NSK

# SOLUTIONS FOR THE FOOD AND BEVERAGE INDUSTRIES

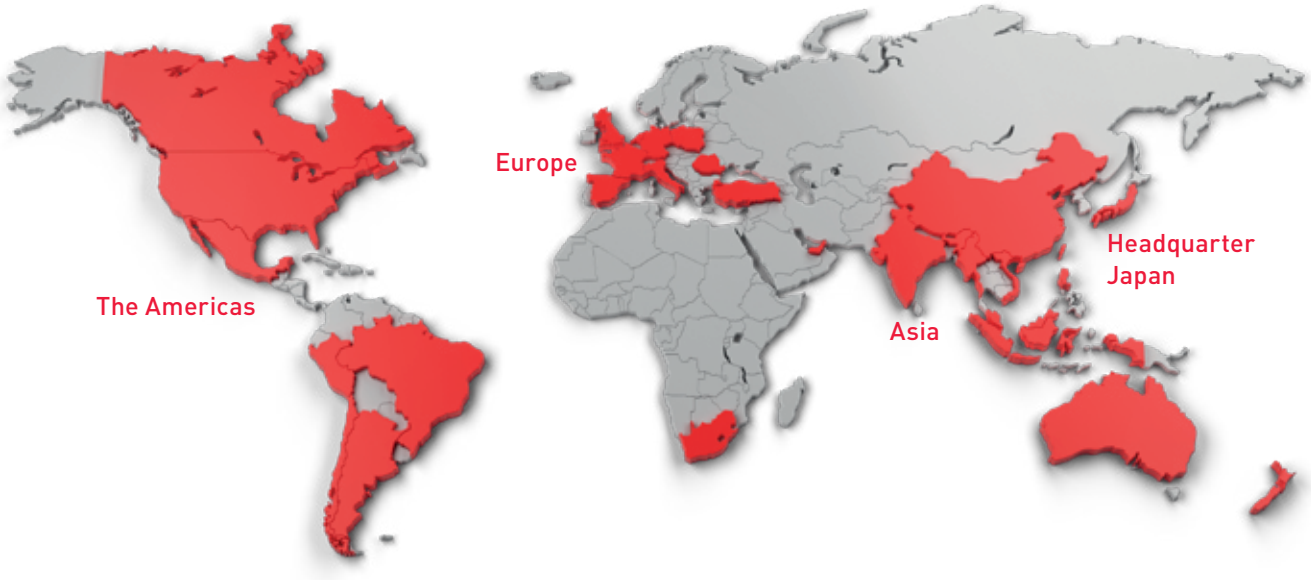


BRANDS OF **NSK EUROPE**

NSK RHP *bearings* PPL

# SETTING THE FUTURE IN MOTION

We are among the leading manufacturers for rolling bearings, linear technology components and steering systems worldwide. We can be found on almost every continent – with production facilities, sales offices and technology centres – because our customers appreciate short decision-making channels, prompt deliveries and local service.




