

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 flux-cored wire of T 23 12 L R / E309LT0 type for welding of dissimilar joints of Cr and CrNi(Mo)-steels and unalloyed or low-alloyed steels, as well as weld cladding of unalloyed or low-alloyed base metals preferably in flat or horizontal position. Ferrite measured with FeritScope MP30 14 – 22 FN. 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 from –60°C to 300°C. The scaling temperature is approximately 1000°C in air. For welding in vertical-up and overhead positions, FOXcore 309L-T1 should be preferred.

Base materials

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

Typical analysis

	C	Si	Mn	Cr	Ni	FN
wt.-%	0.03	0.7	1.4	23.0	12.5	12 – 23

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	–60°C
u	400 (≥ 320)	540 (≥ 520)	33 (≥ 30)	50	40 (≥ 32)

u untreated, as-welded – shielding gas M21 (Ar + 18% CO₂)

Operating data

	Polarity	DC +	Dimension mm
	Shielding gas (EN ISO 14175)	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% CO₂ offers the best weldability. 100% CO₂ can be also used, but the voltage should be increased by 2 V. Suitable gas flow rate for welding outdoors is 15 – 20 l/min. Suggested heat input is max. 2.0 kJ/mm and wire stick-out 15 – 20 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

TÜV (05350), DB (43.014.16), DNV GL, LR, RINA (M21 + Ø 1,2 mm), BV (C1 + Ø 1,2 mm), CE