

## TP 316/316L • UNS S31600/S31603 • 1.4401/1.4404 • TPS-INOX 4401/4404-316/316L

These grades belong to the family of 17%Cr12-13%Ni steels containing 2,0-3,0% Mo. This standard grade is used where specific attributes of other members of the family are not necessary - eg. no likelihood of intercrystalline corrosion caused by welding. Special for TP 316L, low carbon content, minimizes chromium carbide precipitation and improves resistance to intercrystalline corrosion. After TP 304/304L type steels, these TP316/316L grades are the most widely used austenitics. Good high temperature oxidation resistance up to 900°C. In the damp industrial or onshore atmospheres of Europe, they perform better than TP 304/304L and ferritic grades. In low temperature seawater they offer limited resistance to pitting but are susceptible to crevice attack. Their short- and longtime properties at elevated temperatures are also superior to those of comparable TP 304/304L grades. Main applications: Pipe and heat exchanger tubes in chemical and petrochemical plant, in boilers and food industry.

Material grade	Norm	Chemical composition • mass in %									
		C	Si	Mn	P	S	Cr	Ni	Mo	Ti	Sonst.
		max.	max.	max.	max.	max.	min. – max.	min. – max.	min. – max.		
1.4401	EN 10216-5	0,070	1,00	2,00	0,040	0,015	16,50 - 18,50	10,00 - 13,00	2,00 - 2,50	-	N 0,10 max
1.4404	EN 10216-5	0,030	1,00	2,00	0,040	0,015	16,50 - 18,50	10,00 - 13,00	2,00 - 2,50	-	N 0,10 max
TP316	ASME SA / AS TM A 213	0,080	1,00	2,00	0,045	0,030	16,00 - 18,00	10,00 - 14,00	2,00 - 3,00	-	-
TP316L	ASME SA / AS TM A 213	0,035	1,00	2,00	0,045	0,030	16,00 - 18,00	10,00 - 14,00	2,00 - 3,00	-	-

Material grade	Norm	Mechanical properties and heat treatment					
		Rp 0,2 [MPa]	Rp 1,0 [MPa]	Rm [MPa]	A [%]	Härte	Wärmebehandlung
		min.	min.	min. – max.	min	HRB max.	
1.4401	EN 10216-5	205	240	510 - 710	40	-	lösungsgeglüht
1.4404	EN 10216-5	190	225	490 - 690	40	-	lösungsgeglüht
TP316	ASME SA / AS TM A 213	170	-	485	35	90	lösungsgeglüht
TP316L	ASME SA / AS TM A 213	170	-	485	35	90	lösungsgeglüht

Tolerances				
AD - Rohr	AD	WD	special WT	ID
ab Ø4,550 mm	±0,050 mm	±0,150 mm	±0,100 mm	X
ab Ø9,530 mm	±0,050 mm	±0,100 mm	±0,080 mm	±0,050 mm

ab Ø30,001 mm***	±0,100 mm	±0,150 mm	±0,050 mm
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\*\*\* to max. ø44,500 mm

- Tolerances acc. to DIN EN 10305-1 can be confirmed to OD 30mm
- Tolerances acc. to DIN EN ISO 1127 / DIN EN 10216-5 can be confirmed
- Tolerances acc. to ASTM can be confirmed generally

Abmessungsbereich\*

**Abmessungsspektrum**

	WD	[mm]	0,89	1,00	1,20	1,24	1,65	1,82	2,00	2,11	2,30	2,35	2,50	2,60	2,64	2,77	2,87	3,00	3,20	3,25	3,60	3,85	3,91	4,00	4,40	5,50	6,35	7,00
AD		[inch]	0,035			0,048	0,065	0,072		0,083		0,093			0,104	0,109	0,113		0,126	0,128			0,154					0,250
[mm]	[inch]																											
6,00																												
6,35	0,250																											
7,00																												
7,50																												
8,00																												
9,00																												
9,53	0,375																											
10,00																												
11,00																												
12,70	0,500																											
13,00																												
15,00																												
15,88	0,625																											
16,00																												
16,80																												
17,15	0,675																											
18,00																												
19,00																												
19,05	0,750																											
20,00																												
21,34	0,840																											
22,00																												
22,23	0,875																											
23,00																												
25,00																												
25,40	1,000																											
26,00																												
26,67	1,050																											
28,00																												
30,00																												
31,75	1,250																											
32,00																												
33,40	1,315																											
36,00																												
38,10	1,500																											
42,00																												
44,50	1,750																											

