

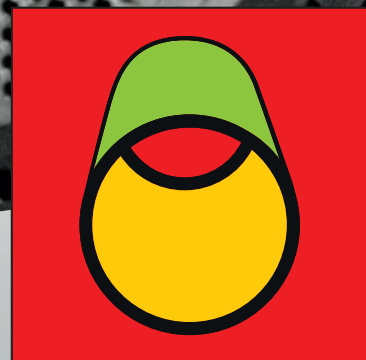
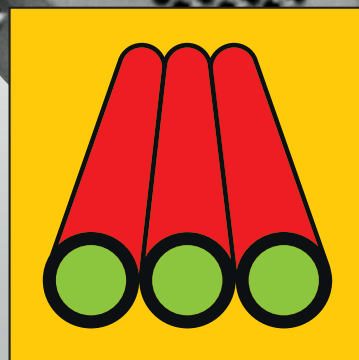
# TPS TECHNITUBE<sup>®</sup>

RÖHRENWERKE GMBH

## SEAMLESS TUBES IN FERRITIC & MARTENSITIC STAINLESS STEEL GRADES

TP405 | TP410 | TP410S | TP430  
1.4002 | 1.4006 | 1.4000 | 1.4016

 In straight and  
u-bent condition



# 1.4002 | TP405 – UNS S40500

## TPS-FS-4002-405

EN 10297-2

Material-No. 1.4002  
Symbol: X6CrAl13

ASTM A/ASME SA 268

TP405 / UNS S40500

- Ferritic steel, not subject to appreciable hardening through air cooling from high temperature
- Similar in nature to TP410 stainless steel, TP405 will form an oxide film, which will protect the finish from progressive corrosion in a variety of mild atmospheres, acidic environments, steam and ammonia
- Good resistant to hydrogen and hydrogen sulphide
- Good weldability by TIG and manual arc welding process, preheat 100-300 C
- Machining is performed in the same way as for plain carbon steel of the same tensile strength
- Limited possibility for polishing
- Used for aircooler, heater and condenser in the oil industry

### Chemical Composition in %

	C max.	Si max	Mn max.	P max	S max	Cr min - max	Ni max	others Al
A/SA 268	0,080	1,00	1,00	0,040	0,030	11,5 – 14,5	0,500	0,1 – 0,3
EN 10297-2	0,080	1,00	1,00	0,040	0,015 - 0,030	12,0 – 14,0	-	0,1 – 0,3

### Mechanical properties at room temperature in heat treated condition

		EN 10297-2	A/SA 268
Tensile strength	Rp <sub>0,2</sub> min	210 MPa	205 MPa
0,2% yield	Rm min	400 MPa	415 MPa
Elongation	min	17%	20 %
Hardness	HRB max.	90	95

### Mechanical properties at higher temperatures in heat treated condition

Temp. °C	100	150	200	250	300	350	400
Rp <sub>0,2</sub> min MPa	235	230	235	225	220	210	195

### Heat treatment/Structure

Annealing:	750 – 800 C
Cooling:	Gas quenched
Structure:	Ferrite

### Physical properties

Density at 20°C	g/cm <sup>3</sup> 7,7
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For this grade we always keep hollows in stock

# 1.4006 | TP410 – UNS S41000

## TPS-FS-4006-410

DIN 17456

Material-No. 1.4006  
Symbol: X12Cr13

ASTM A/ASME SA 268

TP410 / UNS S41000

- Basic martensitic stainless
- High mechanical properties after heat treatment
- Hardenable
- Corrosion and sealing resistant up to 1200 F (649°C)
- Good resistance to hydrogen and hydrogen sulphide
- Good weldability by TIG, MIG, MAG and manual electric arc welding, preheat 200-300°C
- Machining is performed in the same way as for plain carbon steels of the same tensile strength
- Can be polished
- Used for heat exchanger in cracking installations in the oil industry
- Temperature range between 425°C and 525°C must be avoided owing to embrittlement at 475°C

### Chemical Composition in %

	C max.	Si max	Mn max.	P max	S max	Cr min - max	Ni	others
A/SA 268	0,15	1,00	1,00	0,040	0,030	11,5 – 13,5	–	–
DIN17456	0,08 – 0,12	1,00	1,00	0,045	0,030	12,0 – 14,0	–	–

### Mechanical properties at room temperature in heat treated condition

		DIN 17456	A/SA 268
Tensile strength	Rp <sub>0,2</sub> min	250 MPa	205 MPa
0,2% yield	Rm min	450-650 MPa	415 MPa
Elongation	min	20%	20%
Hardness	HRB max.	95	95

### Mechanical properties at higher temperatures in heat treated condition

Temp. °C	100	150	200	250	300	350	400
Rp <sub>0,2</sub> min MPa	235	230	235	225	220	210	195

### Heat treatment/Structure

Annealing:	750 – 800 C
Cooling:	Gas quenched
Structure:	Ferrite

### Physical properties

Density at 20°C	g/cm <sup>3</sup> 7,7
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For this grade we always keep hollows in stock

