

**Classifications**

EN ISO 17633-A	EN ISO 17633-B	AWS A5.22 / SFA-5.22
T Z19 9 H R M21 (C1) 3	TS 308H-F M21 (C1) 0	E308HT0-4(1)

**Characteristics and typical fields of application**

Rutile flux-cored wire of T Z 19 9 H R / E308HT0 type for welding of austenitic CrNi-steels such as 1.4948 / 304H for elevated service temperatures. The higher carbon content as compared to T 19 9 L R / E308LT1, provides improved creep resistance properties, which is advantageous at temperatures above 400°C. Max. temperature according to the TÜV approval is 700°C. The scaling temperature is approximately 850°C in air. The corrosion resistance is corresponding to the base material 1.4301 / 304, i.e. good resistance to general corrosion. The enhanced carbon content, compared to 308L, makes it slightly more sensitive to intergranular corrosion. Easy handling and high deposition rate result in high productivity with excellent welding performance and very low spatter formation. Increased travel speeds as well as self-releasing slag with little demand for cleaning and pickling provide considerable savings in time and money. The wide arc ensures even penetration and side-wall fusion to prevent lack of fusion. The controlled ferrite content of 3 – 8 FN (measured with FeritScope MP30) offers good resistance to hot cracking and sigma phase embrittlement. The very low bismuth content of < 20 ppm results in excellent elongation and impact toughness also after service at elevated temperatures. The scaling temperature is approximately 850°C in air. For welding in vertical-up and overhead positions, FOXcore 308 H-T1 should be preferred.

**Base materials**

1.4301 X5CrNi18-10, 1.4541 X6CrNiTi18-10, 1.4550 X6CrNiNb18-10, 1.4878 X8CrNiTi18-10, 1.4948 X7CrNi18-9; UNS S30400, S30409, S32100, S34700; AISI 304, 304H, 321, 321H, 347, 347H

**Typical analysis**

	C	Si	Mn	Cr	Ni	FN
wt.-%	0.05	0.5	1.3	19.0	9.7	3 – 8

**Mechanical properties of all-weld metal - typical values (min. values)**

Condition	Yield strength $R_{p0.2}$	Tensile strength $R_m$	Elongation A ( $L_0=5d_0$ )	Impact energy ISO-V KV J
	MPa	MPa	%	20°C
u	370 (≥ 350)	570 (≥ 550)	45 (≥ 30)	85 (≥ 32)

u untreated, as-welded – shielding gas M21 (Ar + 18% CO<sub>2</sub>)

**Operating data**

	<b>Polarity</b>	DC +	<b>Dimension mm</b>
	<b>Shielding gas (EN ISO 14175)</b>	M21, (C1)	1.2
			1.6

Welding with standard GMAW power source with DC+ polarity. No pulsing needed. Backhand (drag) technique preferred with a work angle of approximately 80°. Ar + 15 – 25% CO<sub>2</sub> as shielding gas offers the best weldability. 100% CO<sub>2</sub> can be also used, but the voltage should be increased by 2 V. Suitable gas flow rate is 16 – 25 l/min. The heat input should not exceed 2.0 kJ/mm, the interpass temperature be limited to max. 150°C and the wire stick-out 15 – 20 mm. Post-weld heat treatment generally not needed. In special cases, solution annealing can be performed at 1050°C followed by water quenching.

**Approvals**

TÜV (11179), CE