



Titanium Bellows Manufacturer (Company Introduction)

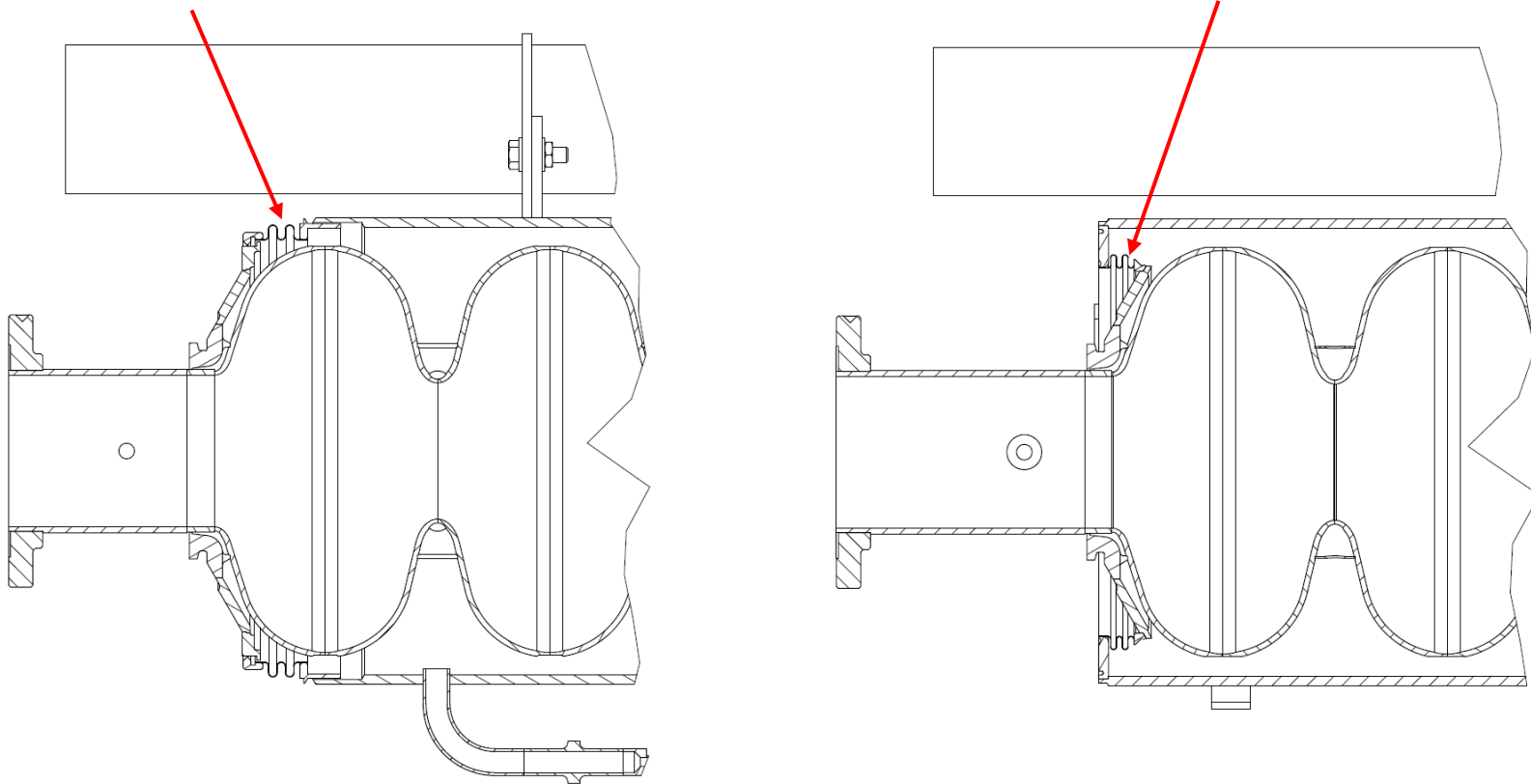
Takeshi DOHMAE (KEK)

TTC 2026 meeting

2026. 9. June

Ti bellows for He jacket

In the TESLA cavity, titanium thin-wall bellows were typically used for He jacket.
But, there are only few companies who produce these kind of Ti bellows.



Mirapuro

Mirapuro is the company who mainly produce vacuum components in Japan.

