

# Stainless steels for superior machinability

Outokumpu Prodec range

outokumpu  
high performance stainless steel



[outokumpu.com/prodec](https://outokumpu.com/prodec)

# 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.

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# Superior machinability with Prodec

The Prodec range comprises stainless steel grades that are optimized for consistently superior machinability, enabling faster machining speed, longer tool life, and enhanced quality.

Extensive technical knowledge and our end-to-end production chain enables us to optimize the material's machinability properties through all steps of the process.

Unlike typical grades optimized for machinability, Prodec products have similar corrosion resistance to conventionally produced stainless steel grades.

## Prodec benefits

- **Faster machining\***

Based on  $V_{15}$  testing results you can optimize machining speeds for Prodec 304L/4307 up to 300 m/min. Using higher speeds can lead to significant cost savings per component.

- **Longer tool life\***

Prodec can double tool lifetime.

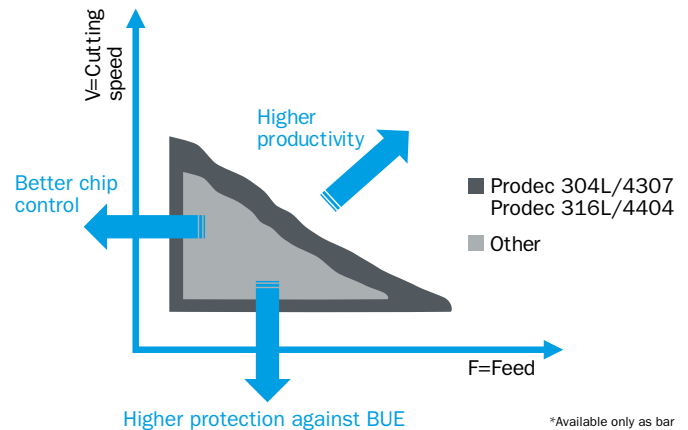
- **Superior quality and tolerances**

Prodec expands the machining window, leading to superior chip formation while avoiding built up edge and tool wear.

\*Testing done with Outokumpu Prodec and 7 European competitors' bars with improved machinability in grades 316L/4404 and 304L/4307.



## Prodec expands the machining window



# Machining improvements with Prodec

Prodec provides significant machining improvements and cost savings per component:

## Plate – real practice results from ring to flange on a CNC turning machine

		Supra 316/4404	Prodec 316L/4404	Improvement	
Speed	m/min	110	160	50	45.5%
Feed	mm/rev	0.25	0.3	0.05	20.0%
Depth	mm	1.5	2	0.5	33.3%
Processing time	min	21.1	15.7	5.4	25.6%
Tool lifetime	pieces	3–6*	9	3–6	150%–300%

\*) Depending on material. Tools: CC Sandvik and Sumitomo Electric

## Plate – from plasma cut ring to machined flange

		Supra 316/4404	Prodec 316L/4404	Improvement	
Turning	min	0:04:53	0:03:18	0:01:35	32.4%
Milling	min	0:13:39	0:09:24	0:14:15	31.1%
Drilling	min	0:03:12	0:02:36	0:00:36	18.8%
Total	min	0:21:44	0:15:18	0:06:26	29.6%