### The NSK company

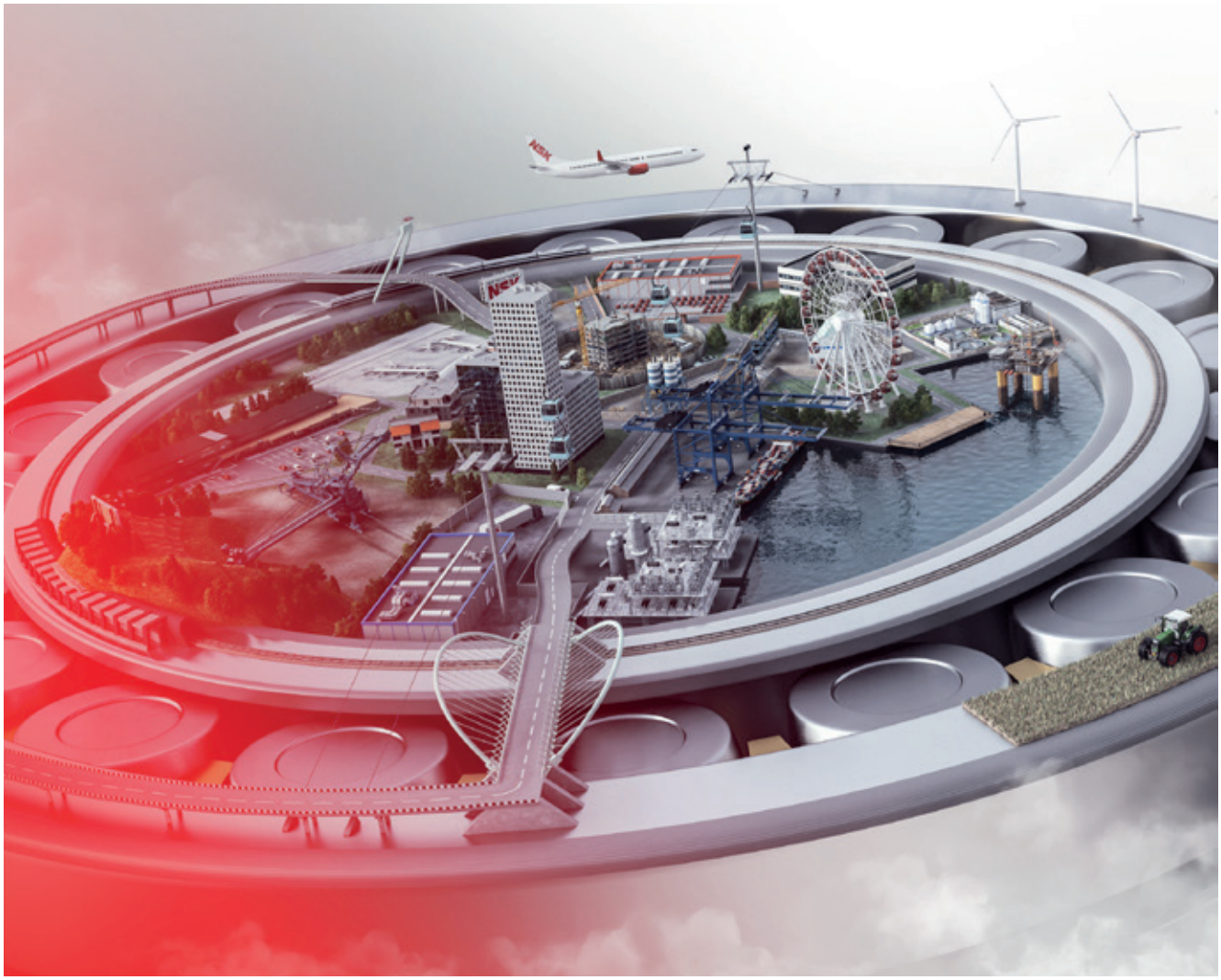
NSK commenced operations as the first Japanese manufacturer of rolling bearings back in 1916. Ever since, we have been continuously expanding and improving not only our product portfolio but also our range of services for various industrial sectors. In this context our worlwide research and production facilities are linked together in a global network. Here we concentrate not only on the development of new technologies, but also on the continuous optimisation of quality – at every process stage. Among other things, our research activities include product design, simulation applications using a variety of analytical systems and the development of different steels and lubricants for rolling bearings.

Trademarks: All NSK product and service names listed in this catalogue are trademarks or registered trademarks of NSK Ltd.

# OUR MOST IMPORTANT PRODUCT: OUR CUSTOMERS' SATISFACTION

One thing keeps us moving: we want to help you increase the reliability of your vehicles and equipment, not only with excellent products, but above all with excellent service. Our experienced engineers have a deep understanding of systems – together with you, they work to optimise products and processes and develop solutions for the future. The goal that we are dedicated to every day is ensuring that you remain competitive over the long run.

More about NSK on www.nsk.com/eu-en/



# Food and Beverage Industry



As one of the biggest rolling bearing manufacturers worldwide, NSK has a wide range of rolling bearings specifically for the food and beverage industry, whose construction features include, amongst others, rustproof materials, sealed construction with lifelong lubrication, and foodstuffs-compatible lubricants.

Continuous high-speed operation, the most stringent of hygiene standards and operating conditions where heat, cold and damp are the norm – these call for bearings that you can rely on to take extreme conditions in their stride, as well as making cost-effective production possible. NSK bearings for the food and beverage industries are robust, made of corrosion-resistant stainless steel and lubricated for life.

For trouble-free operation, bearings should be perfectly adapted to the relevant machines and production processes. Apart from the extensive product range specially developed for the food and beverage industries, engineering also plays an outstanding role. This way, we can work together with you to analyse possible weak points in the production process, measure and monitor efficiency and, where necessary, propose alternative products. Experts work ceaselessly in the NSK research laboratories to improve products and lubricants.

How can rolling bearings guarantee outstanding performance despite having to stand up to high temperatures, water and chemicals? How is foodstuffs contamination prevented safely and reliably? Through which measures can maintenance-free operation be achieved? We will be pleased to give you the correct answers to all these questions. Because, in everything we do, every single day, we strive for Total Quality.

