THK
The Mark of Linear Motion

润滑脂的选择方法

润滑脂的作用

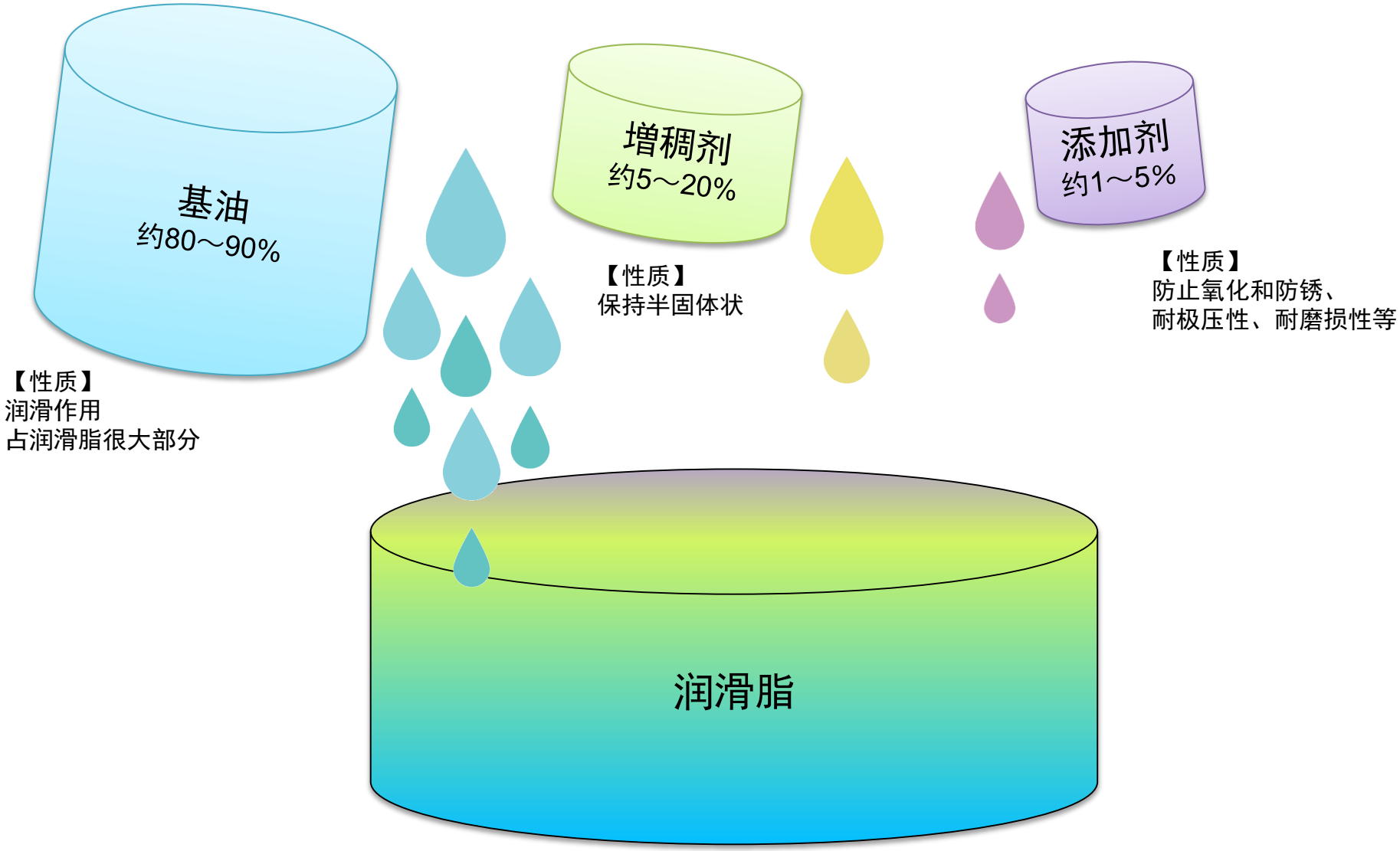
减小各运动部分的摩擦
防止烧伤、减少磨损

在滚动面形成油膜，
缓和作用于表面的应力，
延长滚动疲劳寿命

油膜覆盖金属表面，
防止生锈

润滑脂的组成

润滑脂 ＝ 基油 ＋ 增稠剂＋ 添加剂



润滑脂的硬度

根据「增稠剂」的用量多少，润滑脂的硬度会发生改变。

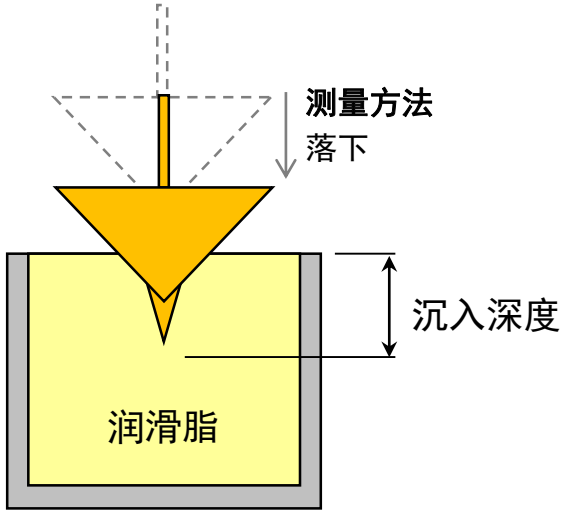
润滑脂的硬度通过混和稠度表示。
混和稠度的高低，一般对运行轻重有影响。

润滑脂的稠度

THK产品群

稠度编号	混和稠度	状态
№000	445 ～ 475	半流体
00	400 ～ 430	半流体
0	355 ～ 385	极软
1	310 ～ 340	软
2	265 ～ 295	中
3	220 ～ 250	稍硬
⋮	⋮	⋮

※JIS K 2220、ISO2137规定



稠度 ＝ 沉入深度 [mm] × 10

润滑脂选择表

润滑脂名		L100	L450	L500	L700	AFA	AFB-LF	AFC	AFE-CA	AFF	AFG	AFJ
特性		清洁环境 高负荷	机床用 （集中加脂）	高负荷 滚珠丝杠	医疗·医药 食品机械	低滑动	万能类型	耐微动磨损	清洁环境	清洁环境	对应滚珠丝杠 发热	宽速度范围
基油		高级合成油	精制矿物油	精制矿物油	高级合成油	高级合成油	精制矿物油	高级合成油	高级合成油	高级合成油	高级合成油	精制矿物油
增稠剂		复合锂基	尿素类	复合锂基	复合磺化钙	尿素类	锂基	尿素类	尿素类	锂基	尿素类	尿素类
特征	低滑动	—	—	—	—	○	—	—	—	—	○	○
	微振动	—	○	—	—	○	—	○	—	○	○	○
	高负荷	◎	◎	◎	○	—	○	—	—	—	—	○
	低发尘（清洁环境）	○	—	—	—	—	—	—	◎	○	—	—
	耐水性	—	◎	—	◎	○	○	—	—	—	○	—
	机械稳定性	○	○	○	○	—	○	○	○	○	—	○
混合稠度（25℃、60W）		294	411	327	314	285	275	288	280	315	285	325

