微型滚珠丝杠专用油脂
Original Grease for Miniature Ball Screws

滚珠丝杠的动作特性一般会受到油脂特性的影响。
尤其是微型滚珠丝杠会受到很大的油脂稠度引起的搅拌阻力的影响，在涂抹油脂后丝杠扭矩可能会增大。因此，油脂的选择极为重要。
作为微型滚珠丝杠的专业厂商，本公司发挥多年积淀的技术专长，研发出了无损微型滚珠丝杠动作特性、且润滑性能优异的油脂。同时还备有起尘量极少的无尘室专用油脂。
客户可根据用途选择最适用的专用油脂。

In general, it is known that the operation characteristic of the Ball Screws is influenced by properties of Grease. Especially, the stir resistance of Grease influences Ball Screw torque after applying Grease. Selection of Grease is extremely important in the Miniature Ball Screws. KSS has developed Ball Screw excellent Grease, which has high lubrication performance without deteriorating Ball Screw operation.
KSS has also developed its exclusive Grease, which keeps smooth feeling and less contamination under clean room environment.
We think the best special Grease is prepared respectively according to customer's usage.

●特点

摩擦系数小、粘附性良好、润滑性优异，是最适于微型滚珠丝杠的油脂。
根据用户的不同用途，本公司备有常规环境下使用的稠度1号、稠度2号以及在无尘室使用的稠度1号油脂。

●Features

It is the best Grease for the Miniature Ball Screws, which has low coefficient of friction, good adhesion characteristic, excellent lubricity.

●用途

常规环境用	MSG No.1：精密定位用途 最适于特别注重动作特性的用途。 MSG No.2：常规用途 较高转速下粘附性也很优异。
无尘室专用	MCG No.1：用于无尘室内的低速定位， 注重低起尘和动作特性。

●Application

General use	MSG No.1：High positioning usage appropriate for high smoothness requirement. MSG No.2：General usage appropriate for high speed.
Clean room use	MCG No.1：High positioning usage in clean room focused on less contamination, high smoothness.

●基本规格　Specifications

	MSG No.1	MSG No.2	MCG No.1
Application / 用途	General use / 一般规格	General use / 一般规格	Clean room use / 无尘室规格
Thickener / 增稠剂	Lithium / 锂皂	Lithium / 锂皂	Lithium / 锂皂
Base-oil / 基油	Synthetic oil / 合成油	Synthetic oil / 合成油	Synthetic oil / 合成油
Appearance / 外观	Light brown / 浅褐色	Light brown / 浅褐色	Beige / 米色
Consistency / 混合稠度	310～340	265～295	310～340
Temp.range / 使用温度范围	−60～120°C	−60～120°C	−30～120°C
Type & Contents / 型号和封入量	MSG-1-380:380g(400cc) MSG-1-45:45g(50cc)	MSG-2-380:380g(400cc) MSG-2-45:45g(50cc)	MCG-1-45:40g(45cc)

注1)在常温以外的环境下使用KSS原装油脂时，请垂询本公司。　Note 1)In case of the usage of this grease under other than room temperature, please consult KSS.

●油脂摩擦试验机（MSG No.1、MSG No.2）

1）试验装置

· 销盘式摩擦磨损试验机（照片 B-11）
· 销：3/16 英寸钢珠（SUJ2　HRC60～62）
· 负载：50N　250N或350N（10N递增方式）
· 圆盘材料：SCM415（表面粗糙度＝0.8s）渗碳淬火（HRC58～62）

●Grease Friction Test（MSG No.1、MSG No.2）

1）Testing device

· Pin-on Disk test machine（Photo B-11）
· Pin：3/16 inch Steel Ball（SUJ2　HRC60～62）
· Load：50N　250N or 350N（Step up each 10N）
· Disk material：SCM415（surface roughness＝0.8s）Case hardening（HRC58～62）

2）其他油脂与MSG的比较数据

参照图B-12、B-13
试样A、B、D：锂基油脂
试样C：脲基油脂

2）Comparison data to other Grease

See Fig. B-12, B-13
Sample A,B,D：Lithium based Grease,
Sample C：Urea based Grease

照片 B-11：销盘式摩擦磨损试验机
Photo B-11：Pin-on Disk test machine

从图中可以看出，MSG No.1几乎没有摩擦系数增大现象，有利于滚珠丝杠发挥其动作特性。

MSG No.1 hardly increase coefficient of friction.
It has an advantage for smooth operation.