Apart from long operating runs, hygiene, health and safety are the key factors in the food and beverage industries. This means that sealing discs on the belt drive bearings and sheaves must not be distorted during high-pressure cleaning. Bearings and their cages must be corrosion-resistant and lubricants should not leak.

This brochure highlights core products for this industry. We are also showing a selection of products made for special environments. On the following pages we present a generic process in the food and beverage industry.

# Needs in Food Processing Lines

## Raw Material Process

**Features:**
- Water resistance
- Dustproofing
- Easy maintenance

**NSK Products:**
- Stainless Steel Bearings
- Molded-Oil Bearings
- Linear Guides (with K1)*





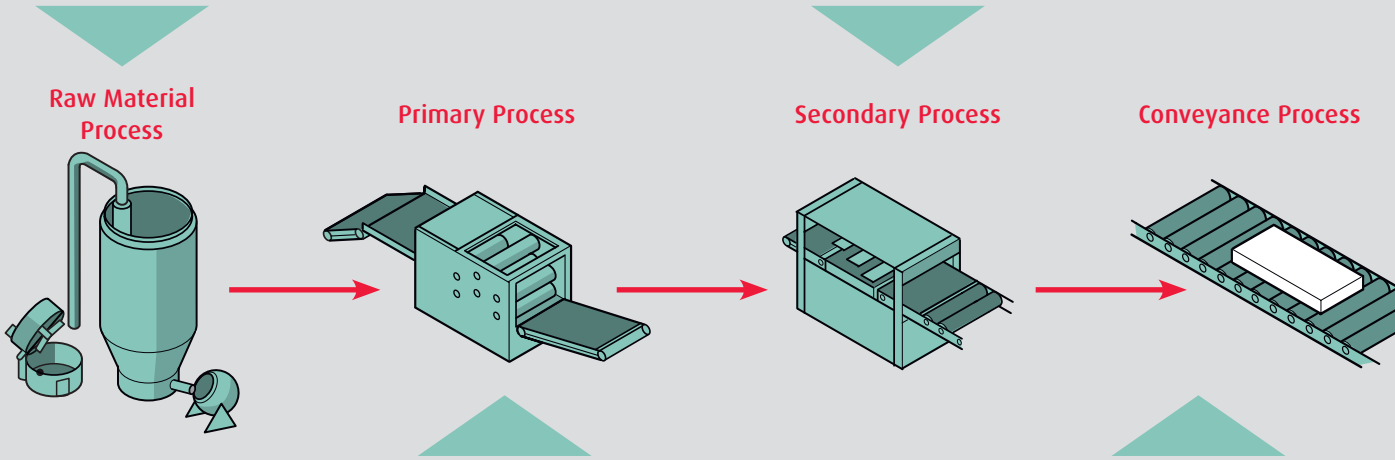
## Secondary Process (Molding)

**Features:**
- Water resistance
- Dustproofing
- Low dust emission
- Easy maintenance

**NSK Products:**
- Mounted Units
- Molded-Oil Bearings
- Stainless Steel Bearings
- Linear Guides (with K1)*
- Ball Screws (with K1)*
- Clean Grease (LG2 / LGU)












## Primary Process (Cutting, Mixing)

**Features:**
- Water resistance
- Dustproofing
- Easy maintenance

**NSK Products:**
- Mounted Units
- Molded-Oil Bearings
- Stainless Steel Bearings
- Linear Guides (with K1)*
- Ball Screws (with K1)*





## Conveyance Process

**Features:**
- Water resistance
- Low dust emissions
- Easy maintenance

**NSK Products:**
- Mounted Units
- Stainless Steel Bearings
- Linear Guides (with K1)*
- Ball Screws (with K1)*

*K1 = K1 Lubrication Unit

## Inspection Process

**Features:**

- Water resistance
- Easy maintenance
- High accuracy



**NSK Products:**

- Mounted Units
- Stainless Steel Bearings
- Molded-Oil Bearings
- Linear Guides (with K1)*
- Ball Screws (with K1)*



