BIT Inspection Technology

(NDT/ Welding Consultancy/ Third Party Inspection)

www.bitndtindia.com

BIT proudly informs the 3 days (24th , 25th and 26th of every month) Hands-on-Training @ BIT Inspection Technology, Chennai.

- How to prepare Proposed Welding Procedure Specification (pWPS),
  - Selection of consumable based on base material to be joined
  - Selection of Joint Design
  - Selection of welding process
  - Welding parameters
  - Welding technique
  - Other essential variable, supplementary variables, non-essential variables involved in the welding procedure qualification
- How to perform Welding Procedure Qualification Record (PQR)
- How to prepare Welding Procedure Specification (WPS) from existing qualified PQR
- How to prepare Welding Procedure Specification (WPS) from pre - qualified PQR
- How to perform welder qualification test (WQT)

All the above practice based on International code

- ASME IX
- AWS D1.1
- API 1104

Hand on training conducted at BIT Inspection Technology, Chennai

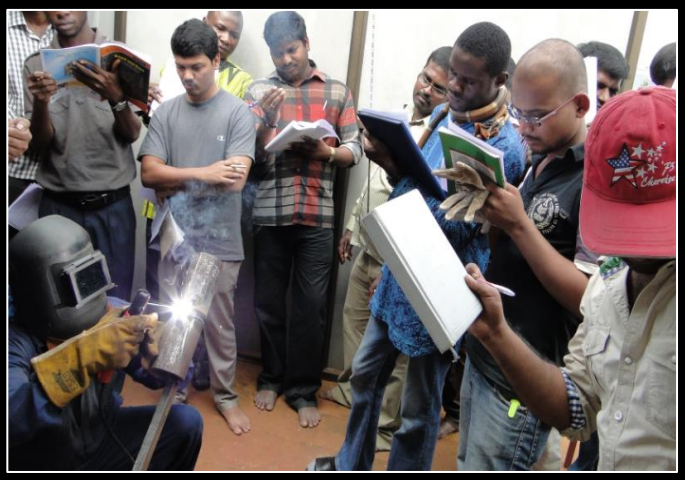
BIT Inspection Technology focus with sincerity and authentic approach in giving new dimension to NDT / Welding Inspection Training








Hand on training conducted at BIT Inspection Technology Workshop, Chennai

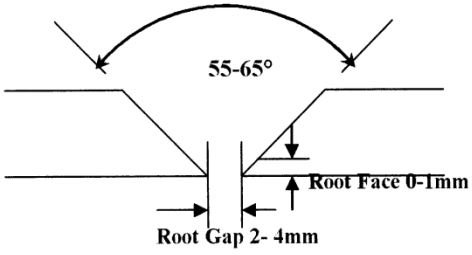


Sample Proposed welding Qualification Record (PWPS)

Sonamet, Lobito, Angola	WELDING PROCEDURE SPECIFICATION N° pWPS-VG-500 REV. 0 (Supported by PQR –)	VG – Kizomba Satellites

01. Scope of work	: **Full Penetration butt welds on 25% Cr Super Duplex Pipe.**	11. Position of welding	: 6G, with Vertical Up Progression .
02. Design codes and spec.	: ASME IX & E168-SZK-0003	12. Number of welders	: 1
03. Material grades and spec.	: UNS 32760	13. Line-up clamp or tacking	: Bridge pieces shall be from same parent material, tack welded **within** the prep and progressively removed as welding continues.
04. Wall thickness	: 14.3mm	14. Removal of line-up clamp	: N/A
05. Diameter	: 168.3mm	15. Cleaning	: Power grinding and / or brushing.
06. Welding process and procedure	: GTAW	16. Preheat temperature	: Ambient temp, Dry only.
07. Type of joint	: Full Penetration single vee butt weld	17. Time lapse between passes.	: N/A
08. Number of Passes	: As per Typical Attached Sketch	18. Inter pass temperature	: 100°C Maximum, measured by thermometer.
09. Sequences	: According to sketch	19. Welding Interruption.	: N.A
10. Current – Polarity	: DC-ve GTAW	20. Tungsten	: 2% Thoriated, 2.4/3.2mm Dia
		21. Backpurge Quality	: Max O2 Content – 0.05%

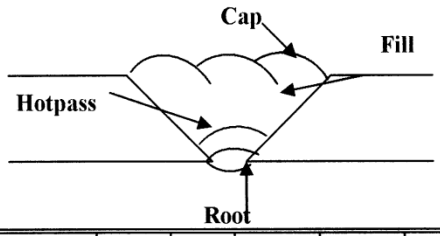
WELDING PREPARATION



WELDING SEQUENCES SKETCH

TYPICAL

Weld Cap Reinforcement – 3mm Max.