Disk rev.（圆盘转速）＝100min⁻¹

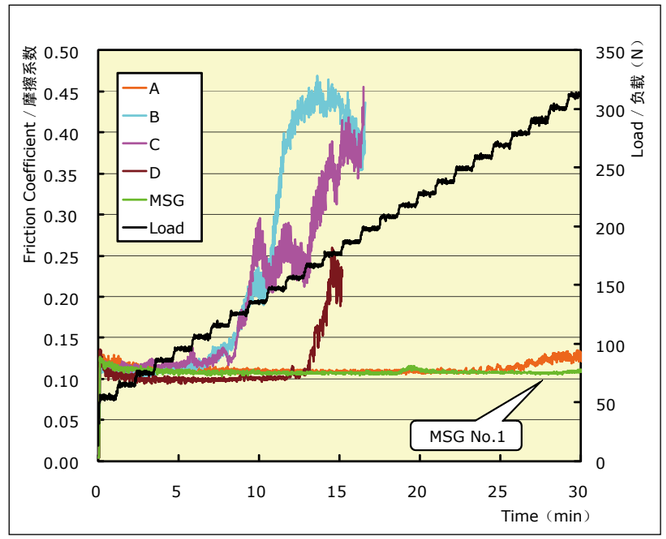


图 B-12：MSG No.1与其他油脂的比较图
Fig. B-12：Comparison btw MSG No.1 & others

MSG No.2即使在较高转速下，摩擦系数的增大也很少，可维持丝杠的动作特性。

MSG No.2 does not increase coefficient of friction under the relatively high speed.

