



# THK CO., LTD.

HEAD OFFICE 3-11-6, NISHI-GOTANDA, SHINAGAWA-KU, TOKYO 141-8503 JAPAN  
INTERNATIONAL SALES DEPARTMENT PHONE:+81-3-5434-0351 FAX:+81-3-5434-0353  
Global site : <http://www.thk.com/>



## EUROPE

THK GmbH  
●EUROPEAN HEADQUARTERS  
Phone:+49-2102-7425-555 Fax:+49-2102-7425-556  
●DUSSELDORF OFFICE  
Phone:+49-2102-7425-0 Fax:+49-2102-7425-299  
●FRANKFURT OFFICE  
Phone:+49-2102-7425-650 Fax:+49-2102-7425-699  
●STUTTGART OFFICE  
Phone:+49-7150-9199-0 Fax:+49-7150-9199-888  
●MUNICH OFFICE  
Phone:+49-8937-0616-0 Fax:+49-8937-0616-26  
●U.K. OFFICE  
Phone:+44-1908-30-3050 Fax:+44-1908-30-3070  
●ITALY MILAN OFFICE  
Phone:+39-039-284-2079 Fax:+39-039-284-2527  
●ITALY BOLOGNA OFFICE  
Phone:+39-051-641-2211 Fax:+39-051-641-2230  
●SWEDEN OFFICE  
Phone:+46-8-445-7630 Fax:+46-8-445-7639  
●AUSTRIA OFFICE  
Phone:+43-7229-51400 Fax:+43-7229-51400-79  
●SPAIN OFFICE  
Phone:+34-93-652-5740 Fax:+34-93-652-5746  
●TURKEY OFFICE  
Phone:+90-216-362-4050 Fax:+90-216-569-7150  
●PRAGUE OFFICE  
Phone:+420-2-41025-100 Fax:+420-2-41025-199  
●MOSCOW OFFICE  
Phone:+7-495-649-80-47 Fax:+7-495-649-80-44  
THK Europe B.V.  
●EINDHOVEN OFFICE  
Phone:+31-040-290-9500 Fax:+31-040-290-9599  
THK France S.A.S.  
Phone:+33-4-3749-1400 Fax:+33-4-3749-1401

## NORTH AMERICA

THK America, Inc.  
●HEADQUARTERS  
Phone:+1-847-310-1111 Fax:+1-847-310-1271  
●CHICAGO OFFICE  
Phone:+1-847-310-1111 Fax:+1-847-310-1182  
●NORTH EAST OFFICE  
Phone:+1-845-369-4035 Fax:+1-845-369-4909  
●ATLANTA OFFICE  
Phone:+1-770-840-7990 Fax:+1-770-840-7897  
●LOS ANGELES OFFICE  
Phone:+1-949-955-3145 Fax:+1-949-955-3149  
●SAN FRANCISCO OFFICE  
Phone:+1-925-455-8948 Fax:+1-925-455-8965  
●DETROIT OFFICE  
Phone:+1-248-858-9330 Fax:+1-248-858-9455  
●TORONTO OFFICE  
Phone:+1-905-820-7800 Fax:+1-905-820-7811  
SOUTH AMERICA  
THK Brasil LTDA  
Phone:+55-11-3767-0100 Fax:+55-11-3767-0101

## CHINA

THK (CHINA) CO.,LTD.  
●HEADQUARTERS  
Phone:+86-411-8733-7111 Fax:+86-411-8733-7000  
●SHANGHAI OFFICE  
Phone:+86-21-6219-3000 Fax:+86-21-6219-9890  
●BEIJING OFFICE  
Phone:+86-10-8441-7277 Fax:+86-10-6590-3557  
●CHENGDU OFFICE  
Phone:+86-28-8526-8025 Fax:+86-28-8525-6357  
●GUANGZHOU OFFICE  
Phone:+86-20-8523-8418 Fax:+86-20-3801-0456  
●SHENZHEN OFFICE  
Phone:+86-755-2642-9587 Fax:+86-755-2642-9604  
THK (SHANGHAI) CO.,LTD.  
Phone:+86-21-6275-5280 Fax:+86-21-6219-9890  
TAIWAN  
THK TAIWAN CO.,LTD.  
●TAIPEI HEAD OFFICE  
Phone:+886-2-2888-3818 Fax:+886-2-2888-3819  
●TAICHUNG OFFICE  
Phone:+886-4-2359-1505 Fax:+886-4-2359-1506  
●TAINAN OFFICE  
Phone:+886-6-289-7668 Fax:+886-6-289-7669