# 1.4000 | TP410S – UNS S41008

## TPS-FS-4000-410S

EN 10 088

Material-No. 1.4000  
produced and tested  
acc. DIN 17456  
Symbol: X6Cr13

ASTM A/ASME SA 240

TP410S / UNS S41008

- Low carbon version of TP410 stainless
- Non hardenable
- Moderate corrosion resistance and good strength in the annealed condition
- Good resistant to hydrogen and hydrogen sulphide
- Good weldability by TIG and manual arc welding process, preheat at 100-300 C
- Machining is performed in the same way as for plain carbon steels of the same tensile strength
- Can be polished
- Used for heatexchanger in cracking installations in the oil industry

### Chemical Composition in %

	C max.	Si max	Mn max.	P max	S max	Cr min - max	Ni	others
<b>A/SA 240</b>	0,080	1,00	1,00	0,040	0,030	11,5 – 13,5	0,60	–
<b>EN 10 088</b>	0,080	1,00	1,00	0,040	0,015 - 0,030	12,0 - 14,0	–	–

### Mechanical properties at room temperature in heat treated condition

		EN 10 088	A/SA 240
<b>Tensile strength</b>	<b>Rp<sub>0,2</sub> min</b>	230 MPa	205 MPa
<b>0,2% yield</b>	<b>Rm min</b>	400-630 MPa	415 MPa
<b>Elongation</b>	<b>min</b>	20 %	22 %
<b>Hardness</b>	<b>HRB max.</b>	93	89

### Mechanical properties at higher temperatures in heat treated condition

Temp. °C	100	150	200	250	300	350	400
<b>Rp<sub>0,2</sub> min MPa</b>	235	230	225	225	220	210	195

### Heat treatment/Structure

Annealing:	780 – 850 C
Cooling:	Gas quenched
Structure:	Ferrite

### Physical properties

Density at 20°C	g/cm <sup>3</sup> 7,7
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For this grade we always keep hollows in stock



# 1.4016 | TP430 – UNS S43000

## TPS-FS-4016-430

EN 10297-2

 Material-No. 1.4016  
 Symbol: X6 Cr17

ASTM A/ASME SA 268

TP430 / UNS S43000

- TP 430 is a ferritic stainless steel with minimum 16% chromium that has lower tensile strength, elongation and impact resistance than austenitic stainless steels.
- Good resistant to alkaline solutions, moisture or dilute organic
- Good bending, deep-drawing and polishing properties
- Its ferritic microstructure makes it resistant to stress corrosion
- Poor weldability
- Machning is performed in the same way as for plain carbon steel of the same tensile strenght
- No corrosion resistance in a salt water environment
- Applicable areas: mechanical engineering, automotive and food industry

### Chemical Composition in %

	<b>C max.</b>	<b>Si max.</b>	<b>Mn max.</b>	<b>P max.</b>	<b>S max.</b>	<b>Cr min - max</b>
<b>A/SA 268</b>	0,12	1,00	1,00	0,040	0,030	16,0 - 18,0
<b>EN 10297-2</b>	0,08	1,00	1,00	0,040	0,015 - 0,030	16,0 - 18,0

### Mechanical properties at room temperature in heat treated condition

		<b>EN 10297-2</b>	<b>A/SA 268</b>
<b>Tensile strenght</b>	R <sub>p</sub> 0,2 min	240 MPa	240 MPa
<b>0,2% yield point</b>	R <sub>m</sub> min	430 MPa	430 MPa
<b>Elongation</b>	min	20%	20%
<b>Hardness</b>	HRB max.		90

### Heat treatment/Structure

Annealing	750 - 850 °C
Cooling	gas quenched
Structure	Ferrite

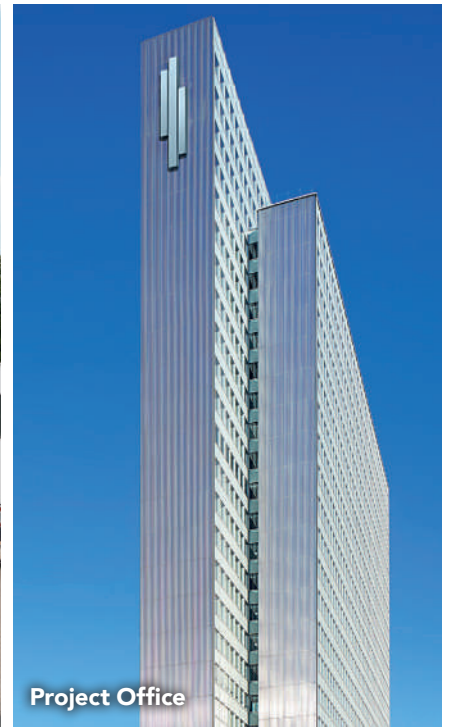
### Physical properties

<b>Density at 20 °C</b>	<b>7,7 kg/dm<sup>3</sup></b>
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For this grade we always keep hollows in stock







Headquarter

Project Office



Mill 1

Mill 2

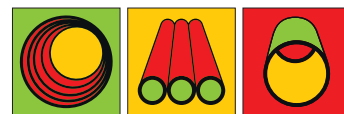
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