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

EN ISO 3581-A	E 29 9 R 32	**AWS A5.4**	E312-16
Shielding	-	**Positions**	PA, PB, PC, PD, PE, PF
Current	DC+, AC	**Packaging Type**	Carton box

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. PER STANDARD	PRODUCT
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

	2.0 mm	2.5 mm	3.2 mm	4.0 mm
Ampere	35A - 50A	50A - 80A	80A - 110A	110A - 150A
Voltage	-	-	-	-
Packaging	88 pcs/kg	56 pcs/kg	28 pcs/kg	18 pcs/kg
Packaging Type	Carton box	Carton box	Carton box	Carton box

NOTES

Pcs/kg is indicative, actual number may vary ± 5%.

312

DESCRIPTION

APPLICATION

Designed for welding hardenable steels with medium and high carbon content, with or without specific requirements, such as tool steels, shafts, gears, free-cutting steels, dissimilar alloys, bearing layers, overlays, and other similar applications. The combination of high alloy content and ferrite (40-50 FN) ensures exceptional tolerance to dilution across a wide range of hardenable steels and alloys, even with minimal or no preheat. It is particularly effective for welding free-cutting steels or steels with a low Mn:S ratio (especially if <20), where other welding solutions may not prevent hot cracking due to boundary liquation in the fusion zone. The weld deposit is prone to work hardening, providing excellent wear and friction resistance. It is also effective against corrosion and high temperatures up to about 1000 °C. However, it is not recommended for structural applications above 300 °C or for welds requiring post-weld heat treatment due to the risk of embrittlement. Not indicated for heavy joint filling, nor for sub-zero applications where high notch toughness is required.

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 varies based on the base material. Preheat is generally not necessary for small components and bearing layers, but is recommended for thicker high carbon steels to prevent quench cracking in the HAZ and to control maximum hardness, between 100-250 °C. Although 29.9 alloys offer good high-temperature oxidation resistance, the high ferrite content weld metal is susceptible to 475 °C embrittlement at temperatures above 300 °C and sigma phase embrittlement at high temperatures. Therefore, this alloy is not suitable for high-temperature structural applications or where PWHT is expected.