



Larsen & Toubro Limited

AFC PROJECT

NFL-PANIPAT



नेशनल फर्टिलाइजर्स लिमिटेड  
NATIONAL FERTILIZERS LIMITED

OWNER: M/s NATIONAL FERTILIZERS LIMITED

QW-482 WELDING PROCEDURE SPECIFICATION  
ASME SEC.IX, BOILER & PRESSURE VESSEL  
CODE

PMC



PMC: PDIL

CONTRACTOR: L&T

SUPPORTING PQR No.:6922/ L&T/HGU/PQR/P-12

DATE : 15.02.2010

REV.

0

WPS No. : WPS/PIPE/007

DATE : 22.06.2011

REV.

0

WELDING PROCESS : GTAW+SMAW

TYPE

MANUAL - MANUAL

JOINTS(QW-402)

JOINT DESIGN

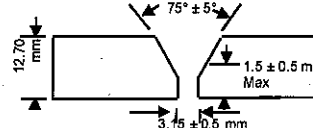
AS PER SKETCH

BACKING USED

NA

BACKING MATERIAL

NA



BASE METALS(QW403)

POST WELD HEAT TREATMENT (QW-407)

MATERIAL SPEC

A 335 Gr P 22

TEMPERATURE RANGE

705°C TO 760°C

TYPE OR GRADE

A 335 Gr P 22

TIME (Min.)

2 Hrs

Q.O. TO P.NO.

5A to 5A

HEATING/COOLING RATE

100°C + 10°C

THICKNESS RANGE(GROOVE)

5.0 MM TO 25.40 MM

GAS(QW-408)

THICKNESS RANGE(FILLET)

ALL THICKNESS

PIPE DIA. RANGE(GROOVE)

ALL SIZE

PERCENT COMPOSITION

PIPE DIA. RANGE(FILLET)

ALL

GASES

MIXTURE

FLOW RATE

FILLER METAL(QW-404)

SHIELDING (GTAW)

Argon

99.995%

12 - 14 LPM

GTAW

SMAW

PURGING

Argon

99.995%

08 - 10 LPM

SFA SPEC.

5.28

5.5

AWS CLASS.

ER-80S B3L

E 8018 B3L

BACKING

NA

NA

NA

F-NO

6

4

ELECTRICAL CHARACTERISTICS (QW-409)

A-NO

4

4

CURRENT

DC

POLARITY

EN(GTAW) & EP(SMAW)

SIZE OF FILLER METAL \*\*

2.4MM

2.5,3.15,4.0 MM

AMPS

99 - 130A

VOLTS

9 - 10V & 19 - 23V

DEPOSITED WELD METAL

5.0 MM

7.7 MM + Reinforcement

THK

10 MM

15.4MM + Reinforcement

TUNGSTEN SIZE & TYPE

2.4MM

THICKNESS RANGE FOR GROOVE

ALL THICKNESS

ALL THICKNESS

MODE OF METAL TRANSFER

Spray / Globular

THICKNESS RANGE FOR FILLET

WIRE FEED SPEED RANGE

NA

OTHER

NA

POSITION(QW-405)

TECHNIQUE (QW-410)

POSITION OF GROOVE

ALL POSITION

TRAVEL SPEED (mm / min.)

53-88 MM/MIN

WELDING PROGRESSION

UP HILL

STRING OR WEAWE

Root String, Subsequent Pass weave

POSITION OF FILLET

ALL POSITION

OSCILLATION (Max.)

2.5 TO 3 TIMES OF THE DIA OF FILLER METAL

PREHEAT(QW-406)

MULTI OR SINGLE PASS

MULTIPLE

PREHEAT TEMP. (Min.)

150°C MIN

MULTIPLE OR SINGLE ELECTRODE

SINGLE

INTERPASS TEMP. (Max.)

250°C MAX

CONTACT TUBE TO WORK DISTANCE

NA

PREHEAT MAINTAINANCE

150°C MIN

GAS CUP SIZE

6 mm / 8 mm

POST HEATING (Min.)

350°C MIN / 2 Hour

INITIAL & INTERPASS CLEANING

CHIPPING / BRUSHING / GRINDING

PEENING

NIL

WELD LAYERS	PROCESS	FILLER METAL		CURRENT		VOLT RANGE	TRAVEL SPEED RANGE
		CLASS	DIA.	TYPE AND POLARITY	AMP RANGE		
1	GTAW	ER 80S B3L	2.5	DCEN	126-130 A	9-10 A	71 MM/Min
2	GTAW	ER 80S B3L	2.5	DCEN	116-123A	9-10A	88 MM/Min
3	SMAW	E8018 B3L	3.15	DCEP	99-100 A	19-20V	88 MM/Min
4	SMAW	E8018 B3L	3.15	DCEP	110-111A	21-23V	53 MM/Min