<https://www.mirapro.co.jp/en/>

They produces:

- ✓ welding bellows,
- ✓ formed bellows,
- ✓ flexible hoses,
- ✓ vacuum piping,
- ✓ high purity gas tube,
- ✓ vacuum piping components,
- ✓ vacuum gauge, etc.

They also have clean environment in their facility.

They have experiences to produce Ti bellows for He jacket which were installed to STF cavity in KEK.



MIRAPRO



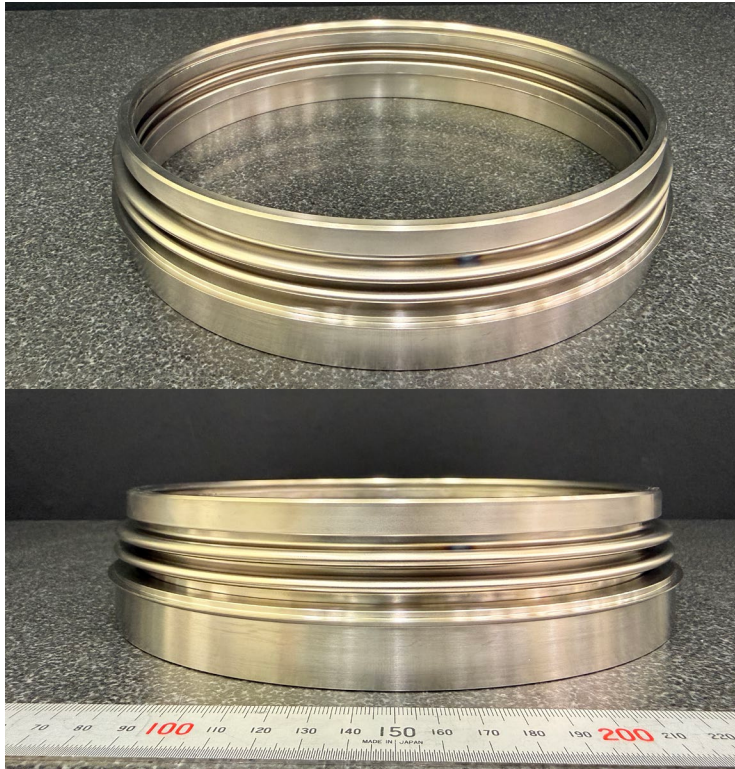
Ti bellows by Mirapuro

ITN type (similar to LCLS-II)

Thickness 0.3mm

2 convolutions

O.D. 232mm

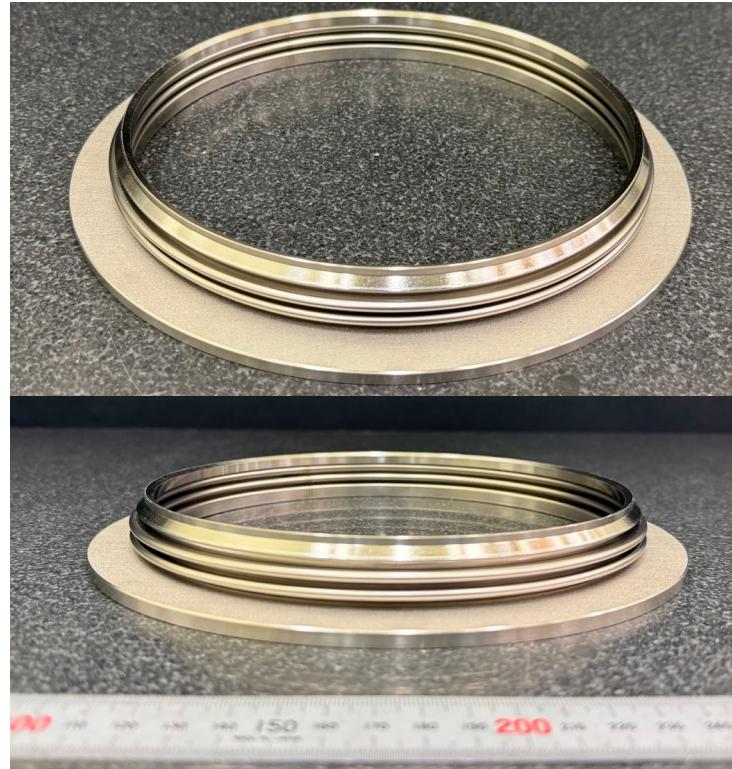


DESY type

Thickness 0.3mm

2 convolutions

O.D. 203mm



KEK STF type

Thickness 0.3mm

10 convolutions

O.D. 248mm



Cycle test

Mirapuro can perform cycle test of bellows.