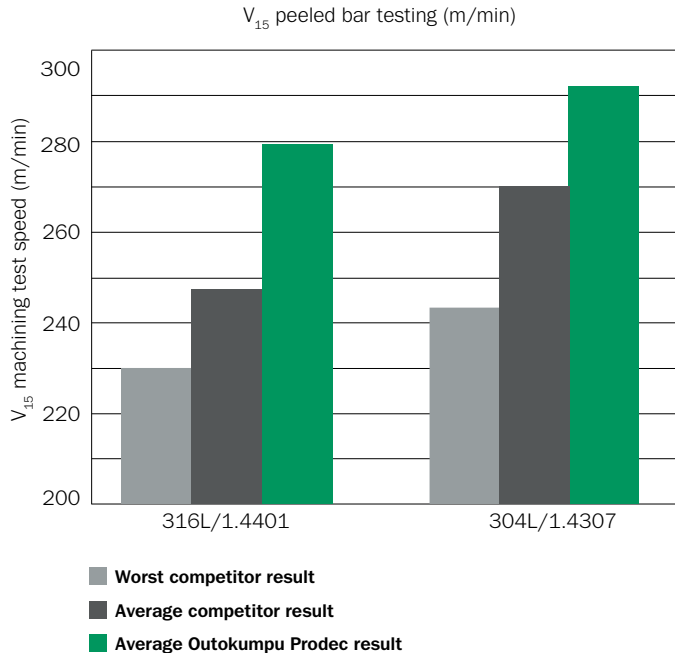
Starting material: Ring 235/85x25

## Bar – cost savings with Prodec

		Standard 316L/4404	Prodec 316L/4404	Improvement	
Cutting speed	m/min	92	137	45	
	sfm	300	450	150	
Processing time/component	min	16.9	7.7		54%
Total machining cost/ component	€	23.1	10.6	12.6	55%
	\$	26.6	12.1	14.5	
Productivity increase	%				54%
Savings/component	€			12.6	
	\$			14.5	

A cost saving example for rough turning a 6" diameter Prodec 316L/4404 peeled bar with a cemented carbide tool.

## Bar – faster machining with Prodec



Testing done with Outokumpu Prodec and 7 European competitors' bars with improved machinability in grades 316L/4404 and 304L/4307. The tool used for testing was a CNMG 2015 cemented carbide insert.

# Prodec range product forms

## Hexagon

8–60 mm /  $\frac{5}{16}$ –3 inches



## Square

8–70 mm /  $\frac{5}{16}$ –3 inches



## Flat

Thickness: 3–95 mm /  $\frac{1}{8}$ –3 $\frac{3}{4}$  inches  
Width: up to 130 mm / 5 inches



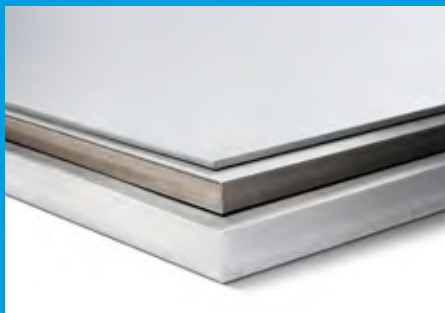
## Round

6–400 mm /  $\frac{1}{4}$ –15 $\frac{3}{4}$  inches



## Plate

Thickness: 5–130 mm  
Width: 400–3260 mm  
Length: 400–13500 mm



Contact us for availability of specific products and sizes at  
[outokumpu.com/prodec](http://outokumpu.com/prodec)

# Choosing the right product

## Products

Outokumpu name	Typical applications	Product forms
<p><b>Prodec 304L/4307</b> A version of Core 304L/4307 with improved machinability. Improves productivity with faster machining, longer tool life, better dimensional tolerances, superior machined surface quality, and improved yields compared to conventionally produced Core 304L/4307.</p>	<ul style="list-style-type: none"> <li>• Fasteners</li> <li>• Flanges and valves</li> <li>• Pressure fittings</li> <li>• Machined components</li> </ul>	Plate Bar Billet
<p><b>Prodec 316L/4404</b> A version of Supra 316L/4404 with improved machinability. Improves productivity with faster machining, longer tool life, better dimensional tolerances, superior machined surface quality, and improved yields compared to conventionally produced Supra 316L/4404.</p>	<ul style="list-style-type: none"> <li>• Fasteners</li> <li>• Flanges and valves</li> <li>• Pressure fittings</li> <li>• Machined components</li> </ul>	Plate Bar Billet
<p><b>Prodec 303/4305</b> For applications that use 303/1.4305. This product gives you faster machining, longer tool life, better tolerances, superior machined surface quality, and reduced scrap losses compared to conventionally produced 303/1.4305.</p>	<ul style="list-style-type: none"> <li>• Nuts, bolts, and screws</li> <li>• Gears</li> <li>• Shafts</li> <li>• Bearings</li> <li>• Machined parts for process equipment</li> </ul>	Plate Bar Billet
<p><b>Prodec 17-4PH</b> A martensitic, precipitation hardening stainless steel for applications that use Dura 17-4PH. It improves productivity with faster machining, longer tool life, better dimensional tolerances, superior machined surface quality, and improved yields when compared to conventionally produced Dura 17-4PH.</p>	<ul style="list-style-type: none"> <li>• Fasteners</li> <li>• Flanges</li> <li>• Oil field valve equipment</li> <li>• Pressure fittings</li> <li>• Chemical process equipment</li> <li>• Paper mill equipment</li> <li>• Aircraft parts</li> </ul>	Plate Bar Billet

