

Futaku Precision Machinery Industry Co.

Developing medical devices with its micromachining technologies capable of fabricating extremely small beta titanium alloy tubes: 0.4mm in outside diameter and 0.2mm in inside diameter

www.futaku.co.jp

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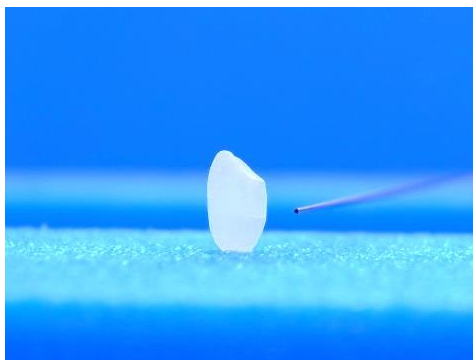
Founded in: 1917
Incorporated in: 1953
No. of employees: 100
Type of Ownership: private
Primary stock exchange: N/A

May 2014: Originally a manufacturer of traditional refined Buddhist altar fittings (e.g., candle holders, bells, incense burners, etc.) in Kyoto, Futaku has developed and innovated its own precision machining technologies. The company has been aggressively applying its expertise to different industries, especially medical fields. Venture Valuation (VV) interviewed Mr. Ryozo Futaku, President and Representative Director.



VV: You are globally the one and only company possessing the know-how to produce beta titanium alloy tubes of micro-diameter size.

Futaku: Our core competence is to treat metals which are hard to process like SUS316¹ and titanium in order to create valuable products. The photo below shows the size of our beta titanium alloy tube in comparison with a rice grain. The tube is 0.4mm in outside diameter, 0.2mm in inside diameter.



Titanium is a dimorphic allotrope. Its hexagonal closed-packed crystalline structure (alpha phase) transforms to body-centered cubic structure (beta phase) over 885°C. Alloyed with other chemical elements² as beta stabilizers, titanium maintains beta phase when quenched. Beta titanium alloys enhance strength by solution treatment and aging.

Titanium alloys are generally categorized as alpha, alpha-beta, and beta. They are characterized by being biocompatible, light in weight, ductile, non-magnetic, having very high strength and toughness, large elastic deflection in springs, exceptional corrosion resistance, no iron-organic molecule binding reaction, and the ability to resist extreme temperatures. Particularly, beta titanium alloys are regarded as the most versatile among the other categories by providing the highest strength-to-weight ratio and the deepest hardenability.

¹ stainless steel contained chrome 18% & nickel 12%

² such as aluminum, vanadium, iron, molybdenum, palladium, niobium, chromium, silicon, tantalum, zirconium, manganese, cobalt, nickel, copper

By adding better value to its properties, we have made beta titanium tubes more flexible with laser processing. The spiral tube (photo on right) is 6mm in outside diameter. We are able to customize spiral design by modifying slit width, pitch, etc.



Another application is beta titanium flexible tube (see left side photo), the same 6mm outside diameter, but wider inside diameter. It stays straight and also bends in any directions.

These spiral and flexible tubes have lately drawn considerable attention from medical professionals for use as endoscope parts, catheter parts, various analytical devices, and other potential applications. To accommodate increasing market demand in medical devices as well as other industries, we have started mass producing tubes of 1.5mm in outside diameter, 0.5mm in thickness, 180mm long. The monthly output is estimated around 3,000 pieces.

VV:
Futaku:

What other medical and biomedical products have you developed?



We are proud to introducing some of them here. One is a catheter part (see left). It measures 1.6mm in outside diameter and 3mm long. It is tapered and in helical form. Therefore, each side has different shape. The smallest bore is 0.32mm in diameter. This demonstrates our expertise in cut processing.

Another product is a stent used for relieving angina pectoris and alleviating myocardial ischemia. The photo below shows the complex structure which requires cutting minimum 0.02mm (20µm) with accuracy and precision. We are confident of fabricating stents with any complicated design variations.



The above products are just a part of our comprehensive product lines and manufacturing services.

VV:
Futaku:

What is your strategic objective in medical fields?

We will globally develop innovative product design and manufacturing services in close cooperation with medical professionals from private and public sectors. We listen to them, identify their needs and wants, and create value added products. In doing so, we constantly keep our knowledge up to date in various scientific disciplines.



For instance, DraCo®, the unprecedented double bendable endoscopic forceps, is a typical case. The idea came from Dr. Eiji Kanehira, an endoscopic surgeon³, who wishes to reduce technical complexities in pure single incision endoscopic surgery. We have worked together and successfully implemented design and functionality.

The most recent product is called a 'cell culture tube catcher' made with beta-titanium. It is a laboratory device to handle cell culture tubes for research in regenerative medicine. As beta-titanium does not transfer the cold temperature, the researchers no longer need to wear bulky gloves when handling frozen cells culture tubes kept under minus 196 °C.

VV Comments after the interview:

Futaku: The medical device market is a thriving sector in the global healthcare industry. Visiongain's reports⁴ on the medical devices industry and its market prospects forecast that the global market for medical devices will reach \$398 billions in 2017 from \$266 billion in 2011, almost 50% growth for seven years. The reports indicate that two significant submarkets are cardiology devices and neurology devices.

Titanium is considered to be a preferred metal for medical professionals to create prosthetics, biomedical implants as well as instrumentation such as intravascular stents, surgical instruments, etc. Futaku's expertise in developing and innovating products offers valuable solutions to advance the healthcare industry.

Contact

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Venture Valuation specializes in independent assessment and valuation of technology-driven companies in growth industries, such as the Life Sciences (Biotech, Pharma, Medtech), ICT, Nanotech, Cleantech and Renewable Energy. In addition to valuation products, Venture Valuation offers high-quality, focused information services like the Global Life Sciences Database, Biotechgate.com and this "*Let's Interview Series*" with companies with interesting technologies and services. We select and interview thriving companies and organizations all over the world.

³ He introduced DraCo® at the Coloproctology 2014, the international scientific congress held from 6th to 9th March in Malaysia.

⁴ <http://www.marketwatch.com/story/medical-devices-industry-and-market-prospects-2013-2023-2014-01-20>
<https://www.visiongain.com/Report/849/Medical-Devices-Industry-and-Market-Prospects-2012-2022>