Stainless steels for mildly corrosive environments

Outokumpu Moda range

outokumpu.com/moda
We believe in a world that lasts forever

Outokumpu is a global leader in the advanced materials business, creating stainless steels that are efficient, long lasting, and recyclable. A strong customer focus, sustainability, and technical excellence are at the heart of everything we do.

As an open and approachable company, our customers rely on our advice to help them select products that will deliver the best long-term performance for their needs.

With over a century of innovation behind us and some of the best minds in the business, we continue to develop pioneering materials to meet the demands of tomorrow.

The durability of stainless steel means that it is not only the best, but also the most economically sustainable choice for a wide range of applications. All of our products are made from an average of 85% recycled material and are fully recyclable at the end of their lifecycles.

Together with our customers and partners, we are building a world that lasts forever.

Stay up to date on our latest innovations, follow market trends, and get inspired by success stories – subscribe to our magazines and newsletters
outokumpu.com/newsletter
The inside view

For mildly corrosive environments.

Outokumpu’s legacy of innovation and consistent quality means we have the right product for every application. By grouping our products into ranges based on performance rather than stainless steel family we aim to make choosing the best product for your application easier.

Moda range products are designed for applications in mildly corrosive environments, with a Pitting Resistance Equivalent (PRE) value of up to 17. This range contains our key product Moda 430/4016 as well as several alternatives including low-chromium options.

Outokumpu has decades of experience in creating and developing the products in the Moda range.

The Moda range is made up of ferritic stainless steels that give you good formability and attractive surface finishes. The Moda range grades are widely used in applications ranging from cutlery and appliances to elevators.

Outokumpu has decades of experience in creating and developing the products in the Moda range. We have invested a great deal of time and research refining the appearance and corrosion resistance of our materials with industry-leading surface finishes.

Moda range products are readily available around the globe and are delivered from mills that are well known for their quality and on-time delivery accuracy. You can depend on Outokumpu stainless steels to reliably and consistently meet the specifications that your application demands.

Our customers also rely on us to deliver the best material selection advice, and we can often find more cost-effective solutions that help you to avoid over-specifying.

Contact us by outokumpu.com/contacts to find out which of our products is right for your next project.

The Pitting Resistance Equivalent (PRE) number can be used to roughly compare the resistance of different stainless steels to pitting corrosion. It takes into account the effect of the most important alloying elements.
Choosing the right product

Choosing the right stainless steel for an application is key to ensuring both the cost effectiveness and success of your project. Take a look at the individual Moda range products – and the applications they are best suited for – to get an idea of your options.

Key product

**Moda 430/4016**

A classic 16% chromium ferritic stainless steel used in mildly corrosive environments.

**Typical applications**
- Kitchen equipment
- Household appliances
- Sinks
- Indoor cladding
- Elevators
- Coins

**Product forms**
C, H, B, R, S

Product forms
Moda range applications

Common applications include:
- Washing machines
- Dishwashers
- Sinks
- Counter tops
- Cooker hoods
- Refrigerators
- Tableware and cutlery
- Ice machines
- Indoor cladding
- Grills
- Elevators
- Bus chassis
- Fins for heat exchangers
- Automotive exhaust systems
- Railroad cars
- Oil process equipment (mildly corrosive environments)
- Coins

Contact us by outokumpu.com/contacts to find out which of our products is right for your next project.
# Alternatives

