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.

**Features**

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

**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. |

**Specifications**

<table>
<thead>
<tr>
<th>Application</th>
<th>MSG No.1</th>
<th>MSG No.2</th>
<th>MCG No.1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thickness</td>
<td>Lithium</td>
<td>Lithium</td>
<td>Lithium</td>
</tr>
<tr>
<td>Base-oil</td>
<td>Synthetic oil</td>
<td>Synthetic oil</td>
<td>Synthetic oil</td>
</tr>
<tr>
<td>Appearance</td>
<td>Light brown</td>
<td>Light brown</td>
<td>Beige</td>
</tr>
<tr>
<td>Consistency</td>
<td>310~360</td>
<td>265~275</td>
<td>310~360</td>
</tr>
<tr>
<td>Temp. range</td>
<td>-60~120°C</td>
<td>-60~120°C</td>
<td>-30~120°C</td>
</tr>
<tr>
<td>Type</td>
<td>MSG-1-380, MSG-1-45</td>
<td>MSG-2-380, MSG-2-45</td>
<td>MCG-1-45</td>
</tr>
</tbody>
</table>

Note 1: 380cc contained, 45cc: 45cc contained
Note 2: In case of the usage of this grease under other than room temperature, please consult KSS.

**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=0.8μm) Case hardening (HRC58~62)

2) Comparison data to other Grease

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

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

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

**Fig. B-12: Comparison btw MSG No.1 & others**

**Fig. B-13: Comparison btw MSG No.2 & others**
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/cm² (0.049 MPa) from the first 0.5kgf/cm² in every one minutes. Durable load are defined when discoloration occur.

Grease Contamination Test (MCG No. 1)

1) Testing device and method
   • Measurement device: see Photo B-15
   • Ball Screw size: Ø 10mm / Lead 15mm
   • Revolution: 500 min⁻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) Test result (0.5 μm particle)

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 gloves 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.

Test results

Durable load for each grease

Contamination comparison btw KSS grease and others

Photograph B-14: SOTA-4-Ball wear test machine

Photograph B-15: Clean bench

Photograph B-14: SOTA-4-Ball wear test machine