



Activating Your Ideas

Tailor-made stainless solutions for chemical tankers

**OUTO
KUMPU**



Because every ship is one of a kind

When moving precious cargo there is no substitute for stainless steel to getting the most from your chemical tankers and their design. That's why we are with you every step of the way, providing you with world-class stainless steel and technical know-how and support, so that you can manufacture vessels that are ever lighter, stronger and easier to clean and maintain. In this brochure, you can see the benefits Outokumpu's comprehensive range of stainless steels and services can offer. Don't hesitate to contact us, we are here to activate your ideas.

Tailored solutions with global delivery

Outokumpu is one of the largest producers of stainless steel and is widely recognised as a world leader in technical support and innovation. Being near to our customers globally from South America to Australia makes it possible to deliver dedicated service on a local level. We are organized according to industrial segments, which means you gain value out of a comprehensive offering, economies of scale and a world-wide contact network within the industry.

Experience of over 500 ships

Over the past 40 years, Outokumpu and its predecessors have regularly supplied stainless steel solutions – including pipes, fittings, welding material and plate – to most shipyards that require stainless steel material. That makes us probably the most knowledgeable and experienced supplier of stainless steel products for ships. Our reference list covers deliveries for more than 500 ships built by almost 100 different shipyards world-wide.

Unifleet BV

A Dutch shipowning company Unifleet BV has headquarters near Rotterdam. The company has long traditions and it is known for high standards, always complying with the latest environmental and safety requirements. At present, Unifleet controls a fleet of eight chemical tankers, sizes between 4200 and 7500 DWT. The list of newbuildings includes a total of nine new chemical tankers, sizes varying between 4500 and 7500 DWT.

Unifleet BV has been pioneering with duplex stainless steel tanks. In October 2010 the company launched Global Taurus, the first of four 5000 DWT duplex stainless steel chemical tankers. Duplex provides several benefits for Unifleet: superior corrosion resistance in the harsh sea climate, high strength and easier maintenance. In combination, these features offer a longer life-span and make

duplex an attractive, cost-effective choice in the long run. This relatively new material was easy to incorporate into production, thanks to Outokumpu's service portfolio. "Outokumpu's full package of prefabricated and pre-polished plate sections is exceptional value for chemical tanker owners and builders because the entire package can be offered in-house. Also the training programmes in welding and stainless materials have been beneficial."

AVIC-Dingheng Shipbuilding Co., Ltd

AVIC-Dingheng Shipbuilding Co., Ltd. focuses on special building projects, such as innovative stainless steel chemical tankers and gas carriers. The company was founded in 2006 by Shanghai Dingheng Shipping Group, located in the marine industry zone of Jiangdu Developing Area, Jiangsu Province. At the end of 2009, AVIC became the largest shareholder of the shipyard with 60% share.

Outokumpu has provided stainless for AVIC-Dingheng since 2007: "We have been very satisfied with Outokumpu's consultative approach and technological know-how. Outokumpu is not just a supplier, but genuine partner in whom we can trust for R&D, training and just-in-time deliveries of corrugated and tailor made plates."

Leonardo Acciarri, naval architect

Italian naval architect, Mr Leonardo Acciarri is one of the most experienced and acclaimed professionals in his field in the world. During the mid 80's he was the first designer to recognise the advantage of duplex 2205 for tanks in chemical tankers.

According to Mr Acciarri, choosing Outokumpu was based on real advantages for the yard and the ship owner. Outokumpu's total tailor made solution included support

in design, training for handling and welding, as well as corrugation and weld preparation. Ship owner benefitted from wider range of cargoes, more payload and technical support with Chemlog.

After the first ships, Mr Acciarri only used Outokumpu for the next 16 chemical tankers built in Europe. Recently, Mr Acciarri has been designing under the new name of Ship Project Engineering & Contracting (SPEC sas) other chemical tankers from 16,000 to 25,000 DWT that have been built in the Far East: "After good experiences in duplex 2205 I'm happy to once again pioneer Outokumpu products in ship building: LDX 2101® duplex stainless steel".

Activating their ideas: forerunners that trust Outokumpu



Well-planned process – visibility beyond the horizon

Through our own research into stainless steel and corrosion, as well as through collaboration with a network of owners, shipyards, designers and classification societies, we can help you to meet the needs of today, and to get a head start on tomorrow. Our multi-phase approach brings you several benefits, such as minimized risks, synergy and cost-efficiency.

Since the beginning of the '60s, Outokumpu has offered extensive technical assistance for ship owners, designers and shipyards. In huge chemical tanker projects, all phases from the initial fleet planning, to design and detailed production need to click seamlessly together in order to minimize risks. Our services leave you less to worry about.



