Stainless steels for corrosive environments
Outokumpu Core range
For multi-purpose use – indoor and mild outdoor conditions (PRE 17 to 22).

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 type, we aim to make choosing the best product for your application easier.

Core range products are designed for applications in corrosive environments, calculated with a Pitting Resistance Equivalent (PRE) value of 17 to 22. This range contains our workhorse products Core 304/4301 and Core 304L/4307, as well as several alternatives and low-nickel and nickel-free options.

Outokumpu austenitics are highly formable and weldable, making them suitable for a wide range of applications from cutlery to storage tanks. Many of our magnetic ferritic stainless steels also have good formability, especially with regards to deep drawing, and are widely used in architectural applications and by appliance makers.

All Core 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 at outokumpu.com/contacts to find out which of our products is right for your next project.

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
Choosing the right product

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

Key products

Core 304/4301
Core 304/4301 is a classic 18% chromium, 8% nickel austenitic stainless steel. It’s an all-purpose product with good corrosion resistance and is suitable for a wide variety of applications that require good formability and weldability. Core 304/4301 can be delivered with a variety of surface finishes.

Typical applications
• Household appliances and consumer goods
• Kitchen equipment
• Indoor and outdoor cladding, handrails, and window frames
• Food and beverage industry equipment
• Storage tanks
• Flanges and valves

Product forms
C, H, P, B, R, S, T

Core 304L/4307
Core 304L/4307 is a low-carbon alternative to Core 304/4301. The lower carbon content minimizes carbon precipitation as a result of heat input, for example during welding, giving improved resistance against intergranular corrosion. It’s suitable for a wide variety of applications that require good formability and weldability and can be delivered with a variety of surface finishes.

Typical applications
• Food and beverage industry equipment
• Chemical and pharmaceutical industry equipment (mild to medium corrosive environments)
• Heat exchangers (oil and water)
• Storage tanks
• Tank containers
• Pipes

Product forms
C, H, P, B, R, S, T

Product forms

Choosing the right product

Core range applications

• Household appliances and consumer goods
• Kitchen equipment, cutlery, pots and pans
• Sinks and countertops
• Indoor and outdoor cladding, handrails, and window frames
• Rebar in concrete
• Automotive applications, such as mufflers, trims, and filters
• Food and beverage industry equipment
• Chemical and pharmaceutical industry equipment (mild to medium corrosive environments)
• Heat exchangers (oil and water)
• Storage tanks
• Tank containers
• Pipes

If you need steels for highly corrosive environments (PRE 22 to 26) such as those in the pulp and paper and chemical industries, check Supra 316/4401, or other products from the Supra range.

Contact us at outokumpu.com/contacts to find out which of our products is right for your next project.
In addition to Core 304/4301 and Core 304L/4307, we also offer several alternatives designed for a more specific range of applications.

### Outokumpu name

| Core 304LN/4311 | A low-carbon, higher nickel and nitrogen alloyed alternative to Core 304/4301 with improved strength and low-temperature toughness. Suitable for applications that require high tensile strength. |
| Core 304/4306 | A higher nickel alternative to Core 304L/4307 with improved formability and deep drawability. |
| Core 305/4303 | A high-nickel alternative to Core 304/4301 with reduced strain hardening and excellent cold forming properties. Ideal for parts that require high deformation degrees. |
| Core 321/4541 | A titanium-stabilized austenitic stainless steel with improved intergranular corrosion resistance for an extended temperature range. |
| Core 347/4550 | A niobium stabilized alternative Core 321/4541 with improved intergranular corrosion resistance and good mechanical properties at high temperatures. Core 347/4550 is particularly useful in applications with intermittent heating in the range 400-800 °C/750-1650 °F. |

### Typical applications

- Railroad cars
- Pressure vessels
- Chemical plant equipment (mild to medium corrosive environments)
- Flanges and valves
- Chemical and pharmaceutical plant equipment (mild to medium corrosive environments)
- Flanges and valves
- Industrial parts with complex shapes
- Sinks and other deep-drawn products
- Complex stamping processes
- Rollers producing very thin-gauge coils
- Annealing covers
- Stack liners
- Automotive exhaust systems
- Welded pressure vessels
- Flanges and valves
- High temperature gaskets
- Rocket engine parts
- Expansion joints
- Aircraft collector rings
- Exhaust manifolds
- Chemical production equipment
- Flanges and valves