# Product properties

## Prodec range

Steel designations				Performance							
Outokumpu name	EN	ASTM		PRE	Hot rolled bar		Cold drawn bar		Plate		Grade family
		Type	UNS		A %	R <sub>p0.2</sub> MPa	A %	R <sub>p0.2</sub> MPa	A%	R <sub>p0.2</sub> MPa	
Prodec 304L/4307	1.4307	304L	S30403	18	45	175	25/25/30	400/380/175	45	200	A
Prodec 316L/4404	1.4404	316L	S31603	24	40	200	25/25/30	400/380/200	40	220	A
Prodec 303/4305	1.4305	303	S30300	17	35	190	15/15/20	400/400/190	35	190	A
Prodec 17-4PH <sup>1)</sup>	1.4542	630	S17400	16	10	520	10/10/12	600/600/520	–	–	PH

<sup>1)</sup> Values for condition +P800

Note: Yield strength (R<sub>p0.2</sub>) according to EN 10088-3 values for hot rolled bar.

Elongation (A) according to EN 10088-3 values for cold rolled bar

(≤ 10 mm/10 < d ≤ 16 mm/16 < d ≤ 40 mm).

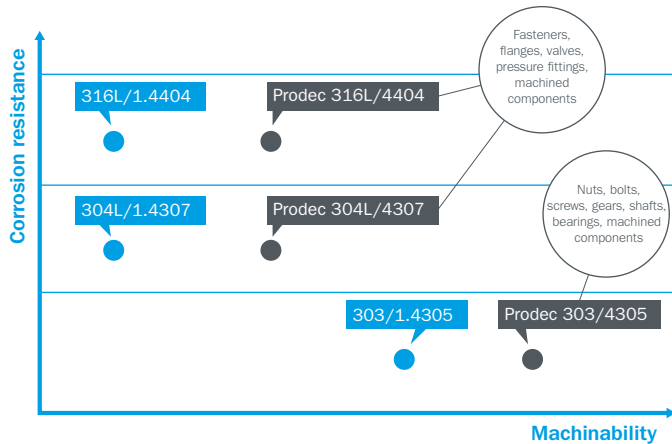
Steel designations				Typical chemical composition, % by mass					
Outokumpu name	EN	ASTM		C	Cr	Ni	Mo	N	Others
		Type	UNS						
Prodec 304L/4307	1.4307	304L	S30403	0.02	18.1	8.1	–	–	–
Prodec 316L/4404	1.4404	316L	S31603	0.02	17.2	10.1	2.1	–	–
Prodec 303/4305	1.4305	303	S30300	0.05	17.2	8.1	–	–	0.3S
Prodec 17-4PH <sup>1)</sup>	1.4542	630	S17400	0.02	16.3	4.7	–	–	Nb 3.5Cu

<sup>1)</sup> Values for condition +P800

For more values by product, please see [steelfinder.outokumpu.com](http://steelfinder.outokumpu.com)



