TAIYO NIPPON SANSO
The Gas Professionals

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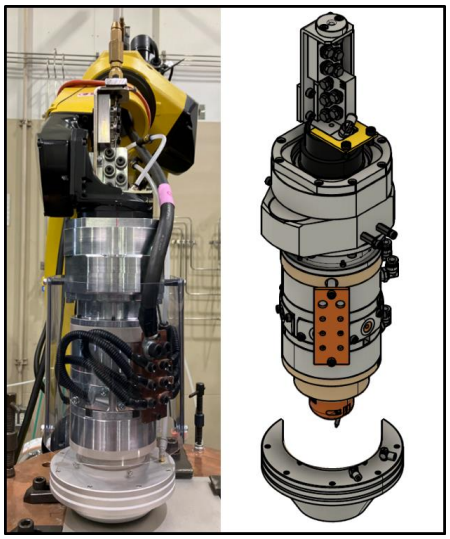
Achieving Both High-Speed and Defect-Less Metal Printing! TNSC Develops Additive Manufacturing Technology Using TIG Welding and the Dedicated “3DPro® RotoTIG” Torch

Taiyo Nippon Sanso Corporation (Headquarters: Shinagawa-ku, Tokyo; President: Kenji Nagata; hereinafter "TNSC"), a Japanese industrial gas business company in the Nippon Sanso Holdings Group, is pleased to announce the development of an innovative 3D printing process utilizing our proprietary “Rotary TIG Welding Technology[*1]” and “3DPro® RotoTIG”, a dedicated torch for metal additive manufacturing (AM). The commercialization of the torch is underway in collaboration with Sugino Machine Limited (Headquarters: Namerikawa City, Toyama; President: Yoshiaki Sugino), integrating their advanced design capabilities. We aim to expand the use of this technology as a new solution for creating high-quality, defect-less parts that are in demand in fields such as aerospace, automotive, and semiconductors.



3DPro® RotoTIG

1. Overview of the New 3D Printing Process Using the “3DPro® RotoTIG” Torch

- The process leverages the high-quality, defect-less, and oxidation-free welding characteristics of the TIG welding[*2] in metal AM.
- It combines the high-speed fabrication capabilities of the Wire Arc DED method[*3] with the TIG method’s defect-less properties.
- The torch features a unique structure in which the electrode, acting as the heat source, freely rotates around the metal wire supplied from the center of the torch. This allows flexible tool path design, unconstrained by scanning direction.

  This enables consistent electrode positioning relative to the fed wire in the scanning direction in all orientations in metal AM, resulting in layered beads of consistent quality and shape.

(Notes)

*1 Rotary TIG Welding Technology: A new welding method where a tungsten electrode rotates around the wire fed from the center of the torch, providing uniform heat input and coaxial central wire feeding, ensuring uniform deposition in all scanning directions.

*2 TIG (Tungsten Inert Gas) welding: An arc welding process using a tungsten electrode, where the weld area is shielded by pure inert gas typically Argon, producing high-quality welds.

*3 Wire Arc DED (Direct Energy Deposition): A 3D printing process using arc plasma as an energy source to melt and solidify metal wire for additive manufacturing. This method is characterized by its ability to produce large parts in a short time.

2. Background of This Product

Metal AM has been positioned as a key business area under the strategic pillar “Exploring New Businesses Towards a Carbon-Neutral Society”, part of Nippon Sanso Holdings Corporation's mid-term business plan “NS Vision 2026 – Enabling the Future –”, as well as “Expanding the Solutions Business”, the growth strategy for our industrial gas business in Japan. TNSC is leveraging its strengths in industrial gas application technologies, such as welding processes, gas purification, and heat treatment, to address challenges in metal AM and advance the business globally in order to develop innovative products, streamline production, and contribute to carbon neutrality.

Sugino Machine, driven by the founding spirit of “We develop our own ideas, create our own solutions, sell our own products and provide services”, has developed a wide range of technologies, including high-pressure water technology, pneumatic technology, pipe equipment technology, and technologies related to the energy market. Presently, they offer six core technologies: "cutting, grinding, cleaning, polishing, crushing, and dissolving.

【Company Overview】

Taiyo Nippon Sanso Corporation

Business description:	Manufacture and sale of various industrial gases such as oxygen, nitrogen, argon, LP gas, gas for medical uses, and specialty gases, manufacture and sale of welding equipment and materials, gas-related devices, and, air separation equipment, assembly, processing, inspection of electrical components, and equipment maintenance
Established:	October 30, 1910
Incorporated:	February 4, 2020
Capital:	1.5 billion yen
Shareholder:	Nippon Sanso Holdings Corporation (Investment ratio: 100%)
Revenue:	414.3 billion yen*

*Note: This figure shows the revenue of Japan for Nippon Sanso Holdings Corporation in FYE2024

Sugino Machine Limited

Business description:	Development, design, manufacture, and sale of high-pressure jet cleaning equipment, ultrahigh-pressure water cutting equipment, equipment for the inspection and maintenance of nuclear power plants, wet/dry atomization equipment, drilling units, tapping units, machining centers, tube expansion tools and equipment, tube pulling equipment, roller burnishing tools, biomass nanofiber, industrial robot, etc.
Established:	March 1, 1936
Incorporated:	April 6, 1956

Taiyo Nippon Sanso Corporation
Tnsc.Info@tn-sanso.co.jp