## KOREA

SEOUL REPRESENTATIVE OFFICE  
Phone:+82-2-3468-4351 Fax:+82-2-3468-4353

## SINGAPORE

THK LM SYSTEM Pte. Ltd.  
Phone:+65-6884-5500 Fax:+65-6884-5550

## THAILAND

THK LM System Pte.Ltd.Representative Office in Thailand  
Phone:+660-2751-3001 Fax:+660-2751-3003

## INDIA

BANGALORE REPRESENTATIVE OFFICE  
Phone:+91-80-2330-1524 Fax:+91-80-2330-1524

business information for aircraft manufacturers

CATALOG No.23-1E  
©THK CO., LTD. 201008050 EE13 Printed in Japan



**The World's No.1**  
Market Leader for Linear Motion Systems

## The THK commitment: The Highest Quality Possible.

As the leading manufacturer of linear motion systems, THK has been delivering high-performance, high-reliability products to a wide range of users. With an ongoing quest for the highest quality possible, THK assures the highest level of quality at all stages: from technology development, to production management through to product support.

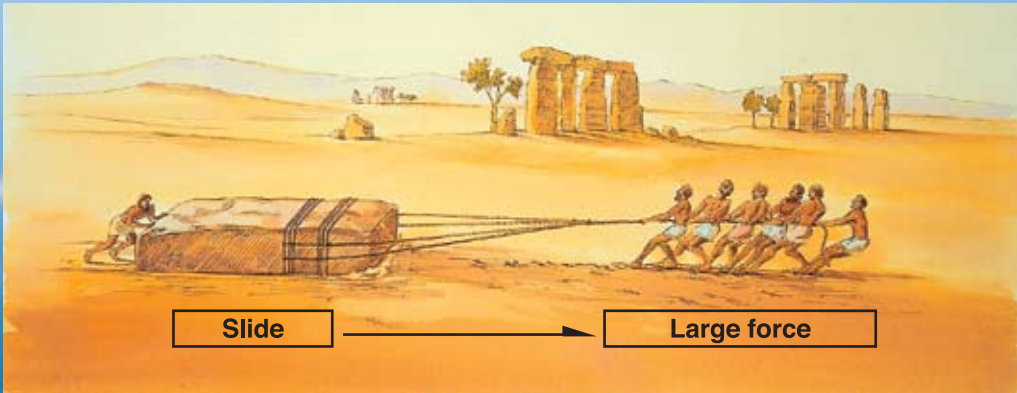
**Advancing technology further than ever before.  
Going higher, and then beyond.**



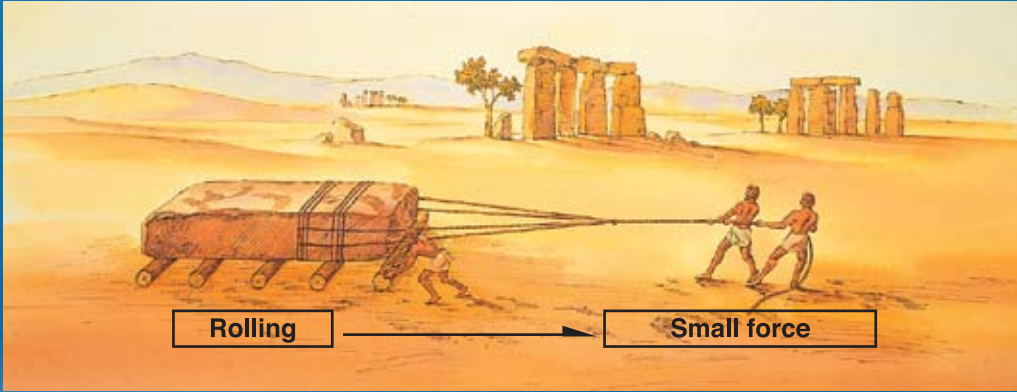
# THK Core Competence — Rolling Technology for Linear Motion Components

Rolling rather than sliding linear motion components is a prominent technological innovation that makes all machines move smoothly. THK has developed the world’s first rolling linear motion components — components that have been considered difficult to create. In addition to linear motion applications, rolling technology has been applied to many other mechanical motions such as orthogonal, spiral, curve, oscillation and rotary motions. And the fields of application are continuing to expand.

