WELDING PROCEDURE SPECIFICATION (WPS)

Company Name: Rapid Sheet Metal Inc.

Welding process(es): GTAW MANUAL

Supporting PQR No.(s): AWS D17.1 5.4.2 CLASS C

Identification #: RSM-C-GW-929Ma

Revision _____ Date _____ By _____

Authorized By _____ Date 9/27/2011

Type: Manual ■ Semi-Automatic ☐

Mechanized ☐ Automatic ☐

JOINT DESIGN

Type: OAI Square Groove Weld

Single ■ Double Weld ☐

Backing: Yes ☐ No ■

Backing Material: N/A

Root Opening: 0.00" + 0.045"

Root Face Dimension: N/A

Groove Angle: 90 degrees square

Radius (J-U): N/A

Back Gouging Yes ☐ No ■

Method: N/A

Position: 1G

BASE METALS

Material Spec.: GROUP IV

Type or Grade: OR 5052 H32

Thickness: Groove 0.090" Fillet _____

Diameter _____

FILLER METALS

Specification: ER 5356 AWS A5.10

SHIELDING

Flux _____

Gas: ARGON 100%

Composition _____

Electro-Flux (Class) _____

Flow Rate: 25 - 35 CFH

Gas Cup Size: # 8

ELECTRICAL CHARACTERISTICS

General Characteristics _____

Current: AC ■ DCEP ☐ DCEN ☐ Pulsed ☐

Other _____

Tungsten Electrode (GTAW/PAW)

Size: 1/8"

Type: PURE

TECHNIQUE

Stringer or Weave Bead: STRINGER

Multi-pass or Single Pass (per side): SINGLE

Number of Electrodes: ONE

Peening: N/A

Inter-pass Cleaning: N/A

Other _____

PREHEAT

Preheat Temp., Min _____

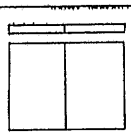
Inter-pass Temp., Min _____ Max _____

POSTWELD HEAT

Temp _____

Time _____

WELDING PROCEDURE

Pass or Weld Layers	Process	Filler Metals Class	Filler Metals Diam	Current Type & Polarity	Current Amps or Wire Feed Speed*	Volts*	Travel Speed*	Joint Details
1	GTAW	AWS A5.10	1/8"	AC	* 134	* 28 V	* AS NEEDED	

QUALIFICATION TEST RECORD

Name: [redacted] Id 163 S.S. No. 9878

Joint welding procedure: RSM-C-GW-92311a Welder ■ Welding operator ☐

TEST-WELD

Base metal description: GR 5052 H32 Group No. Group IV

Welding process: GTAW MANUAL Single weld ■ Double weld ☐

Current: AC ■ DCEN ☐ DCEP ☐ Backing: Yes ☐ No ■

Vertical: Down ☐ Up ☐ Penetration: Complete ■ Partial ☐

	Position				Dimension, in [mm]	
Sheet groove	1G ■	2G ☐	3G ☐	4G ☐		T
Tube groove	1G ☐	2G ☐	5G ☐	6G ☐	O.D.	T
Sheet fillet	1F ☐	2F ☐	3F ☐	4F ☐		T
Corner Fillet	1F ☐	2F ☐	4F ☐	5F ☐	O.D.	T

TEST RESULTS

Visual		Pass ■	Fail ☐
Radiographic	NA ■	Pass ☐	Fail ☐
Metallographic	NA ☐	Pass ■	Fail ☐
Bend	NA ☐	Pass ■	Fail ☐

QUALIFIED

Base Metal Group No. group IV Single weld ■ Double weld ☐

Current: AC ■ DCEN ☐ DCEP ☐ Backing: With ☐ Without ■

Vertical: Down ☐ Up ☐ Penetration: Complete ■ Partial ☐

	Position				T, in [min] Min	T, in [min] Max	O. D., in [mm] Min
Sheet groove	1G ■	2G ☐	3G ☐	4G ☐	0.087"	0.360"	
Tube groove	1G ☐	2G ☐	5G ☐	6G ☐			
Sheet fillet	1F ☐	2F ☐	3F ☐	4F ☐			
Corner Fillet	1F ☐	2F ☐	4F ☐	5F ☐			

Restrictions: None

The above named individual is qualified in accordance with AWS D17.1 within the above limits for the welding process used for this test weld.

Date of Test Weld: September 23, 2011 Signed by: Qualifier

AWS QC 1 CLIVE A. J. LINSMAYER 9110031 C ★ I

WELDING PROCEDURE SPECIFICATION (WPS)

Company Name: Rapid Sheet Metal Inc.

