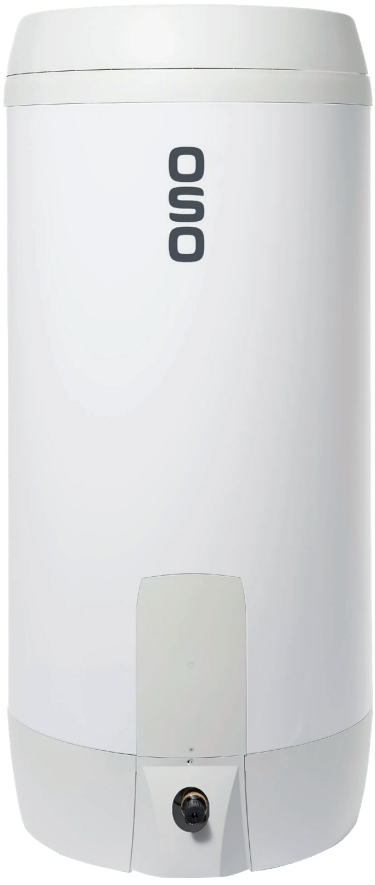
Norwegian OSO Hotwater trusts Finnish PIVATIC technology and OUTOKUMPU stainless material

Pivatic Oy, based in Hyvinkää, Finland, signed a supply contract in 2022 for a sheet metal coil processing line with a Norwegian company that manufactures hot water boiler tanks. This article describes the delivery project in question from the customer's manufacturing and product technology applications point of view. The information in the article has been gathered from the customer interview. The interviews were conducted in April 2023 at the Pivatic factory during customer's line FAT approval.

Norwegian OSO Hotwater is the largest manufacturer of stainless steel hot water boilers in Europe. The family-owned company started operations in 1932 and has been awarded multiple times for its energy-efficient and high-quality water heating systems for buildings, industry and marine technology, as well as renewable energy applications in hot water boilers. The generalization of heating systems such as geothermal heat, heat pumps and energy storage require enhanced insulation of boiler tanks and a new type of technology in sheet metal part manufacturing processes. Production automation has been taken very far by OSO Hotwater in their manufacturing processes.

The higher the required level of energy efficiency, the more is required from the actual hot water tank. The energy loss of the OSO Hotwater tank is approx. 20 % lower compared to more traditional designs. In year 2022 the demand for hot water tanks has increased by 40 % in Europe, where the use of natural gas has been common in the past, and the current transition from the use of gas to electric heating systems has caused a long-lasting spike in demand for hot water tanks. Heating the water in the tank with gas or electricity differs greatly from each other. Heating the electric tank requires more efficient heat transfer from the heating element and better control of the water flow. The key technology seems to be the insulation of the hot water tank which is made with sheet metal technology. Applications of vacuum technology and polymer foams (NANOPUR, VACUUM panel) are being used. Cumulatively, it is estimated that OSO's new insulation technology has saved approximately 200 million kilowatt hours of electricity over the past ten years.



OSO Hotwater has invested in the development of product and manufacturing technology since 1968, when the company was the first to use cold-rolled stainless-steel sheet in hot water boiler manufacturing. This development step has been groundbreaking in production technology. In the past, corrosion prevention of tanks was based on coatings.

Since 2015, OSO Hotwater has been Norway's most robotized company. Because the company wanted to keep production in Norway as an alternative to manufacturing in low-wage countries, all repetitive and heavy work tasks have been replaced by production automation. Human work is directed to more constructive tasks. At the same time special attention has been placed to occupational well-being and a healthy work environment in the factory. Even though Norway is a country with one of the highest cost levels in the world, it has been possible to maintain competitiveness.

In hot water boiler manufacturing, the company has three main markets:

- Strong domestic market, i.e., during 91 years of operation, the market share in the Norwegian housing stock is approx. 65 %
- In Europe, customers are OEM HVAC equipment manufacturers
- Export markets, mainly Europe, North America, and off-shore, where knowledge of water quality is important.
- OSO Hotwater opened a new subsidiary in Finland in 2021