Slide

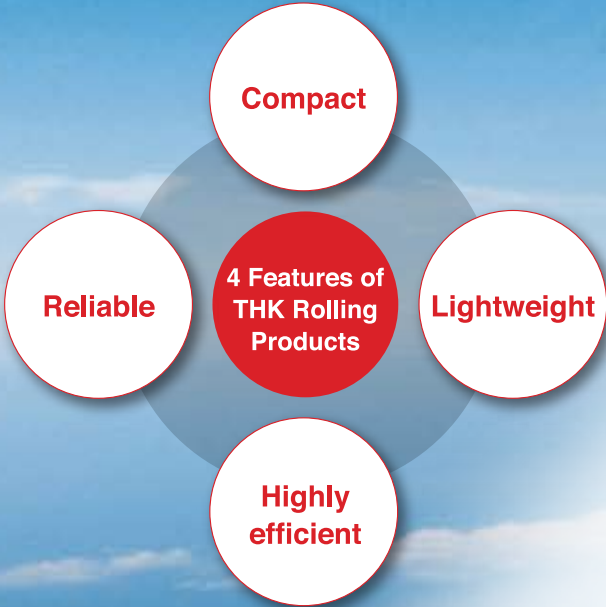


Rolling



Mechanical motion is generally categorized as linear, rotary and linear-rotary combined motions. Rolling rotary components were first commercialized as bearings more than 100 years ago, but rolling linear motion components were not achieved for many years, although the many merits were obvious, including reduced energy and power consumption. THK developed the world’s first Linear Motion System in 1972, and commercialized rolling linear motion components.

**THK commercialized the world’s first rolling linear motion components.**



## Cross Roller Rings

Cross Roller Rings are high-precision roller bearings comprising orthogonally arranged cylindrical rollers that support a load in any direction.



## LM Guides

LM Guides are a core product of THK that enabled the world’s first rolling linear motion to be achieved by the company. THK LM Guides enhance both the accuracy and rigidity of machines, while increasing their service life and making them run faster with less energy consumption.



## Ball Splines

Ball Splines are rolling motion spline bearings that feature a load capacity greater than linear bushings because the balls roll in the grooves on the shaft. These innovative products transmit torque securely while enabling linear motion.



## Ball Screws

Highly efficient feed motion is achieved because the balls roll between the screw shaft and the nut. Drive torque requirements are reduced to less than one-third of a conventional slide screw, offering a substantial power saving for the drive motor.



## Rod Ends

Rod Ends are spherical sliding bearings comprising a spherical inner ring that is manufactured to the same accuracy and hardness of steel ball bearings. Rod ends achieve very smooth but tight rotary and oscillating motions without any play.





# THK Technology in Aircraft Development

Highly acclaimed THK products are in use as essential mechanical components in all industries. THK products also have enormous potential in the development of aircraft and are already being supplied to several aircraft component manufacturers. Our strength lies in not merely offering standardized components, but also in our flexible development and proposals for customized products that completely satisfy customer needs by meeting their special purposes and usage conditions.

## Control Sticks



### Ball Splines



A push-pull control stick is lighter in weight and the control space is wider than conventional arm-type control sticks. THK provides compact, low-sliding rotary ball splines with excellent linear and rotary motion and torque transmission capability for use in the manufacture of control sticks.

## Seats



### Light Circuitous Rings (Cross Roller Rings)



THK's large diameter, lightweight rotary bearings for aircraft are made of super duralumin and resin balls. These bearings feature excellent dynamic stability, minimal weight, a lubricant-free structure, and high impact-resistance.

### LM Guides



THK — the pioneer in LM Guides make all mechanical motions work smoothly by rolling rather than sliding — provides lightweight products with high rigidity and accuracy as an ideal solution for customers' requirements.

## Seats

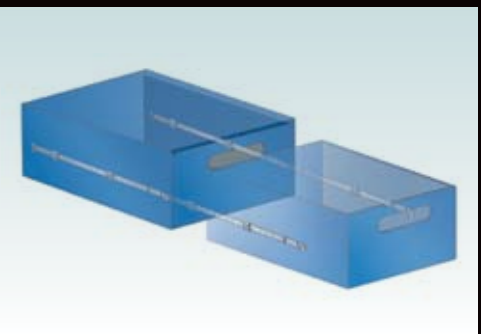


### Actuators



THK actuators have a structure where the ball screw and the support bearing are consolidated, resulting in a light, compact design and contributing to reliability and quiet operation.

## Interior



### Light Guides



Since the block and the rails are made of aluminum, they are light, allowing smooth, stable movement of the block. In addition, the rails are detachable, improving serviceability and ease of maintenance.