Welding process(es): GMAW MANUAL

Supporting PQR No.(s): AWS D17.1 5.4.2 CLASS C

Identification #: RSM-D-CW-92811

Revision _____ Date _____ By _____

Authorized By _____ Date 9/27/2011

Type: Manual ■ Semi-Automatic ☐ Mechanized ☐ Automatic ☐

JOINT DESIGN

Type: FILLET CORNER WELD GA 11

Single ■ Double Weld ☐

Backing: Yes ☐ No ■

Backing Material: N/A

Root Opening: 0.080" + 0.045"

Root Face Dimension: 50 degree offset

Groove Angle: >80 deg - 150 deg

Radius (J-U): N/A

Back Gouging Yes ☐ No ■

Method: N/A

Position: CORNER 1 F

ELECTRICAL CHARACTERISTICS

General Characteristics _____

Current: AC ■ DCEP ☐ DCEN ☐ Pulsed ☐

Other _____

Tungsten Electrode (GTAW/PAW)

Size: 1/8"

Type: PURE

BASE METALS

Material Spec.: GROUP IV

Type or Grade: OR 5052 H32

Thickness: Groove 0.090" Fillet _____

Diameter _____

FILLER METALS

Specification: ER 5356 AWS A5.10

TECHNIQUE

Stringer or Weave Bead: STRINGER

Multi-pass or Single Pass (per side): SINGLE

Number of Electrodes: ONE

Peening: N/A

Inter-pass Cleaning: N/A

Other _____

SHIELDING

Flux _____

Gas: ARGON 100%

Composition _____

Electro-Flux (Class) _____

Flow Rate: 25 - 35 CFH

Gas Cup Size: # 8

PREHEAT

Preheat Temp., Min _____

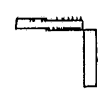
Inter-pass Temp., Min _____ Max _____

POSTWELD HEAT

Temp _____

Time _____

WELDING PROCEDURE

Pass or Weld Layers	Process	Filler Metals Class	Filler Metals Diam	Current Type & Polarity	Current Amps or Wire Feed Speed*	Volts*	Travel Speed*	Joint Details
1	GTAW	AWS A5.10	1/8"	AC	* 134	* 28 V	* AS NEEDED	

QUALIFICATION TEST RECORD

Name: [redacted] Id 163 S.S. No. 9678

Joint welding procedure: RSM-C-CW-92311b Welder ■ Welding operator ☐

TEST-WELD

Base metal description: GR 5052 H32 Group No. Group IV

Welding process: GTAW MANUAL Single weld ■ Double weld ☐

Current: AC ■ DCEN ☐ DCEP ☐ Backing: Yes ☐ No ■

Vertical: Down ☐ Up ☐ Penetration: Complete ■ Partial ☐

	Position				Dimension, in [mm]	
Sheet groove	1G ☐	2G ☐	3G ☐	4G ☐		T
Tube groove	1G ☐	2G ☐	5G ☐	6G ☐	O.D.	T
Sheet fillet	1F ☐	2F ☐	3F ☐	4F ☐		T
Corner Fillet	1F ☐	2F ■	4F ☐	5F ☐	O.D.	T

TEST RESULTS

Visual		Pass ■	Fail ☐
Radiographic	NA ■	Pass ☐	Fail ☐
Metallographic	NA ☐	Pass ■	Fail ☐
Bend	NA ☐	Pass ■	Fail ☐

QUALIFIED

Base Metal Group No. group IV Single weld ■ Double weld ☐

Current: AC ■ DCEN ☐ DCEP ☐ Backing: With ☐ Without ■

Vertical: Down ☐ Up ☐ Penetration: Complete ■ Partial ☐

	Position				t, in [mm] Min	t, in [mm] Max	O. D., in [mm] Min
Sheet groove	1G ☐	2G ☐	3G ☐	4G ☐			
Tube groove	1G ☐	2G ☐	5G ☐	6G ☐			
Sheet fillet	1F ☐	2F ☐	3F ☐	4F ☐			
Corner Fillet	1F ■	2F ■	4F ☐	5F ☐	0.087"	0.360"	

Restrictions: None

The above named individual is qualified in accordance with AWS D17.1 within the above limits for the welding process used for this test weld.

Date of Test Weld: September 23, 2011 Signed by: C.W.I.

