Rolling Bearings and Precision Machine Components for Food and Beverage Processing Machinery

Through advanced material engineering, lubrication technologies, and precision technologies, NSK products significantly improve the performance of food processing machinery.
NSK meets the requirements of food and beverage processing equipment

NSK’s bearings and precision machine components are used in a variety of machines, such as home electrical appliances, automobiles, semiconductor equipment, and aerospace industry applications.

Through our steadfast technical skill in meeting requests from global industries down to the last minute detail and our R&D and support systems that cater to needs in any country, NSK is developing operations worldwide as a top manufacturer. With our internationally recognized brand, we drive global industries with high quality and technological capability.

NSK’s Global Operations

<table>
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<tr>
<th>Regional headquarters</th>
<th>Production bases</th>
<th>Sales bases</th>
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<td>Japan</td>
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Square-shaped ball bearings
Needs in Food Processing Lines

**Raw Material Process**
- **Required features**
  - Dust proofing, water resistance, easy maintenance
- **Recommended products**
  - Molded-Oil™ bearings, NSK K1™ for food machinery
  - Stainless-steel bearings
  - Stainless-steel linear guides
  - Waterproof Megatorque Motor™

**Packaging Process**
- **Requirements**
  - Low dust emissions, easy maintenance, high speed
- **Recommended products**
  - Molded-Oil™ bearings, NSK K1™ for food machinery
  - Clean Grease (LG2, LGU)
  - Stainless-steel linear guides
  - Stainless-steel ball screws
  - Linear guides - Ball screws
  - Megatorque Motor™

**Conveyance Process**
- **Required features**
  - Low dust emissions, water resistance, easy maintenance
- **Recommended products**
  - Stainless-steel bearings
  - Monocarrier™
  - Linear guides - Ball screws
  - Stainless-steel linear guides
  - Stainless-steel ball screws

**Inspection Process**
- **Required features**
  - Water resistance, easy maintenance, high accuracy
- **Recommended products**
  - Stainless-steel bearings
  - Stainless-steel linear guides
  - Stainless-steel ball screws
  - Monocarrier™
  - Megatorque Motor™

**Heating Process**
- **Required features**
  - Heat resistance, water resistance, easy maintenance
- **Recommended products**
  - KPM grease
  - Stainless-steel bearings

**Primary Process** (cutting, mixing)
- **Required features**
- **Recommended products**

**Secondary Process** (molding)
- **Required features**
- **Recommended products**
Needs in Beverage Processing Lines

Filling and Sealing Processes

- **Dust proofing, waterproof, low dust emission, easy maintenance**
- **Recommended products**
  - Molded-Oil™ bearings, NSK K1™ for food machinery
  - Stainless-steel bearings
  - Clean Grease (LG2, LGU)
  - Stainless-steel linear guides
  - Waterproof Megatorque Motor

Inspection Process

- **Waterproof, high speed, easy maintenance**
- **Recommended products**
  - Molded-Oil™ bearings, NSK K1™ for food machinery
  - Stainless-steel bearings
  - Stainless-steel linear guides
  - Stainless-steel ball screws
  - Linear guides - Ball screws
  - Monocarrier™
  - Waterproof Megatorque Motor
  - Megatorque Motor™

Packing Process

- **High speed, easy maintenance, high-load operation**
- **Recommended products**
  - Molded-Oil™ bearings, NSK K1™ for food machinery
  - NSK HPS high-performance standard deep groove ball bearings for industrial machinery
  - Linear guides - Ball screws
  - Monocarrier™
  - Megatorque Motor™
Product Introduction

Stainless Bearings
(ES1 Stainless Steel Material)

- Corrosion resistance: Better than SUS440C
- Hardness: Equivalent to SUS440C
- Noise level: Operating life: Better than SUS440C

Corrosion resistance

The corrosion resistance of ES1 is better than SUS440C.

Test piece: 49.6 x 10mm
(Placed with 380 electrolyte paper and passivation treatment was applied)
Test solution: 3.5%NaCl aqueous solution
Immersion time: 8 hours (room temperature)

Substrate spray test (JISB2371)
Test solution: 3.5%NaCl aqueous solution
Test time: 1 hour
Test temperature: 35 °C

Molded-Oil™ Bearings for Food Machinery
NSK KT™ Lubrication Unit for Food Machinery

- Environmental friendliness: Lubricant is gradually supplied from porous synthetic resin, lowering grease splatter.
- Water resistance: Contact of lubricant with the roller surface ensures a constant supply of lubricating oil.
- Safety: NSF-certified H1 lubricant is used.

Aqua-Bearing™

- Corrosion resistance: Five times more resistant than conventional resin bearings in strong acid environments.
- Durability: 1,000 times more durable than stainless steel bearings on the market.
- Maintainability: Self-lubricating fluororesin is used.