Welding Process	Pass N°	Consumable Type	AWS Classification	Dia. (mm)	Arc Voltage (V)	Amperage (A)	Wire Speed (m/min)	Stick-out (mm)	Travel Speed (cm/min)	Max weave Width (mm)	Gas Type (Shield)	Gas flow (l/min) (Shield)	**Gas Type & flow (l/min) (Purge)	Direction	Heat Input (Kj/mm)
GTAW	R	Sandvik 25.10.4.L	2594	2.4	9-12	90-110	N/A	N/A	4.5-9.0	N/A	Argon 99.998%	12-15	Argon 98%.2%N 18-20	↑ →	0.8-1.4
	HP	«	«	2.4	10-13	110-130	N/A	N/A	4.5-10	N/A	«	«	«	↑ →	0.9-1.5
	Fill	«	«	3.2	10 - 13	110-155	N/A	N/A	4.5- 12	N/A	«	«	«	↑ →	0.9-1.5
	Fill /Cap	«	«	3.2	10 - 13	135-155	N/A	N/A	6 – 10.5	N/A	«	«	«	↑ →	0.9-1.5

Notes :-

1. Back purge is Argon / Nitrogen in a 98% Argon / 2% Nitrogen Mix.
2. Back purge to remain until a minimum of 8mm weld metal is deposited.
3. Stringer beads only. Minor oscillation to ensure side wall fusion is permitted.

	For Sonamet	For Vetco Gray	For Company

Sample Procedure Qualification Record (PQR)

WELD PROCEDURE QUALIFICATION RECORD

(Page 1 of 3)

Materials Engineering

COMPANY: Stolt Offshore Limited
Bucksburn House
Howes Road
Bucksburn
Aberdeen

M.E.L. REF: MPQ 50185
DATE: 7/12/2004

PQR NUMBER: SON-PQR-521
SPECIFICATION: ASME IX & E124-SZK-0003
JOINT TYPE: Single Vee Butt Weld

BASE METALS

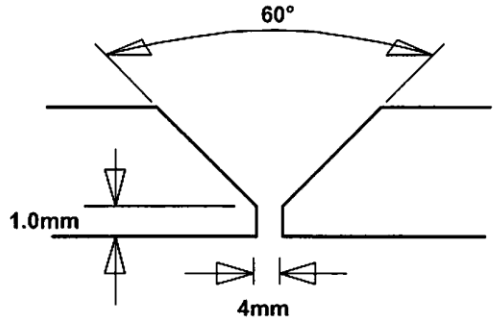
SPECIFICATION:	API-5L-X52	**TO**	API-5L-X52
ASME P NUMBER:	S1	**TO**	S1
ASME GROUP NUMBER:		**TO**	
EN GROUP NUMBER:		**TO**	
THICKNESS(ES) (mm):	14.3	**TO**	14.3
DIAMETER(S)(mm):	168.3	**TO**	168.3

WELDING PROCESS(ES)

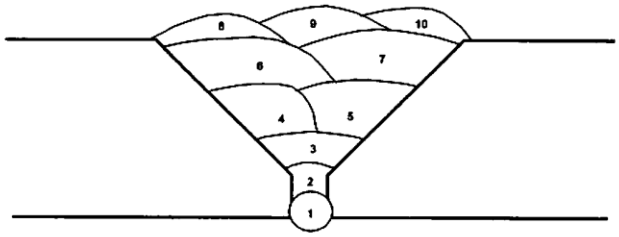
PROCESS 1: GTAW

PROCESS 2: SMAW

JOINT DETAILS



RUN SEQUENCE



WELDING DETAILS / TECHNIQUE

WELDING POSITION:	6G
WELD PROGRESSION:	Vertical Up
STRING / WEAVE:	Stringer bead
JOINT PREPERATION:	Machine/Flame Cut/Grind
INTER RUN CLEANING:	Wire Brush/Grind
GOUGING METHOD:	N/A
LEG LENGTH (mm):	N/A
THROAT THICKNESS (mm):	N/A
TUNGSTEN TYPE/SIZE(mm) :	2% Thoriated / 2.4