Disk rev.（圆盘转速）＝500min⁻¹

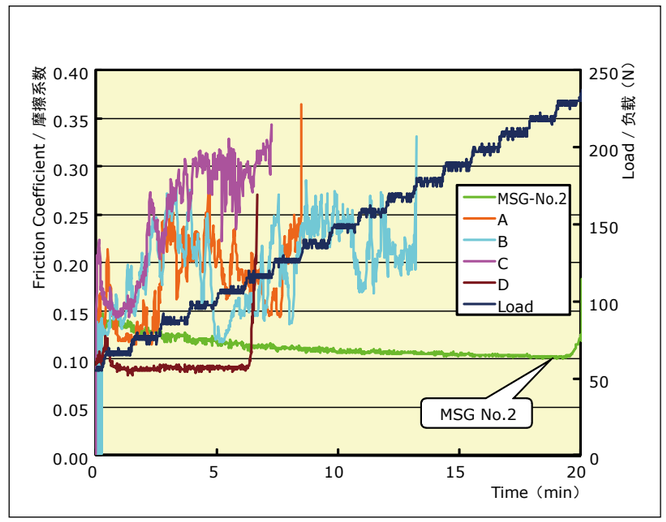


图 B-13：MSG No.2与其他油脂的比较图
Fig. B-13：Comparison btw MSG No.2 & others

●油脂承载能力测量

1)测量装置和测量方法

· 测量装置 ：
曾田式四球磨损试验机(照片 B-14)
· 测量方法 ：
750 min^{-1} 阶跃载荷方式(3/4 inch Ball)***

***注)阶跃载荷方式
将试样设置在试验机上,从0.5kgf/cm^2(0.049MPa)起,每1分中增加0.5kgf/cm^2的压力进行试验,产生烧结时的压力减去0.5kgf/cm^2的值即为承载能力。数值越大,油脂越不易烧结。

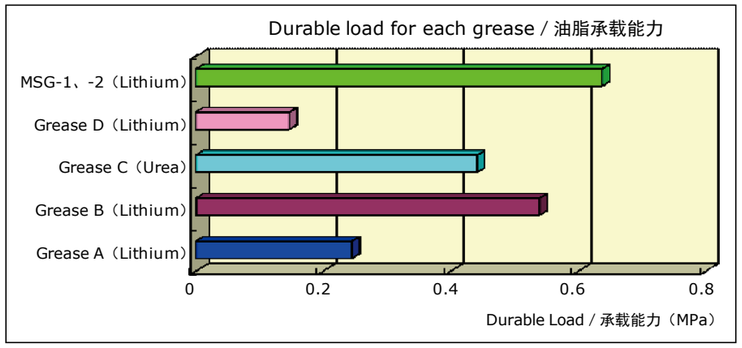
●Grease Load Test (MSG No.1、MSG No.2)

1)Testing device and method

· Testing device and method ：
SOTA-4-Ball test machine(Photo B-14)
· Testing method ：
750 min^{-1} Step load method
(3/4 inch Ball)***

***Note)Step load method
Pressure is added by each 0.5kgf/cm^2(0.049MPa) from the first 0.5kgf/cm^2 in every one minutes.
Durable load are defined when discoloration occur.

2)测量结果 Test results



照片 B-14 ：曾田式四球磨损试验机
Photo B-14 ：SOTA-4-Ball wear test machine

●油脂起尘试验 (MCG No.1)

1)测量装置和测量方法

· 测量装置 ：照片 B-15
· 滚珠丝杠尺寸 ：φ10mm / 导程 15mm
· 测得的转速 ：500min^{-1}

比较本公司生产的常规用途油脂(MSG No.2)与其他公司生产的常规用途油脂后可以发现,本公司生产的KSS无尘室规格油脂MCG No.1即使经过运行时间后起尘量也很少。

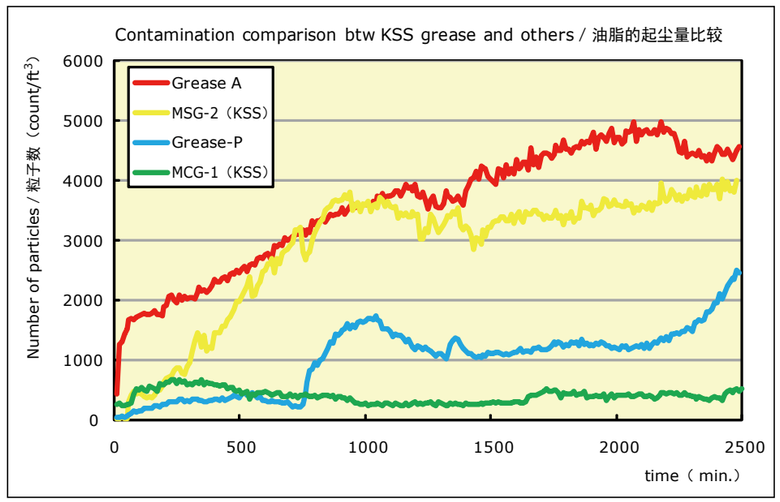
●Grease Contamination Test (MCG No.1)

1)Testing device and method

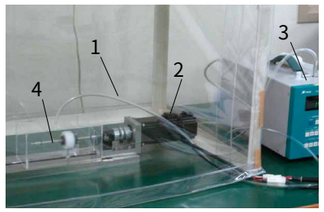
· Measurement device ：see Photo B-15
· Ball Screw size ：φ10mm / Lead 15mm
· Revolution ：500min^{-1}

KSS clean room Grease (MCG No.1) has less contamination compared to other Grease such as KSS general use Grease (MSG No.2) and other competitor's (Grease-A,-P)as the time passed.

