Turbolink is a leading manufacturer of fluid film bearings for high speed rotating machinery.

Turbolink products include a complete line of vertical bearing assembly, tilting pad journal bearing, self equalizing tilting pad thrust bearings, flat-land and taper-land thrust bearings, horizontal bearing assembly, as well as medium & thin wall journal bearings. Turbolink is also well-equipped to deliver aftermarket service that optimizes the performance of critical application bearings. Our dedicated special engineers diagnose, analyze, test, repair and replace worn bearings quickly and efficiently, then return them to you as good as or better than new.

**THE HISTORY OF TURBOLINK BEARING**

### 2001
- Establishment of Turbolink
- Award of ISO 9001:2000 Certificate
- HYUNDAI H. I.(Korea) for COPT bearings
- HYUNDAI H. I.(Korea) for Motor VCB (Vertical combined bearing) bearings

### 2002
- SAMSUNG TECHWIN(Korea) for Turbo compressor bearings
- DOOSAN H.I.(Korea) for Steam turbine & generator bearings
- KOREA POWER PLANT(KOREA) for Steam turbine & generator bearings

### 2003
- Establishment of R&D center
- HYOSUNG(Korea) for Horizontal motor bearings

### 2005
- Award of NIP(New Excellent Product) Certificate on Tilting pad journal bearing
- HYUNDAI H. I.(Korea) for Motor VCB (Vertical combined bearing) bearings
- Award of ISO 14001:2004 Certificate

### 2006
- Award of ISO 9001:2000 Certificate
- HYUNDAI H. I.(Korea) for COPT bearings
- HYUNDAI H. I.(Korea) for Motor VCB (Vertical combined bearing) bearings

### 2007
- HYOSUNG(Korea) for Horizontal motor bearings

### 2008
- Award of NEP(New Excellent Product) Certificate on Tilting pad journal bearing
- HYUNDAI H. I.(Korea) for Motor VCB (Vertical combined bearing) bearings
- HYUNDAI H. I.(Korea) for Motor VCB (Vertical combined bearing) bearings
- HYOSUNG(Korea) for Horizontal motor bearings

### 2009
- ABB(Florida) for Motor VCB bearings
- KOBELCO(Japan) for Turbo compressor bearings
- SIEMENS(China) for Steam turbine bearings
- WUXI-TECO(China) for Motor bearings

### 2010
- KOBELOCO(Japan) for Turbo compressor bearings
- SIEMENS(China) for Steam turbine bearings
- KOBELOCO(Japan) for Turbo compressor bearings
- KOBELCO(Japan) for Turbo compressor bearings

### 2011
- Award certificate for outstanding export performance($1-Million export tower)
- JYOTI(India) for Pump VCB bearings
- HITACHI NICO(Japan) for Gear box bearings

### 2012
- EBARA(Japan) for Pump VCB bearings
- DMW(Japan) for Pump bearings

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**ABOUT TURBOLINK**

**CHOOSE TURBOLINK, IF YOU WOULD DEFINE THE FUTURE**

- Excellent quality
  - Proven by reliability testing lab
  - Use the famous white metal of Ecka granules

- Short lead time
  - Standard lead time is no longer than 15 weeks

- Can do design and manufacture any kinds of bearings
  - Very flexible to special order
  - Can improve the bearing shape for special requirements

- Can do assist technical supports
  - Provide rotordynamic analysis as well as bearing characteristics

- Approved to ISO 9001, ISO 14001
  - The scope of the registration is detailed as the design, development and manufacture of fluid film bearing
Tilting Pad Journal Bearing

Tilting pad journal bearings are numerous to ensure that the requirements of each rotating machine can be met well. Our design skills supply a variety of pad pivot types to provide varying degrees of alignment capability, hydrostatic jacking, double tilting and electrical insulation. Turbolink can provide you the bearing characteristics of load capacity, minimum film thickness, maximum bearing metal temperature as well as stiffness and damping coefficients in order to design the bearings which are more compatible with your rotating machinery.

Characteristics
Double tilting pad journal bearings
- Less sensitive to shaft alignment
- Pivot type: Point pivot, Ball socket pivot
- Direction of load: LOP (Load On Pads), LBP (Load Between Pads)

Anti spragging bearings
- Preloaded bearings
- Optimum pivot bearings
Hydrodynamically stable at high speed

Applications
Turbine, Generator, Compressor, Gear Box, Pump, Motor
TILTING PAD THRUST BEARING

Turbolink has designed and manufactured customized tilting pad thrust bearings for many rotating machinery based on broad experience. Self-equalizing thrust bearings have excellent force-balancing function which allows each shoe to carry an equal amount of the total thrust load.

Characteristics
- Self-equalizing
- Less sensitive to misaligned thrust load
- Optimum pad number design
- Optimum pivot
- Direct lubrication

Applications
- Turbine, Generator, Compressor, Pump, Motor
**JOURNAL & THRUST COMBINED BEARING**

Turbolink Journal & Thrust combined bearings are developed for turbo-machines at high speed. High speed turbo-machines with flexible shafts demand journal bearings in terms of their required dynamic properties; 4 or 5 pad tilting pad journal bearings are commonly used. With tilting pads, directed lubrication is always used to reduce pad metal temperature.

