

**Classifications**

EN ISO 17633-A	EN ISO 17633-B	AWS A5.22 / SFA-5.22
T 23 12 L R M21 (C1) 3	TS 309L-F M21 (C1) 0	E309LT0-4(1)

**Characteristics and typical fields of application**

Rutile austenitic flux-cored wire of T 23 12 L R / E309LT0 type for welding of dissimilar joints of high-alloyed Cr and CrNi(Mo)-steels with unalloyed or low-alloyed steels in flat or horizontal position, as well as the first cladding layer on unalloyed and low-alloyed steels. Especially designed for welding in flat position with Ar + 15 – 25% CO<sub>2</sub> as shielding gas. 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 wire shows good wetting behavior and results in a finely rippled surface pattern. The wide arc ensures even penetration and side-wall fusion to prevent lack of fusion. Suitable for service temperatures down to –60°C. Bismuth-free weld deposit (Bi < 20 ppm) and controlled ferrite content of 12 – 18 FN measured with FeritScope MP30 (stricter on demand) for high temperature service or post-weld heat treatment. For welding in vertical-up and overhead positions, FOXcore 309L H-T1 should be preferred.

**Base materials**

Primarily used for surfacing (buffer layer) unalloyed or low-alloyed steels and when joining non-molybdenum-alloyed stainless and carbon steels. Joints and mixed joints between austenitic steels or mixed joints between austenitic and heat resistant steels with ferritic steels to pressure boiler steels and fine grained structural steels, ship building steels, etc.

**Typical analysis**

	C	Si	Mn	Cr	Ni	FN
wt.-%	0.030	0.6	1.3	23.0	12.2	10 – 19

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

Condition	Yield strength R <sub>p0.2</sub>	Tensile strength R <sub>m</sub>	Elongation A (L <sub>0</sub> =5d <sub>0</sub> )	Impact energy ISO-V KV J	
	MPa	MPa	%	20°C	–60°C
u	390 (≥ 350)	530 (≥ 520)	45 (≥ 30)	70 (≥ 47)	50 (≥ 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

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. Suitable gas flow rate is 15 – 20 l/min. The wire stick-out should be 15 – 20 mm and the heat input not exceed 2.0 kJ/mm. For dissimilar welding, slight weaving is recommended for all welding positions. Post-weld heat treatment generally not needed. For constructions that include dissimilar welding of low-alloyed steels, a stress-relieving annealing stage may be advisable. Always consult the supplier of the parent material or seek other expert advice to ensure that the correct heat treatment process is carried out. Preheat and interpass temperatures as required by the base metal.

**Approvals**

CE