G-TECH 312

SMAW

AUSTENITIC STAINLESS STEELS
312

DESCRIPTION

Rutile-basic coated electrode for similar steels, medium and high carbon hardenable steels

This alloy gives a two-phase weld deposit with substantial percentages of ferrite in an austenite matrix. Even with considerable dilution the microstructure remains two-phase and thus highly resistant to weld metal cracks and fissures. Weld deposit is work hardenable and gives good wear resistance. Applications include tool steels, shafts, gear teeth, free-cutting steels, unknown specification steels, dissimilar alloy combinations and buffer layers. Excellent weldability with a spatter free arc and self-releasing slag result in a very smooth bead appearance.

SPECIFICATIONS

ISO 3581-A	E 29 9 R 32	AWS A5.4	E312-16
DIN	-	Werkstoff Number	-
Certifications	-	Shielding	-
Positions	PA, PB, PC, PD, PE, PF	Current	DC+, AC

ASME QUALIFICATIONS

F-No (QW432)	5
A-No (QW442)	8

FERRITE

% 40

PREN

29

HARDNESS

300HV

CHEM. COMP. %

	DEFAULT
C	0.09
Mn	1
Ni	10
Cr	29
P	0.02
S	0.01
Si	1.15
Cu	0.2

MECHANICAL PROPERTIES

	MIN	VARIANT
Tensile strength R_m MPa	650	700
Yield strength $R_{p0.2}$ MPa	450	600
Elongation A (L_0=5d_0) %	15	22
Impact Charpy ISO-V	-	30J @ 20°C
Impact Charpy ISO-V	-	-

WELDING PARAMETERS

	2 mm	2.5 mm	3.2 mm	
Ampere	35A - 50A	50A - 80A	80A - 110A	110A -
Voltage	-	-	-	
Packaging	88 pcs/kg	56 pcs/kg	28 pcs/kg	18 p
Packaging Type	Carton box	Carton box	Carton box	Carto

312

DESCRIPTION

APPLICATION

Suitable for welding medium and high carbon hardenable steels, including those with known or unknown specifications like tool steels, shafts, gear teeth, free-cutting steels, dissimilar alloy combinations, buffer layers, overlays, etc. The welding material, featuring a high alloy and high ferrite content (40-50FN), exhibits exceptional tolerance to dilution on a wide range of hardenable and alloy steels, often requiring minimal or no preheat. It is effective for welding free-cutting steels or those with a low Mn:S ratio, especially below 20, preventing hot cracking due to liquation at the fusion boundary. The resulting weld deposit work-hardens, offering excellent wear and friction resistance. It is useful for corrosion resistance and high-temperature scaling up to about 1000°C. However, it's not recommended for structural applications above 300°C or for welds that undergo post-weld heat treatment due to potential embrittlement. Additionally, it is not suitable for filling up heavy joints, sub-zero applications, or situations requiring high notch toughness.

ALLOY TYPE

Austenite-ferrite weld metal composition of nominally 29%Cr-9%Ni for dissimilar joints and difficult to weld steels.

MICROSTRUCTURE

Duplex austenite-ferrite microstructure with about 40% ferrite.

MATERIALS

Medium and high carbon hardenable steels, tool steels and free-cutting steels.

WELDING & PWHT

The procedure is contingent upon the base material. Preheating is generally unnecessary for small components and buffer layers; however, it is advisable for thicker high-carbon steels to prevent potential Heat-Affected Zone (HAZ) quench cracking and regulate peak hardness, typically in the range of 100-250°C. Despite the excellent high-temperature oxidation resistance of 29%Cr-9%Ni alloys, it's crucial to note that duplex high ferrite weld metal may experience 475°C embrittlement above approximately 300°C and sigma embrittlement at elevated temperatures. Consequently, this alloy is not employed in applications involving high-temperature structural service or Post Weld Heat Treatment (PWHT).