※使用时，请避免混合不同的润滑脂。

THK的多数产品将AFB-LF润滑脂作为标准润滑脂。
AFB-LF润滑脂是万能润滑脂，耐极压性以及机械稳定性优异。

根据使用环境选择

需要选择适合使用环境的润滑脂。

洁净室

【THK推荐润滑脂】

AFE-CA

AFF

L100

低发尘性能优异。

高速运动部

【THK推荐润滑脂】

AFA

AFG

AFJ

因为基油动粘度小，
直线运动轻便，可进行高速运动。

冷却液飞溅环境

【THK推荐润滑脂】

L450

耐水性能优异。

※L450润滑脂可使用日本SKF(株)产的ECP泵。

※以上为部分事例，详细请参照产品目录。

根据使用环境选择

需要选择适合使用环境的润滑脂。

沾水环境

【THK推荐润滑脂】

L450

L700

耐水性能优异。

※L450润滑脂可使用日本SKF(株)产的ECP泵。

食品机械

【THK推荐润滑脂】

L700

即使偶然进入人体，也无须担心的润滑脂。
（取得NSF H1规格认证）

微小行程

【THK推荐润滑脂】

AFC

AFF

即便是微小行程
特殊添加剂也可带来预防磨损的效果。

※以上为部分事例，详细请参照产品目录。

请与THK协商洽谈！

在一直使用的润滑脂上
补充加入不同的润滑脂
来使用好吗？

有能够用于集中加脂
的润滑脂吗？

如果在高温环境、真空环境等
特殊环境中使用或者对于润滑脂
有疑问时，欢迎垂询THK！

可下载THK独创润滑脂的SDS（化学物质等安全数据图表）！

（※需要登陆技术支持网站并注册）

https://tech.thk.com

在技术支持网站里「技术信息」栏处可下载。
欢迎灵活使用！

长寿命高级润滑脂

AFA润滑脂

基础油：高级合成油
增稠剂：尿素类

AFA润滑脂是以高级合成油为基础油、使用尿素类增稠剂的长寿命高级润滑脂。

特　长

●长寿命润滑脂

与普通的金属皂基油脂不同，氧化稳定性优异，可长期使用。

●宽温度范围润滑脂

可在-45℃～+160℃的宽温度范围内保持优异的润滑性。
在低温度范围内具有较低的起动扭矩值。

●优异的耐水性

耐水性优异，水分混入产生的影响小。

●优异的机械稳定性

长时间使用也不易软化，机械稳定性优异。

【代表特征】

试验项目		代表特征值	试验方法
混和稠度 (25℃,60W)		285	JIS K 2220 7
滴点: ℃		261	JIS K 2220 8
铜板腐蚀 (100℃,24h)		合格	JIS K 2220 9
蒸发量: mass% (99℃,22h)		0.2	JIS K 2220 10
离油度: mass% (100℃,24h)		0.5	JIS K 2220 11
氧化稳定度: kPa (99℃,100h)		80	JIS K 2220 12
混和稳定度 (10万W)		329	JIS K 2220 15
水洗耐水度: mass% (38℃,1h)		0.6	JIS K 2220 16
低温扭矩: mN·m (−20℃)	起动	170	JIS K 2220 18
	旋转	70	
防锈试验: (52℃,48h)		合格	ASTM D1743-73
使用温度范围 (℃)		-45~160	—

【滚珠丝杠润滑脂的旋转扭矩试验】

<试验方法>
在KR4620A＋640L的导轨部涂敷1cc、滚珠丝杠部涂敷2cc润滑脂 (仅在初期封入)，然后测定电机各转速下的扭矩。
扭矩利用驱动扭矩监视器输出值进行测定。

滚珠丝杠使用不同润滑脂的旋转扭矩比较表　　单位: N·cm

使用润滑脂	运动粘度的中心值 CST (mm^2/S) (40℃)	运动粘度范围 CST (mm^2/S) (40℃)	转速			
			100min^{-1}	1000min^{-1}	2000min^{-1}	4000min^{-1}
AFA润滑脂	25	22.5～27.5	11.27	11.27	12.25	14.6
I公司制润滑脂	130	117～143	14.6	23.13	31.16	43.12
K公司制润滑脂	15.3	13.8～16.8	12.64	12.05	13.03	14.41
润滑油 VG32	32	28.8～35.2	11.17	10.78	13.43	14.7

注) 其他公司的润滑脂为低扭矩润滑脂。

长寿命万能润滑脂

AFB-LF润滑脂

基础油：精制矿物油
增稠剂：锂基

AFB-LF润滑脂是以精制矿物油为基础油、使用锂基增稠剂的万能润滑脂。耐极高压性能及机械稳定性优异。

特　长

●优异的耐极高压性

由于使用了特殊添加剂，与市售的万能锂基润滑脂相比，耐摩擦性和耐极高压性优异。

●优异的机械稳定性

长时间使用也不易软化，机械稳定性优异。

●优异的耐水性

受水影响小，不会因水分混入而产生软化和降低耐极高压性。

高速四球试验 含水10%	AFB-LF润滑脂	普通锂基润滑脂
无焦化最大负荷 (N)	784	618
熔接负荷 (N)	1961	1569
负荷磨损指数 (N)	363	289

●长寿命

润滑寿命是普通锂皂基润滑脂的数倍。因此，可延长给脂时间间隔，从而降低成本、减轻维护负担。

【代表特征】

试验项目	代表特征值	试验方法
混和稠度 (25℃,60W)	275	JIS K 2220 7
滴点: ℃	193	JIS K 2220 8
铜板腐蚀 (100℃,24h)	合格	JIS K 2220 9
蒸发量: mass% (99℃,22h)	0.36	JIS K 2220 10
离油度: mass% (100℃,24h)	0.6	JIS K 2220 11
氧化稳定度: kPa (99℃,100h)	15	JIS K 2220 12
混和稳定度 (10万W)	345	JIS K 2220 15
梯姆肯耐负荷性能: N	204	JIS K 2220 20
水洗耐水度: mass% (38℃,1h)	1.8	JIS K 2220 16
防锈试验: (52℃,48h)	合格	ASTM D1743-73
使用温度范围 (℃)	-15～100	—