Ex. Cycle test of bellows for ITN cavity.

Bellows: t0.3 mm, 2 convolutions

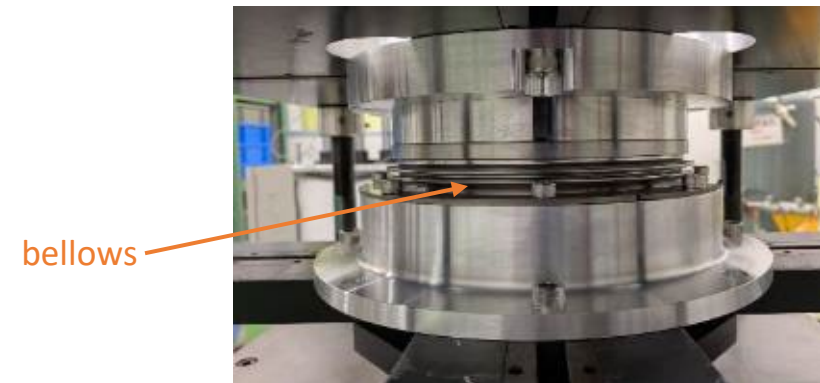
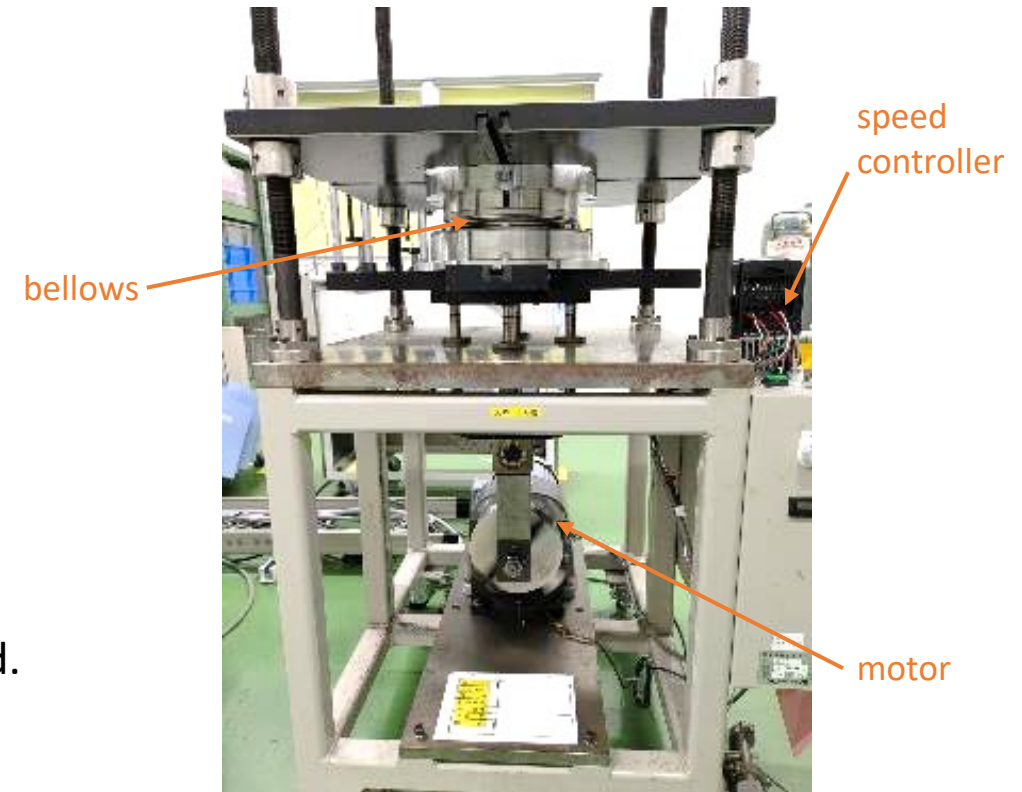
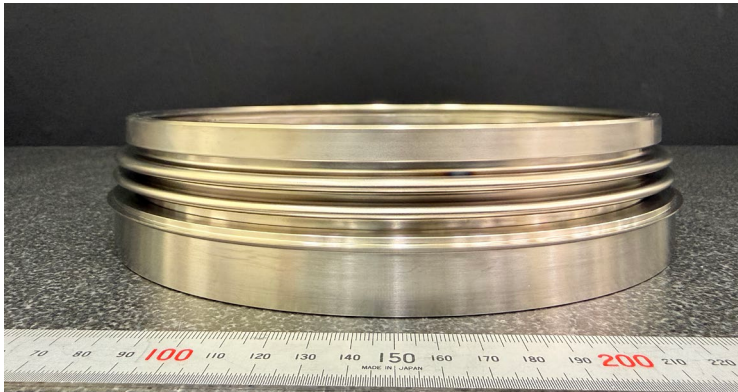
Cycle distance: $\Delta 3$ mm (compression)