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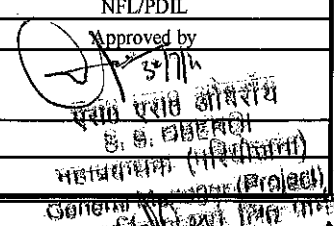
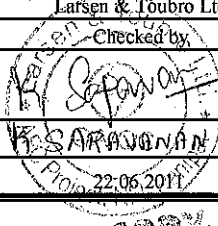
Larsen & Toubro Ltd

NFL/PDIL

Signature

Name

Date



MASTER COPY

General Manager (Project)  
National Fertilizers Limited



Larsen & Toubro Limited

OWNER: M/s NATIONAL FERTILIZERS LIMITED

PMC: PDIL

CONTRACTOR: L&T

AFC PROJECT

NFL-PANIPAT

FORMAT :-LT/AFC/WPS/PIPE/011 Rev.00



QW-482 WELDING PROCEDURE SPECIFICATION ASME SEC.IX, BOILER & PRESSURE VESSEL CODE



SUPPORTING PQR No.: PQR/PCS/004

WPS No. : WPS/PIPE/003

DATE : 31.03.2008

REV.

WELDING PROCESS : GTAW+SMAW

DATE : 25.06.2010

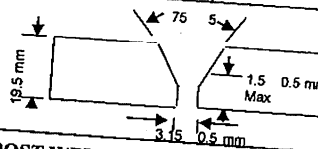
REV.

TYPE

MANUAL

JOINTS(QW-402)

JOINT DESIGN SINGLE 'V' BUTT WELD (J Groove 22mm & Above) WITH OR WITHOUT WELD METAL



BASE METALS(QW-403)

POST WELD HEAT TREATMENT (QW-407)

MATERIAL SPEC A106 Gr. B or Equivalent Gr. B
TYPE OR GRADE P1 / Gr. 1 & 2 to P1 / Gr. 1 & 2
THICKNESS RANGE(GROOVE) 5 MM TO 39 MM
THICKNESS RANGE(FILLET) ALL THICKNESS
PIPE DIA. RANGE(GROOVE) ALL
PIPE DIA. RANGE(FILLET) ALL SIZE

TEMPERATURE RANGE 610 ± 10° C
TIME (Min.) 1 Hr. / 1" thickness min.
HEATING/COOLING RATE 200° C

GAS(QW-408)

Table with columns: SFA SPEC, AWS CLASS, F-NO, A-NO, GASES, MIXTURE, FLOW RATE. Values include GTAW, SMAW, ER-70S2, E7018, Argon, 99.995%, 10-15 LPM.

FILLER METAL(QW-404)

ELECTRICAL CHARACTERISTICS (QW-409)

Table with columns: SIZE OF FILLER METAL \*\*, DEPOSITED WELD METAL THK., THICKNESS RANGE FOR GROOVE, THICKNESS RANGE FOR FILLET. Values include 1.6, 2.0 & 2.5MM, 3.0MM (Min), 6MM (Max), ALL THICKNESS.

Table with columns: CURRENT, POLARITY, TUNGSTEN SIZE & TYPE, MODE OF METAL TRANSFER, WIRE FEED SPEED RANGE, OTHER. Values include DC, 60-160A, 2.4MM, NA.

POSITION(QW-405)

TECHNIQUE (QW-410)

POSITION OF GROOVE 6G
WELDING PROGRESSION UP HILL
POSITION OF FILLET ALL
PREHEAT(QW-406) 100°C for > 25MM
PREHEAT TEMP. (Min.) 250°C
PASS TEMP. (Max.) YES
REHEAT MAINTAINANCE YES
POST HEATING (Min.) NA

TRAVEL SPEED (mm / min.) GTAW-50-120MM/Min SMAW-50-160MM/Min
STRING OR WEAVE BOTH
OSCILLATION (Max.) 3 TIMES OF THE DIA OF FILLER METAL & ELECTRODE
MULTI OR SINGLE PASS MULTIPLE
MULTIPLE OR SINGLE ELECTRODE MULTIPLE
CONTACT TUBE TO WORK DISTANCE SINGLE
GAS CUP SIZE NA
METHOD OF BACK GOUGING 6 - 10MM
INITIAL & INTERPASS CLEANING BACK CHIPPING (If required)
PEENING CHIPPING / BRUSHING / GRINDING

Table with columns: WELD LAYERS, PROCESS, FILLER METAL CLASS, DIA., TYPE AND POLARITY, AMP RANGE, VOLT RANGE, TRAVEL SPEED RANGE. Contains 5 rows of data.

Larsen & Toubro Ltd

Prepared by

Larsen & Toubro Ltd

Checked by

NFL/PDIL

H.S.ROUT

D.D.BANERJEE

Approved by

S. Bhattacharya

ONLY OWNER / PMC APPROVED BRANDS OF ELECTRODE SHALL BE USED.



