

## Original Grease for Miniature Ball Screws



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

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

### ●Specifications

	MSG No.1	MSG No.2	MCG No.1
Application	General use	General use	Clean room use
Thickener	Lithium	Lithium	Lithium
Base-oil	Synthetic oil	Synthetic oil	Synthetic oil
Appearance	Light brown	Light brown	Beige
Consistency	310~340	265~295	310~340
Temp.range	-60~120°C	-60~120°C	-30~120°C
Type & Contents	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)

Note 1) 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=0.8s) 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



Photo B-11 : Pin-on Disk test machine

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

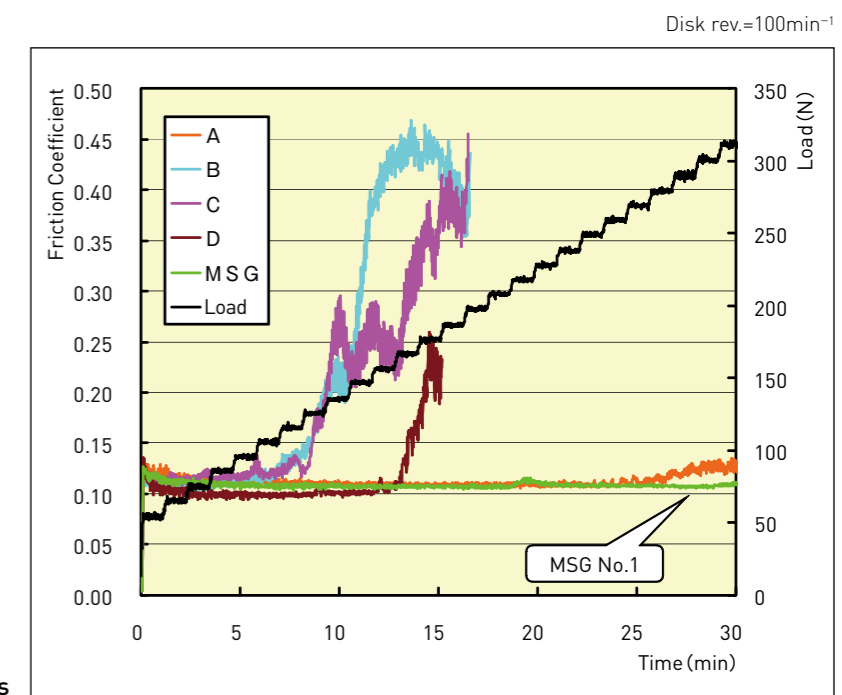


Fig. B-12 : Comparison btw MSG No.1 & others

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

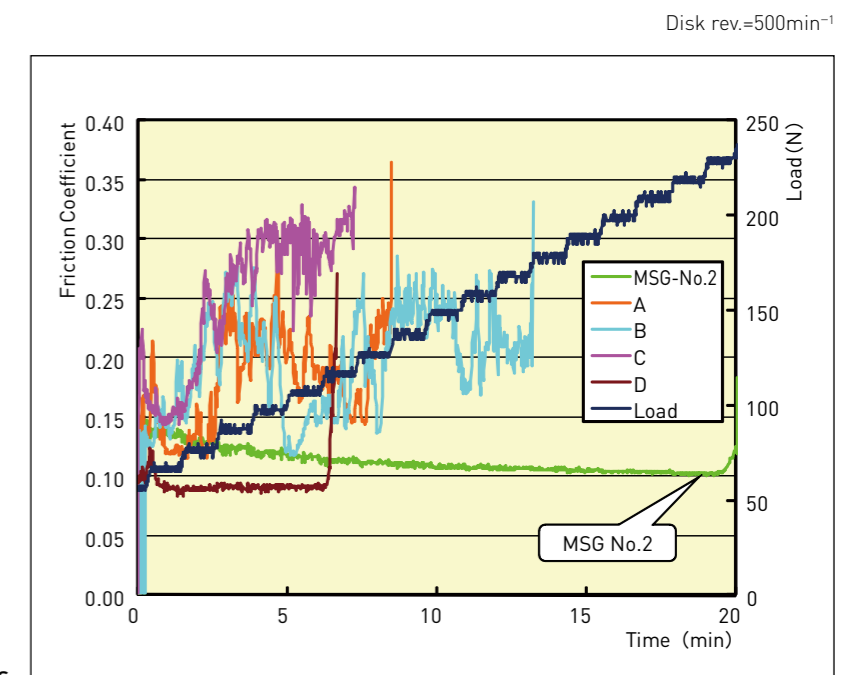


Fig. B-13 : Comparison btw MSG No.2 & others

● 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<sup>-1</sup> Step load method (3/4 inch Ball )\*\*\*

\*\*\*Note) Step load method

Pressure is added by each 0.5kgf/cm<sup>2</sup> (0.049MPa) from the first 0.5kgf/cm<sup>2</sup> in every one minutes. Durable load are defined when discoloration occur.