【润滑脂寿命数据比较】

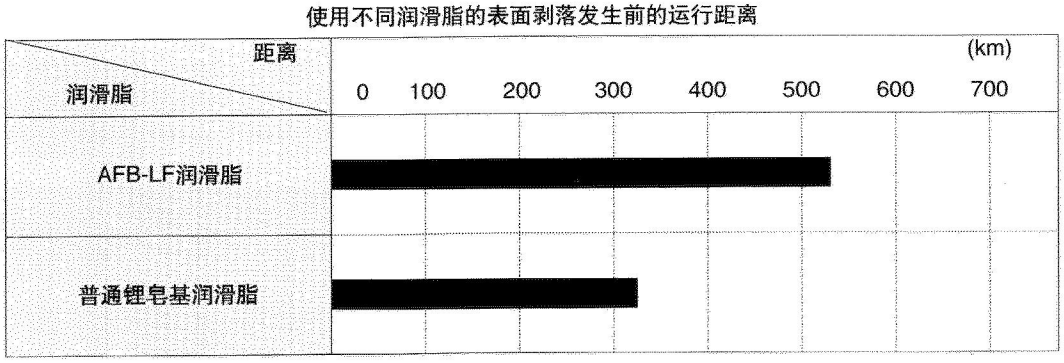
<试验品>

LM滚动导轨HSR25CA1SS＋600L

<试验条件>

负荷　：9.8kN/1个滑块
行程　：350mm
速度　：30m/min (MAX)
时间常数　：200msec
给脂量　：4g/1个滑块 (仅在初期封入)

使用不同润滑脂的表面剥落发生前的运行距离



耐微动腐蚀用润滑脂

AFC润滑脂

基础油：高级合成油
增稠剂：尿素类

AFC润滑脂使用以高级合成油为基础油的尿素类增稠剂和特殊添加剂，是耐微动腐蚀性非常优异的润滑脂。

特　长

●优异的耐微动腐蚀性
为发挥优异的耐微动腐蚀效果而开发的润滑脂。

●长寿命润滑脂
与普通的金属皂基油脂不同，氧化稳定性优异，可长期使用、减轻维护负担。

●宽温度范围润滑脂
由于采用高级合成油作为基础油，可在-54℃～+177℃的宽温度范围内保持良好的润滑特性。

【代表特征】

试验项目		代表特征值	试验方法
混和稠度 (25℃,60W)		288	JIS K 2220 7
滴点: ℃		269	JIS K 2220 8
铜板腐蚀 (100℃,24h)		合格	JIS K 2220 9
蒸发量: mass% (177℃,22h)		7.9	JIS K 2220 10
离油度: mass% (177℃,24h)		2	JIS K 2220 11
氧化稳定度: kPa (99℃,100h)		50	JIS K 2220 12
杂质: 个/cm³	25～75μm	370	JIS K 2220 13
	75μm以上	0	
混和稳定度 (10万W)		341	JIS K 2220 15
水洗耐水度: mass% (38℃,1h)		0.6	JIS K 2220 16
低温扭矩: mN·m (－54℃)	起动	630	JIS K 2220 18
	旋转	68	
防锈试验: (52℃,48h)		合格	ASTM D1743-73
振动试验 (200h)		合格	—
使用温度范围 (℃)		-54～177	—

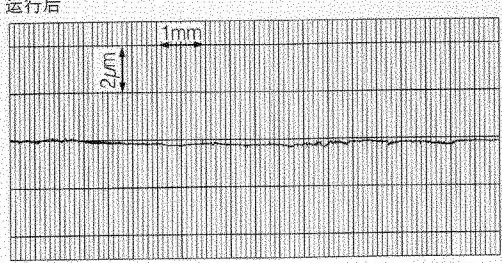
【耐微动腐蚀性试验数据】
<试验条件>

项　目	试验条件
行　　程	3mm
每分钟的行程	200min⁻¹
总 行 程 数	2.88×10⁵ (24小时)
面　　压	1118MPa
润滑脂封入量	12g/1LM个 (每8小时给脂一次)

