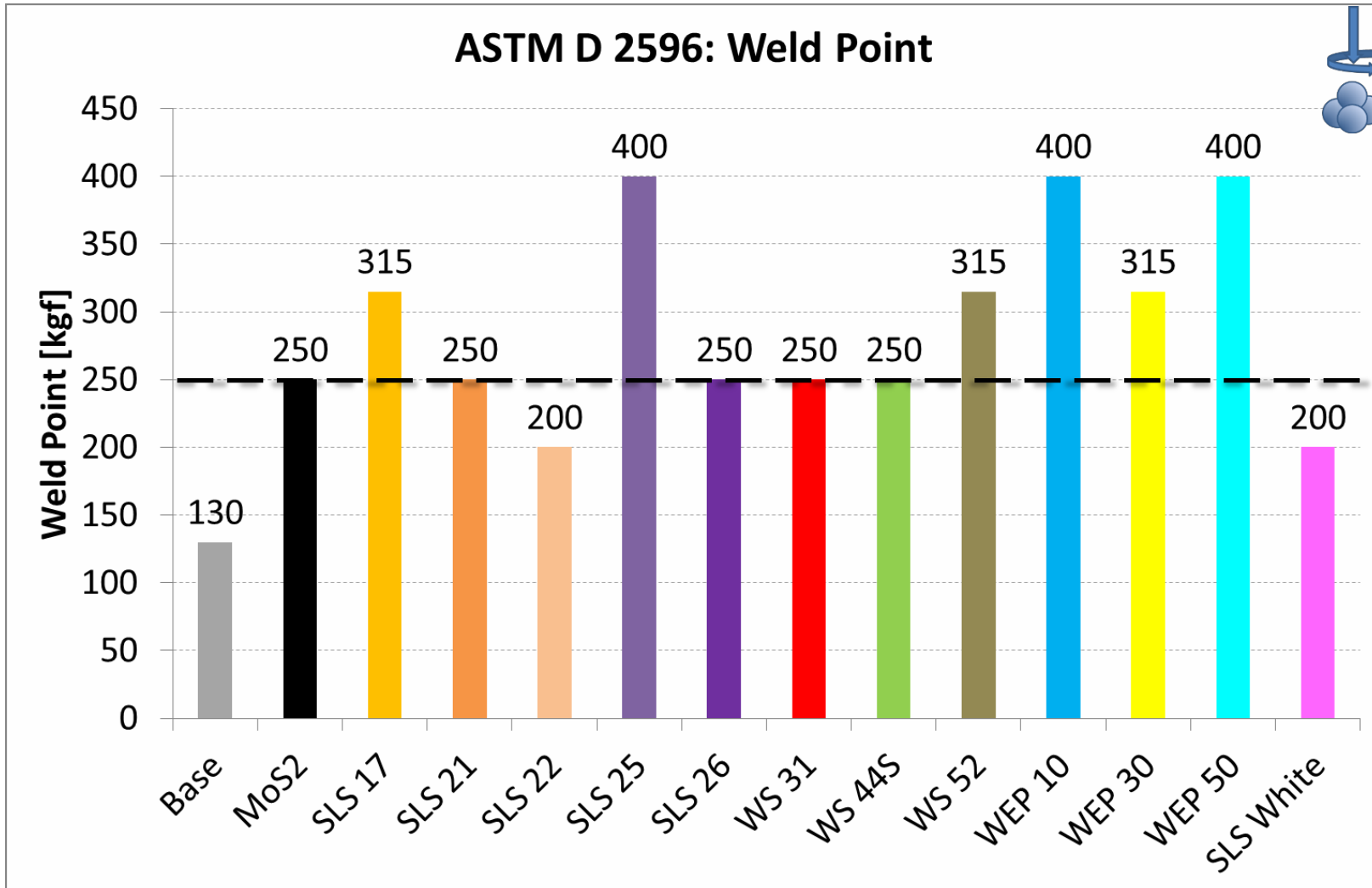