## Packaging Process

**Features:**

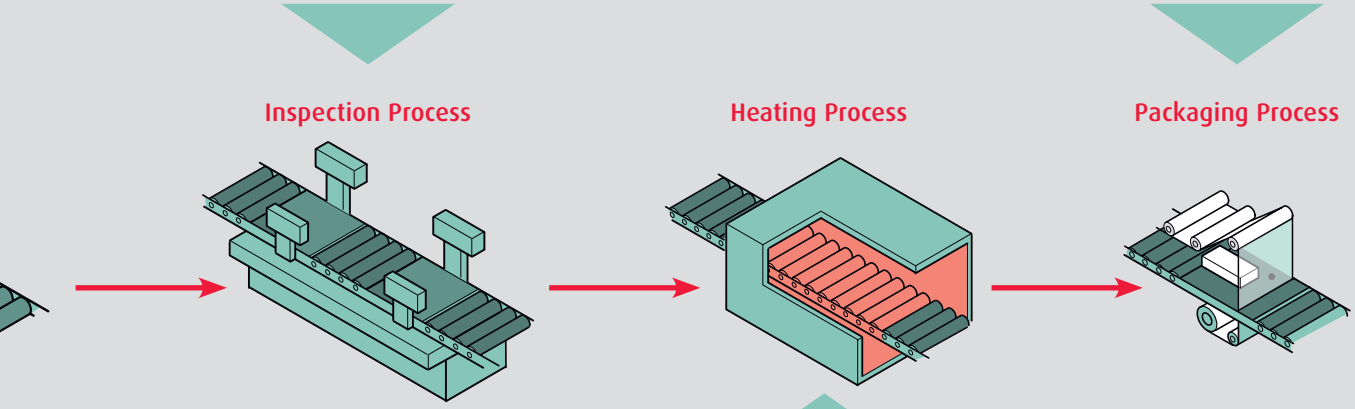
- Low dust emissions
- Easy maintenance
- High speed



**NSK Products:**

- Mounted Units
- Molded-Oil Bearings
- Stainless Steel Bearings
- Linear Guides (with K1)*
- Ball Screws (with K1)*
- Clean Grease (LG2 / LGU)








## Heating Process

**Features:**

- Water resistance
- Heat resistance
- Easy maintenance

**NSK Products:**

- Stainless Steel Bearings
- KPM Grease

# Needs in Beverage Processing Lines

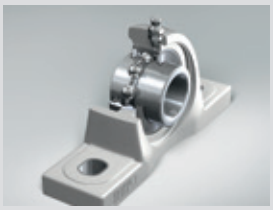
## Filling and Sealing Process

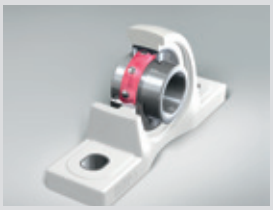
**Features:**

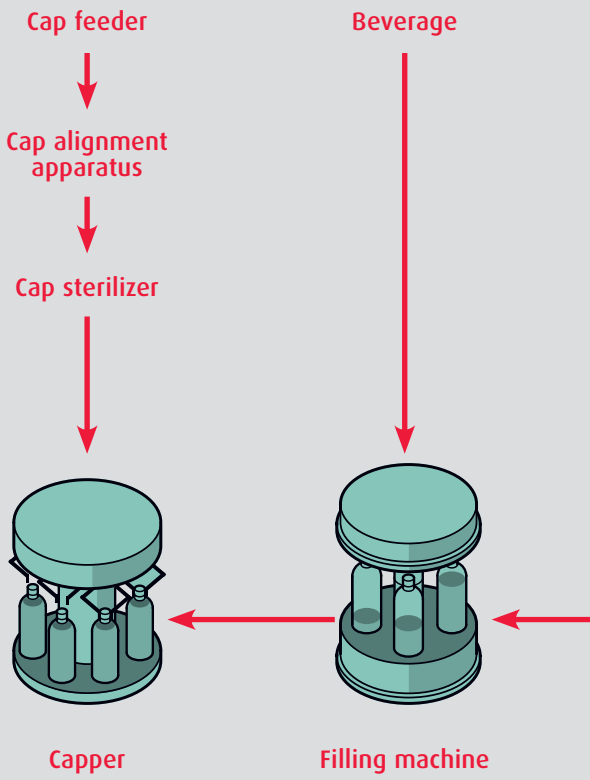
- Dustproofing
- Waterproof
- Low dust emission
- Easy maintenance

**NSK Products:**

- Silver-Lube
- Life-Lube
- Molded-Oil Bearings
- Stainless Steel Bearings
- Linear Guides (with K1)*
- Clean Grease (LG2 / LGU)








## Inspection Process

**Features:**

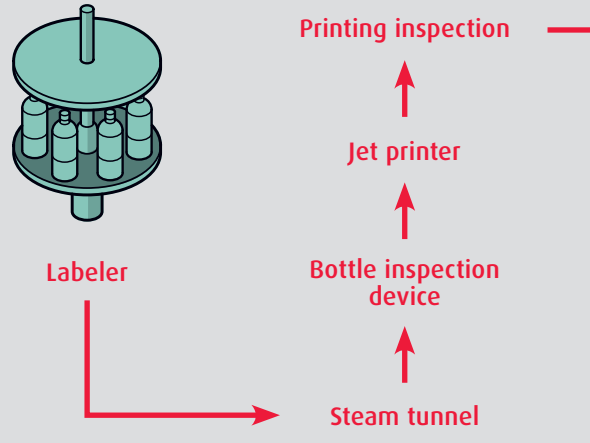
- Waterproof
- High speed
- Easy maintenance

