

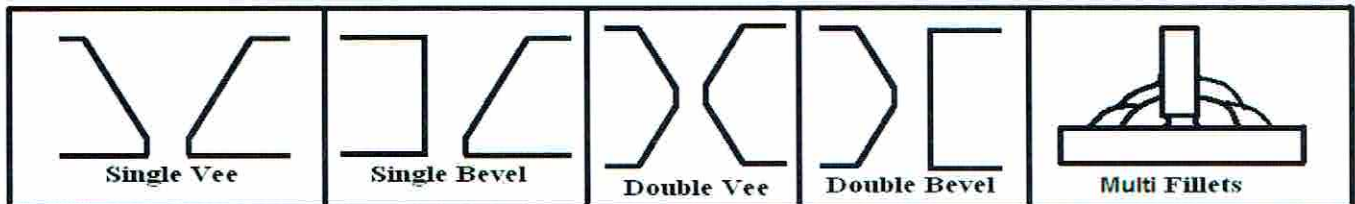


Weld Procedure Specification: MDK 001

Welding Specification.	BS EN ISO 15614-1.
Supporting PQR(s).	MDK 001
EPQ Job Number.	EPQ 75846
Joint Type(s) Qualified.	Groove Welds (Multi Run) & Fillet Welds (Multi Run only) to ISO 15614-1
Material(s) Qualified.	API 5L X52 Normalized. (Or Equivalent)
Material Group No.	ISO 15608 Group No.1 Sub Group 1.2.
PQR Dimensions.	4"NB x 12mm w/t.
Thickness Range.	3 mm to 24mm
Diameter Range.	2" to Unlimited (See notes).
Welding Process 1.	MAG-Metal Active Gas Welding. (135)
Welding process 2.	FCAW-Flux Cored Arc Welding. (136)
Positions Qualified.	All Based on a H-L045test (6G)
Progression Qualified.	All, Excluding vertical down
Preheat Temperature.	Ambient moisture free
Interpass Temperature.	250°C maximum
Heat Treatment: (H-T).	N/A (As Welded)
Heat Treatment Details:	N/A
Shielding Gas (Torch)	Argoshield Heavy 78% Argon/ 20% Carbon Dioxide / 2% Oxygen @ 12-18L/Min.
Backing Gas (Purge)	N/A
Stringer Bead / Weave (Size)	Stringer Beads

Run No.	Welding Process	Filler Make	Trade Name	Dia (mm)	Spec (ISO)	Grade	AC/DC	Amps (A)	Volts (V)	Travel Speed (mm/sec)	Heat Input (KJ/mm)	Heat Input 'K' Factor 0.8
Root	MAG	Lincoln	Supra MIG	1.0	14341-A	G 46 4 M21 3Si1/G42 3 C1 3Si1	DC+ve	95 - 110	17 - 19	1.0-1.7	1.1-1.8	0.88-1.44
Remainder	FCAW	Lincoln	Outershield	1.2	17632-A	T 50 5 1Ni P M 2 H5	DC+ve	140 - 196	18 - 21	2.6-4.9	0.7-1.2	0.56-0.96

Notes:
 Pipe qualification covers plate & hollow section welds also.
 Consumables to be stored as per manufacturers instructions.
 Weld preparations qualified, are shown below.
 Bullets shall be from the base metal. (Or equivalent)



Weld Preparation tolerances: ~~Root Gap: 3 - 5mm~~ | Root Face: 0 - 2mm | Prep Angle: 45° - 65°

Certifying Authority



Client Representative

Date

11/06/14

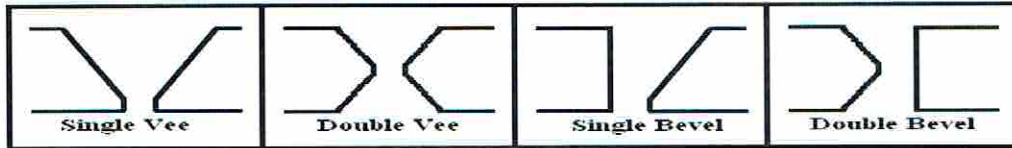
Date



Welder Qualification Certificate in accordance with BS EN ISO 9606-1:2013

Client:	MDK Fabrication Limited		
Name:	Mark Kelman	Test Date:	29/05/2014
Weld Procedure No:	MDK 001	Element Reference No:	EPQ 75846

Joints Qualified



Weld Preparation tolerances: Root Gap: 3 - 5mm / Root Face: 0 - 2mm / Prep Angle: 45° - 65°

