business information for aircraft manufacturers
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.
The World’s No.1
Market Leader for Linear Motion Systems
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.
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.

Cross Roller Rings

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

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.

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.

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.
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-friction rotary ball splines with excellent linear and rotary motion and torque transmission capability for use in the manufacture of control sticks.

Business Class Seat

Telescopic Guides

Limited guides (telescopic guides) which realized high rigidity and weight reduction are adopted for linear guide sections of seats or tables. By adopting double-slide structure, overhang load would applied and, it is suitable for the part which has a big stroke.

Seats

MPG

Lightweight Rings which realized stable motion and weight reduction with aluminum inner and outer rings and resin balls are adopted for rotation guide sections for seats. With a groove for positioning at outer ring, fixation at any position is enabled.

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.
### 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.

### Telescopic Guides
Limited guides (telescopic guides) which realized high rigidity and weight reduction are adopted for linear guide sections of seats or tables. By adopting a double-sleeve structure, overhang load would be applied, and it is suitable for the part which has a big stroke.

### 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.

### Ball Splines
We propose a ball spline which would transmit torque to the rod guide section of EMA (Electro-Mechanical Actuator) of S/LAIRFLAP.

### Double Needle Roller Bearings
We propose Double Needle Roller Bearings which correspond to high applied load for guide section of S/LAIRFLAP. As Double Needle Roller Bearings could receive high load, it would realize small size and lightweighting on S/LAIRFLAP drive division.

### Landing Gear
Motor-driven landing gear are superior to hydraulic axles in terms of weight, system reliability and maintainability. The field-proven flanged and collector-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 45 years. THK develops and manufactures new products that leverage the company’s accumulated expertise in quality, technology and reliability.
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 SWTH 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.

**Project Management Risk Management**

- Raw materials
- Machining and heat treatment
- Grinding
- Assembly
- Shipping

**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 ensure the reliability of aircraft components, any unseen internal defects must be detected without fail. As part of the 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 key areas: Japan, Europe, America and Asia.

- Headquarters of Local Subsidiary
- Production Base
- Sales Office
- Representative Office

NORTH AMERICA
THK America, Inc.
- HEADQUARTERS
- CHICAGO OFFICE
- NORTH EAST OFFICE
- ATLANTA OFFICE
- LOS ANGELES OFFICE
- SAN FRANCISCO OFFICE
- DETROIT OFFICE
- TORONTO OFFICE

SOUTH AMERICA
THK BRAZIL INDUSTRIA E COMERCIO LTDA.
- SAO PAULO OFFICE

EUROPE
THK GmbH
- EUROPEAN HEADQUARTERS
- DÜSSELDORF OFFICE
- STUTTGART OFFICE
- U.K. OFFICE
- ITALY OFFICE
- SWEDEN OFFICE
- AUSTRIA OFFICE
- SPAIN OFFICE
- TURKEY OFFICE
- PRAGUE OFFICE
- MOSCOW OFFICE
THK Europe B.V.
- EINDHOVEN OFFICE
THK France S. A. S.
- PARIS OFFICE

THK Manufacturing of America, Inc. (USA)
Site: 106,356m² (1,173,900sq.ft.) / Floor space: 37,311m² (402,982sq.ft.)

THK Manufacturing of Europe S. A. S. (FRANCE)
Site: 106,356m² (1,173,900sq.ft.) / Floor space: 26,376m² (282,781sq.ft.)

THK Manufacturing of Ireland Ltd. (IRELAND)
Site: 10,183m² (109,771sq.ft.) / Floor space: 4,291m² (46,188sq.ft.)

THK RHYTHM AUTOMOTIVE MICHIGAN CORPORATION (USA)
Site: 430,960m² (4,617,266sq.ft.) / Floor space: 17,099m² (188,139sq.ft.)

THK RHYTHM AUTOMOTIVE CANADA LIMITED (ST.CATHARINES)
Site: 117,763m² (1,307,598sq.ft.) / Floor space: 41,347m² (445,508sq.ft.)

THK RHYTHM AUTOMOTIVE CANADA LIMITED (TILLSONBURG)
Site: 60,540m² (651,600sq.ft.) / Floor space: 10,870m² (117,000sq.ft.)

THK RHYTHM AUTOMOTIVE GmbH (KREFELD GELLEP)
Site: 66,211m² (709,118sq.ft.) / Floor space: 18,000m² (195,760sq.ft.)

THK RHYTHM AUTOMOTIVE CZECH a.s. (CZECH)
Site: 135,000m² (1,469,350sq.ft.) / Floor space: 42,800m² (460,084sq.ft.)