**NSK Products:**

- Silver-Lube
- Life-Lube
- Molded-Oil Bearings
- Stainless Steel Bearings
- Linear Guides (with K1)*
- Ball Screws (with K1)*








*K1 = K1 Lubrication Unit

## Bottle Molding Process

**Features:**

- Dustproofing
- Water resistance
- Low dust emission
- Easy maintenance

**NSK Products:**

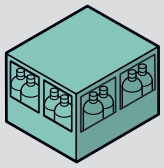
- Silver-Lube
- Life-Lube
- Stainless Steel Bearings
- Aqua Bearings
- Linear Guides (with K1)*





Preform feeder → Blow molding machine

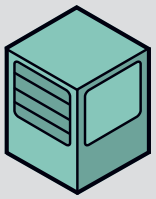
Depalletizer → Bottle mouth ultraviolet pasteurizer → Bottom ultraviolet pasteurizer → Emty bottle inspection device



Molds bottles from preforms



**Rinser**
Rinses inside of bottle with aseptic water



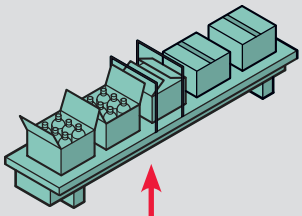
**Warm air drier**



**Bottle sterilizer**
Sterilizes inside of bottle

FILLING PROCESS

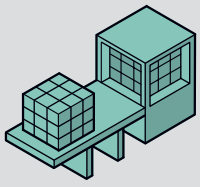
Caser → PC coder → Weight checker → Palletizer



**Carton feeder**

Packs products in cardboard boxes

Stacks products on pallets



## Packing Process

**Features:**

- High speed
- Easy maintenance
- High-load operation

**NSK Products:**

- Self-Lube
- Molded-Oil Bearings
- NSKHPS Deep Groove Ball Bearings
- Linear Guides (with K1)*
- Ball Screws (with K1)*





WRAPPING PROCESS

# Core Products for the Food and Beverage Industry



## Mounted Units

- Range of diverse casting and pressed steel housings
- Inserts - 3 main locking arrangements and 2 inner ring length options
- 3 main sealing options: standard, triple lip, flinger
- Positively located steel end cap available for units up to 60 mm shaft
- All cast iron housings supplied with regreasing facility



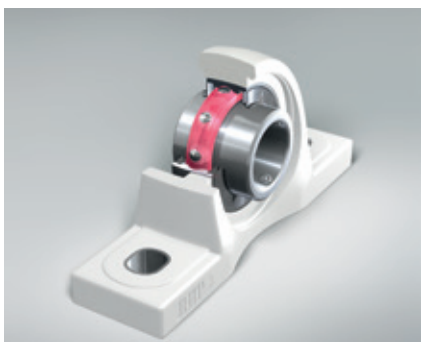
## Triple-lip sealed inserts

- Inserts interchangeable with standard items
- Longer bearing life through superior sealing performance
- Extended relubrication intervals
- Suitable for areas with strong dust or water pollution



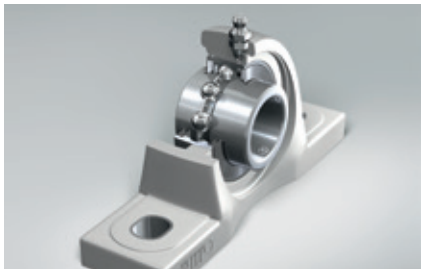
## NSKHPS Single Row Deep Groove Ball Bearings

- Suitable for the use under radial loads
- Can withstand moderate axial loads in either directions
- Low torque
- Suitable for applications where high speed and low power loss is required
- NSKHPS - High Performance Standard



## Life-Lube

- Combine corrosion resistance of Silver-Lube housing with sealing and lubricating attributes of Molded-Oil Bearings
- Suitable for wet environments
- Suitable for areas with process fluids and chemicals



## Silver-Lube

- High grade stainless steel bearing-rings, cage & balls, seal core & grub screws, grease nipple & holt hole liners
- Nitrile rubber seals and stainless steel flingers
- Thermoplastic polyester resin housing; plastic end covers available
- Factory filled with a wide temperature USDA H1 food grade grease
- Silver-Lube is available in four different geometries