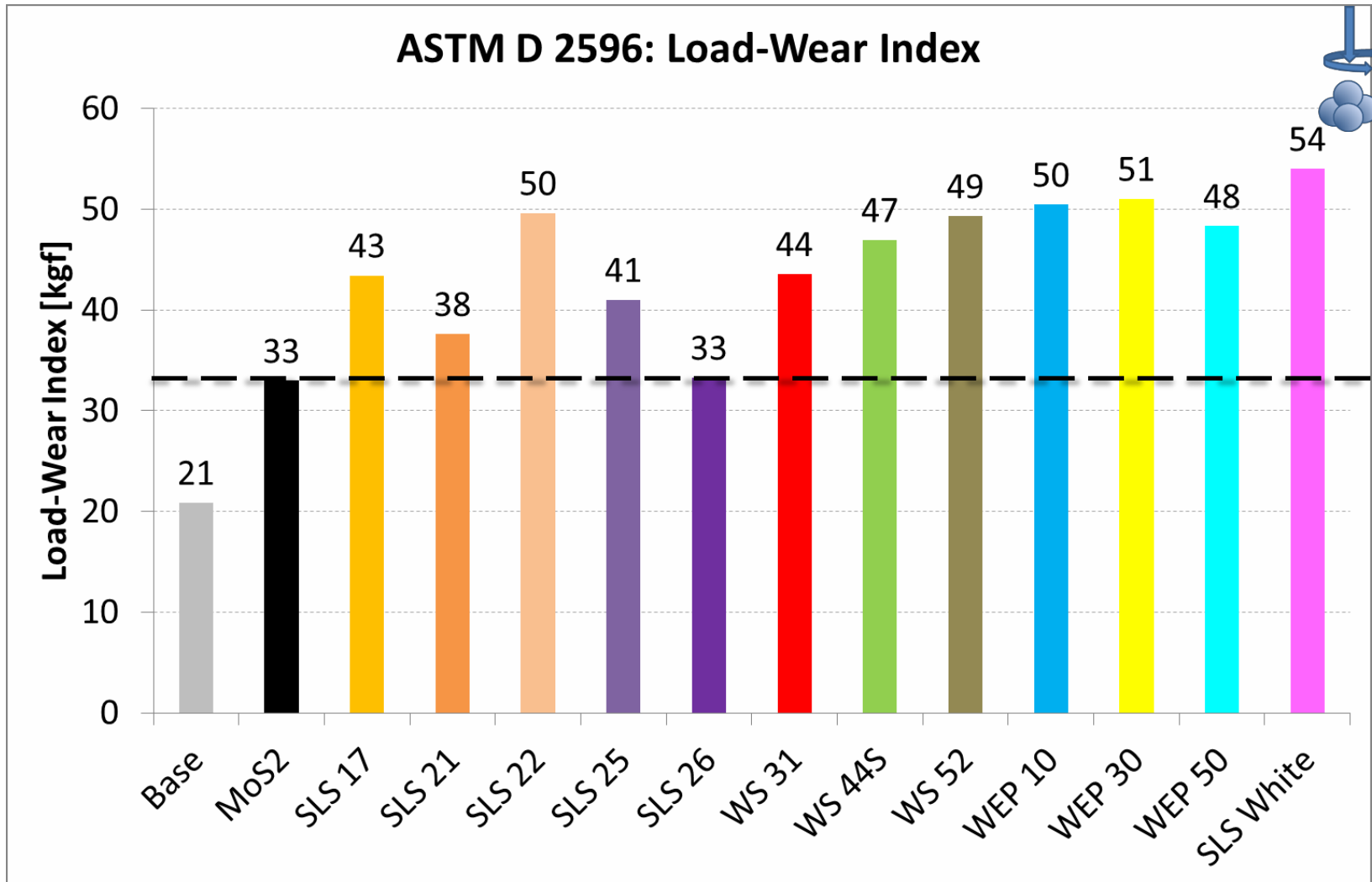
正常负荷:
旋转速度:

