

Bearings with solid grease

(For food machinery)



Overview

“Solid grease” is a lubricant essentially composed of lubricating grease and ultra-high polymer polyethylene. Solid grease has the same viscosity as ordinary grease at normal temperature, but as a result of a special heat treatment process, this grease solidifies retaining a large proportion of the lubricant in it. Thanks to this solidification, the grease does not easily leak from the bearing, even when the bearing is subjected to strong vibrations or centrifugal force, helping to extend bearing life.

Table 1 Major components in solid greases

Solid grease (code)	Resin	Lubricant	Operating temperature range (°C)
General-purpose solid grease (LP03)	Ultra-high polymer polyethylene ①	Li-mineral oil grease	-20 ~ +80 (Constant use:+60 and less)
Food-grade solid grease (LP09)	Ultra-high polymer polyethylene ①	Ultra-high polymer polyethylene ②	-10 ~ +100 (Constant use:+80 and less)

① Conforms to FDA standard.

② Conforms to H-1 standard of NSF.

Features

1. Reduced lubricant leakage

Because the base oil is retained in a solid mixture, it is less likely to leak out of the bearing. During operation, temperature rise and/or centrifugal force will cause a gradual release of the base oil into the raceway groove. Eliminating grease leakage from the bearing ensures a consistent supply of lubricant and prevents contamination of the surrounding environment.

2. Superior lubrication

Bearings with solid grease resist grease leakage prolonging bearing life in applications where high centrifugal force or vibration are present. The solid lubricant does not emulsify when exposed to water also extending both grease and bearing life.

3. Low torque characteristics

The running torque of spot-pack bearings with solid grease is lower than that of bearings using standard lubricants. With conventional greases, a shearing resistance is created as the grease is channeled out of the raceway groove. Spot-pack bearings with solid grease do not experience shear resistance resulting in a lower running torque.

4. Sealing effect

Though solid grease protects a bearing against ingress of foreign matters (water, dust, etc.), it is not a sufficient means as a sealing device. Therefore, for applications that need reliable sealing performance, we recommend the use of contact type rubber seals (deep groove ball bearings, bearing units) or other seals (other bearing types).



Bearings with solid grease for food machinery

Bearing units stainless series

(Stainless bearings + Stainless steel housing)



Guards against corrosion

NTN bearing units in the stainless series feature ball bearings inserted into housings made of stainless that provide superior resistance to corrosion as compared to standard series cast iron units. This series is especially useful in a wide variety of applications because of the rust free properties of the housing.

Please refer to **Table 2** for materials of stainless series.

Maintains a clean operating environment

The solid grease lubricant in the ball bearing, solely developed by NTN, reduces leakage from the bearing, significantly reducing environmental pollution.

Also this grease will not homogenize when water penetrates into the bearing raceway.

Note) It is not the bearing for clean room

Table 2 Materials

Parts		Materials
Bearing	Raceways	Martensite stainless steel (equivalent to SUS440C)
	Rolling element	Martensite stainless steel (SUS440C)
	Slinger, Retainer	Austenite stainless steel (SUS304)
	Rubber seal	Nitril rubber
	Set screw (W shape screw head)	Martensite stainless steel (SUS410)
Bearing housing		Austenite stainless steel casting (SCS13)
Cover		Austenite stainless steel (SUS304)

Note) Please refer to P14~P15 for the physical property for each material

Bearings with food solid grease for food machinery

The bearings with solid grease type P-09 boasts a high degree of safety because its heat-solidifying grease for food machinery is composed of food-grade lubricating grease that complies with the NSF's H-1 standard (permitting accidental contact with food) and super molecular weight polyethylene approved according to an FDA (US Food and Drug Administration) standard.

Interchangeability

The basic dimensions are the same as current NTN units and are also compatible with units from other manufacturers ISO standard.

The dimension tables for this series are shown on following pages. Pillow types are shown on page 88-89, Rhombus flange types are shown on page 182-183, The bearings are shown on page 430-431. There are specifications of the grease for food machinery and for heat-resistance in the stainless series bearing unit. Please consult NTN about the details.

Bearing units plastic housing series

(Stainless bearings + Glass fiber reinforced plastic housing)



Guards against corrosion

NTN bearing units in the plastic series feature ball bearings inserted into housings made of plastics that provide superior resistance to corrosion as compared to standard series cast iron units. This series is especially useful in a wide variety of applications because of the nonmagnetic and rust free properties of the housing.

Please refer to **Table 3** for materials of plastic series.