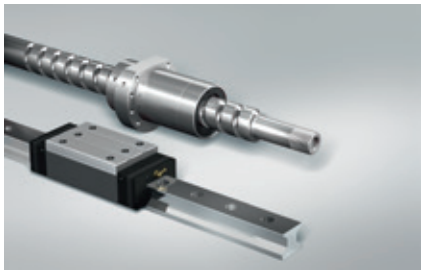
## Molded-Oil Bearings

- Excellent performance in water and dust contaminated environments
- Environmentally friendly
- Low torque



## Stainless Steel Bearings

- Stainless Steel ES1
- Higher corrosion resistance than ordinary steel
- Available as open, shielded and contact-seal type
- Suitable for wet and damp environments
- Grease Lubrication



## Linear Guides

- Excellent running characteristics - friction optimised, smooth and accurate
- Highest Load capacity and best rigidity values

## Ball Screws:

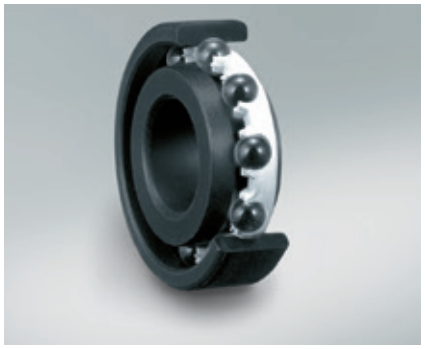
- Large product range
- Minimal dynamic torque variation
- High reliability and precision



## K1 Lubrication Unit

- Long-term, maintenance-free operation
- Available in accordance with the FDA
- Effective sealing function
- Applicable to all the linear guide models

# Products for special environments



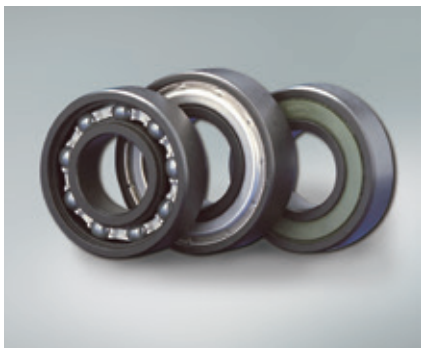
## Aqua Bearings

- Corrosion resistant in water, alkali, acid environments
- Self lubricating special fluoresin for inner, outer ring and cages



## Corrosion-Resistance through Nickel-Plating

- Nickel coating on outer and inner rings
- Suitable for alkaline and midly acidic environments
- Suitable for applications with water rinsing

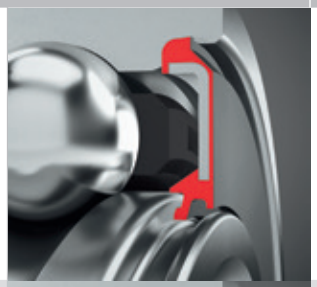
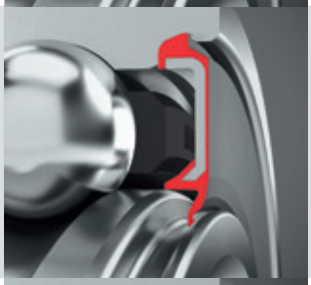


## Chrome-Plated Corrosion Resistant Bearings

- Extremly high corrosion resistant through chrome plating
- Suitable for constant underwater operations

# Sealing Technology

NSK offers several different seal/shield designs and materials, each developed to meet specific needs of your application. As an example, we offer seals with varying degrees of contamination resistance and drag characteristics, including our full-contact DU seals, light-contact DW seals and non-contact V seals.

| Seals and shields comparisons | | | | | | |
|---|---|---|---|---|---|---|
| | | Dustproofing | Waterproofing | Torque | Constant revolutions | Protection against lubrication leakage |
| DU/DDU* |  | Excellent | Excellent | Normal | Normal | Excellent |
| DW/DDW* |  | Excellent | Normal | Low | Good | Excellent |
| V/VV* |  | Good | Unsuitable | Very low | High | Good |
| Z/ZZ* |  | Normal | Unsuitable | Very low | High | Normal |

* double sided seals / shields

# Molded-Oil Technology

The difference is in the lubrication: NSK's patented Molded-Oil grease is specifically developed for situations requiring high levels of hygiene, such as in the food and beverage industries. As such, the Molded-Oil lubricant is transported by a substance that releases the lubricant gradually. This way, the required amount of lubrication is provided to the bearing over a long period of time. At the same time, the risk of oil leakages is minimised, making the bearings outstandingly smooth-running. Optionally, lubricants with USDA H1 (L21) certification can be used.