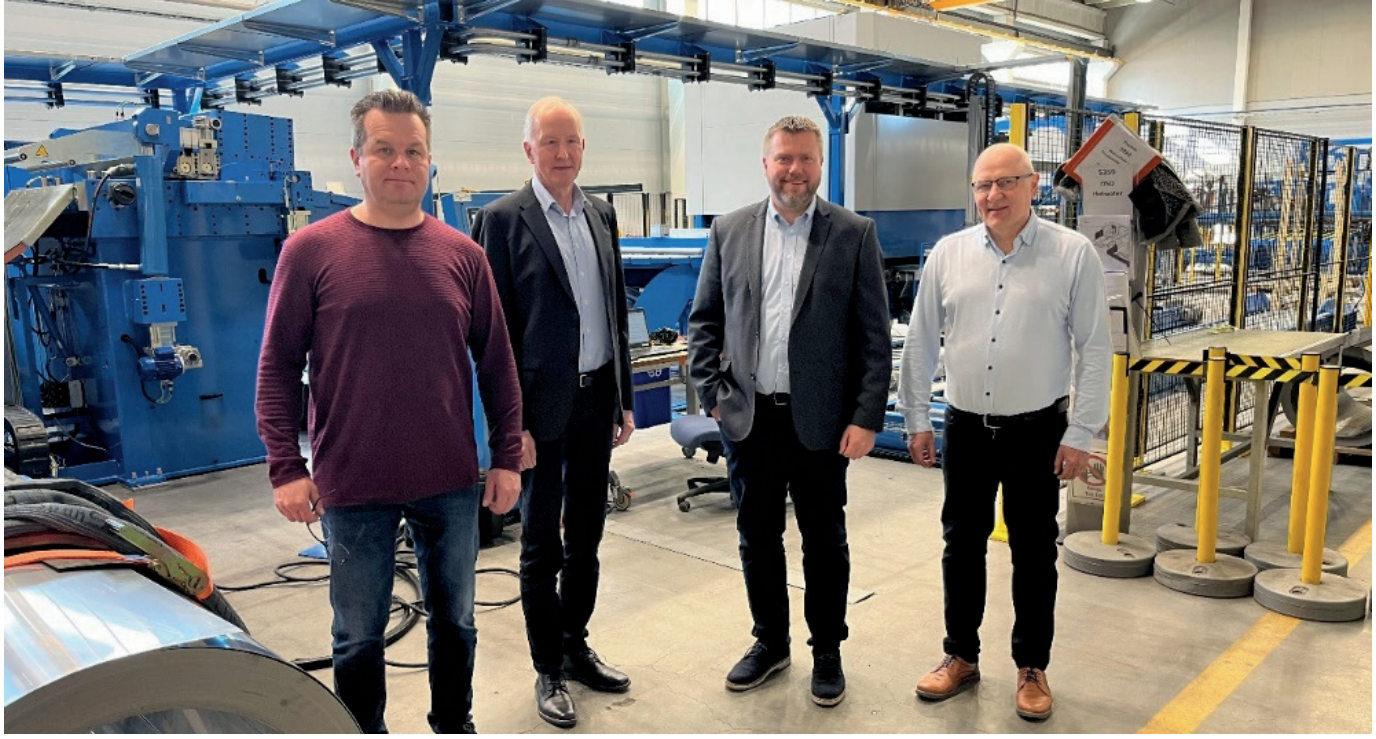
Manufacturing of the hot water boiler tanks

PIVATIC has already delivered a similar type of line before, so the ongoing delivery meets growing demand and directly increases the customer's production capacity.

PIVATIC's new line produces sheet metal blanks for the manufacture of water boiler end parts. The material of the hot water tanks is Outokumpu's AISI 444 nickel-free stainless steel.

The blanks are deep drawn into tank ends and welded to the cylinder with a fully automized production process. The tanks use a vacuum-insulated structure, which achieves an energy saving of 500 kWh per year in a normal 200-liter tank.

>



PIVATIC's sheet metal coil processing line during the customer's FAT approval. In the photo, from the left, Sales Manager Juha Räsänen of Pivatic Oy, Chief Editor Simo Mäkimattila of Ohutlevy Magazine, CEO Roy Magnussen of OSO Hotwater, and Project Manager Jouko Arvela of Pivatic Oy, Hyvinkää.

PIVATIC's line uses Outokumpu's nickel-free stainless steel. Norwegian OSO Hotwater is a pioneer in the use of stainless-steel for hot water tanks. The tightness of each tank is checked with pressurized water. Since the plate to be welded is quite thin, there are tough demands on the part of the weld seam both in terms of strength and corrosion resistance. In addition, the tank's pressure fluctuation puts stress on the weld seams.

