HYUNDAI WELDING

Rev. 03

ST-2209

AWS A5.9 ER2209
JIS Z3321 YS2209
EN ISO 14343-A - W 22 9 3 N L

HYUNDAI WELDING CO., LTD.

❖ Specification

AWS A5.9	ER2209
JIS Z3321	YS2209
EN ISO 14343	W 22 9 3 N L

❖ Applications

Welding of UNS S31803, S32205
(Independent water power plant)

❖ Characteristics on Usage

1.Weld metal has 30~60% ferrite contents
2. Due to the high chromium contents, corrosion resistance is excellent in most environments(chloride enviroment)
3. Superior pitting resistance(PREN ≥34)

❖ Shielding gas

100% Ar

❖ Polarity

GTAW : DC-

❖ Packing

ST-2209	TIG	Size	2.4mm X 1000mm (3/32in X 39in)
		Weight	5kg (11lbs)

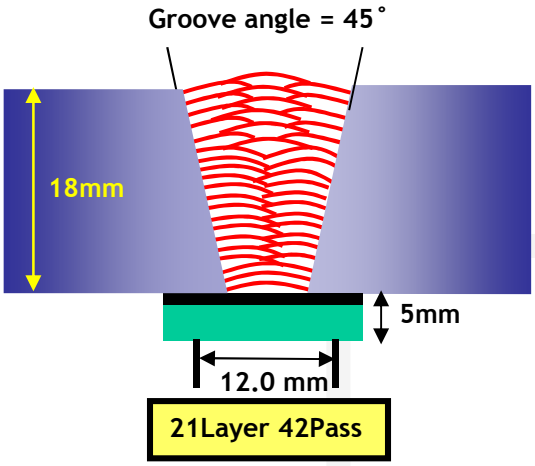
❖ Approval

DNV, LR

1. Mechanical Properties & Chemical Composition of All-Weld Metal (GTAW)

❖ Welding Conditions

Method by AWS Spec.



Size(mm)	:	2.4mm
Shielding gas	:	100% Ar
Flow(ℓ /min.)	:	15~20
Ampere/Voltage	:	150~160A/13~14V
Speed(cm/min.)	:	12.4~14.1
Heat input(KJ/cm)	:	5.0~15.0

Base metal: UNS S31803

1-2 Chemical composition of the wire (wt%)

C	Si	Mn	P	S	Ni	Cr	Mo	Cu	N
0.018	0.47	1..68	0.014	0.001	8.75	22.90	3.20	0.09	0.17
≤0.03	**≤0.9**	**0.5~ 2.0**	**≤0.03**	**≤0.03**	**7.5~ 9.5**	**21.5~ 23.5**	**2.5 ~3.5**	**≤0.75**	**0.08 ~0.2**
AWS A5.9 ER2209									

1-3 Chemical composition of All weld metal (wt%)

C	Si	Mn	P	S	Ni	Cr	Mo	Cu	N2	PREN
0.020	0.38	1.68	0.020	0.005	8.31	22.7	3.11	0.03	0.13	35.04

*** PREN = Cr + 3.3×Mo + 16×N**

1-4 Radiographic Test

Consumable	Specification	Accepted	Rejected
ST-2209	AWS A5.4	O	

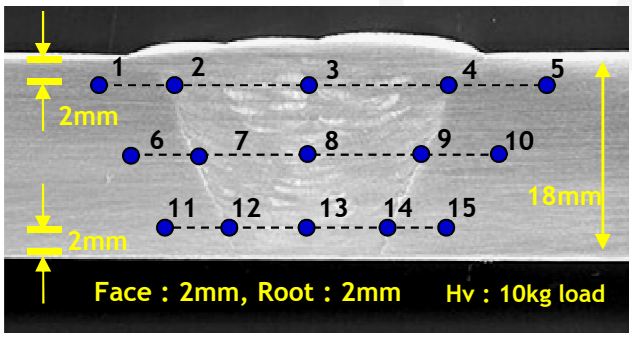
1. Mechanical Properties & Chemical Composition of All Weld Metal (GTAW)

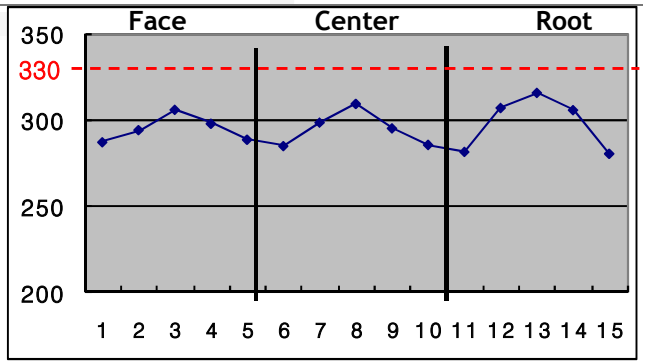
1-5 Mechanical properties of All-weld metal

Tensile Test		
T.S. MPa (ksi)		EL. (%)
813 (118)		27
AWS A5.4 E2209	≥690	≥20

CVN Impact test Joule (ft·lbs)				
℃ (°F)	X1	X2	X3	Avg.
−20 (−4)	192 (142)	166 (122)	222 (164)	195 (144)
−50 (−58)	182 (134)	188 (139)	172 (127)	180 (133)