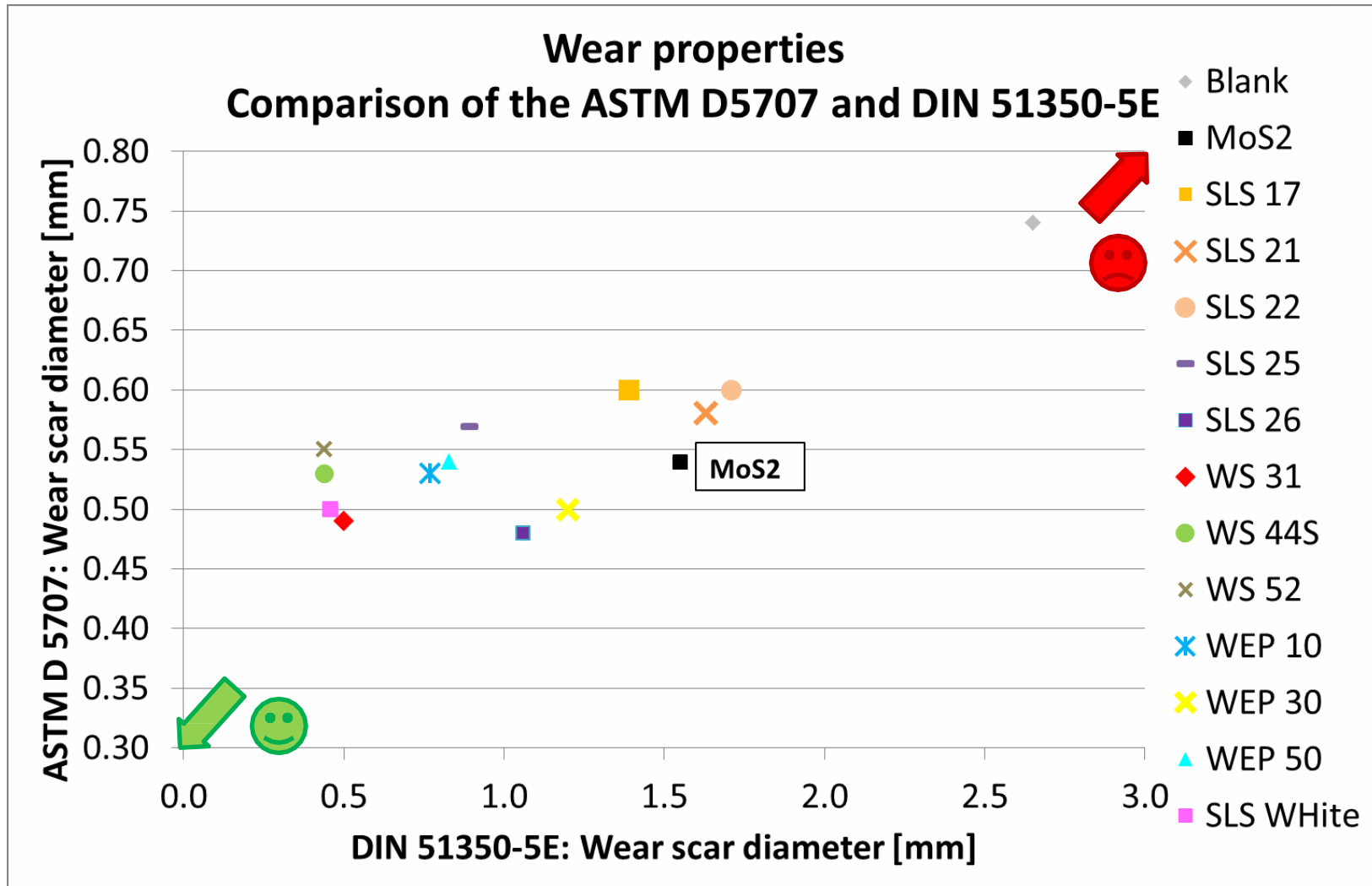
100 – 12000 N
10 - 3000 rpm

方法	结果	温度 [°C]	转速 [rpm]	时间 [秒]	负荷 [kg]
DIN 51350-05-E	磨损	18-40	1420	60	100
ASTM D 2596-97	负荷磨损指数 熔融点	27 ± 8	1770	10	Load steps









- Tribotecc® - WEP products exhibit superior lubricating properties and improved load carrying capacity and are suitable additives for heavy duty and mining applications.

Tribotecc® - WEP产品具有卓越的润滑性能和改善的承载能力，是重型和采矿应用的合适添加剂。

- Tribotecc® - SLS 17 and SLS 25 are light-colored solid lubricants with improved extreme pressure properties on four ball tests.

Tribotecc® - SLS 17和SLS 25是浅色固体润滑剂，并在四次球测试中具有改进的极压性能。

- Synthetic multiphase system Tribotecc® - WS 44S and WS 31 show excellent friction and wear behavior.

合成多相系列产品 Tribotecc® - WS 44S和WS 31具有出色的摩擦和耐磨损性能。

- Light-colored solid lubricants Tribotecc® - SLS 21 and SLS 22 offers outstanding performances in terms of extreme pressure behavior according to SRV tests.

浅色固体润滑剂 Tribotecc® - SLS 21和SLS 22根据SRV测试在极压性能方面表现出色。

Our customers and partners 客户及伙伴



bp



T DRIFCTION



Sintered Metallic Components



Contact 联络我们

中国指定代理商：
上海璞展实业有限公司
电话：021-60547912
传真：021-57810356
地址：上海市松江区高技路655号4幢
网址：www.shpuzhan.cn



Tribotecc GmbH 特博科有限公司 Member of Treibacher Group 特里巴赫集团成员

Kaerntner Strasse 7
1010 Vienna
Austria

Industriestrasse 23
9601 Arnoldstein
Austria

+43 1 512 56 11 0
+43 1 512 7839
office@tribotecc.at

+43 4255 21200
+43 4255 2092
office@tribotecc.at

www.tribotecc.at
www.treibacher.com