Maintains a clean operating environment

The solid grease lubricant in the ball bearing, solely developed by NTN, reduces leakage from the bearing, significantly reducing environmental pollution. Also, the housing will not stain, nor is there paint to peel and contaminate the environment.

Note) It is not the bearing for clean room

Table 3 Materials

Parts		Materials
Bearing	Raceways	Martensite stainless steel (equivalent to SUS440C)
	Rolling element	Martensite stainless steel (SUS440C)
	Slinger, Retainer	Austenite stainless steel (SUS304)
	Rubber seal	Nitryl rubber
	Set screw (W shape screw head)	Martensite stainless steel (SUS410)
Bearing housing	Housing	Glass reinforced Polyester
	Sleeve for set bolt	Austenite stainless steel (SUS 304)
	Nut for grease fitting	Austenite stainless steel (SUS 304)
Cover		Polypropylene
Plug		Polyethylene

Note) Please refer to P14~P15 for the physical property for each material

Light weight

Weight is reduced more than 30% to 60% over standard series units.

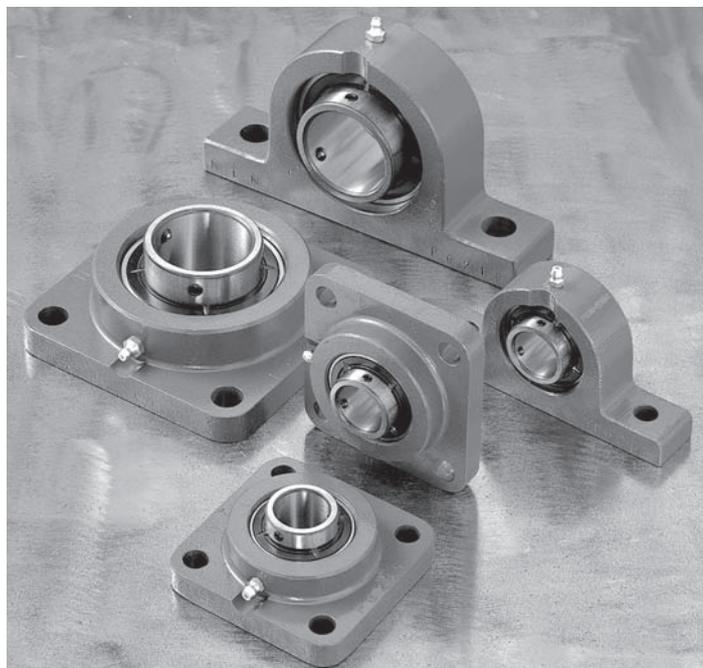
Water resistant

The glass filled polyester housing not only reduces corrosion but offers better water resistance.

The dimension tables for this series are shown on following pages. Pillow types are shown on page 90-91. Rhombus flange types are shown on page 184-185. The bearings are shown on page 430-431. There are specifications of the grease for food machinery and for heat-resistance in the stainless series bearing unit. Please consult NTN about the details.

Note) Over tightening the setting bolt may deform the plastic housing. Use the tightening torque guideline listed in **Table 11.1(2)** (P51).

Bearing units steel series (Rolled steel housing for general structures)



Superior Housing Strength

Made of precision gas cut rolled steel, NTN steel housings offer superior strength characteristics when compared to cast iron and cast steel housings.

The housing material is SS400 of JIS G3101 (Mechanical properties of general structural rolled steel). please refer **Table 3.3** (page 14) for mechanical property.

Consistent Microstructure

The rolled steel microstructure is more consistent than cast iron or cast steel, reducing the risk of housing fracture under severe conditions.

Interchangeability

Rolled steel housing dimensions are consistent with cast units, allowing them to be interchanged with NTN standard housings and other manufacturers ISO standard.

In general, if both cast iron and steel series housings are within the same size range, the steel housings are considered safer. This is because they require a lower safety factor than ductile or cast iron housings (Please refer to **Table 4**). In addition, the design and shape of the steel series provides higher strength. (Solid base etc.)

Table 4 Safety factor

Material		Static load	Pepeated load		Impact load
			Pulsating	Reversed	
SS400	Rolled steel for structure	3	5	8	12
FC200	Gray cast iron	4	6	10	15
FCD450	Ductile cast iron	4	6	10	15
SC450	Cast steell	4	6	10	15

Table 5 Material strength

Material		Tensil strength ^{*1} (N/mm ²)
SS400	Rolled steel for structure	400
FC200	Gray cast iron	200 ^{*2}
FCD450	Ductile cast iron	450 ^{*2}
SC450	Cast steell	450 ^{*2}

*1 Minimum value of material standard

*2 Respective casting pouring sample

Applications

NTN rolled steel housings provide superior strength to cast steel and cast iron. Their ability to resist impact loads makes them suitable for applications involving heavy loads and vibration. Possible applications for NTN rolled steel housings include but are not limited to conveyors, trucks and overhead cranes at steel mills, mining machinery and pollution control equipment.