1-6 Vickers hardness test(H_V :10kg)



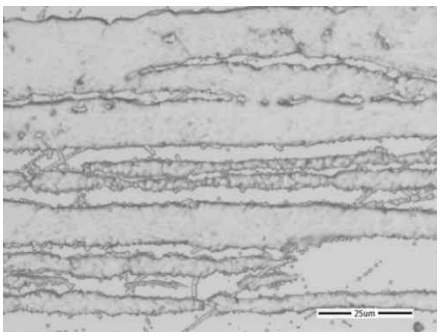


H_V10, Vickers hardness test							
1	2	3	4	5	6	7	8
286.9	294.0	305.9	297.8	288.5	284.7	298.46	309.32
9	10	11	12	13	14	15	
295.06	285.4	281.3	307.0	315.8	305.7	280.3	

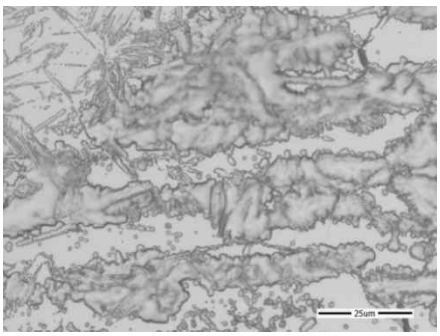
1. Mechanical Properties & Chemical Composition of All Weld Metal (GTAW)

1-7 Ferrite content of weld metal

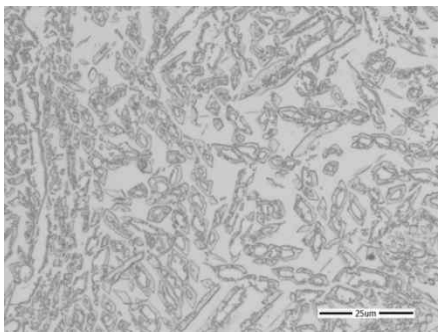
Consumable	Shaeffler	WRC(1992)	ASTM E562
ST-2209	55.1	66.7	40.1



Base Metal

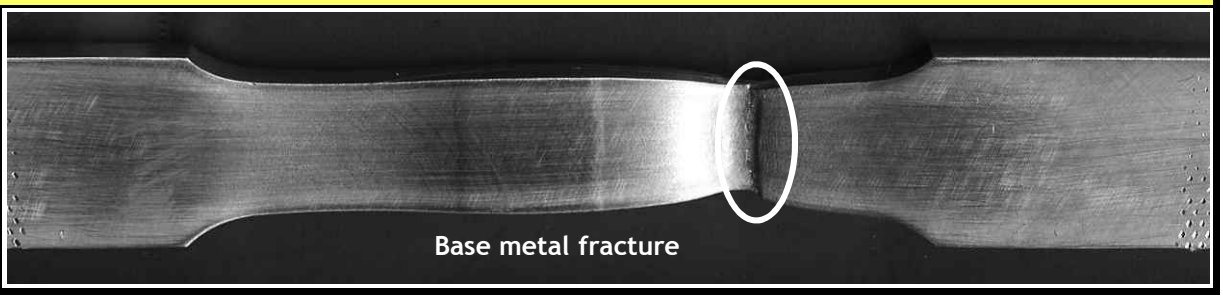


HAZ



Weld Metal

1-8 Mechanical properties of weld metal(Butt welding)

Transeverse tensile test (ASME Sect. IX QW-150), Base metal : UNS S31803	
Flat (1G)	

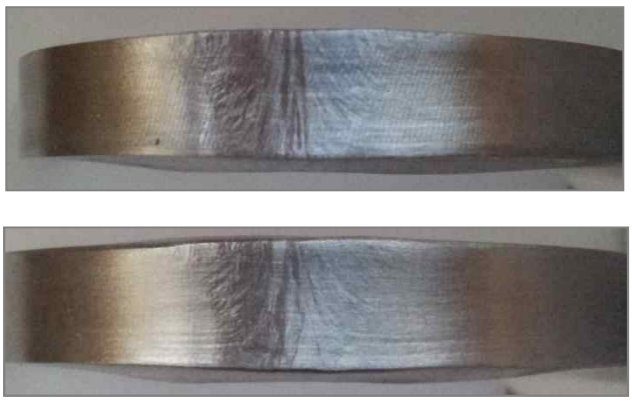
1. Mechanical Properties of Butt Weld Metal (GTAW)

1-9 Bending test

● Transverse Bending Test (Face, Root, Side)

Face (Non-Crack)

Root (Non-Crack)



Side (Non-Crack)

1-10 Ferric Chloride Pitting Test (ASTM G48 Method A)

Consumable	Specimen Weight(g)		Weight loss(g)	Remark (Pitting)
	Before	After		
ST-2209 (1G)	116.0912	116.0906	0.0006	No Pitting

* Temperature : 25℃±, Period : 24Hr

Before

After