SHIELDING

	SHIELDING GAS	BACKING GAS
TYPE:	Argon	N/A
FLOW RATE (l/min):	12-15	N/A
COMPOSITION:	Argon 99.998%	N/A

PRE-HEAT

METHOD: Propane Gas Torch

MIN TEMPERATURE (°C): 100
MAX INTERPASS TEMP (°C): 250
CONTROL METHOD: Tempilstick / Digital Pyrometer

POST WELD HEAT TREATMENT

METHOD: Not applicable
TEMPERATURE CONTROL:
RATE OF RISE (°C/HR): **FROM** °C
SOAK TEMPERATURE (°C):
SOAK TIME (Hrs):
COOLING RATE/METHOD: **DOWN TO** °C

MATERIALS ENGINEERING LIMITED

SIGNED: G Morrice
DATE: 15/12/2004
CB/VB: Greg Morrice / Jason Craig

CERTIFYING AUTHORITY

SIGNED:
DATE: 17/12/04

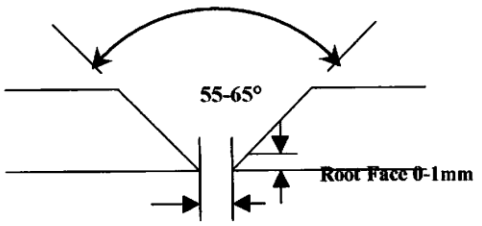
Sample Welding Procedure Specification (WPS)

Sonamet Lobito,Angola	WELDING PROCEDURE SPECIFICATION N° WPS-MON-500 REV. 0 (Supporting PQR : GTA-555)	Kizomba 'C' Mondo Manifolds

01. Scope of work	: **22% CR Duplex Fabrication.**	11. Position of welding	: All Positions with Vertical Up Progression
02. Design codes and spec.	: ASME IX	12. Number of welders	: 1 or 2
03. Material grades and spec.	: UNS S31803 and equivalent Pipe & Fittings.	13. Line-up clamp or tacking	: Bridge pieces shall be from same parent material, tack welded **within** the prep and progressively removed as welding commences.
04. Wall thickness	: 10-30mm	14. Removal of line-up clamp	: N/A
05. Diameter	: All	15. Cleaning	: Power grinding and / or brushing.
06. Welding process and procedure	: GTAW	16. Preheat temperature	: Ambient (Dry Only) Measured by Thermometer.
07. Type of joint	: Full Penetration single vee butt weld	17. Time lapse between passes.	: N/A
08. Number of Passes	: As per Typical Attached Sketch	18. Inter pass temperature	: 150°C Maximum Measured by Thermometer.
09. Sequences	: According to sketch	19. Welding Interruption.	: Continuous welding where possible, however a minimum one third weld volume to be deposited prior to any interruption.
10. Current – Polarity	: DC-ve Root, Fill & Cap	20. Tungsten	: 2% Thoriated & 2.4mm Dia
		21. Backpurge Quality	: Oxygen content prior to and during welding to be 0.05% (500ppm) Max measured by a suitable purge monitor.