	Test Piece	Range of Qualification
Joint Type:	Butt Weld	Butt Weld
Weld Details:	ss, nb	ss,nb; ss,mb; bs; ss,gb; ss,fb
Single/Multi Run:	Single Run & Multi Run	Single Run & Multi Run
Product Type(s):	Pipe	Pipe & Plate
Material Specification(s): Type(s)/Grade(s): Group:	API 5L X52 Normalized Group No.1 Sub-Group 1.2	All
Thickness:	12mm	-
Diameter:	4"	2" to Unlimited
Deposited Thickness MAG: Deposited Thickness FCAW:	2mm 10mm	4mm 3mm to 20mm 24mm Max for Multi Process Joint.
Filler Material Group: MAG: Filler Material Group: FCAW:	FM1 (ISO 14341) FM1 (ISO 17632)	FM1 & FM2 FM1 & FM2
Type of Filler Material MAG: Type of Filler Material FCAW:	S P	S & M R,P,V,W,Y,Z
Shielding Gas: Backing Gas (Purge):	Argoshield Heavy (78%Argon/20%CO2/2%O2) N/A	Argoshield Heavy (78%Argon/20%CO2/2%O2) N/A
Welding Position(s):	H-L045 (6G)	PA, PC, PE,PF
Welding Progression(s):	Vertical Up	All except Vertical Down.

Welding Parameters

Run	Process	Consumable	Trade-name	Spec (ISO)	Grade	Dia. (mm)	Polarity
Root	MAG	Lincoln	Supra MIG	14341-A	G 46 4 M21 3Si1/ G42 3 C1 3Si1	1.0	DC+ve
Remainder	FCAW	Lincoln	Outershield	17632-A	T 50 5 1Ni P M 2 H5	1.2	DC+ve

Testing Details

Visual	MPI	RAD	Bends
Acceptable	Acceptable	Acceptable	Acceptable



Certifying Authority _____

Date _____

11/06/14

Client Representative _____

Date _____



Weld Procedure Qualification Record

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Company: MDK Fabrication Limited

ELEMENT Ref: EPQ 75846

Welding Date: 29/05/2014

Weld Procedure (PQR No): MDK 001
Specification: BS EN ISO 15614-1
Joint Type: Single Vee Butt Weld.
Welder(s): Mark Kelman

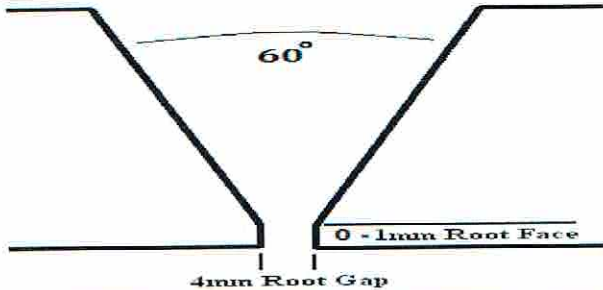
BASE METALS

Specification: API 5L X52
Group No: EN Group 1 Sub Group 1.2
Dimensions: 4"NB x 12mm w/t.

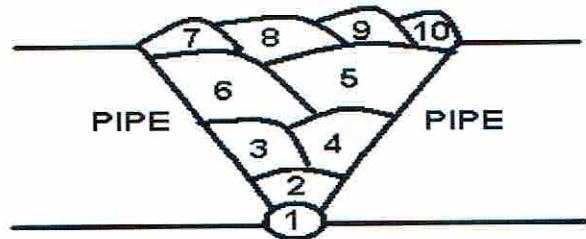
WELDING PROCESS(ES)

Process 1: MAG: Metal Active Gas Welding (135)
Process 2: FCAW: Flux Cored Arc Welding (136)
Process 3:

JOINT DETAILS



RUN SEQUENCE



WELDING DETAILS / TECHNIQUE

Position: 6G (H-L045)
Progression: Vertical up
String / Weave: Stringer
Joint preparation: Machined & Ground.
Gouging: N/A
Tungsten / size: N/A

Gas Shielding

Type & composition: Argoshield Heavy * See notes.
Flow rate: 12-18L/min

Backing Gas / Purge

Type & composition: N/A
Flow rate:

PRE-HEAT

Method: Ambient (Moisture Free)
Minimum Temp: 17°C
Interpass Temp: 250°C
Control Method: Digital Pyrometer

POST WELD HEAT TREATMENT (PWHT)

PWHT Method: N/A (As Welded)
Control Method:
Rate of rise:
Soak Temp:
Soak Time:
Rate of fall:

ELEMENT ABERDEEN

CERTIFYING AUTHORITY

Signed: S. Mar Gregor

Signed: [Signature]

Date: 10/06/14

Date: 11/06/14





Weld Procedure Qualification Record

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Company: MDK Fabrication Limited

ELEMENT Ref: EPQ 75846

Welding Date: 29/05/2014

Weld Procedure (PQR No): MDK 001

Specification: BS EN ISO 15614-1

Joint Type: Single Vee Butt Weld.