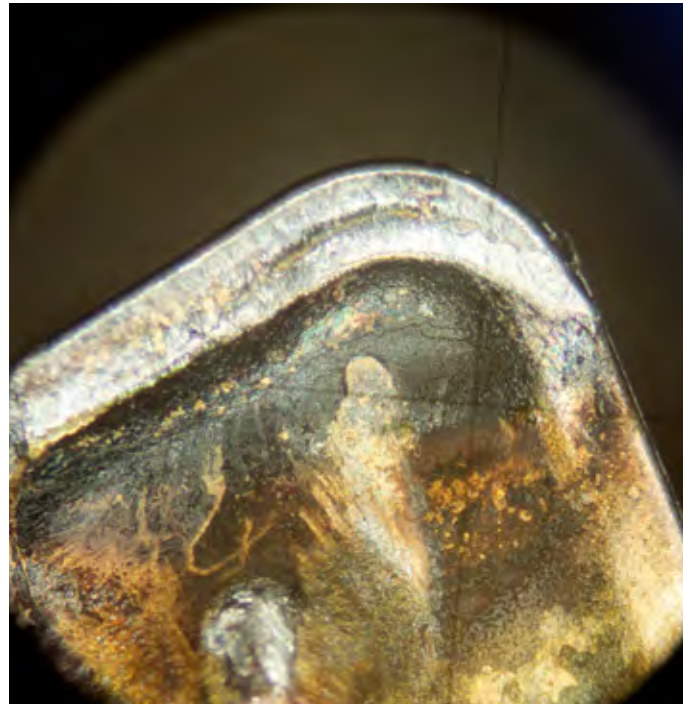
# Product performance comparison



## High quality according to international standards

Our manufacturing programs are supported by in-house product inspection and testing, as well as the extensive experience of our technical team. Our mills are accredited to recognized international standards, including:

- ISO 9001 & 14001 – TÜV Nord
- BS OHSAS 18001 – TÜV Nord
- AD 2000 – Merkblatt WO/TRD 100 - TÜV Nord
- PED 97/23/EC
- ASME MO QSC 713
- Approvals from DNV, Germanischer Lloyd, Lloyd's Register
- NORSOK M-650 Ed. 4.



# Customer view

Todd Rhodes  
President, Plus Ten Stainless

Our customers require very close tolerances, and I'm always looking for ways to control our production process. They regularly achieve 25-30% faster machining speeds without any heat-affected zone around the perimeter when they use Prodec products. They also see their tools lasting longer – sometimes up to twice as long.

We recently had a project that called for 315 pieces of 304L plate with a water jet cut in the middle. The customer didn't want to pay the premium for our Prodec 304L. Because of price, we sold them 304 pieces of standard grade 304L. To avoid having to order a larger

“ We regularly achieve 25-30% faster machining speeds. We also see our tools lasting longer, sometimes as much as twice as long.

“ The Prodec pieces machined like butter.

volume of the standard grade, I made up the difference with 11 pieces of Prodec 304L that we had in stock.

We informed the customer that the 11 pieces were Prodec so they could track the results. When I called them later to see how their project turned out, they reported that the 11 Prodec pieces 'machined like butter' while the standard grade pieces were stressing the equipment so much so that they were still struggling to get a good part machined. I think they realized that the premium cost for Prodec represents real value once machining and tool life efficiencies are factored in.

I'm a big fan of Prodec and keep telling my customers that even though these products are enhanced to increase the life of their tool inserts, they still conform to all ASTM specifications and standards and can be certified as the standard grade.

# Prodec used for motorcycle fairings

Rolled Alloys in Streamwood, Illinois is a leading supplier of specialty metals including Outokumpu Prodec in round and hexagon bar. One of their customers is a world-famous American motorcycle brand, renowned for its tough, highly reliable machines. The material selection and fabrication for this customer has to be of the very highest quality,

“ I was getting up to 500 cuts, and normally I'd change the tool tip after 100 to 300 cuts.

Rolled Alloys supplied 1" diameter Prodec 303/4305 stainless bar to JBA Precision in Wisconsin, which fabricates washers that are used in the motorcycle aftermarket industry to connect the fairing and windshield to the bike frame. Fabricating the washers requires precise and efficient tooling processes.

"By the second run with Prodec 303/4305, I noticed that I was getting up to 500 cuts, and normally I'd change the tool tip after 100 to 300 cuts," said Jeffrey Kopidlansky, owner-operator of JBA Precision. "And the finish maintained for a longer time, even with a duller tool." Kopidlansky added that since implementing Prodec 303/4305, his tools are lasting six months or longer, and his drill speeds have also increased.



# 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.

outokumpu  
classic

**Moda**

Mildly  
corrosive  
environments

**Core**

Corrosive  
environments

**Supra**

Highly  
corrosive  
environments

outokumpu  
pro

**Forta**

Duplex  
& other  
high strength

**Ultra**

Extremely  
corrosive  
environments

**Dura**

High  
hardness

**Therma**

High  
service  
temperatures

**Prodec**

Improved  
machinability

**Deco**

Special  
surfaces

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