Cycle speed: 8.6 mm/sec

Cycles: 10,000

After 10,000 cycles, leak test and visual inspection were performed.

Leak rate $< 8 \times 10^{-10}$ Pa·m³/s



Pressure test

Mirapuro can perform pressure test of bellows.

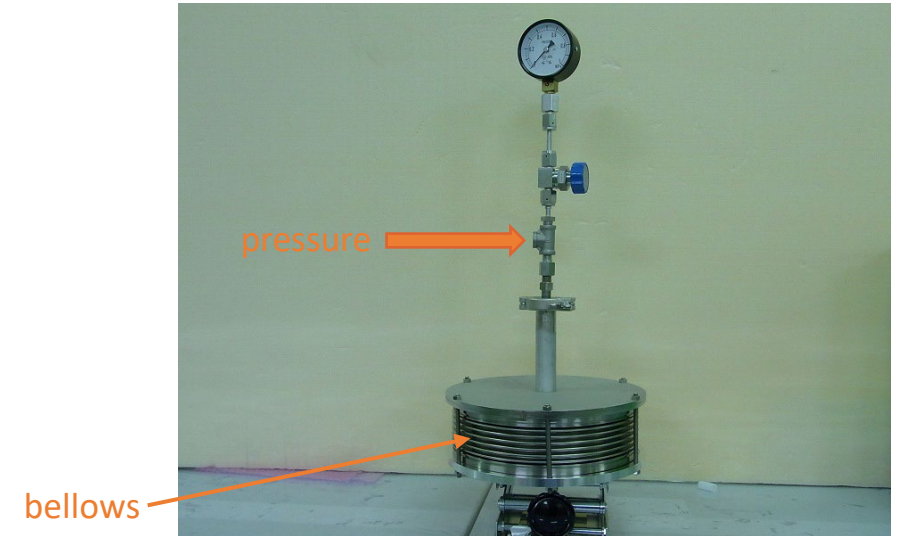
Ex. Cycle test of bellows for KEK STF cavity.

Bellows: t0.3mm, 6 convolutions

Pressure: 0.9 MPa for 10 minutes

After this pressure test leak test was performed.

Leak rate $< 1 \times 10^{-9} \text{ Pa} \cdot \text{m}^3/\text{s}$



Summary and contact

- Mirapuro is the company who can produce Ti thin wall bellows for He jacket of cavity. (minimum thickness is 0.2mm)
- Mirapuro can also perform cycle test (compression & expansion) and pressure test for their products.

NOTE: Material (Ti thin sheets) need to be prepared by the client for low volume production.

Contact:

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More Information of Mirapuro

Company Name MIRAPRO CO.. LTD.

Head Office 1100 Anadaira, Sutama-cho, Hokuto City, Yamanashi

Established 30th June, 1984

Revenue \$ 235M (FY2024)