Housing shape

There are various shapes for steel series. The dimension tables for this series are shown on following pages. Pillow types are shown on page 84-87. Thick pillow types are shown on page 98-99. Square flange types are shown on page 138-141. Square flange with spigot joint types are shown on page 148-149. Round flange with spigot joint types are shown on page 162-163. Rhombus flange type are shown on page 178-181. Take-up types are shown on page 230-233.

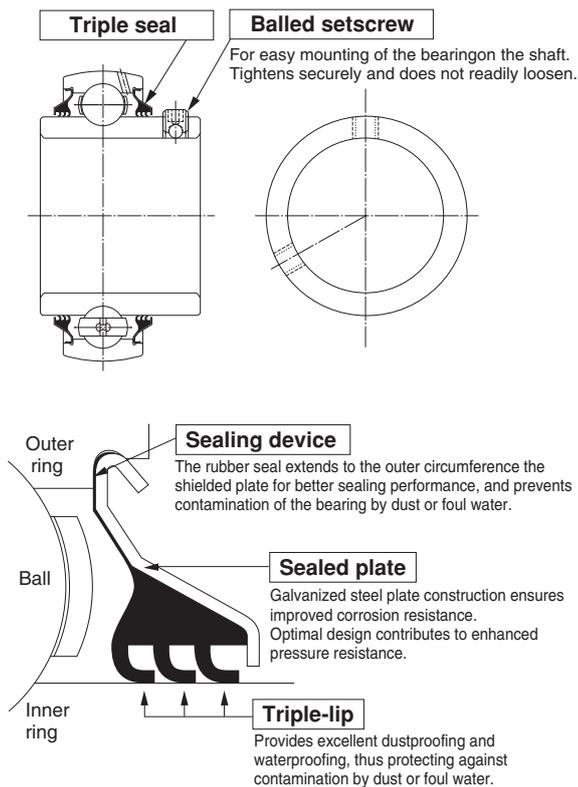
NTN Triple-Sealed Bearings for Bearing Units

These reliable triple-sealed bearings are dustproof and waterproof.

They ensure a longer bearing life even when exposed to heavy airborne dust and splashes of foul water.



1. Construction



Types

- **Low torque triple-sealed bearing**
(Cylindrical-bore, set screw type)
UC201D1LLJ through UC208D1LLJ
UC305D1LLJ through UC320D1LLJ
- **High torque triple-sealed bearing**
(Cylindrical-bore, set screw type)
UC201D1LLS through UC212D1LLS
(Square-bore type for agricultural machines)
1AS-11/8, 4AS09-11/4, etc.

2. Features

Better dustproofing and waterproofing ensure a longer bearing life.

Triple-sealed bearings feature a secure bearing seal with three lips. This special seal offers reliable dustproofing and waterproofing superior to those of standard bearings used in bearing units. In addition, it ensures a longer service life, even when exposed to heavy airborne dust and splashes of foul water. (Patent pending)

Reduces maintenance cost.

A bearing life longer than that of a standard bearing unit configurations means extended maintenance intervals, greatly reduced maintenance costs (of inspection, relubrication, replacement, etc.), and increased availability of machinery.

Decreases price of the bearing unit and contributes to more compact machinery.

The triple-sealed bearing unit replaces conventional covered bearing units in certain operating conditions, greatly decreasing the cost of bearing units. In addition, if the cover is not required, the machinery can be made more compact.

Secure balled setscrew

The triple-sealed bearing is mounted on the shaft with NTN's unique balled setscrew, which features an embedded ball in its tip. Compared with knurled cup point or cup-point setscrews, the balled setscrew provides much greater resistance to loosening, as it does not readily loosen due to vibration or impact.

Interchangeability

The triple-sealed bearing unit conforms to the JIS (Japanese Industrial Standard) for UC-type bearings. It is not only ready to use as a relubricable bearing, but it also replaces the conventional bearing units of NTN and other manufacturers. It therefore serves as a ready replacement for existing bearing units.

In the meantime, the relubricatable type is recommended to minimize the wear of the seal lip.

3. Allowable Operating Temperature Range and Speed

The triple-sealed bearing can be used in a temperature range of -15°C to 100°C.

• Allowable speed

Triple-sealed bearing unit $\cdots d_n$ value : 36000

High-torque triple-sealed bearing unit $\cdots d_n$ value : 21000