AFC润滑脂

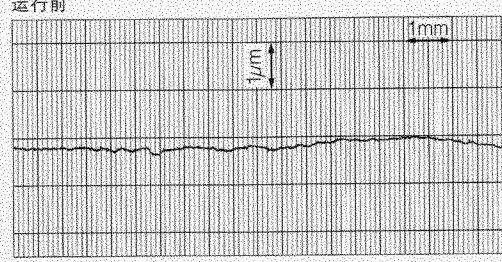
运行前

运行后

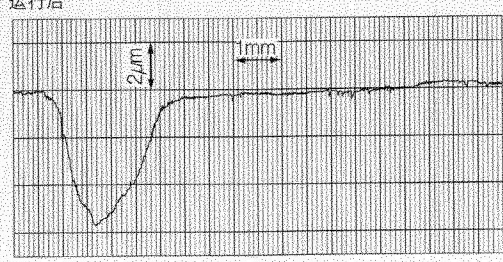


普通轴承用润滑脂

运行前



运行后



最适合半导体关联装置的低发尘润滑脂

AFE-CA润滑脂

基础油：高级合成油
增稠剂：尿素类

AFE-CA润滑脂以高级合成油为基础油并使用尿素类增稠剂，是低发尘特性非常优异的润滑脂。

特　长

●低发尘润滑脂

与传统的低发尘用真空润滑脂相比，发尘量少，适合在无尘室内使用。

●长寿命润滑脂

与普通的金属皂基油脂不同，氧化稳定性优异，可长期使用、减轻维护负担。

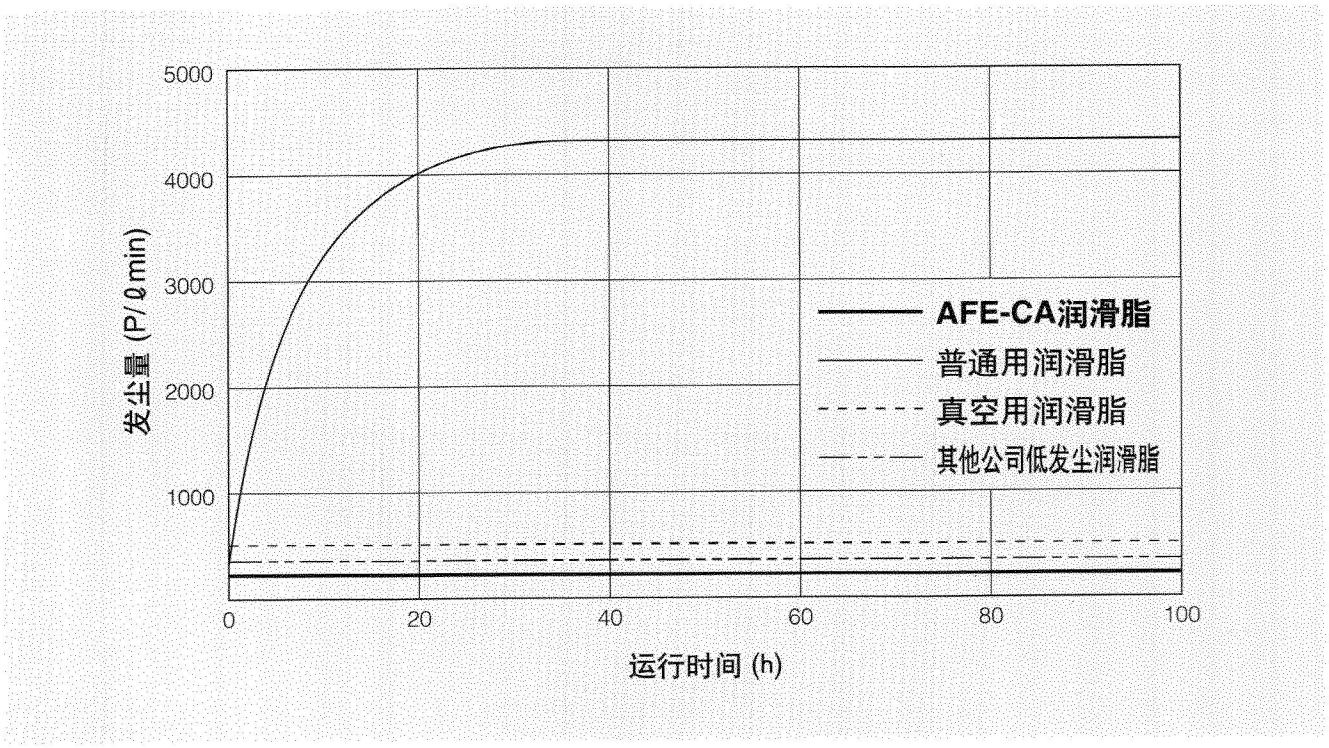
【低发热特性的试验数据】

<试验条件>

项　目	内　容
试件型号	KR4610型
滚珠丝杠转速	1000min^{-1}
行　程	210mm
润滑脂封入量	丝杠、LM滚珠导轨各2cc
测量流动速率	1 ℓ /min
测　量　器	计尘器
颗粒大小	0.5 μm

【代表特征】

试验项目		代表特征值	试验方法
混和稠度 (25℃,60W)		260	JIS K 2220 7
滴点: ℃		258	JIS K 2220 8
铜板腐蚀 (100℃,24h)		合格	JIS K 2220 9
蒸发量: mass% (99℃, 22h)		0.1	JIS K 2220 10
离油度: mass% (100℃, 24h)		0.8	JIS K 2220 11
氧化稳定度: kPa (99℃, 100h)		20	JIS K 2220 12
杂质: 个/cm^3	75 μm以上	0	JIS K 2220 13
	125 μm以上	0	
混和稳定度 (10万W)		311	JIS K 2220 15
低温扭矩: mN·m (−20℃)	起动	130	JIS K 2220 18
	旋转	78	
表观粘度Pa·s (−10℃, 10s^{-1})		250	JIS K 2220 19
轴承防锈 (52℃, 48h)		合格	ASTM D1743-73
使用温度范围 (℃)		-40～180	—



最适合精密定位的无尘环境用润滑脂

AFF润滑脂

基础油：高级合成油
增稠剂：锂基

AFF润滑脂使用高级合成油、锂基增稠剂及特殊添加剂，滚动阻力值稳定、低发尘和耐微动磨损性优异，这些是传统的真空润滑脂及低发尘润滑脂所不具备的。

特　长

●稳定的滚动阻力值

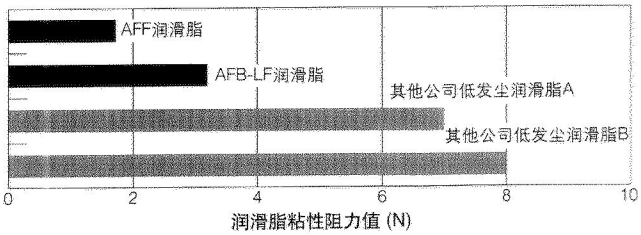
粘性阻力值低，滚动阻力变动小，因此低速时的随动性优异。

【润滑脂粘性阻力值的测定数据】

<试验条件>

项　目	内　容
使　用　型　号	HSR25A1C1＋580LP
润滑脂封入量	3cm³/1个LM滑块 (仅在初期封入)
进　给　速　度	10mm/s

• 润滑脂粘性阻力值　(温度: 23°C)



●耐微动磨损性

耐微动磨损性优异，可延长润滑时间间隔。

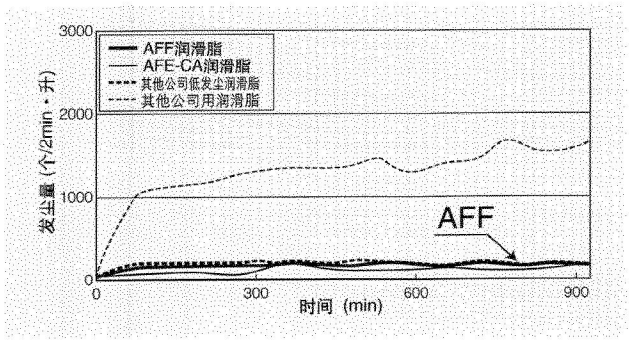
●优异的低发尘性

低发尘性能优异，适用于无尘室。

【低发尘特性的试验数据】

<试验条件>

项　目	内　容
使　用　型　号	SR20W1＋280LP
润滑脂封入量	1cm³/1个LM滑块 (仅在初期封入)
空气供给量	500cm³/min
测　量　器	颗粒计数器
测定颗粒大小	0.3μm以上
进　给　速　度	30m/min
行　　程	200mm



【代表特征】

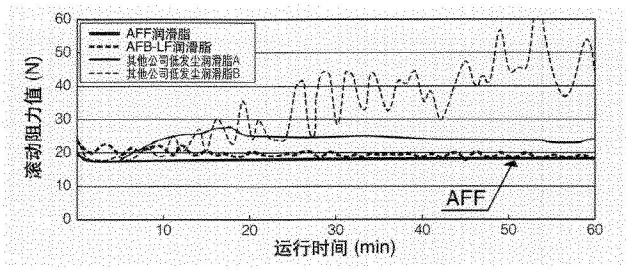
试验项目		代表特征值	试验方法
混和稠度 (25°C,60W)		315	JIS K 2220 7
滴点: °C		216	JIS K 2220 8
铜板腐蚀 (100°C,24h)		合格	JIS K 2220 9
蒸发量: mass% (99°C,22h)		0.43	JIS K 2220 10
离油度: mass% (100°C,24h)		0.57	JIS K 2220 11
氧化稳定度: kPa (99°C,100h)		39	JIS K 2220 12
杂质: 个/cm³	25μm以上	0	JIS K 2220 13
	75μm以上	0	
	125μm以上	0	
混和稳定度 (10万W)		329	JIS K 2220 15
低温扭矩: mN·m (−20°C)	起动	220	JIS K 2220 18
	旋转	40	
表观粘度: Pa·s (−10°C,10s⁻¹)		340	JIS K 2220 19
梯姆肯耐负荷性能: N		88.2	JIS K 2220 20
4球试验 (熔接负荷): N		3089	ASTM D2596
耐微动磨损性能: mg		3.8	按照ASTM D4170标准
轴承防锈: (52°C,48h)		合格	ASTM D1743-73
使用温度范围 (°C)		−40～120	—

●低速时的滚动阻力特性

【低速时的滚动阻力值试验数据】

<试验条件>

项　目	内　容
试　　验　　品	HSR35RC0＋440LP
润滑脂封入量	4cm³/1个LM滑块 (仅在初期封入)
进　给　速　度	1mm/s
行　　程	3mm