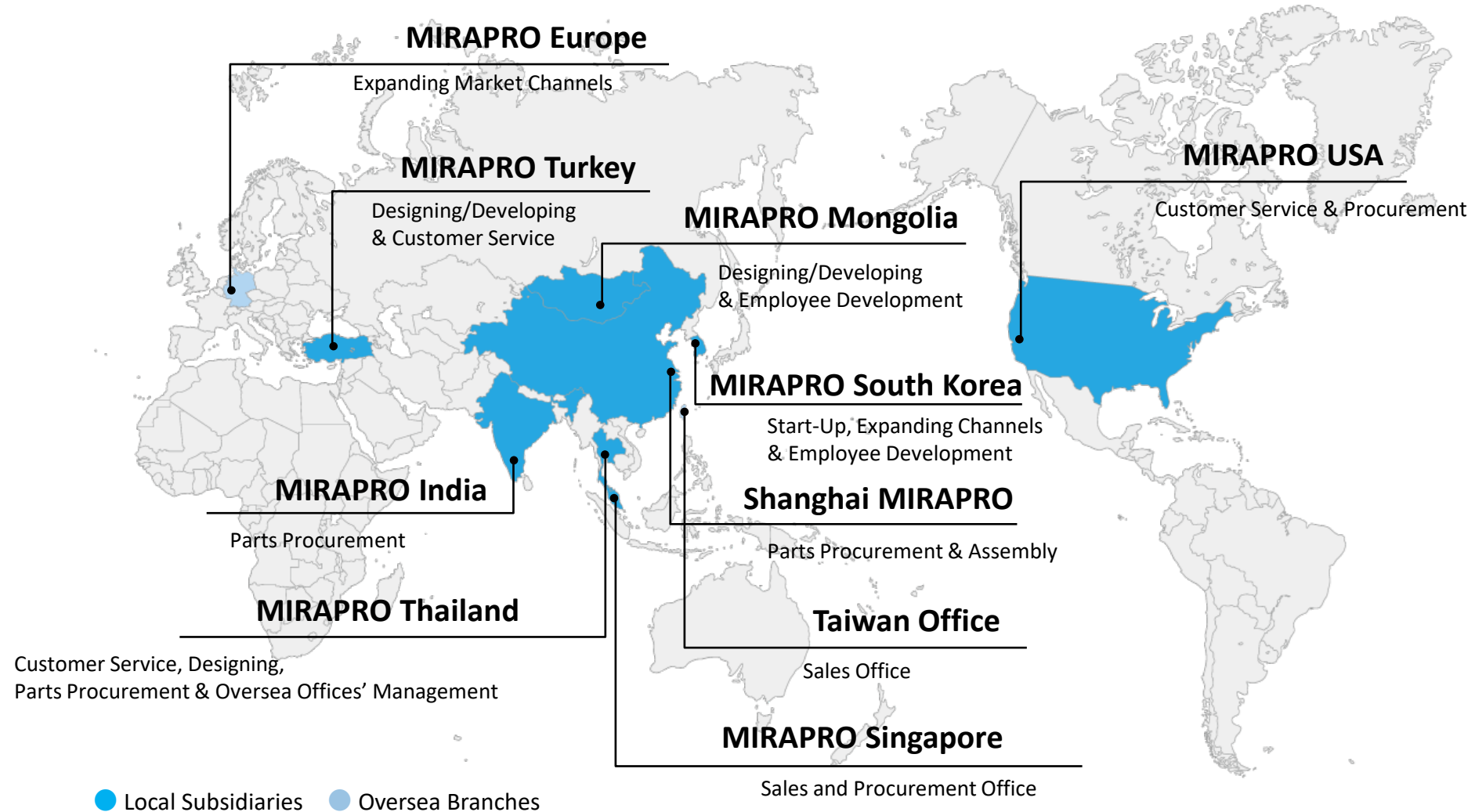
President and CEO Hiroyuki Tsugane

Employees 800 (As of March, 2025)

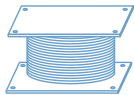


Overseas Locations

Business operation globally supported by world-wide network



- For over two decades, MIRAPRO has grown from designing and manufacturing **bellows** to becoming a trusted **Original Design Manufacturer** by building on its expertise in **factory automation** and **image capturing technologies** and further integrating **advanced AI capabilities** to serve not only the **semiconductor manufacturing equipment market** but also the **medical equipment sector**, where the **precision and reliability is required**.



Vacuum Components

Design

Develop

Manufacture

Inspection

Welded bellows, Formed bellows, Flexible hose, Vacuum piping component, Vacuum chamber.

Automated Welding machines, Weld inspection for quality control, Cleaning.



Cell Culture

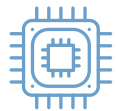
Design

Develop

Manufacture

Inspection

Designed and manufactured an Incubation and monitoring of Stem Cell growth system.



Semiconductor Machines

Design

Develop

Manufacture

Inspection

Installation

Component assembly machines that assembles at a highspeed. Quality control inspection systems on micro-millimeter level.



Energy

Design

Develop

Manufacture

Designing and developing new methods of clean energy.



Medical and FA

Design

Develop

Manufacture

Inspection

Installation

Medical Equipment assembly, quality control inspection and packaging.



AI-equipped Inspection System / IoT

Design

Develop

Manufacture

Inspection

Maintenance

Design and develop an AI and IoT system that can analyse large amounts of data and give accurate judgments and progenitive thinking.