Services for ship owners

For the ship owners, Outokumpu offers strategic cooperation in mapping out future needs with regard to ship size, cargo and other requirements. Uniquely we also offer a training programme for the operations department and information about cleaning and maintenance. The training programme covers the handling and maintenance of stainless steel cargo systems and includes subjects such as compatibility of different cargoes with stainless steel, tank cleaning, inspection and repair procedures.

Services for ship designers

Our comprehensive track record and installed base of offshore constructions has gained us corrosion resistance and fabrication know-how that we can share with naval architect agencies and ship design consultancies. Our training programme for designers includes the essentials of different stainless steels, their characteristics and application examples as well as the future opportunities that stainless special grades bring along.

Services for shipyards

To help shipyards with the special requirements of building stainless steel cargo tanks and associated pipes, Outokumpu has developed a training programme and produced an information packages concentrating of cutting, forming and welding. The training programme covers the handling and welding of stainless steel products, precautions during construction, tank finishing and inspection.

What's your cargo? Check the compatibility in Chemlog

The Outokumpu cargo list, "Chemlog", includes information about new cargoes and their compatibility with stainless steels used in chemical tankers. Chemlog is constantly updated as a result of laboratory testing and frequent contacts with owners and others involved in the marine transportation of liquid chemicals. Find Chemlog and other useful tools at www.outokumpu.com.



Authorities that have approved Outokumpu as a supplier:



I STRATEGIC PHASE:

Ship owners

- Mapping out market activities in a big picture
- Planning a long and short term building program with ship owners
- Discussing future requirements in according to
 - size
 - cargo
- Safety & classification bodies

II DESIGN PHASE:

Ship designers

- Material consultation
- Tailor-made options
 - thickness
 - dimensions
 - weight reduction
- Chemlog
- Training programme

III PRODUCTION PHASE:

Shipyards

- Assistance in design information
- Technical assistance in transforming to Stainless Duplex grades
- Cost savings by producing TMP, corrugated, weld preparation and packaging
- Training programme
- Project price offer
- Delivery programme
- Payment terms
- Contract negotiation



Careful navigation of global deliveries

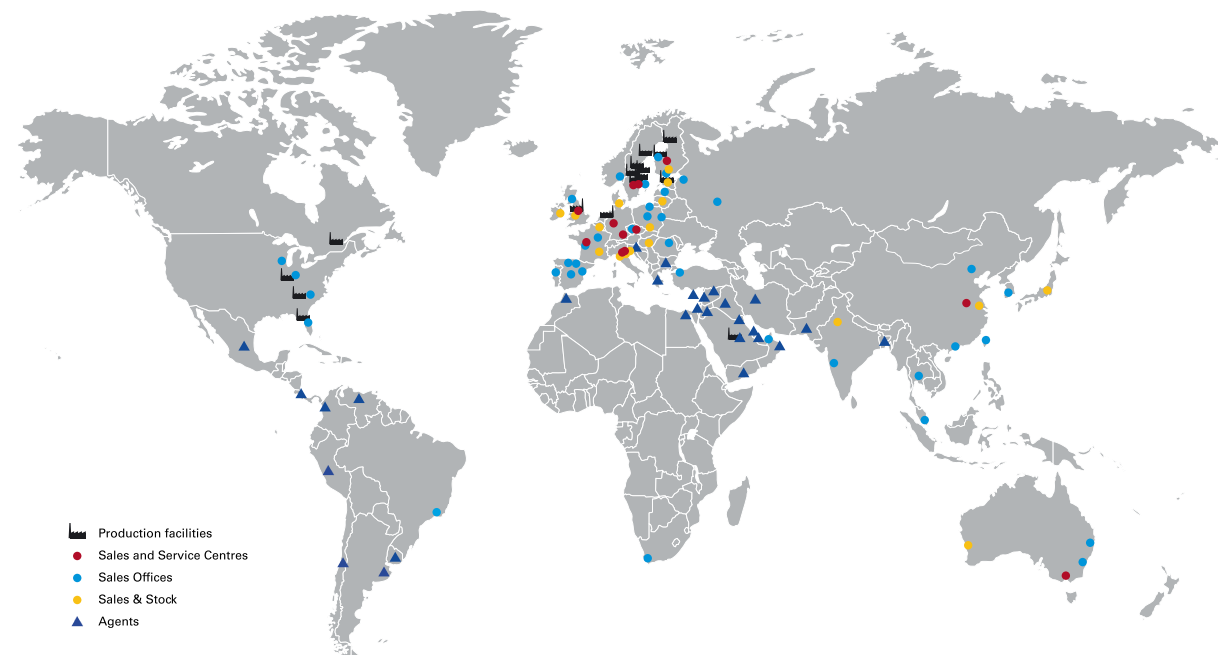


Products tailored to your needs, with timely delivery

Our state-of-the-art service centres and stock locations in the key markets play a key role in our logistics chain, effectively ensuring that you get the product you need, when you need it. This can cover everything from special surfaces through to products cut, shaped and prepared according to your specific needs. You benefit from minimized warehousing and a smoother production flow.