2)测量结果(0.5μm粉尘) Test result(0.5μm particle)



1Suction / 吸引泵
2Servo Motor / 伺服电机
3Particle Counter / 计数器
4Sample / 试样



照片 B-15 ：清洁台
Photo B-15 ：Clean bench

●因润滑脂而产生的扭矩特性差异

微型滚珠丝杠的驱动扭矩较小,扭矩特性会受到润滑脂稠度的影响。
涂抹的润滑脂稠度越大,滚珠丝杠的驱动扭矩越大。
而使用KSS微型滚珠丝杠专用油脂不易受到润滑脂稠度的影响,可抑制扭矩增大(参照图 B-16)。

●Difference of Torque characteristics by Grease

Driving torque of Miniature Ball Screw is relatively small, therefore torque characteristics of Miniature Ball Screw is influenced by the Grease consistency.
If high consistency Grease applied, driving torque of the Ball Screw tends to become larger.
By using KSS original Grease for Miniature Ball Screw, influence of the Grease consistency is relatively smaller, and able to prevent the increase in the driving torque.
See graph blow(Fig.B-16).

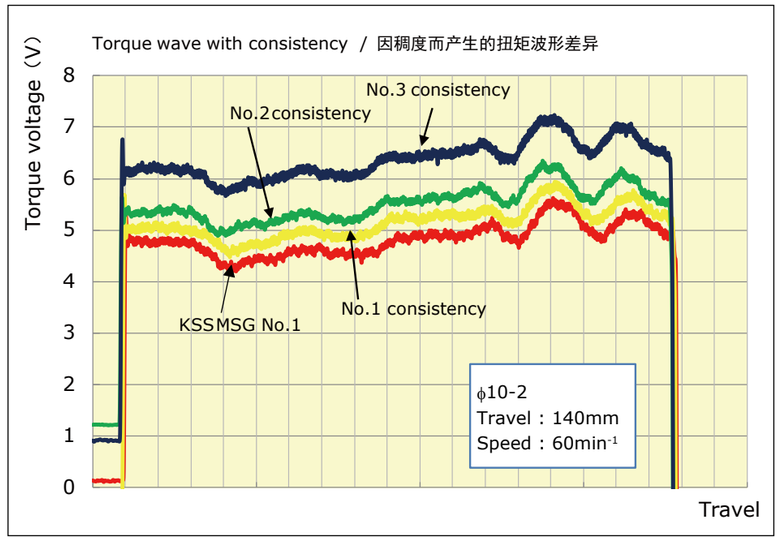


图 B-16 ：因稠度而产生的扭矩特性
Fig. B-16: Torque wave by Grease consistency

⚠ 操作注意事项

操作注意事项

· 如果油脂误入眼中,可能会引发炎症。
操作时请佩戴护目镜等防护用品,以免油脂误入眼中。
· 油脂如果触及皮肤,可能会引发皮肤炎。
操作时请佩戴保护手套等防护用品,以免油脂触及皮肤。
· 请勿饮用或食用。
(如果吞入腹中,可能会引起腹泻或呕吐。)
· 请将油脂放置于儿童用手够不到的场所。

应急处理

· 油脂一旦误入眼中,请用清水冲洗15分钟,并立即接受医生治疗。
· 油脂触及皮肤时,请用肥皂水充分清洗。
· 油脂吞入腹中时,请勿强行催吐,应立即接受医生治疗。

废油和废容器的处理

· 相关法令对油脂的处理方法作了明确规定。请依照法令正确处理。
· 不了解处理方法时,请咨询经销商后再处理。

存放方法

· 请用密封塞对油脂进行密封,以防脏物或水分等混入。
· 请避开直射阳光,存放于阴暗之处。

⚠ Handling instruction

Handling Precaution

· It might be inflammatory when entering eyes.
Wear glasses when you handle it.
· When it touches the skin, it might be inflammatory.
Wear globes when you handle it.
· Do not eat or drink it.
It is likely to have loose bowels, and to vomit when drinking.
· Put the Grease on the place where child's hand does not reach.

First aid

· Wash for 15 minutes by clean water, and receive the doctor's diagnosis when it enters eyes.
· Wash enough with water and soap when it touches your skin.
· Receive the doctor's diagnosis without forcibly vomiting when drinking.

Disposal

· Dispose properly according to the law.
· Consult manufacturer about an uncertain point.

Storage

· Seal up to avoid mixing garbage and moisture.
· Avoid direct sunlight, and keep it in darkness.