Qualifier

AWS QC 1 CLIVE A. LINGMAYER

WELDING PROCEDURE SPECIFICATION (WPS)

Company Name: Rapid Sheet Metal Inc.

Welding process(es): GMAW MANUAL

Supporting PQR No.(s): AWS D17.1 5.4.2 CLASS C

Identification #: RSM-C-PW-9281k

Revision _____ Date _____ By _____

Authorized By TS Date 9-27-2011

Type: Manual ■ Semi-Automatic ☐ Mechanized ☐ Automatic ☐

JOINT DESIGN

Type: FILLET T- JOINT GA10

Single ■ Double Weld ☐

Backing: Yes ☐ No ■

Backing Material: N/A

Root Opening: 0.00"

Root Face Dimension: 90 degree

Groove Angle: N/A

Radius (J-U): N/A

Back Gouging Yes ☐ No ■

Method: N/A

Position: T-JOINT 2F

BASE METALS

Material Spec.: GROUP IV

Type or Grade: GR 5052 H32

Thickness: Groove 0.090" Fillet _____

Diameter _____

FILLER METALS

Specification: ER 5356 AWS A5.10

SHIELDING

Flux _____

Gas: ARGON 100%

Composition _____

Electro-Flux (Class) _____

Flow Rate: 25 - 35 CFH

Gas Cup Size: #5

ELECTRICAL CHARACTERISTICS

General Characteristics _____

Current: AC ■ DCEP ☐ DCEN ☐ Pulsed ☐

Other _____

Tungsten Electrode (GTAW/PAW)

Size: 1/8"

Type: PURE

TECHNIQUE

Stringer or Weave Bead: STRINGER

Multi-pass or Single Pass (per side): SINGLE

Number of Electrodes: ONE

Peening: N/A

Inter-pass Cleaning: N/A

Other _____

PREHEAT

Preheat Temp., Min _____

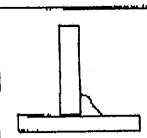
Inter-pass Temp., Min _____ Max _____

POSTWELD HEAT

Temp _____

Time _____

WELDING PROCEDURE

Pass or Weld Layers	Process	Filler Metals Class	Filler Metals Diam	Current Type & Polarity	Current Amps or Wire Feed Speed*	Volts*	Travel Speed*	Joint Details
1	GTAW	AWS A5.10	1/8"	AC	* 194	* 28 V	* AS NEEDED	

QUALIFICATION TEST RECORD

Name: [redacted] Id 163 S.S. No. 9678

Joint welding procedure: RSM-C-FW-02311c Welder ■ Welding operator ☐

TEST-WELD

Base metal description: GR 5052 H32 Group No. Group IV

Welding process: GTAW MANUAL Single weld ■ Double weld ☐

Current: AC ■ DCEN ☐ DCEP ☐ Backing: Yes ☐ No ■

Vertical: Down ☐ Up ☐ Penetration: Complete ☐ Partial ■

	Position				Dimension, in [mm]	
Sheet groove	1G ☐	2G ☐	3G ☐	4G ☐		T
Tube groove	1G ☐	2G ☐	5G ☐	6G ☐	O.D.	T
Sheet fillet	1F ☐	2F ■	3F ☐	4F ☐		T
Corner Fillet	1F ☐	2F ☐	4F ☐	5F ☐	O.D.	T

TEST RESULTS

Visual		Pass ■	Fail ☐
Radiographic	NA ■	Pass ☐	Fail ☐
Metallographic	NA ☐	Pass ■	Fail ☐
Bend	NA ☐	Pass ■	Fail ☐

QUALIFIED

Base Metal Group No. group IV Single weld ■ Double weld ☐

Current: AC ■ DCEN ☐ DCEP ☐ Backing: With ☐ Without ■

Vertical: Down ☐ Up ☐ Penetration: Complete ☐ Partial ■

	Position				T, in [min] Min	T, in [min] Max	O. D., in [mm] Min
Sheet groove	1G ☐	2G ☐	3G ☐	4G ☐			
Tube groove	1G ☐	2G ☐	5G ☐	6G ☐			
Sheet fillet	1F ■	2F ■	3F ☐	4F ☐	0.067"	0.360"	
Corner Fillet	1F ☐	2F ☐	4F ☐	5F ☐			

Restrictions: None

The above named individual is qualified in accordance with AWS D17.1 within the above limits for the welding process used for this test weld.

Date of Test Weld: September 23, 2011 Signed by: Qualifier

AWS QC 1 CLIVE A.J. LIGHMAYER 01040911 CWI