## Features of Molded-Oil Bearings

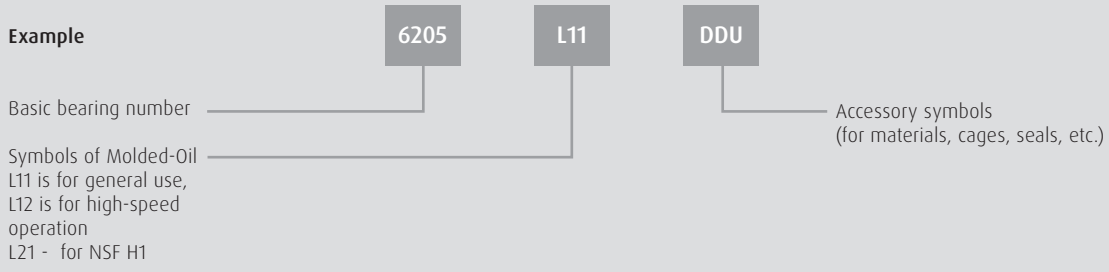
- **Excellent performance in water- and dust-contaminated environments**
  The bearings are designed to prevent liquids such as water (which can wash the lubricating oil out) and dust from getting inside the bearings. Sealed types can be used in environments exposed to water and dust.*
- **Environmentally friendly**
  Because they can be lubricated with minute quantities of oil that exudes from Molded-Oil, the bearings are able to minimise oil leakage.
- **Low torque**
  Packing with Molded-Oil after providing the bearing surface with special treatment realises smooth rotation of rolling elements.
- **Optimal composition and molding methods enable high-speed operation of Molded-Oil bearings**
  Optimisation of composition and molding method of Molded-Oil improves strength and enables high-speed operation of Molded-Oil bearings.

* Water and dust dramatically accelerate bearing damage. In order to realise stable operation, we recommend using seals to prevent water and dust from getting into the bearing.

## Applications

- **Food-processing equipment**
- **Steel mill equipment**
- **Paper mill equipment**
- **Liquid crystal display and semiconductor manufacturing equipment**
- **Agricultural machines**
- **Cleaning equipment and lines**
- **Conveying equipment**

### Combination of model numbers



| Model numbers | | | | |
|---|---|---|---|---|
| **Bearing types** | **Molded-Oil types** | | **Model numbers** | **Remarks** |
| **Deep groove ball bearings** | ● | For general use | 6205L11DDU | – |
| | | | 6001L11-H-20DDU | Stainless steel bearing |
| | ● | For high-speed operation | 6205L12DDU | – |

## Thanks to Molded-Oil technology, a snack foods manufacturer saved more than €50.000 a year

A snack foods manufacturer in the UK was experiencing a short service life of only 4 months in standard deep groove ball bearings used in a 7-lane food-processing conveyor system.

### Key Facts

- Food conveyor system
- Frequent washdown cycles using agressive cleaning fluids causing standard bearings to fail prematurely
- 84 bearings used within the equipment, replaced 3 times per year – totalling 252 bearings annually
- Maintenance time of 24 hours per breakdown (2 engineers working for 12 hours)
- Loss of production: 14 hours per breakdown
- Standard bearings replaced with Molded-Oil deep groove ball bearings increased bearing life from 4 to 12 months

| Breakdown of cost savings | | | |
|---|---|---|---|
| **Before** | **Cost p.a.** | **NSK Solution** | **Cost p.a.** |
| Deep groove ball bearings, replaced 3 times per year | €684 | Stainless steel Molded-Oil deep groove ball bearings replaced once annually | €4,253 |
| Engineering costs | €3,218 | Engineering costs | €1,073 |
| Potential profit loss | €53,627 | Potential profit loss | €0 |
| **Total costs** | **€57,529** | | **€5,326** |

# Greases for Food Processing Machinery

NSK has developed the world's first 100% food-derived grease lubricant, 'EXCELLA GREEN FOOD GRADE GREASE H3G', and adapted it to bearings for food-processing machinery. H3G grease is NSF-certified under category H3. H3G grease has low torque, excellent water resistance and little 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 ↑ Low

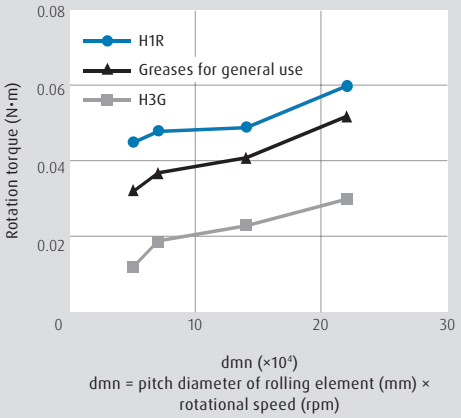
H3: Lubricants intended for food contact.