低发热特性优异的滚珠丝杠用润滑脂

AFG润滑脂

基础油：高级合成油
增稠剂：尿素类

AFG润滑脂以高级合成油为基础油，使用尿素类增稠剂，低发热特性优异，可适用于从低温到高温的宽温度范围，是滚珠丝杠用高级润滑脂。

特　长

●低发热
粘性阻力低，高速使用时也可控制发热。

●低粘性
粘性阻力低，旋转扭矩值小。

●宽温度范围
可在－45℃～＋160℃的宽温度范围内保持优异的润滑性。

●长寿命
长时间使用也不易软化，氧化稳定性优异。

●耐水性
不易受水的影响，不会因水分混入而产生软化或降低耐极高压性等。

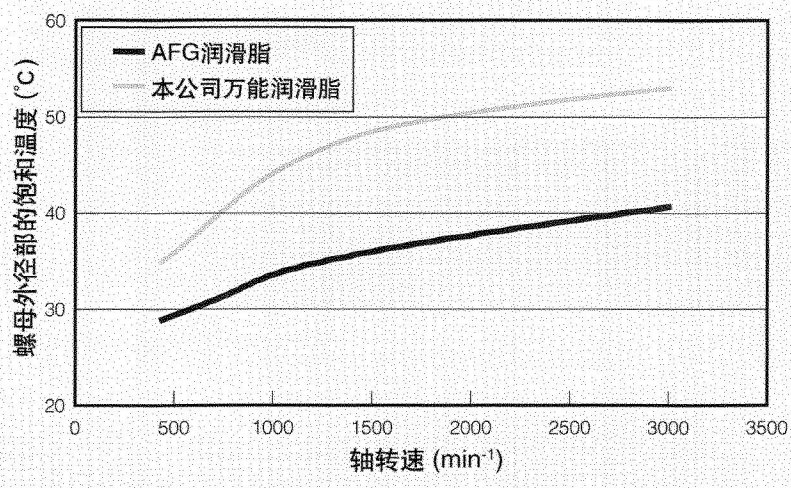
【代表特征】

试验项目		代表特征值	试验方法
混和稠度 (25℃,60W)		285	JIS K 2220 7
滴点: ℃		261	JIS K 2220 8
铜板腐蚀 (100℃,24h)		合格	JIS K 2220 9
蒸发量: mass% (99℃,22h)		0.2	JIS K 2220 10
离油度: mass% (100℃,24h)		0.5	JIS K 2220 11
氧化稳定度: kPa (99℃,100h)		80	JIS K 2220 12
混和稳定度 (10万W)		329	JIS K 2220 15
水洗耐水度: mass% (38℃,1h)		0.6	JIS K 2220 16
低温扭矩: mN·m (－20℃)	起动	170	JIS K 2220 18
	旋转	70	
轴承防锈: (52℃,48h)		合格	ASTM D1743-73
使用温度范围 (℃)		-45～160	—

【低发热特性的试验数据】

<试验条件>

项　目	内　容
轴径／导程	32/10mm
进给速度	67～500mm/s
轴转速	400～3000min^{-1}
行程	400mm
润滑脂封入量	12cm^3
温度测定位置	螺母外径部



适用于宽速度范围的高级润滑脂

AFJ润滑脂

基础油：精制矿物油
增稠剂：尿素类

THK AFJ润滑脂以精制矿物油为基础油，使用尿素类增稠剂、特殊添加剂，是从低速到高速的宽速度范围内润滑性优异的润滑脂。

特　长

●宽速度范围
从低速到高速的宽速度范围内发挥稳定的润滑性。

●耐磨损性
即使在低速时油膜形成能力也非常优异，从而可减轻磨损。

●耐振动性
减轻高速时产生的机械振动引起的磨损。

●低滚动阻力
可在宽速度范围内降低LM滚动导轨及滚珠丝杠的滚动阻力。

●高压送性
可在自动给脂系统中发挥优异的压送性。

【代表特征】

试验项目		代表特征	试验方法
混和稠度: (25℃, 60W)		325	JIS K 2220 7
滴点: ℃		185	JIS K 2220 8
铜板腐蚀 (100℃, 24h)		合格	JIS K 2220 9
蒸发量: mass% (99℃, 22h)		0.6	JIS K 2220 10
离油度: mass% (100℃, 24h)		7.0	JIS K 2220 11
氧化稳定性: kPa (99℃, 100h)		10	JIS K 2220 12
混和稳定性: (10万W, 25℃)		360	JIS K 2220 15
低温扭矩: mN·m (−20℃)	起动	380	JIS K 2220 18
	旋转	130	
轴承防锈 (52℃, 48h)		合格	ASTM D 1743-73
4球试验 (熔接负荷): N		3089	ASTM D 2596
使用温度范围 (℃)※1		-20~120(150)	—

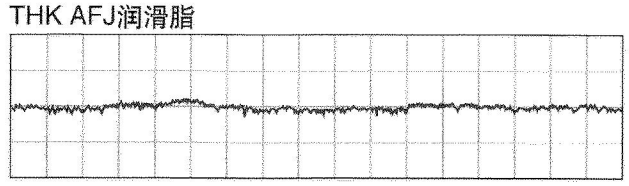
※1 （ ）为瞬间使用温度。

【LM滚动导轨滑块磨损量测定】

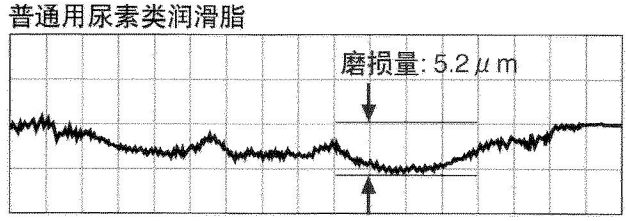
<试验条件>

项　目	内　容
使用型号	NRS55B2SS+780LP
负荷荷重	5.9kN
进给速度	0.1m/min
行程	200mm
润滑脂封入量	12cm/1LM滑块 (仅在初期封入)
试验时间	480小时

THK AFJ润滑脂



普通用尿素类润滑脂

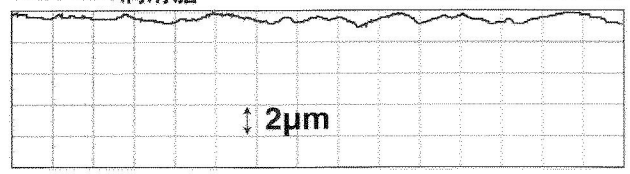


【LM滚动导轨轨道耐振动性的试验数据】

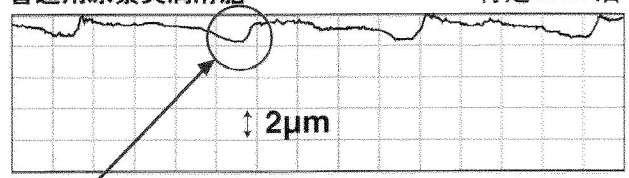
<试验条件>

项　目	内　容
使用型号	SHS25R1UU+580LP
负荷荷重	11.05kN(0.35C)
进给速度	60m/min
加减速	9.8m/s^2
行程	350mm
润滑脂封入量	2cm^3/1个滑块