## Horizontal Tail Wing

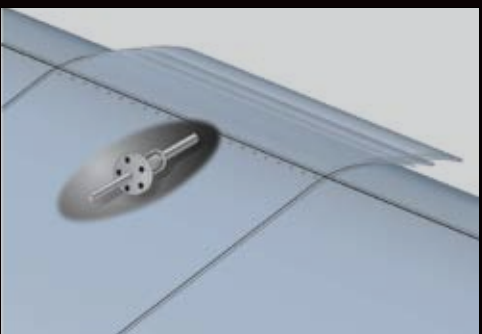


### Ball Screws



Horizontal and vertical tails require extremely high reliability. THK develops unique ball screws that utilize the company's special processing techniques, materials and sealing methods to meet the stringent requirements of the aircraft industry.

## Flight Control Surface



### Ball Screws



THK's state-of-the-art technologies satisfy the requirements of the aircraft industry for reliable, durable and eco-friendly aircraft components. The ball screws provided by THK are used in aircraft flight control surface structures.

## Landing Gear



### Ball Screws



Motor-driven landing gear are superior to hydraulic axles in terms of weight, system reliability and maintainability. The field-proven flanged and deflector-type ball screws that THK provides for motor-driven landing gear make them more compact in size and lighter in weight.



### 3 Energies That Drive Our Manufacturing Activities

As the LM Guide pioneer, THK has supplied several hundred million products over the past 35 years. THK develops and manufactures new products that leverage the company's accumulated expertise in quality, technology and reliability.



#### Quality management system

## Quality

ISO9001  
JIS Q 9100

## Reliability

Evaluation facilities

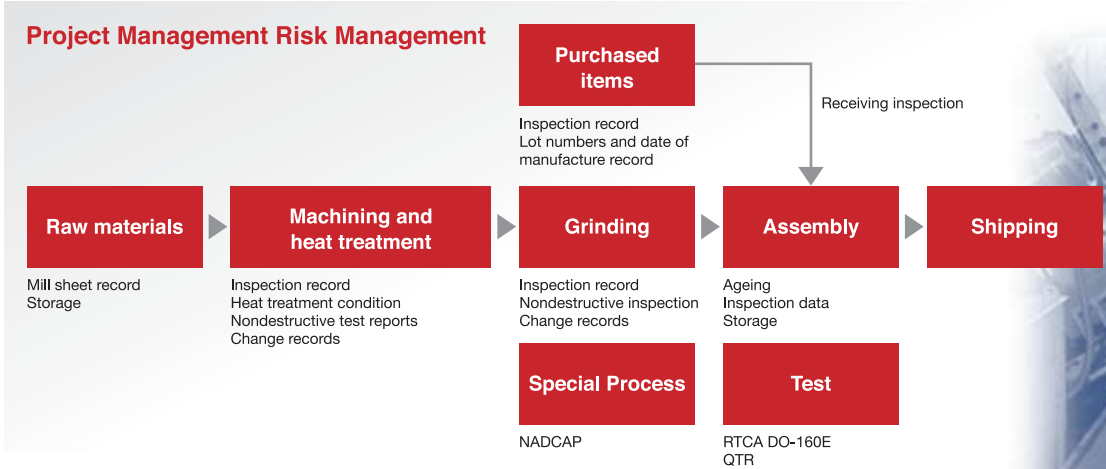
## Technology

Linear Motion Technology  
Production Engineering

Rolling elemental technology  
Tribology

## Quality System

The manufacture of aircraft components requires stringent quality control. THK operates and maintains a quality management system that is certified for ISO9001. THK's production history and stable quality are verified and controlled by the 5W1H system for the entire manufacturing process, from raw material procurement to product assembly, and the relevant records are stored for a long period of time. To further ensure the quality of aircraft components, THK has established a system that has received JIS Q9100 certification for its Aerospace Quality Management System in 2009.



## Technology Structuring

### Design Technology

In the aircraft industry, all components must satisfy a high-level standard in every aspect — weight, reliability, operating environments (–55 to +85 °C) and durability. THK repeatedly performs design verification and tests for each item to ensure the quality of our technologies. THK continually seeks to develop more lightweight products and enhances its design reliability to take our aircraft component manufacturing technology to even higher levels.

### Production Engineering

THK fully understands the importance of quality control in the manufacture of aircraft components. This is why THK has established and maintains a unique manufacturing system to maintain stable product quality. Using Failure Modes and Effects Analysis (FMEA) techniques, THK is committed to continually improving its nondestructive inspection, machining, initial failure mode confirmation, transport, storage and other manufacturing processes.