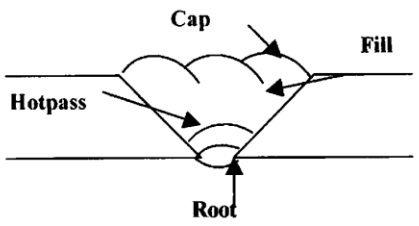
WELDING PREPARATION

TYPICAL



WELDING SEQUENCES SKETCH

TYPICAL



Welding Process	Pass N°	Consumable Type	AWS Classification	Wire dia. (mm)	Arc Voltage (V)	Amperage (A)	Wire Speed (m/min)	Stick-out	Travel Speed (cm/min)	Max weave Width (mm)	Gas Type	Gas flow (l/min) (Shield)	Gas flow (l/min) (Purge)	Direction	Heat Input (Kj/mm)
GTAW	R	Sandvik	25.10.4.L	2.4	9 - 11	95 - 115	N/A	N/A	5.5 – 7.5	N/A	Argon 99.98% HP	12-15	16-18	↑→	0.9 - 1.4
	HP	«	22.8.3.L	2.4	10 - 12	120 - 130	«	«	7.5 – 9.0	N/A	«	«	«	↑→	0.9 - 1.4
	FILL/ CAP	«	«	3.2	10 - 13	140 - 165	«	«	8.0 - 13	N/A	«	«	«	↑→	0.8 - 1.5

	For Sonamet		
Name : Date : Signature :	Richard Bews 05.10.06 Abergy UK Limited RICHARD BEWS SENIOR WELDING ENGINEER		

Sample Welder qualification Test Record

GTAW – DUPLEX

Lamprell

WELDER QUALIFICATION RECORD

NAME : Viswanathan
WELDER ID NO. : 410
QUALIFICATION DATE : 29/12/04
WELDING PROCESS / TYPE : GTAW
WELDING PROCEDURE NO. : WPS 251

PARAMETERS

VARIABLE	TEST CONDITIONS	QUALIFICATION RANGE
Base Metal	ASTM A316l (P8)	P1 to P11, P34, P41 to P47
Material Thickness	25mm	Unlimited
Weld Deposit Thickness	25mm(Multipass)	Unlimited
Pipe Diameter (OD)	6"	2 7/8" to Unlimited
Welding Position	6G	All position
Progression	Uphill	Uphill
Backing	Yes - Inert gas	With Inert gas backing
F. No.	N/A	N/A
AWS Class	N/A	N/A
Electrode (Single or Multiple)	Single	Single
Current (AC / DC)	DC	DC
Polarity	SP	SP
Gas Composition	98%Ar + 2%N_2	98%Ar + 2%N2
Code	ASME IX	ASME IX
Other	Solid wire - Metrode Zeron 100X	Solid or Metal cored wire - Metrode Zeron 100X

INSPECTION / TESTING

NON-DESTRUCTIVE EVALUATION

VISUAL - ACCEPTABLE
RT / UT - ACCEPTABLE
Report No. & Date - 3L-10485/RT/06 / 29.12.04
Accepted by - Prasannan
Organisation - EIL

DESTRUCTIVE TESTING

SIDE BEND	N/A	TRANSVERSE TENSILE	N/A
ROOT BENDS	N/A	HARDNESS SURVEY	N/A
FACE BENDS	N/A	NICK BREAK	N/A
IMPACT TESTS	N/A	FILLET WELD BREAK TEST	N/A
MACRO SECTION	N/A	OTHERS	N/A

We certify that the statement in this record is correct and that the test welds were prepared, welded and tested in accordance with above cognisant code.

Lloyd's Register EMEA
Dubai Office

Training Faculty

***R.Baskar**, AMIE (Mech),*

ASNT NDT Level III (RT, UT, PT, MT,VT& ET)
PCN NDT level 3 RT,PT,MT,UT , Level 2
AWS - SCWI
CSWIP 3.2
Managing Director – BIT Inspection Technology
NDT consultancy – GE Oil & Gas, Norway
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*Now BIT Inspection Technology proudly announces that, the **weld defect specimens and Radiographic films are developed to the customer requirement.** Our specimens and radiographic reference films are used worldwide*

WHO SHOULD ATTEND?

All personnel responsible for making decisions, exercising judgments applicable to welding operations in power generation, petrochemical, oil and gas, fertilizer, shipbuilding and maintenance, structural fabrication, offshore & onshore structure fabrication, etc.....

- **Engineer & Inspectors**
- **Quality Control Engineers & Supervisors**
- **Quality Assurance Engineers & Supervisor**
- **Technical Services Engineers & Supervisor**
- **Erection & Construction Engineers & Supervisor**
- **Fabrication Engineers & Supervisor**
- **Chartered Engineers**
- **Engineering and Welding Consultancy**
- **Experienced Welder**
- **Experienced Fabricator**

Exchange experience through Case studies