THK AFJ润滑脂　行走434km后



普通用尿素类润滑脂　行走86km后



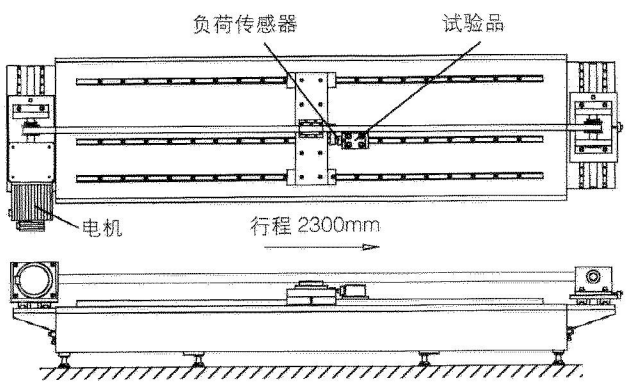
"磨损产生机理"

高速·高加减速的动作模式 → 产生机械振动 → 滚动槽产生磨损

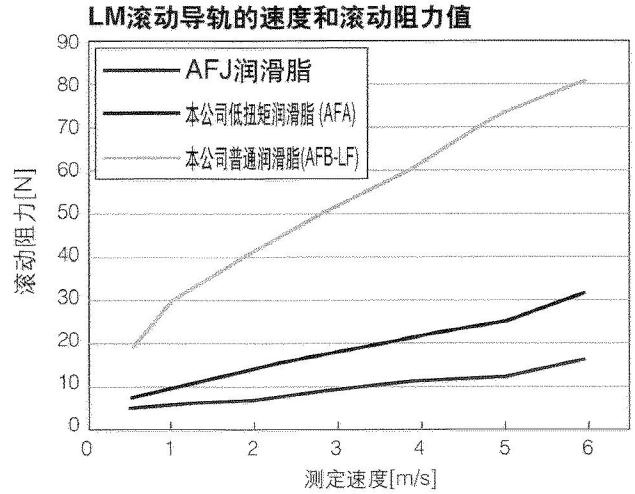
【LM滚动导轨滚动阻力测定】

<试验条件>

项　目	内　容
使用型号	SHS25R1UU+3000L
负荷荷重	无负荷
加速度	29.4m/s^2(3G)
行程	2300mm
试验时温度	21°C
润滑脂封入量	2cm^3/1个滑块
测定速度	0.5, 1, 2, 3, 4, 5, 6m/s



LM滚动导轨的速度和滚动阻力值



SAFETY DATA SHEET

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1. Product identifier

Trade name or designation of the mixture	AFC GREASE
Registration number	-
Synonyms	None.
SDS number	1030-T21996-2
Product code	AFC+70, AFC+400
Issue date	17-February-2012
Version number	03
Revision date	29-September-2019
Supersedes date	03-December-2015

1.2. Relevant identified uses of the substance or mixture and uses advised against

Identified uses	Industrial lubricating grease (Package size 70gr and 400gr)
Uses advised against	None known.

1.3. Details of the supplier of the safety data sheet

THK Co.,LTD
HEAD OFFICE: 2-12-10, Shibaura, Minato-ku, Tokyo 108-8506 Japan
THK GmbH: Kaiserswerther Strasse 115, D-40880 Ratingen, Germany

Telephone	+49-(0)2102-7425-555 (THK GmbH)
E-mail	info-msds@thk.eu (THK GmbH), thk022@thk.co.jp (THK Co., LTD)
1.4. Emergency telephone number	+49-(0) 2102-7425-222 at workday 8 am - 5 pm (THK GmbH)

SECTION 2: Hazards identification

2.1. Classification of the substance or mixture

The mixture has been assessed and/or tested for its physical, health and environmental hazards and the following classification applies.

Classification according to Regulation (EC) No 1272/2008 as amended

This mixture does not meet the criteria for classification according to Regulation (EC) 1272/2008 as amended.

Hazard summary Not classified for health hazards. However, occupational exposure to the mixture or substance(s) may cause adverse health effects.

2.2. Label elements

Label according to Regulation (EC) No. 1272/2008 as amended

Hazard pictograms	None.
Signal word	None.
Hazard statements	The mixture does not meet the criteria for classification.

Precautionary statements

Prevention	Observe good industrial hygiene practices.
Response	Wash hands after handling.
Storage	Store away from incompatible materials.
Disposal	Dispose of containers in accordance with local authority requirements.

Supplemental label information EUH210 - Safety data sheet available on request.

2.3. Other hazards This mixture does not meet vPvB / PBT criteria of Regulation (EC) No 1907/2006, Annex XIII.

SECTION 3: Composition/information on ingredients

3.2. Mixtures

General information

Chemical name	%	CAS-No. / EC No.	REACH Registration No.	Index No.	Notes
3,3'-dicyclohexyl-1,1'-methylenebis (4,1-phenylene)diurea	1 - 15	Proprietary 406-370-3	-	616-094-00-7	
Classification: Aquatic Chronic 4;H413					

Chemical name	%	CAS-No. / EC No.	REACH Registration No.	Index No.	Notes
Benzenamine, N-phenyl-, reaction products with 2,4,4-trimethylpentene	1 - 5	Proprietary 270-128-1	-	-	
Classification: Aquatic Chronic 3;H412					
Phosphorodithioic acid, O,O-di-C1-14-alkyl esters, zinc salts	1 - 2	Proprietary 272-028-3	-	-	
Classification: Skin Irrit. 2;H315, Eye Irrit. 2;H319					
Sodium nitrite	0.1 - 1	Proprietary 231-555-9	-	007-010-00-4	
Classification: Ox. Sol. 3;H272, Acute Tox. 3;H301, Aquatic Acute 1;H400					
Distillates (petroleum), hydrotreated heavy paraffinic	0.1 - 0.5	64742-54-7 265-157-1	-	649-467-00-8	
Classification: -					L
Distillates (petroleum), hydrotreated light naphthenic	0.1 - 0.5	Proprietary 265-156-6	-	649-466-00-2	
Classification: -					L

List of abbreviations and symbols that may be used above

Note L: The classification as a carcinogen need not apply if it can be shown that the substance contains less than 3 % DMSO extract as measured by IP 346 "Determination of polycyclic aromatics in unused lubricating base oils and asphaltene free petroleum fractions - Dimethyl sulphoxide extraction refractive index method", Institute of Petroleum, London. This note applies only to certain complex oil-derived substances in Part 3.
The two petroleum substances in the product – Distillates (petroleum), hydrotreated heavy paraffinic - Distillates (petroleum), hydrotreated light naphthenic - contain less than 3 % DMSO extract as measured by IP 346.