Larsen & Toubro Limited

AFC PROJECT

NFL-PANIPAT



OWNER: M/s NATIONAL FERTILIZERS LIMITED

PMC: PDIL

CONTRACTOR: L&T

**QW-482 WELDING PROCEDURE SPECIFICATION  
ASME SEC.IX, BOILER & PRESSURE VESSEL  
CODE**

SUPPORTING PQR No.: LT/EP7/IOCL/PQR/12

DATE : 02.09.2004

REV.

0

WPS No. : WPS/PIPE/004

DATE : 22.07.2010

REV.

0

WELDING PROCESS : GTAW+SMAW

TYPE

MANUAL

**JOINTS(QW-402)**

JOINT DESIGN

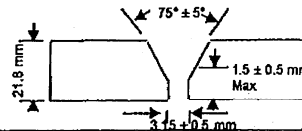
SINGLE 'V' BUTT WELD  
( J Groove 22mm & Above )

BACKING USED

WITH OR WITHOUT

BACKING MATERIAL

WELD METAL



**BASE METALS(QW-403)**

**POST WELD HEAT TREATMENT (QW-407)**

MATERIAL SPEC

SA 335 GR P11

TEMPERATURE RANGE

700 - 750° C

TYPE OR GRADE

P11

TIME (Min.)

1 Hr. / 1" ( MIN. 2 Hrs. )

P.NO. TO P.NO.

P4 / Gr. 1 TO P4 / Gr. 1

HEATING/COOLING RATE

200° C

THICKNESS RANGE(GROOVE)

4.8 MM TO 43.8 MM

**GAS(QW-408)**

THICKNESS RANGE(FILLET)

ALL THICKNESS

PIPE DIA. RANGE(GROOVE)

ALL

**PERCENT COMPOSITION**

PIPE DIA. RANGE(FILLET)

ALL SIZE

GASES

MIXTURE

FLOW RATE

**FILLER METAL(QW-404)**

SFA SPEC.

GTAW

SMAW

SHIELDING

Argon

99.995%

10 - 15 LPM

AWS CLASS.

ER-80SB2

E 8018B2

TRAILING

NA

NA

NA

F-NO

6

4

BACKING

NA

NA

NA

A-NO

3

3

CURRENT

DC

POLARITY

GTAW-DCEN & SMAW-DCEP

SIZE OF FILLER METAL \*\*

1.6,2.0&2.5MM

2.5,3.15&4.0MM

AMPS

60 - 160A

VOLTS

10 - 28V

DEPOSITED WELD METAL THK.

3.0MM (Min)

18.9MM + Reinforcement

THICKNESS RANGE FOR GROOVE

6MM (Max)

37.8MM + Reinforcement

TUNGSTEN SIZE & TYPE

2.4MM

THICKNESS RANGE FOR FILLET

ALL THICKNESS ALL THICKNESS

MODE OF METAL TRANSFER

NA

WIRE FEED SPEED RANGE

NA

OTHER

NA

**POSITION(QW-405)**

**TECHNIQUE (QW-410)**

POSITION OF GROOVE

6G

TRAVEL SPEED (mm / min.)

GTAW-50-120MM/Min SMAW-50-160MM/Min

WELDING PROGRESSION

UP HILL

STRING OR WEAVE

BOTH

POSITION OF FILLET

ALL

OSCILLATION (Max.)

3 TIMES OF THE DIA OF FILLER METAL & ELECTRODE

**PREHEAT(QW-406)**

**MULTI OR SINGLE PASS**

PREHEAT TEMP. (Min.)

150° C

MULTIPLE OR SINGLE ELECTRODE

SINGLE

INTERPASS TEMP. (Max.)

250° C

CONTACT TUBE TO WORK DISTANCE

NA

PREHEAT MAINTAINCE

150° C

GAS CUP SIZE

6 - 10MM

POST HEATING (Min.)

NA

METHOD OF BACK GOUGING

BACK CHIPPING (If required)

INITIAL & INTERPASS CLEANING

CHIPPING / BRUSHING / GRINDING

PEENING

NIL

WELD LAYERS	PROCESS	FILLER METAL		CURRENT		VOLT RANGE	TRAVEL SPEED RANGE
		CLASS	DIA.	TYPE AND POLARITY	AMP RANGE		
1	GTAW	ER-80SB2	2.5	DCEN	80 - 120	10 - 16	60 - 120 MM/Min
2	SMAW	E-8018B2	2.5	DCEP	80 - 120	20 - 24	70 - 80 MM/Min
3	SMAW	E-8018B2	3.15	DCEP	90 - 120	20 - 24	70 - 80 MM/Min
4	SMAW	E-8018B2	4	DCEP	110 - 160	22 - 28	60 - 80 MM/Min
5	SMAW	E-8018B2	4	DCEP	110 - 160	22 - 28	60 - 80 MM/Min

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Prepared by

Checked by

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Date

22.07.2010

22.07.2010

