WELDING AND NDT

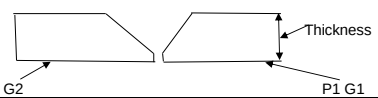
QW-482 WELDING PROCEDURE SPECIFICATION (WPS)

(See QW-200.1,Section, IX, ASME Boiler and Pressure Vessel code)

PW.P.S. NO. : GS-001			Supporting PQR(s)	To be Qualified
Revision No.:	0	Welding Process(es):	GTAW + SMAW	
Date:	30/04/2019	Type(s):	MANUAL + MANUAL	
Equipment Name:	Applicable only for qulaification of PQR No 001		Joint Type:	GROOVE/FILLET

JOINTS (QW-402)

.1 Ø Joint Design:	Refer Typical	Typical:	
.5(a) + Backing: (Yes/No)	No		
.5(b) Backing Material (type):	NA		
.10 Ø Root Spacing	2~4 mm		
.11 ± Retainers :	NA		
Root face & Included Angle:	1-1.5 mm & 60°	P1 G2	P1 G1



BASE METALS (QW-403)

	MATERIAL - 1		MATERIAL - 2	
.11 Ø P.NO.:	1	P.NO.:	1	
.5 Ø Group No.:	2	Group No.:	1	
Specification/Grade:	SA 516 Gr 70	Specification/Grade:	SA 516 Gr 60	
.8 Thickness Range : (mm)				
a) Base Metal	Groove : 5-32	Fillet : NA	Tubesheet: NA	
b) Pipe Dia Range	Groove : ALL	Fillet : ALL	Ligament: Width : NA	
Overlay thickness (Min):	NA	Tube thickness: NA		
.9 t Pass<12.7 mm	NONE	.6 T Limits :	NA	

FILLER METALS (QW-404)

	ROOT PASS	FILL UP PASS(es)	COVERING PASS(es)
.4 Ø F.NO.:	6	6 + 4	4
.5 Ø A.NO.:	1	1 + 1	1
Spec No.(SFA):	5.18	5.18 + 5.1	5.1
.12 & .33 Ø AWS No.(Class):	ER70S-2	ER70S-2 + E7018	E7018
.3 Ø Size of Filler Metal (mm):	2.4/2.5	2.4/2.5 + 3.2,4.0	4
.23 Ø Filler Metal Product Form:	SOLID (BARE) WIRE	SOLID (BARE) WIRE + NA	NA
.50 ± Flux :	NA	NA + NA	NA
.14± Filler :	WITH ADDITION ONLY	WITH ADDITION ONLY + NA	NA
Flux Trade Name:	NA	NA + NA	NA
.22 ± Consumable Insert:	NA	NA + NA	NA

.30 Ø Weld Metal Thk Range:	GTAW UPTO 06 mm(MAX) SMAW UPTO 10 mm (MAX)
Chemical Composition:	NA
Brand Name/ Batch No:	GTAW WIRE OF APPROVED BRAND & E7018 OF APPROVED BRAND TO BE USED
Other :	NA

POSITIONS (QW-405)

.1 + (a) Position(s) of Groove :	ALL
.2 & .3 Ø Welding Progression :	VERTICAL UPHILL
.1 + (b) Position(s) of Fillet :	ALL
Other:	NA

PREHEAT (QW-406)

Thickness Range (mm)	≤25 >25-38
.1 Preheat Temp (MIN)° C :	25 100
.3 Interpass Temp (MAX)° C:	275 275
Preheat Maintenance :	NA
Method of measuring .1 & .3	Temperature indicating crayon / Laser gun

POSTWELD HEAT TREATMENT (QW-407)

.1 Ø Type of PWHT:	NONE
.2 (a) Temperature Range :(°C)	NA
.2 (b) Time Range:(Minute)	NA
Method of PWHT:	NA
.4 T Limits	NONE
Rate Of Heating:(°C/hr)	NA
Rate Of Cooling:(°C/hr)	NA
Others :	NA

ELECTRICAL CHARACTERISTICS (QW-409)

.4 (a) Ø Current (AC or DC):	SEE BELOW
.4 (b) Ø Polarity (EN or EP):	SEE BELOW
.8 (a) Ø Amperes (Range):	SEE BELOW
.8 (b) Ø Voltage (Range):	SEE BELOW
.12 Ø Tungsten Type:*	2% Thoriated Size (mm): 2.4 mm OR EQUI
.1 > Heat Input :	NA
.3 ± Pulsing Current :	NA
Others :	NA

GAS (QW-408)

	.2 (a) Ø Gas(es)	.2(b) Ø Mixture & .2 © Ø % Composition	.3 Ø Flow rate (LPM)
.2d ± Shielding Gas:	ARGON	SINGLE (NO CHANGE IN COMPOSITION)	5~15
.5 ± Backing Gas or Ø Backing Flow:	NA	NA	NA
.1 ± Trailing Gas or Ø Comp:	NA	NA	NA
.9 - Backing Gas or Ø Comp :	NONE	NONE	NA
.10 Ø Shielding Trailing gas :	NONE	NONE	NONE

TECHNIQUE (QW-410)

.1 Ø String/Weave Bead:	STRING/WEAVE @	.3 Ø Gas Cup Size: (mm)	6.3 mm Dia or EQUI
.15 Ø Electrode Spacing :	NA	.11 Ø Closed to out Chamber :	NONE
.10 Ø Multiple/Single Electrode:	SINGLE	.9 Ø Multi/Single pass (per side):	MULTI PASS
.7 Ø Oscillation:	NA	.26 ± Peening:	NA
.5 Ø Initial or Interpass Cleaning:	WIRE BRUSH OR GRIND/MACHINED ;SURFACE TO BE GROUND OR POWER WIRE BRUSHED OR MACHINED		
.6 Ø Method of Back Gouging:	BY GRINDING IF REQUIRED		
.25 Ø Manual or Automatic	Manual		
.64 Ø Use of Thermal Process :	NONE		
Others :	NA		

Weld Layer(s)	Process	Filler Metal Classification	Filler Metal Dia. (mm)	Current Type & Polarity	Current Amp. (Range)	Volt (Range)	Travel Speed (mm/min)	Energy or Power (Range)	Maximum Heat Input (KJ/mm)	Minimum Bead Length (mm)
AS REQ	GTAW	ER70S-2	2.4/2.5	DCEN	80-150	10-18	AS PER PQR	NA	NA	NA
REMAINING	SMAW	E7018	3.2	DCEP	100-140	22-28	AS PER PQR	NA	1.5	150
REMAINING	SMAW	E7018	4.0	DCEP	150-180	22-28	AS PER PQR	NA	1.5	180

*Tungsten electrode can be identified as : 1)EWTh-2 or WT 20(Red Colour)

NA : NOT APPLICABLE NONE : ESSENTIAL VARIABLE BUT NOT USED

Legend :

+ Addition > Increase/greater than ↑ Uphill ← Forehand ø Change

-Deletion < Decrease/less than ↓ Downhill → Backhand

PEPARED BY: WELDING ENGINEER	REVIEWED BY: WELDING MANAGER	APPROVED BY: CLIENT/CUSTOMER/TPI
NAME:	NAME:	NAME:
DATE:	DATE:	DATE:

ASME DESIGNATOR

☑ REQ.

☐ NOT REQ.