Composition comments All concentrations are in percent by weight unless ingredient is a gas. Gas concentrations are in percent by volume. The full text for all H-statements is displayed in section 16.
Due to the high viscosity the product is not an aspiration hazard.

SECTION 4: First aid measures

General information First aid personnel must be aware of own risk during rescue.

4.1. Description of first aid measures

Inhalation Move affected person into fresh air and keep warm. If breathing is difficult, give oxygen. Get medical attention if any discomfort continues.

Skin contact Remove contaminated clothing. Wash with soap and water. Get medical attention if irritation develops and persists.

Eye contact Flush thoroughly with water. If irritation occurs, get medical assistance. Make sure to remove any contact lenses from the eyes before rinsing.

Ingestion Immediately rinse mouth and drink plenty of water. Never give anything by mouth to an unconscious person. Get medical attention if any discomfort continues.

4.2. Most important symptoms and effects, both acute and delayed Inhalation of oil mist or vapours formed during heating of the product will irritate the respiratory system and provoke coughing.

4.3. Indication of any immediate medical attention and special treatment needed Treat symptomatically. The effects might be delayed.

SECTION 5: Firefighting measures

General fire hazards The product is not flammable.

5.1. Extinguishing media

Suitable extinguishing media Extinguish with foam, carbon dioxide or dry powder.

Unsuitable extinguishing media Do not use water or halogenated extinguishing media.

5.2. Special hazards arising from the substance or mixture Thermal decomposition may produce smoke, oxides of carbon and lower molecular weight organic compounds whose composition have not been characterised.

5.3. Advice for firefighters

Special protective equipment for firefighters Selection of respiratory protection for firefighting: follow the general fire precautions indicated in the workplace. Self-contained breathing apparatus, operated in positive pressure mode and full protective clothing must be worn in case of fire.

Special fire fighting procedures Use standard firefighting procedures and consider the hazards of other involved materials. Containers close to fire should be removed or cooled with water.

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

For non-emergency personnel	Avoid contact with skin. Wear suitable protective clothing, gloves and eye/face protection. In case of spills, beware of slippery floors and surfaces.
For emergency responders	Keep unnecessary personnel away.
6.2. Environmental precautions	Do not contaminate water. Contact local authorities in case of spillage to drain/aquatic environment.
6.3. Methods and material for containment and cleaning up	Absorb spillage with non-combustible, absorbent material. Clean contaminated area with oil-removing material.
6.4. Reference to other sections	See Section 8 for personal protective equipment. For waste disposal, see section 13 of the SDS.

SECTION 7: Handling and storage

7.1. Precautions for safe handling	Avoid contact with skin. Always remove grease with soap and water or skin cleaning agent, never use organic solvents. Wear appropriate personal protective equipment. Be aware of potential for surfaces to become slippery. Observe good industrial hygiene practices.
7.2. Conditions for safe storage, including any incompatibilities	Keep container in a well-ventilated place. Store away from incompatible materials.
7.3. Specific end use(s)	Industrial lubricating grease.

SECTION 8: Exposure controls/personal protection

8.1. Control parameters

Occupational exposure limits	No exposure limits noted for ingredient(s).
Biological limit values	No biological exposure limits noted for the ingredient(s).
Recommended monitoring procedures	Follow the schedule for work place measurements.
Derived no effect levels (DNELs)	Not available.
Predicted no effect concentrations (PNECs)	Not available.

8.2. Exposure controls

Appropriate engineering controls	Provide adequate ventilation and minimise the risk of inhalation of vapours and oil mist. Provide access to washing facilities including soap, skin cleanser and fatty cream.

Individual protection measures, such as personal protective equipment

General information	Use personal protective equipment as required. Keep working clothes separately. Personal protective equipment should be chosen according to the CEN standards and in discussion with the supplier of the personal protective equipment.
Eye/face protection	Wear approved safety goggles.
Skin protection	
- Hand protection	Wear protective gloves. Where hand contact with the product may occur the use of gloves approved to relevant standards (e.g. Europe: EN374, US: F739) made from the following materials may provide suitable chemical protection. PVC, neoprene or nitrile rubber gloves Suitability and durability of a glove is dependent on usage, e.g. frequency and duration of contact, chemical resistance of glove material, dexterity. Always seek advice from glove suppliers. Contaminated gloves should be replaced. Personal hygiene is a key element of effective hand care. Gloves must only be worn on clean hands. After using gloves, hands should be washed and dried thoroughly. Application of a non-perfumed moisturizer is recommended. For continuous contact we recommend gloves with breakthrough time of more than 240 minutes with preference for > 480 minutes where suitable gloves can be identified. For short-term/splash protection we recommend the same, but recognize that suitable gloves offering this level of protection may not be available and in this case a lower breakthrough time maybe acceptable so long as appropriate maintenance and replacement rules are followed. Glove thickness is not a good predictor of glove resistance to a chemical as it is dependent on the exact composition of the glove material. Glove thickness should be typically greater than 0.35 mm depending on the glove manufacturer and model.
- Other	Wear appropriate clothing to prevent repeated or prolonged skin contact.
Respiratory protection	In case of inadequate ventilation or risk of inhalation of oil mist, suitable respiratory equipment with combination filter (type A2/P2) can be used.
Thermal hazards	When material is heated, wear gloves to protect against thermal burns.
Hygiene measures	Always observe good personal hygiene measures, such as washing after handling the material and before eating, drinking, and/or smoking. Routinely wash work clothing and protective equipment to remove contaminants.

Environmental exposure controls	Contain spills and prevent releases and observe national regulations on emissions.

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

Appearance	Buttery.
Physical state	Solid.
Form	Buttery.
Colour	Brown.
Odour	Mild.
Odour threshold	Not available.
pH	Not available.
Melting point/freezing point	Not available.
Initial boiling point and boiling range	Not available.
Flash point	201.0 °C (393.8 °F) Setaflash Closed Cup (ISO 3679)
Evaporation rate	Not available.
Flammability (solid, gas)	No data available.
Upper/lower flammability or explosive limits	
Flammability limit - lower (%)	Not available.
Flammability limit - upper (%)	Not available.
Vapour pressure	Not available.
Vapour density	Not available.
Relative density	0.9
Solubility(ies)	Not available.
Partition coefficient (n-octanol/water)	Not available.
Auto-ignition temperature	Not available.
Decomposition temperature	Not available.
Viscosity	Not available.
Explosive properties	Not explosive.
Oxidising properties	Not oxidising.
9.2. Other information	No relevant additional information available.

SECTION 10: Stability and reactivity

10.1. Reactivity	This product may react with strong oxidising agents.
10.2. Chemical stability	Stable at normal conditions.
10.3. Possibility of hazardous reactions	Will not occur.
10.4. Conditions to avoid	Heat, sparks, flames, elevated temperatures.
10.5. Incompatible materials	Strong oxidising agents.
10.6. Hazardous decomposition products	Carbon oxides. Nitrogen oxides (NOx). Sulphur oxides. Sodium oxides. Phosphorus oxides. Calcium oxides. Silicon oxides. Aluminum oxides. Formaldehyde. PAH (polycyclic aromatic hydrocarbons).