Easier project administration

To ease the allocation of your construction resources, we plan carefully scheduled deliveries, pick delivery transports suitable to your needs and tailored packaging according to your wishes. Through our experience in the business, we can also help you arrange documented quality plans and third party inspections. With projects as massive as chemical tankers, you can never be too careful. That's why we automatically implement a back-up system for deliveries.



Tubes, pipes and fittings made to last

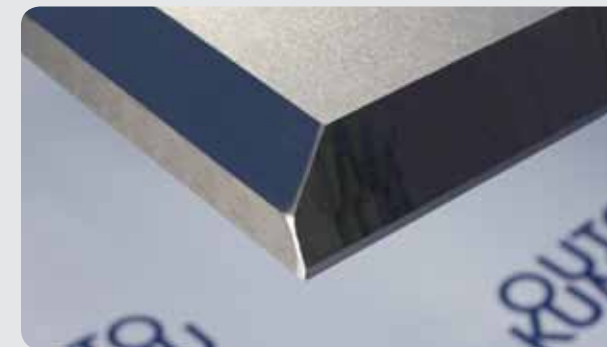


Outokumpu manufactures a wide range of welded stainless steel pipes, tubes and fittings in a comprehensive selection of grades. Naturally Outokumpu's state of the art technology, quality assurance, R&D and technical expertise extends to our tubular product range also. Butt weld

fittings and threaded fittings are commonly used in the demanding chemical and offshore industries. Our duplex tubes and pipes are particularly suited to customers facing the challenge of transporting fluids in corrosive or high temperature environments.

Tailor-made plates for the ultimate strength and ease of maintenance

Outokumpu's Hot Rolled Quarto Plates can be fabricated fully according to your wishes. This ensures durability, ease of construction and a long life-span.



STANDARD GRADES

- 4301/4306/4307
- 4541/4571
- 4401/4404/4432/4435/4436

SPECIAL'S GRADES

- Duplex**
- 2304/2205
 - LDX 2101®/LDX 2404®
 - 2507
 - 4501
- High alloy austenitic**
- 904L
 - 254 SMO®/654 SMO®
 - 4529/4565
- Heat resistant**
- 4845
 - 153 MA™/253 MA®

DIMENSIONS

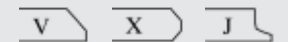
- Thickness (2) 3 – 110 mm
- Width up to 3.2 m
- Length up to 13 m

SURFACES

- Pickled (1D)
- Shot blasted (1E)
Ground/polished

EDGES

- Mill edge for plasma cutters
- Straight cut/sheared edge
- Edge prepared – ready for welding



Outokumpu – Activating Your Ideas

Our technical leadership allows us to offer stainless steels for all needs across the transport industry, and also to tailor solutions to meet your specific needs.

We are fully committed to sustaining value by continuously developing our people and putting the customer at the heart of everything we do.

Total customer commitment defines all that we do. You have the idea. We make it a reality with our world-class stainless steels and professional support.

Our global network supports you all the way from assessing your needs on the ground, to providing full back-up in quality and production planning.

We are committed to excellence everywhere. Not just in product development and customer service, but also in logistics and the development of new technologies for the environment.



This document is for information only and seeks to provide professionals with the best possible information to enable them to make appropriate choices. Although every effort has been made to ensure the accuracy of the information provided in this document, Outokumpu can not accept any responsibility for any loss, damage or other consequence resulting from the use of this publication. The information provided herein may be subject to alterations without notice.

This document does not constitute a recommendation or a contractual commitment on the part of Outokumpu. Product selection is the responsibility of the specifiers, designers and builders, who are solely responsible for rendering the finished unit suitable for the use for which it is intended. It is the customer's sole responsibility to ensure that the product is suitable for the use for which it is intended. Outokumpu shall not provide any guarantee in this respect.

Copyright© Outokumpu Group. All rights reserved.

Activating Your ideas

Outokumpu is a global leader in stainless steel with the vision to be the undisputed number one. Customers in a wide range of industries use our stainless steel and services worldwide. Being fully recyclable, maintenance-free, as well as very strong and durable material, stainless steel is one of the key building blocks for sustainable future.

What makes Outokumpu special is total customer focus – all the way, from R&D to delivery. You have the idea. We offer world-class stainless steel, technical know-how and support. We activate your ideas.