**Characteristics**
- Compact design
- The minimum practical axial length

**Optimum pivot bearings**
- Bearings are combined as follows
  - Tilting pad journal bearing & Tilting pad thrust bearing
  - Multi axial groove journal bearing & Tilting pad thrust bearing
  - Tilting pad journal bearing & Flat land thrust bearing
  - Tilting pad journal bearing & Taper land thrust bearing

**Applications**
- Turbo-compressor
- Turbo-chiller

**FIXED PROFILE BEARING**

Fixed profile bearing is a kind of bearing that has been used for the longest period and its efficiency has been approved by using for long period. Fixed bearing is generally applied to the rotary machine that is loaded by heavy weight with low speed and high speed and it is widely used due to its simple design. Fixed profile bearing is applied to journal bearing and thrust bearing as well. Combined type of bearing that has thrust surface on both ends of journal bearing is also produced. Even though multi-lobe type of journal bearing among fixed profile bearings can be used sometimes as high speed purpose, however tilting pad journal bearing is mainly used in case of very high speed in consideration of safety.

**Characteristics**
- Simplicity
- Compact

**Journal bearing**
- Cylindrical type, Elliptical type
- Multi-lobe type

**Thrust bearing**
- Land type, Taper land type

**Applications**
- Turbine, Generator, Compressor, Motor, Pump
VERTICAL GUIDE & THRUST BEARING

Turbolink vertical bearings are a standard range of vertical bearings, which are robust, lightweight (dependant on size) and self lubricating. These bearings can be fitted with a variety of resistance temperature devices to measure the temperature of the lubricating oil or pads. Turbolink vertical combined bearings are usually self contained with water coolers which can be modified for different methods (i.e. air cooled and circulated oil variations) only by minor modification of casing.

Characteristics
- Guide & thrust combined bearings
- Tilting pad guide bearing + Tilting pad thrust bearing
- Cooling type: Air cooling, Fan cooling, Water cooling
- Hydrostatic lubrication

Applications
- Vertical pump, Vertical motor, Generator

▲ Vertical guide & thrust bearing
Turbolink medium & thin wall journal bearings are specifically designed for high speed and light load rotating machinery which needs high stable characteristics. Turbolink can provide high stable bearings developed based on experience, bearing analysis and rotor dynamic analysis.

**Medium&Thin Wall Journal Bearing Characteristics**
- Cost down through compact design and adaptability
- Less radial space
- Made as interchangeable halves
- Spares easy to handle and transport
- Lower stock holding costs for spares

**Applications**
- COPT (Cargo Oil Pump Turbine)

**Turbolink HM center flange bearings** are specifically designed for motor and generators. HM bearings are functionally and dimensionally interchangeable with DIN 31694 and ISO 11687-3 bearings. HM bearing assemblies consist of cast iron housings with or without insulation and bearing shell lined with tin based whitemetal. The spherical seating assists alignment at assembly. All standard parts are fully split.

**Components**
- **Bearing shell**
  - Circular or elliptical type
  - Thrust face
- **Bearing housing**
- **Seal**
  - Floating labyrinth seal
- **Oil ring for lubricating**
- **Cooling type**
  - Natural air cooling
  - Forced air cooling
  - Water cooling
  - Recirculating oil lubrication with external cooling of oil

**Horizontal Bearing Assemblies with Air Cooling**

- **COPT (Cargo Oil Pump Turbine)**
R&D CENTER

Turbolink Research & Development center has been studying and developing high quality bearings by theoretical analysis as well as experimental analysis. Whether the goal is greater capacity, higher operating speed, or any special requirement, each improvement Turbolink makes means more performance for you.

TEST FACILITIES

Turbolink has an on-site laboratory for operational testing. This allows us to modify our designs and verify the performance of our enhancements under various kinds of application conditions. Turbolink has three journal bearing test rigs and one thrust bearing test rig. Circumferential distributions of film pressure and film thickness as well as bearing metal temperatures are measured according to the change of speed and load.

Bearing and Rotordynamic Analysis

When a bearing fails, accurate diagnosis is the key to repair it. Turbolink bearing experts carry out full rotating machine studies (bearing characteristic analysis and rotor dynamic analysis) of your installation to identify the cause of the malfunction and to make a proper countermeasure.

Bearing analysis
- 3-dimension thermo-hydrodynamic analysis
- Load capacity
- Power loss
- Stiffness & damping coefficients
- Stability

Rotordynamic analysis
- Bearing dynamic characteristic analysis
- Natural frequency analysis
- Unbalance response
- Stability analysis
- Transient response
- Torsional vibration analysis

Journal bearing test rig
- Driver power: 37 kW
- Max. rotating speed: 4,500 rpm
- Max. static load: 50 kN
- Shaft diameter: 200 mm

Journal bearing test rig
- Driver power: 11 kW
- Max. rotating speed: 8,000 rpm
- Max. static load: 20 kN
- Shaft diameter: 100 mm

Thrust bearing test rig
- Driver power: 11 kW
- Max. rotating speed: 8,000 rpm
- Max. static load: 20 kN
- Collar diameter: 127 mm

Measurement data
- Film pressure distribution
- Film thickness distribution
- Metal temperature
- Power loss
- Eccentricity ratio

[Circumferential pressure distribution]