## Reliability

### Durability Evaluation Tests

Equipment certified by an official TÜV monitoring organization is installed in THK plants to perform durability tests on LM Guides and assure their reliability. THK has also introduced durability testers for ball screws to evaluate and verify in-house the durability and lubricity of these products.

### Nondestructive Inspections

To insure the reliability of aircraft components, any unseen internal defects must be detected without fail. As part of quality assurance inspection regime, THK performs nondestructive testing daily on its manufactured components using ultrasound detectors, magnetic particle testers and X-ray units.

### Environmental Testing

Aircraft components are used under wide-ranging ambient temperature conditions between –55 and +85 °C. THK carefully inspects the products it manufactures using its own environmental testers. In particular, the raw materials used for manufacturing aircraft components are carefully selected using these testers.

### Static Strength Testing

THK utilizes several tensile and compression testers with capacities up to 25 t to evaluate and verify the static strength performance of its products.



Operating under a corporate policy of closely integrating its manufacturing and marketing efforts, THK carries out its business in locations throughout the world where demand exists.

With the belief that local production carried out directly in customer regions is the best method of production, THK has been reinforcing its production and marketing bases in four key areas: Japan, Europe, America and Asia.

● Sales Office  
● Manufacturing Plant

ASIA

- CHINA  
■ SHANGHAI  
■ BEIJING  
■ CHENGDU  
■ GUANGZHOU  
■ SHENZHEN  
■ THK MANUFACTURING OF CHINA (LIAONING) CO., LTD.  
■ THK MANUFACTURING OF CHINA (WUXI) CO., LTD.  
■ DALIAN THK CO., LTD.  
■ THK RHYTHM GUANGZHOU CO., LTD.
- TAIWAN  
■ TAIPEI  
■ TAICHUNG  
■ TAINAN
- KOREA  
■ SEOUL  
■ SAMICK THK CO., LTD.
- SINGAPORE  
■ SINGAPORE
- VIETNAM  
■ THK MANUFACTURING OF VIETNAM CO., LTD.
- THAILAND  
■ BANGKOK  
■ THK RHYTHM(THAILAND)CO., LTD.
- INDIA  
■ BANGALORE

EUROPE

- GERMANY  
■ DUSSELDORF  
■ FRANKFURT  
■ STUTTGART  
■ MUNICH  
UNITED KINGDOM  
■ MILTON KEYNES
- ITALY  
■ MILAN  
■ BOLOGNA
- SWEDEN  
■ STOCKHOLM
- AUSTRIA  
■ LINZ
- SPAIN  
■ BARCELONA
- TURKEY  
■ ISTANBUL
- CZECH  
■ PRAGUE
- RUSSIA  
■ MOSCOW
- NETHERLANDS  
■ EINDHOVEN
- FRANCE  
■ LYON  
■ THK Manufacturing of Europe S. A. S.
- IRELAND  
■ PGM Ballscrews Ireland Ltd.

NORTH AMERICA

- U.S.A.  
■ CHICAGO  
■ NEW YORK  
■ ATLANTA  
■ LOS ANGELES  
■ SAN FRANCISCO  
■ DETROIT  
■ THK Manufacturing of America, Inc.  
■ THK RHYTHM NORTH AMERICA CO., LTD.
- CANADA  
■ TORONTO

SOUTH AMERICA

- BRASIL  
■ SAO PAULO



THK EUROPE HEADQUARTERS (DUSSELDORF, GERMANY)



THK AMERICA HEADQUARTERS (CHICAGO)



THK Manufacturing of America, Inc.



THK RHYTHM NORTH AMERICA CO., LTD.



THK Manufacturing of Europe S. A. S.(FRANCE)



PGM Ballscrews Ireland Ltd.



THK MANUFACTURING OF CHINA (LIAONING) CO., LTD.



THK MANUFACTURING OF VIETNAM CO., LTD.



THK MANUFACTURING OF CHINA (WUXI) CO., LTD.



THK RHYTHM GUANGZHOU CO., LTD.(CHINA)



SAMICK THK CO., LTD.(KOREA)



DALIAN THK CO., LTD.(CHINA)



THK RHYTHM(THAILAND)CO., LTD.



THK CHINA HEADQUARTERS (LIAONING)



THK HEAD OFFICE (TOKYO)

JAPAN

HEAD OFFICE  
International Sales Department