H1: Lubricants used in locations where the lubricant may accidentally come into contact with food.

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 recognised in the field of public health and safety.

H3G grease has lower torque than greases for general use.

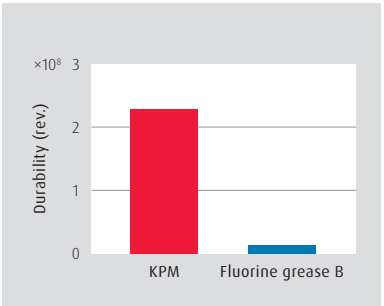



## Heat-Resistant Grease (KPM)

- Heat resistance: can be used up to 200°C
- Life: about 5 times longer than commercially available fluorine greases

### Durability

KPM life is very long, about five times longer than fluorine greases on the market.




Test bearing: 6305
Rotational speed: 10,000 rpm
Axial load: 1,500N
Temperature of outer ring: 200°C
In normal atmosphere

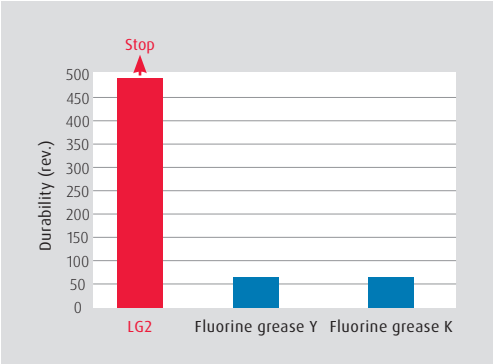


All greases are not available as a standard grease from NSK.
Please contact NSK for more information.

## Clean Grease (LG2, LGU)

- Low dust emissions: lower than other fluorine greases on the market
- Life: over 10 times longer than other fluorine greases on the market

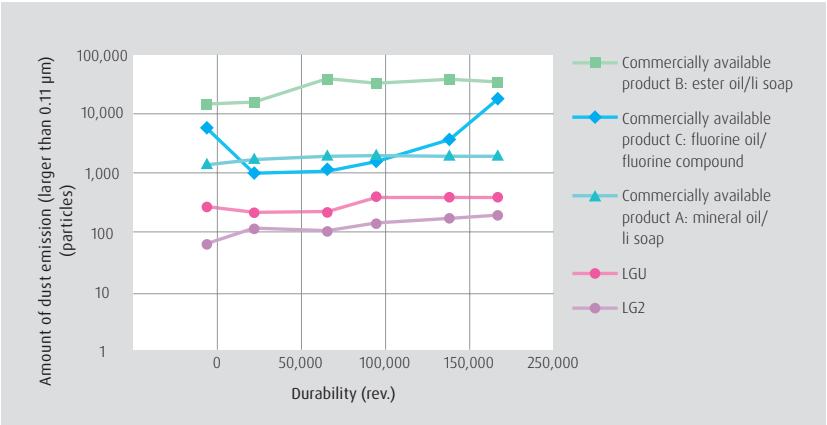





### Durability in the atmosphere

LG2 and LGU greases have longer life in normal atmosphere.

Test bearing: 608
Rotational speed: 1,000 rpm
Rotation direction: forward/reverse rotation
Axial load: 196 N
In normal atmosphere
Temperature: normal temperature




### Dust emission in the atmosphere

The dust emissions of LG2 and LGU greases are lower in normal atmosphere.

Test bearing: 695VV
Rotational speed: 3,600 rpm

## Table of greases

| Name | Operating temperature range, °C | Feature | Base oil kinematic viscosity (40°C), mm²/s | Consistency |
|---|---|---|---|---|
| H3G | 0–90 | For food-processing machinery (NSF category H3) | 14.8 | 255 |
| H1R | 0–120 | For food-processing machinery (NSF category H1) | 150 | 280 |
| H1B | 0–200 | For food-processing machinery (NSF category H1) | 415 | 280 |
| NS Hi-Lube | −40 – +130 | Wide-range grease | 26 | 250 |
| LG2 | −20 – +70 | Clean grease | 32 | 199 |
| LGU | −40 – +120 | Wide-range clean grease | 96 | 201 |
| KPM | −20 – +230 | Grease for high-temperature use | 420 | 290 |

# Notes


NSK

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