The central quality criteria of the tank is corrosion, which must be controlled especially in a welded structure. The quality of water varies in different countries, and calcareous water and other water-precipitated deposits on metal surfaces cause local corrosion.

The choice of nickel-free steel comes from the health risk that the metal that may dissolve from the tank can cause.

Pivatic Oy

Pivatic Oy designs, manufactures, and markets automated production lines for sheet metal manufacturing industry. The company was established in 1975. Pivatic sells, manufactures and produces production lines to meet customer demands. Pivatic's customers traditionally manufacture parts in large series or batches, and the life cycle of Pivatic production lines is extremely long. In the case of OSO Hotwater, the hot water tank's technology changes slowly, but the manufacturing technology in terms of automation is constantly developing.

Production automation, robotization and cost efficiency are the main changing factors. The products will then undergo changes, e.g., through product control electronics, energy efficiency and recycling of materials.

In the sales, design, and manufacture of Pivatic's production lines, you must understand the customer's needs and be prepared already in the sales phase. Standard modules and components are used in the production lines, but for customer applications new components are developed specifically for the customer's needs and future investments. In the case of OSO Hotwater, the heating systems of buildings are changing, which drives the demand for flexible manufacturing technology.

Pivatic's deliveries in the last +10 years were divided by key industries as follows:

- 35 % HVAC
- 33 % construction (steel doors, elevators, building profiles, panels)
- 10 % household appliances and similar applications
- 10 % metal furniture
- 8 % electrical cabinets and cable trays
- 4 % other industries such as steel service centers, subcontracting, trailers

The regional distribution varies greatly from year to year, but the USA and Mexico and the German-speaking regions of Europe have traditionally been strong market areas. Sweden, Spain, China, India, South Korea, and Poland can be mentioned as individual important export countries. The importance of Finland as a home market has always been very important. The company has a sister company in the United States and a permanent office in Germany.

Pivatic's Sales Manager Juha Räsänen says: We operate on an agency basis in several countries, and the agent's own customer contacts and other products he represents regionally affect what we offer. For example, electric cabinets and steel doors come uniformly from everywhere. Our agents in China are focused on the elevator industry. In Brazil and India, steel kitchen furniture is a local specialty, heating devices in cooler countries or in Mexico from where they are shipped to colder countries. The specialty is also the suppliers of large manufacturers, such as the telecommunication cabinet manufacturers that once became established with Nokia's manufacturing.

Typical delivery projects

The optimal investment in Pivatic manufacturing varies between 0.5 M€ and 3 M€, including sheet punching, coil

punching, profile, panel, box bending, integrated press braking or roll forming.

A potential customer for Pivatic is determined by the total annual volume and the minimum product size. The annual volume should be 300,000 – 1,500,000 parts per year, the minimum parts are at least 200x200 mm, and the parts are generally rectangular. With cooperation partners such as German RAS and Remmert, and Polish Eagle, Pivatic has also offered customers solutions for more flexible and smaller annual volumes and batch sizes than before, in accordance with the new strategy.

On the punching side, modern nesting possibilities enable a minimum series size of 1 part. From PIVATIC's point of view, the preference is the manufacture of product families that have 1-3 different parametric parts where the part width/length can vary in punching and bending. This way you get the best cycle times and the best ROI for your investment. Typical batch sizes are several tens or hundreds.

It should be noted that even though a single part can be manufactured, it doesn't pay off the machine, but instead the costs for manufacturing batches are determined by the operating costs, amount of coil changes needed, and limitation of punching tools.

Optimal and successful customer products

From PIVATIC's point of view, the most optimal customer products are refrigerators, refrigerated display cabinets, facade cladding, ceiling panels, steel door leaves, steel door frames, elevator door leaves, elevator car panels, cable trays, electrical enclosures, kitchen furniture, office furniture, store shelves, water heater casings, electric radiators, fire dampers, air conditioning duct parts, cooling beams, air conditioners, and fans.

As a customer, the Norwegian OSO Hotwater can be classified in the HVAC segment, and with that definition counts to the PIVATIC's largest customer segment.

Among the delivery projects, the most desired are casing-type products that form the outer shell of the device, because their manufacturing stages involve separate lines for punching and edge bending of other parts. ■

More information:
www.osohotwater.com
www.pivatic.com
https://pivatic.com/en/solutions/

• AUTHOR: SIMO MÄKIMATTILA