2) Test results

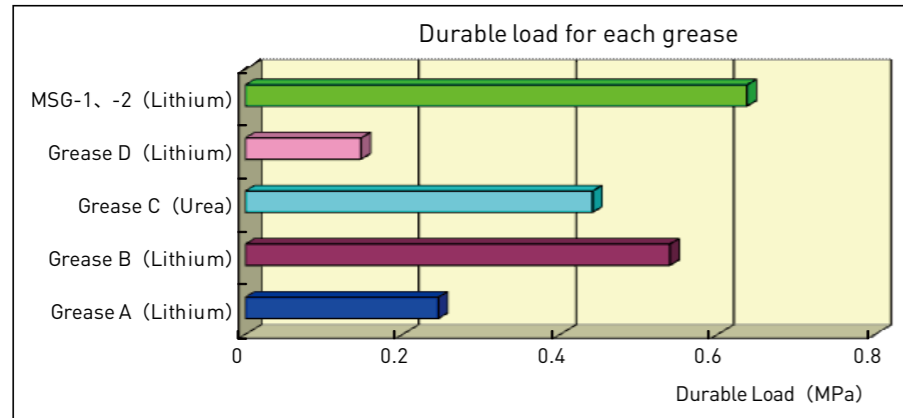


Photo B-14 : SOTA-4-Ball wear test machine

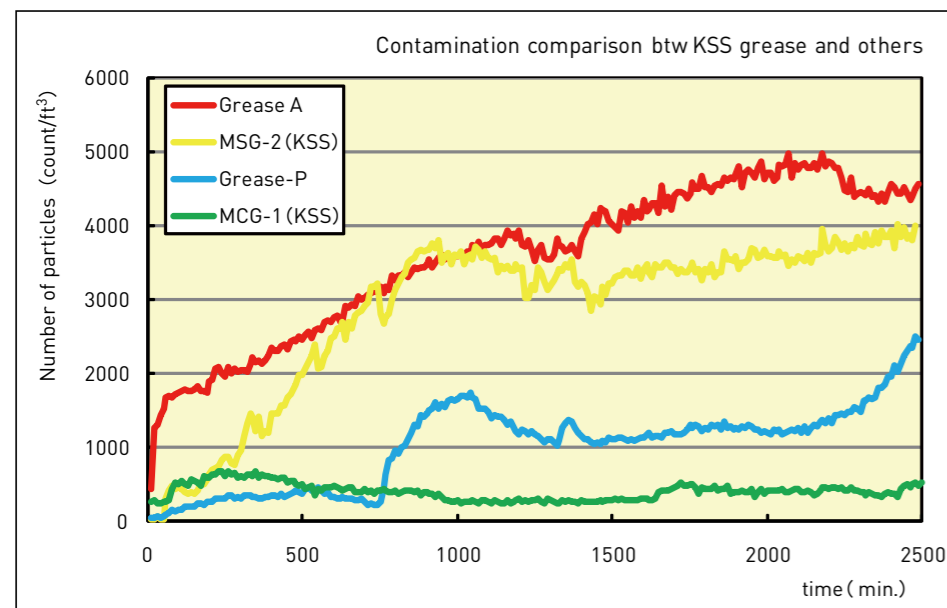
● Grease Contamination Test (MCG No.1)

1) Testing device and method

- Measurement device : see Photo B-15
- Ball Screw size :  $\phi$  10mm / Lead 15mm
- Revolution : 500min<sup>-1</sup>

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 $\mu$ m particle)



- ① Suction
- ② Servo Motor
- ③ Particle Counter
- ④ Sample

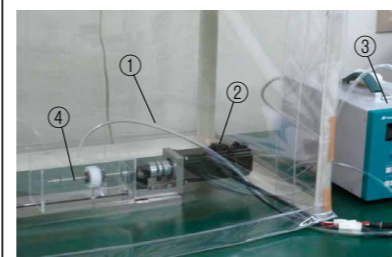


Photo B-15 : Clean bench

● 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).

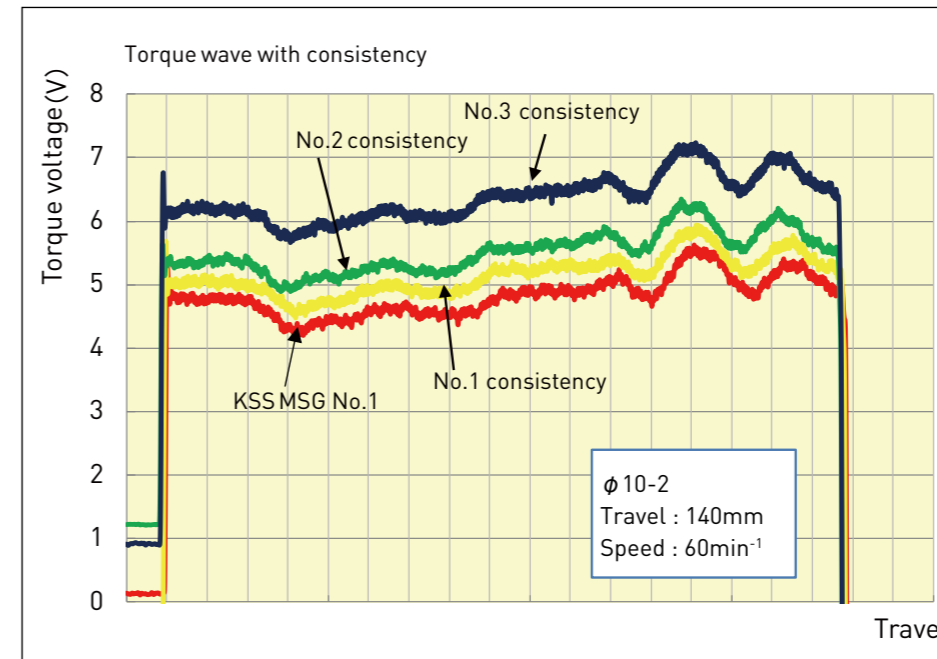


Fig. B-16: Torque wave by Grease consistency

⚠ 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 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.