Highly Corrosion-Resistant Coated Bearings

- Corrosion resistance: Corrosion-resistant against sterilizing liquid, such as sodium hypochlorite solution and oxonia
- Durability: Longer life than SUS440C
- Maintainability: Solid fluorocarbons are used.
**Greases for Food Processing Machinery**

- NSK has developed the world's first 100% food-derived grease lubricant, "EXCELLA GREEN™ FOOD GRADE GREASE HSG," and adopted it to bearings for food processing machinery. H3G grease is certified NSF in category H3.
- H3G grease has low torque, excellent water resistance, and R# leakage in environments where the machine is exposed to water.
- H3G grease can be used up to 90 °C, H1R grease up to 120 °C, and H1B grease up to 200 °C.
- H1R grease and H1B grease are certified according to Muslim Halal and Jewish Kosher standards.

**NSF lubricant categories for food processing machinery**

| Safety | High: H3 | Lubricants intended for food contact.
|        | Low: H1 | Lubricants used in locations where the lubricant may incidentally come in contact with food.
|        | Low: H2 | Lubricants used in locations where there is no possibility that the lubricant will come into contact with food.

NSF (National Sanitation Foundation International): US-based third-party certification body that is internationally recognized in the field of public health and safety.

**Clean Grease (LG2, LGU)**

- Low dust emissions: Lower than fluorine greases on the market.
- Life: Over ten times longer than fluorine greases on the market.

**Table of Greases**

<table>
<thead>
<tr>
<th>Name</th>
<th>Operating temperature range, °C</th>
<th>Feature</th>
<th>Base oil kinematic viscosity (mm²/s)</th>
<th>Consistency</th>
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<tr>
<td>H3G</td>
<td>0~90</td>
<td>For food-processing machinery (NSF category H3)</td>
<td>148</td>
<td>255</td>
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<tr>
<td>H1R</td>
<td>0~120</td>
<td>For food-processing machinery (NSF category H1)</td>
<td>150</td>
<td>280</td>
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<tr>
<td>H1B</td>
<td>0~200</td>
<td>For food-processing machinery (NSF category H1)</td>
<td>415</td>
<td>280</td>
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<tr>
<td>NS-H-Lube</td>
<td>40~130</td>
<td>Wide-range grease</td>
<td>26</td>
<td>250</td>
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<tr>
<td>LG2</td>
<td>-20~70</td>
<td>Clean grease</td>
<td>32</td>
<td>199</td>
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<tr>
<td>LGU</td>
<td>-40~120</td>
<td>Wide-range clean grease</td>
<td>96</td>
<td>201</td>
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<tr>
<td>KPM</td>
<td>-20~230</td>
<td>Grease for high-temperature use</td>
<td>420</td>
<td>290</td>
</tr>
</tbody>
</table>

**Heat-Resistant Grease (KPM)**

- Heat resistance: Can be used up to 230 °C.
- Life: About five times longer than commercially available fluorine greases.

**NSK HPS High-Performance Standard Deep Groove Ball Bearings for Industrial Machinery**

**Features**

- Compared with conventional products...
Product Introduction

Linear Guides (Stainless Steel)
- Corrosion resistance: Available with fluoride low-temperature chrome plating.
- Durability: Long operating life equivalent to general steel.
- Maintainability: Available with K1 lubrication unit for food processing machinery.
- Lineup: NH Series models NH15 to NH30 and all PE, PU, and NS Series linear guides are available.

Monocarrier™ (MCM and MCH Series)
- Corrosion resistance: Fluoride low-temperature chrome plating is standard (rails, roller slides).
- Maintainability: NSK K1 lubrication unit is standard. The K1 unit for food processing machinery is also available.
- Lineup: 10 models are available, with rail widths ranging from 28 mm to 100 mm.

Standard Ball Screws (PSS and FSS Series)
- Corrosion resistance: Available with fluoride low-temperature chrome plating.
- Lineup: Products with diameters of 6-25 mm and leads of 5-60 mm are available.

Megatorque Motor™ (PS and PN Series)
- Low dust emission without reguring decelerator.
- Maintainability: Maintenance-free
- Lineup: Outer rotor motors and inner rotor motors are available. Maximum output torque: 6 N·m - 180 N·m

Environment-Resistant Megatorque Motor (Z Series)
- Environment resistance: World’s first IP66 rating under IEC standards
- Durability: Withstands high-pressure water jets
- Maintainability: Maintenance-free

Rotor
- Withstands high loads
- Axial load: 9,600 N
- Moment load: 200 N·m

Mechanism to mitigate pressure from water jets is introduced to meet IP66 rating (with rotor in motion). Rigidity and accuracy of rotor are improved for enhanced sealing. (Axial and radial runout of output shaft: 10 µm)

Motor securing face
- Since the bottom face is waterproof and dustproof, with O-ring surface treatment is not necessary.
- The outer and inner diameters are designed with centering easy.
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www.nsk.com

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