SECTION 11: Toxicological information

General information	Occupational exposure to the substance or mixture may cause adverse effects.
Information on likely routes of exposure	
Inhalation	Inhalation of oil mist or vapours formed during heating of the product will irritate the respiratory system and provoke coughing.
Skin contact	Prolonged or frequent contact may cause redness, itching, irritation, eczema/chaps and oil acne.
Eye contact	May cause eye irritation on direct contact.
Ingestion	Ingestion may cause irritation and malaise.
Symptoms	Inhalation of oil mist or vapours formed during heating of the product will irritate the respiratory system and provoke coughing.

11.1. Information on toxicological effects

Acute toxicity The harmful effects may increase in used grease.

Components	Species	Test Results
Sodium nitrite (CAS Proprietary)		
Acute		
Inhalation		
LC50	Rat	5.5 mg/l, 4 Hours
Oral		
LD50	Rat	158 mg/kg

Skin corrosion/irritation Prolonged skin contact may cause temporary irritation.

Serious eye damage/eye irritation May cause eye irritation on direct contact.

Respiratory sensitisation Due to lack of data the classification is not possible.

Skin sensitisation Due to lack of data the classification is not possible.

Germ cell mutagenicity Due to lack of data the classification is not possible.

Carcinogenicity Prolonged and repeated contact with used grease may cause serious skin diseases, such as dermatitis and skin cancer.

IARC Monographs. Overall Evaluation of Carcinogenicity

Sodium nitrite (CAS Proprietary) 2A Probably carcinogenic to humans.

Reproductive toxicity Due to lack of data the classification is not possible.

Specific target organ toxicity - single exposure Due to lack of data the classification is not possible.

Specific target organ toxicity - repeated exposure Due to lack of data the classification is not possible.

Aspiration hazard Based on viscosity, the product is not anticipated to be an aspiration hazard.

Mixture versus substance information The product is a mixture.

Other information No data available.

SECTION 12: Ecological information

12.1. Toxicity The product contains a substance which is very toxic to aquatic organisms.

Components		Species	Test Results
Sodium nitrite (CAS Proprietary)			
Aquatic			
Crustacea	EC50	Greasyback shrimp (Metapenaeus ensis)	16.14 - 26.61 mg/l, 48 hours
Fish	LC50	Rainbow trout,donaldson trout (Oncorhynchus mykiss)	0.15 - 0.25 mg/l, 96 hours

12.2. Persistence and degradability None known.

12.3. Bioaccumulative potential None known.

Partition coefficient n-octanol/water (log Kow) Not available.

Bioconcentration factor (BCF) Not available.

12.4. Mobility in soil Not known.

Mobility in general The product contains substances, which are insoluble in water and which may spread on water surfaces.

12.5. Results of PBT and vPvB assessment This mixture does not meet vPvB / PBT criteria of Regulation (EC) No 1907/2006, Annex XIII.

12.6. Other adverse effects Not available.

SECTION 13: Disposal considerations

13.1. Waste treatment methods

Residual waste Dispose of in accordance with local regulations.

Contaminated packaging Since emptied containers retain product residue, follow label warnings even after container is emptied.

EU waste code 16 03 06

SECTION 14: Transport information

ADR

14.1. - 14.6.: Not regulated as dangerous goods.

RID

14.1. - 14.6.: Not regulated as dangerous goods.

ADN

14.1. - 14.6.: Not regulated as dangerous goods.

IATA

14.1. - 14.6.: Not regulated as dangerous goods.

IMDG

14.1. - 14.6.: Not regulated as dangerous goods.

14.7. Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code

Not available.

SECTION 15: Regulatory information

15.1. Safety, health and environmental regulations/legislation specific for the substance or mixture

EU regulations

Regulation (EC) No. 1005/2009 on substances that deplete the ozone layer, Annex I and II, as amended

Not listed.

Regulation (EC) No. 850/2004 On persistent organic pollutants, Annex I as amended

Not listed.

Regulation (EU) No. 649/2012 concerning the export and import of dangerous chemicals, Annex I, Part 1 as amended

Not listed.

Regulation (EU) No. 649/2012 concerning the export and import of dangerous chemicals, Annex I, Part 2 as amended

Not listed.

Regulation (EU) No. 649/2012 concerning the export and import of dangerous chemicals, Annex I, Part 3 as amended

Not listed.

Regulation (EU) No. 649/2012 concerning the export and import of dangerous chemicals, Annex V as amended

Not listed.

Regulation (EC) No. 166/2006 Annex II Pollutant Release and Transfer Registry, as amended

Phosphorodithioic acid, O,O-di-C1-14-alkyl esters, zinc salts (CAS Proprietary)

Regulation (EC) No. 1907/2006, REACH Article 59(10) Candidate List as currently published by ECHA

Not listed.

Authorisations

Regulation (EC) No. 1907/2006, REACH Annex XIV Substances subject to authorization, as amended

Not listed.

Restrictions on use

Regulation (EC) No. 1907/2006, REACH Annex XVII Substances subject to restriction on marketing and use as amended

Not listed.

Directive 2004/37/EC: on the protection of workers from the risks related to exposure to carcinogens and mutagens at work, as amended.

Not listed.

Other EU regulations

Directive 2012/18/EU on major accident hazards involving dangerous substances, as amended

Sodium nitrite (CAS Proprietary)

Other regulations

The product is classified and labelled in accordance with Regulation (EC) 1272/2008 (CLP Regulation) as amended and respective national laws implementing EC directives. This Safety Data Sheet complies with the requirements of Regulation (EC) No 1907/2006 as amended.

National regulations

Follow national regulation for work with chemical agents in accordance with Directive 98/24/EC, as amended.

15.2. Chemical safety assessment

No Chemical Safety Assessment has been carried out.

SECTION 16: Other information

List of abbreviations

DNEL: Derived No-Effect Level.
PNEC: Predicted No-Effect Concentration.
PBT: Persistent, bioaccumulative and toxic.

vPvB: Very Persistent and very Bioaccumulative.
LC50: Lethal Concentration 50%.
LD50: Lethal Dose 50%.
EC50: Effective Concentration 50%.

References

EU Regulation (EC) 1272/2008 (CLP Regulation) as amended

Information on evaluation method leading to the classification of mixture

The mixture is classified based on test data for physical hazards. The classification for health and environmental hazards is derived by a combination of calculation methods and test data, if available. For details, refer to Sections 9, 11 and 12.

Full text of any H-statements not written out in full under Sections 2 to 15

H272 May intensify fire; oxidiser.
H301 Toxic if swallowed.
H315 Causes skin irritation.
H319 Causes serious eye irritation.
H400 Very toxic to aquatic life.
H412 Harmful to aquatic life with long lasting effects.
H413 May cause long lasting harmful effects to aquatic life.

Training information

Follow training instructions when handling this material.

Disclaimer

This information is provided without warranty. The information is believed to be correct. This information should be used to make an independent determination of the methods to safeguard workers and the environment.