

# Metal Mesh Foil Air Dynamic Pressure Bearing

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⇒ Metal mesh foil thrust bearing with simple structure to maximize axial load capacity

### Client / Market

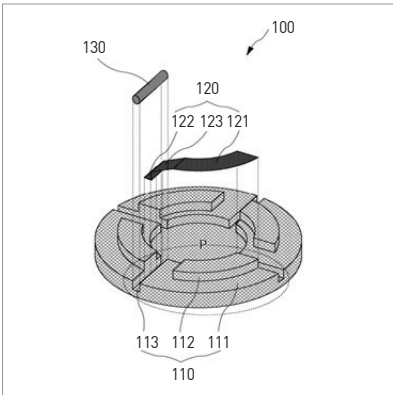
- Air foil bearing manufacturer, manufacturer of turbo machinery like turbine/compressor/blower

### Necessity of this Technology

- It is widely known that the rotational speed of a small turbo machine's rotor is from 100,000 to 400,000 rpm to obtain desired output.
- The thrust bearing is a must for the small high-speed turbo machinery. The problem is that they are too small to connect the lubricant-supplying devices due to the issue of volume, etc.
- In the case of small high-speed rotor like micro gas turbine, in particular, whose actual use is increasing, a need for thrust bearing that meets additional requirements of being contactless and oil-less on top of the basic requirement (reduction of vibration in axial direction, available for use in high temperature, high durability).
- Also, existing thrust air foil bearing has low axial load capacity therefore inappropriate for high-powered turbo machines. And the bump foil for damping is a thin bump structure therefore also weak to support axial load.

### Technical Differentiation

- Realization of simplified structure and low production cost/It is a small, light contactless and oil-less thrust bearing in metal mesh foil that can be installed for a small high-speed rotor.
- By applying press metal mesh instead of bump foil of conventional air foil bearing, the axial load capacity was improved at least 8 times with high damping and stiffness.
- With a simple structure consisting of pressed metal mesh, top foil and fixing pin, which is different from conventional air foil thrust bearing, it is unnecessary to make bump foil, which makes the structure simple and easy to make. Thus, it can be easily applied on a small rotor, and compared to the conventional bearing, the range of application can be extended much further.
- It can also be applied for high-powered turbo machine where axial directional load is high.



### DESIRED PARTNERSHIP

Technology Transfer

Licensing

Joint Research

Other



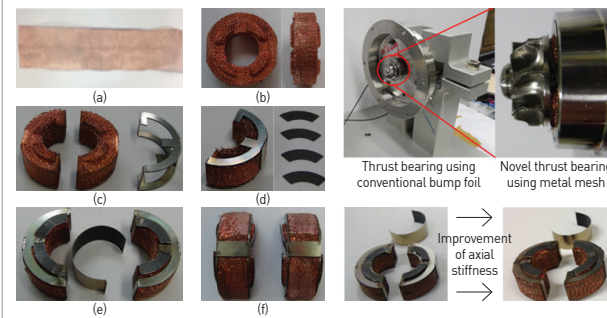
### TECHNOLOGY READINESS LEVEL [TRL]



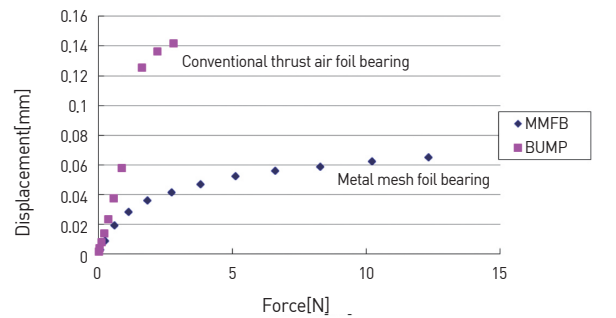
### Excellence of Technology

- The issue of conventional air foil thrust bearing with having weak axial load capacity as the bump foil created with a thin plate was used as damper was improved by using a pressed metal mesh of specific density to support the top foil of thrust bearing. With this method, the axial load capacity was highly improved.
- Comparing the axial displacement for axial directional load under the rotational condition of 170,000 rpm, the metal mesh foil bearing had 8 times the stiffness compared to the conventional air foil bearing and excellent load capacity.

### Fabrication Process



### Comparison of Displacements for Axial Directional Load



### Current Intellectual Property Right Status

#### PATENT

- Metal Mesh Damper Manufacturing Device and Manufacturing Method (KR1378778)
- Combo Metal Mesh Foil Bearing (KR1409815)
- Split Combo Bearing Including Air Foil Thrust Bearing and Metal Mesh Foil Radial Bearing (KR1443036, US14/264221)
- Combo Bearing Including Air Foil Thrust Bearing and Metal Mesh Foil Radial Bearing (KR1445063)
- Metal Mesh Bearing Damper Manufacturing Device (KR2013-0112021)
- Metal Mesh Foil Radial and Thrust Integral Bearing (KR1517818)
- Metal Mesh Foil Thrust Bearing (KR1517793)