### Outokumpu name

| Core 301LN/4318 | A low-carbon, nitrogen alloyed alternative to Core 301/4310 with elevated strength, making it particularly suitable for lightweight construction. Temper rolled Core 301LN/4318 is used for applications that require increased hardness and strength. |
| Core 301/4310 | A lower chromium and nickel alternative to Core 304/4301 with high work hardening capacity, this is a good choice for applications subjected to high mechanical loading. |
| Core 201/4372 | This low-nickel stainless steel has properties approaching Core 301/4310 but with a higher work hardening coefficient. |
| Core 201LN/4372 | This low-nickel stainless steel also has properties approaching Core 301/4310, but has a higher strength than Core 201/4372. It hardens more quickly due to its higher work hardening coefficient. |

### Product forms

- C, H, P, R, S
- C, H, B, R, S
- C, H, S
- C, H, B, R, S
- C, H, S

### Low-nickel stainless steels

Our low-nickel stainless steels offer better price stability than standard products. We use a minimum of 3.5% nickel in all our low-nickel steels to ensure that we meet ASTM standards.
Nickel-free ferritic stainless steels

Nickel-free ferritic stainless steels offer good price stability along with good corrosion resistance and formability. Ferritic stainless steels are magnetic.

Outokumpu name | Typical applications | Product forms
--- | --- | ---
Core 441/4509 | • Indoor claddings  
• Restaurant equipment and appliances  
• Tubing  
• Heat exchangers | C, H, S

A nickel-free 17% chromium ferritic stainless steel originally designed for exhaust systems, with good corrosion resistance and high-temperature strength. Core 441/4509 is available with a single (niobium) or dual (niobium and titanium) stabilizer. Due to good formability and weldability, it is often a suitable replacement for Core 301/4310.

Core 4622 | • Household, catering and architectural applications (indoor and outdoor)  
• Tubular products for automotive and process industries  
• Tanks and process equipment | C, H

A high chromium (21Cr) ferritic stainless steel with equal corrosion resistance to Core 304/4301. Core 4622 has excellent deep drawability and is almost ridge free, meaning it is easier to polish and has a lower overall production cost.

Core 434/4113 | • Automotive trim fittings | C, H, S

A molybdenum-alloyed ferritic stainless steel that offers improved corrosion resistance.

Outokumpu Moda 434/4113 can be successfully used in place of Core 304/4301 in many indoor and mild corrosive outdoor environments.

Product performance comparison

Strength vs. corrosion resistance

Corrosion resistance (PRE)

Yield strength (R_p0.2)

Note: PRE values shown are Outokumpu typical values. Yield strength (R_p0.2) according to EN 10088-2 minimum values for cold rolled strip. For specific values by product, please see steelfinder.outokumpu.com

PRE calculation = %Cr + 3.3 x %Mo + 16 x %N

Learn more at autokumpu.com/core
# Core range

<table>
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<th>Steel designations</th>
<th>ASTM</th>
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<th>Performance</th>
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<th>Core range products are available with the following surface finishes: 1, 2B, 2D, 2E, and our Deco range includes Deco BA/2R, ground, polished, brushed, patterned, and special surfaces.</th>
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Note: figures shown are EN 10088-2 cold-rolled minimum values for elongation (A80), tensile strength (Rm), and yield strength (Rp0.2). Chemical compositions are Outokumpu typical values. For specific values by product, please see [steelfinder.outokumpu.com](http://steelfinder.outokumpu.com).

Stainless steel types

**Austenitic stainless steels** have good to excellent corrosion resistance combined with very good weldability and formability. The austenitic structure has good creep resistance and good oxidation resistance that makes these steels useful at elevated temperatures. They can also be used in cryogenic applications and are, in the annealed condition, the only non-magnetic steel group.

**Ferritic stainless steels** have good resistance to corrosion, especially stress-corrosion cracking. Their lower carbon and nitrogen content, together with molybdenum and/or titanium stabilization, improve both weldability and toughness. Ferritic stainless steels are magnetic.
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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