<table>
<thead>
<tr>
<th>Outokumpu name</th>
<th>Typical applications</th>
<th>Product forms</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Moda 4510</strong></td>
<td>• Automotive exhaust systems</td>
<td>C, H, S</td>
</tr>
<tr>
<td></td>
<td>• Sugar industry equipment</td>
<td></td>
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<tr>
<td></td>
<td>• Household appliances</td>
<td></td>
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<tr>
<td>A titanium-stabilized 16% chromium ferritic steel with improved corrosion resistance, formability, and weldability compared to Moda 430/4016.</td>
<td></td>
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<tr>
<td><strong>Moda 439/4510</strong></td>
<td>• Automotive exhaust systems</td>
<td>C, H, S</td>
</tr>
<tr>
<td></td>
<td>• Sugar industry equipment</td>
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<td></td>
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<tr>
<td><strong>Moda 4511</strong></td>
<td>• Food processing industry equipment</td>
<td>C, H, S</td>
</tr>
<tr>
<td></td>
<td>• Welded ferritic parts</td>
<td></td>
</tr>
<tr>
<td>A niobium-stabilized 16% chromium ferritic steel with improved formability and weldability compared to Moda 430/4016.</td>
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<tr>
<td><strong>Moda 430Ti/4520</strong></td>
<td>• Counter tops</td>
<td>C, H, S</td>
</tr>
<tr>
<td></td>
<td>• Flue induction connectors</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Automotive applications</td>
<td></td>
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<tr>
<td>An alternative to Moda 430/4016 with better formability and weldability for stamping, drawability applications, and complex shapes.</td>
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<td></td>
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<tr>
<td><strong>Moda 4589</strong></td>
<td>• Conveyor chains</td>
<td>C, H, S</td>
</tr>
<tr>
<td></td>
<td>• Railroad cars</td>
<td></td>
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<tr>
<td>A 14% chromium product with a small amount of niobium for elevated strength, making it suitable for structural parts exposed to loads that demand higher yield points.</td>
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</tbody>
</table>
Low-chromium alternatives

Our low-chromium stainless steels offer better corrosion resistance than carbon steels in mildly corrosive environments.

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| **Moda 410L/4003** | • Railroad and road vehicles  
• Shipping containers  
• Industrial applications  
• Mining conveyors | C, H, P, S |
| A weldable ferritic stainless steel with elevated yield strength and resistance to abrasion. Its better corrosion resistance compared to carbon steels enables lower maintenance costs and longer service life. | |
| **Moda 409/4512** | • Automotive applications  
• Industrial exhaust systems | C, H, S |
| A weldable ferritic stainless steel with good oxidation resistance in dry air. This product is also available as low-carbon Moda 409L. | |
| **Moda 410S/4000** | • Bearings  
• Bushings  
• Dies  
• Fasteners  
• Pump shafts  
• Valves and valve components | C, H, P, S |
| A 13% chromium general-purpose stainless steel that is used widely where corrosion is not severe. When supplied in the age hardened condition Moda 410S/4000 can be used where moderate corrosion resistance and higher strength is required, while retaining its machinability. | |
PRE calculation = %Cr + 3.3 x % Mo + 16 x %N

Note: PRE values shown are Outokumpu typical values. Yield strength ($R_{p0.2}$) according to EN 10088-2 minimum values for cold rolled strip. Yield strength for temper rolled products ranges from 500-2000 MPa.

For more values by product, please see steelfinder.outokumpu.com
Elongation vs. corrosion resistance

PRE calculation: $\%Cr + 3.3 \times \%Mo + 16 \times \%N$

Note: PRE values shown are Outokumpu typical values. Elongation ($A_{80}$) according to EN 10088-2 minimum values for cold rolled strip.

For more values by product, please see steelfinder.outokumpu.com
## Stainless steel types

**Ferritic stainless steels** have good resistance to corrosion, especially stress corrosion cracking. Lower carbon and nitrogen contents, together with niobium and/or titanium stabilization, improve both weldability and toughness. Ferritic stainless steels are magnetic.
Making money with Moda 430/4016

Passing from cash register to pocket to hand and back again, dropped, and thrown – coins have to withstand a lifetime of tough treatment. They are also exposed to a variety of different, often slightly corrosive, environments such as the insides of people’s pockets or wallets.

The wear and corrosion resistance of the magnetic Moda 430/4016 made it the perfect choice for coin production. Furthermore, as a nickel-free ferritic stainless steel, it is a cost-effective choice, as it is not impacted by the price volatility of nickel. Moda 430/4016 also provides exceptional surface quality as well as consistent gauge and hardness control. When combined in a bi-metallic coin with yellow metals like copper-nickel, the surface remains bright and aesthetically pleasing even in polluted environments. Copper-alloy surfaces can also help prevent the build-up and spread of pathogenic microbes.

Looking for expert help to choose the best product for your next project? Contact us by outokumpu.com/contacts
Working towards forever.

We work with our customers and partners to create long lasting solutions for the tools of modern life and the world’s most critical problems: clean energy, clean water, and efficient infrastructure. Because we believe in a world that lasts forever.

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