outokumpu
high performance stainless steel

Prodec 303/4305

EN 1.4305, ASTM TYPE 303

General characteristics

Prodec 303/4305 is for applications that use 303/1.4305. It gives you faster machining, longer tool life, better tolerances, superior machined surface quality, and reduced scrap losses compared to conventionally produced 303/1.4305. It is an austenitic stainless steel that belongs to the standard CrNi stainless steel family. Prodec 303/4305 is a sulfur-alloyed variant with improved machinability. Due to its high sulfur content, the corrosion resistance of Prodec 303/4305 can be slightly lower than the corrosion resistance of grade 4301.

The austenitic CrNi standard grades are the most widely used group of stainless steels. Their well-balanced material properties make them suitable for the fabrication of many products.

Typical applications

- Nuts, bolts, and screws
- Gears
- Shafts
- Bearings
- Machined parts for process equipment

Products & dimensions

Chemical composition

The typical chemical composition for this grade is given in the table below, together with composition limits given for the product according to different standards. The required standard will be fully met as specified on the order.

The chemical composition is given as % by mass.

	C	Mn	Cr	Ni	Mo	N	Other
Typical	**0.05**		**17.2**	**8.1**			**S:0.3**
EN 10088-2	≤0.10	≤2.0	17.0-19.0	8.0-10.0		≤0.10	S:0.15-0.35
EN 10088-3	≤0.10	≤2.00	17.0-19.0	8.0-10.0		≤0.10	S:0.15-0.35

Corrosion resistance

Prodec 303/4305 has excellent corrosion resistance in solutions of many halogen-free organic and inorganic compounds over a wide

temperature and concentration range. It can withstand many organic and sufficiently diluted mineral acids depending on the temperature of the solution. Prodec 303/4305 may suffer from uniform corrosion in mineral acids and hot strong alkaline solutions. More detailed information on corrosion properties of Prodec 303/4305 can be found in Outokumpu's Corrosion Tables published in the Outokumpu Corrosion Handbook and on www.outokumpu.com.

In aqueous solutions containing halogenides, e.g. chlorides or bromides, pitting and crevice corrosion may occur depending on halogenide concentration, temperature, pH-value, concentration of oxidizing compounds, or crevice geometry, if applicable. The presence of corrosion-inhibiting or accelerating compounds like transition metal ions or organic compounds may influence the corrosion behavior of Prodec 303/4305.

Prodec 303/4305 is prone to chloride-induced stress corrosion cracking at temperatures over about 50 °C depending on the applied stress and the chloride concentration in the environment. Prior cold deformation of the structure under load increases the risk of stress corrosion cracking.

Due to its high sulfur content, resistance to stress corrosion cracking, pitting, and crevice corrosion may be slightly below the typical corrosion resistance of the other austenitic CrNi standard grades.

Prodec 303/4305 can be used for indoor and outdoor applications in rural areas and urban environments where chloride contamination is low. The best material performance is usually reached with the help of adequate design, correct post-weld treatment, and regular cleaning during use (if applicable).

For more information on corrosion resistance, please refer to the Outokumpu Corrosion Handbook or contact our corrosion experts.

Pitting corrosion resistance		Crevice corrosion resistance
PRE	CPT	CCT
17	<10	<0

Pitting Resistance Equivalent (PRE) is calculated using the following formula: PRE = %Cr + 3.3 x %Mo + 16 x %N
Corrosion Pitting Temperature (CPT) as measured in the Avesta Cell (ASTM G 150), in a 1M NaCl solution (35,000 ppm or mg/l chloride ions).
Critical Crevice Corrosion Temperature (CCT) is obtained by laboratory tests according to ASTM G 48 Method F

Mechanical properties

The mechanical properties of the available products in soft annealed condition at room temperature are given in the table below. Moderate strengths can be reached at elevated temperatures (~550 °C/1022 °F). Temperatures for excessive scaling are close to 850 °C/1562 °F. This grade, along with other austenitic corrosion-resistant steels, exhibits very high ductility and high elongation to fracture. It is not susceptible to brittle fracture in the solution annealed condition.

Hot rolled quarto plate	$R_{p0.2}$ MPa	$R_{p1.0}$ MPa	R_m MPa	Elongation[1] %	Impact strength J	Rockwell	HB	HV
Typical (thickness 15 mm)	**275**		**585**	**35**				
EN 10088-2	≥ 190	≥ 230	500 - 700	≥ 35				

Wire rod	$R_{p0.2}$ MPa	$R_{p1.0}$ MPa	R_m MPa	Elongation[1] %	Impact strength J	Rockwell	HB	HV
Typical	**260**	**330**	**580**	**35**				

[1]Elongation according to EN standard:
A_{80} for thickness below 3 mm.
A for thickness = 3 mm.
Elongation according to ASTM standard $A_{2"}$ or A_{50}.

Physical properties

Typical physical properties are shown in the table below.

Density kg/dm³	Modulus of elasticity GPa	Thermal exp. at 100 °C 10^{-6}/°C	Thermal conductivity W/m°C	Thermal capacity J/kg°C	Electrical resistance µΩm	Magnetizable
7.9	200	16,0	15	500	0.73	No

Fabrication

Machinability

Prodec 303/4305 is easily machined and produces small brittle chips. Prodec 303/4305 may be machined at high speeds with deep cuts and heavy feeds and still give acceptable tool life.

Welding

Prodec 303/4305 is not recommended for applications requiring welding. However, if welding is necessary, AWS E312 filler metal may be considered.

More detailed information concerning welding procedures can be obtained from the Outokumpu Welding Handbook, available from our sales offices.

Standards & approvals

Prodec 303/4305 meets AMS 5640, ASTM A 581, A 582, QQ-S-764, and MIL-S-862 specifications.

Standard	Designation
EN 10088-2	1.4305
EN 10088-3	1.4305

Contacts & Enquiries

Contact your nearest sales office

www.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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