Welder(s): Mark Kelman

Run No.	Process	Filler Dia (mm)	Trade Name / Grade	Polarity	Amps (A)	Volts (V)	ROL (mm)	Time (sec)	Speed (mm/sec)	Heat Input (KJ/mm)	Temp (Deg C)
1	GMAW	1.0	Lincoln Supra MIG	DC+ve	101	18.0	35	34	1.0	1.8	17
1	GMAW	1.0	Lincoln Supra MIG	DC+ve	95	18.0	40	27	1.5	1.2	39
1	GMAW	1.0	Lincoln Supra MIG	DC+ve	98	17.0	54	35	1.5	1.1	94
1	GMAW	1.0	Lincoln Supra MIG	DC+ve	109	19.0	30	18	1.7	1.2	101
1	GMAW	1.0	Lincoln Supra MIG	DC+ve	110	17.0	42	35	1.2	1.6	64
1	GMAW	1.0	Lincoln Supra MIG	DC+ve	102	18.0	50	41	1.2	1.5	107
2	FCAW	1.2	Lincoln Outershield	DC+ve	141	18.0	120	47	2.6	1.0	54
2	FCAW	1.2	Lincoln Outershield	DC+ve	140	19.0	85	31	2.7	1.0	102
2	FCAW	1.2	Lincoln Outershield	DC+ve	140	18.0	165	60	2.8	0.9	134
3	FCAW	1.2	Lincoln Outershield	DC+ve	194	19.0	150	33	4.5	0.8	72
3	FCAW	1.2	Lincoln Outershield	DC+ve	195	19.0	25	7	3.6	1.0	128
3	FCAW	1.2	Lincoln Outershield	DC+ve	196	18.0	170	35	4.9	0.7	121
4	FCAW	1.2	Lincoln Outershield	DC+ve	185	21.0	110	28	3.9	1.0	146
4	FCAW	1.2	Lincoln Outershield	DC+ve	186	20.0	70	22	3.2	1.2	172
4	FCAW	1.2	Lincoln Outershield	DC+ve	190	20.0	145	35	4.1	0.9	185
5	FCAW	1.2	Lincoln Outershield	DC+ve	192	20.0	220	51	4.3	0.9	167
5	FCAW	1.2	Lincoln Outershield	DC+ve	191	21.0	135	28	4.8	0.8	200
6	FCAW	1.2	Lincoln Outershield	DC+ve	195	20.0	210	50	4.2	0.9	155
6	FCAW	1.2	Lincoln Outershield	DC+ve	185	23.0	145	36	4.0	1.1	192
7	FCAW	1.2	Lincoln Outershield	DC+ve	159	21.0	200	39	5.1	0.7	108
7	FCAW	1.2	Lincoln Outershield	DC+ve	165	22.0	200	47	4.3	0.9	172
8	FCAW	1.2	Lincoln Outershield	DC+ve	182	21.0	195	48	4.1	0.9	158
8	FCAW	1.2	Lincoln Outershield	DC+ve	188	21.0	205	53	3.9	1.0	189
9	FCAW	1.2	Lincoln Outershield	DC+ve	179	20.0	220	70	3.1	1.1	190
9	FCAW	1.2	Lincoln Outershield	DC+ve	177	21.0	200	64	3.1	1.2	207
10	FCAW	1.2	Lincoln Outershield	DC+ve	176	21.0	210	66	3.2	1.2	185
10	FCAW	1.2	Lincoln Outershield	DC+ve	179	21.0	210	62	3.4	1.1	250

ELEMENT ABERDEEN

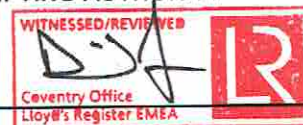
CERTIFYING AUTHORITY

Signed: S. Mac Gregor

Signed: [Signature]

Date: 10/06/14

Date: 11/06/14





Weld Procedure Qualification Record

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Company: MDK Fabrication Limited

ELEMENT Ref: EPQ 75846

Welding Date: 29/05/2014

Weld Procedure (PQR No): MDK 001

Specification: BS EN ISO 15614-1

Joint Type: Single Vee Butt Weld.

Welder(s): Mark Kelman

ADDITIONAL INFORMATION

Material: API 5L X52

Dimensions: 4"NB x 12mm (Machined from 13.49mm)

Cast No: 573637

Consumable: Lincoln Supra MIG

Size: 1.0mm

Spec / Grade: ISO 14341-A: G 46 4 M21 3Si1 / G42 3 C1 3Si1

Batch No: 43144

Consumable: Lincoln Outershield 81Ni1-H

Size: 1.2mm

Spec / Grade: ISO 17632-A: T 50 5 1Ni P M 2 H5

Batch No: 27443281

NOTES:

Consumables were clean / dry and stored in accordance with manufacturers instructions.

A 'k' factor of 0.8 will be applied to the heat inputs. See WPS.

*78% Argon / 20% Carbon Dioxide / 2% Oxygen.

ELEMENT ABERDEEN

CERTIFYING AUTHORITY

Signed: S. MacGregor

Signed: 

Date: 10/06/14

Date: 11/06/14

