



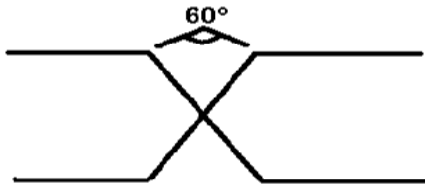
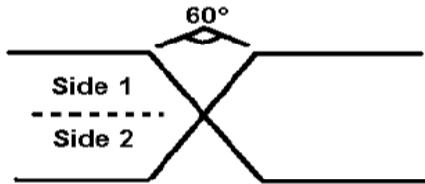
Major Tool and Machine, Inc.
1458 E. 19th St, Indianapolis, IN 46218
Procedure Qualification Record (PQR) - Details of Welding Test
Weldspec for Windows

PQR record number	PQR434	Revision 0	WPS record number	WPS433	Revision
Date	5/9/2005		Company name	Major Tool and Machine, Inc.	
			Welding standard	NCSX-CSPEC-141-03-05	

BASE METALS (QW-403)

	Product form	Specification (type or grade)	P no.	Grp-no.	Size	Sch.	Thick.	(in.)	Dia.	(in.)
Welded to:	Casting	CF8MNmMOD	U	U	n/a	n/a	1.320		n/a	
	Casting	CF8MNmMOD	U	U	n/a	n/a	1.320		n/a	
and tested:	Without PWHT, With impacts									
Notes										

JOINTS (QW-402)

Joint design	Double-V-groove		
Backing:	Back-gouged & welded		
Retainers	None		
Groove angle (deg.)	60 included		
Root opening (in.)	0.093		
Root face (in.)	0.0		

WELDING PROCESSES

Welding process	GTAW
Type	Manual

FILLER METALS (QW-404)

SFA specification	n/a
AWS classification	n/a
Filler metal F-number	U
Weld metal A-number	U
Filler metal nominal composition	-
Filler metal trade name	Metrode ER316MNNF
Filler metal size (in.)	0.093
Deposited thickness (in.)	1.5
Maximum pass thickness (in.)	0.125
Weld deposit chemistry	-

POSITION (QW-405)

Position of groove	1G
Weld progression	-

PREHEAT (QW-406)

Preheat temperature (°F)	70
Maximum interpass temperature (°F)	300

GAS (QW-408)

Shielding gas:	Type	Argon
	Flow rate (cfh)	32
Trailing gas:	Type	None
	Flow rate (cfh)	-
Backing gas:	Type	None
	Flow rate (cfh)	-

ELECTRICAL (QW-409)

Filler metal size (in.)	0.093
Amperes	See Pg. 3
Volts	See Pg. 3
Travel speed (in./min)	See Pg. 3
Maximum heat input (kJ/in.)	See Pg. 3
Tungsten size (in.)	0.093
Tungsten type	SFA 5.12 EWTh-2
Current/polarity	DCEN
DC pulsing current	Not used

TECHNIQUE (QW-410)

String or weave	Stringer
Orifice/gas cup size	0.450
Multi/Single pass per side	Multiple passes
Peening	Not used
Initial/interpass cleaning	Brushing and Grinding
Back gouging method	Grinding

Reduced section

GUIDED BEND TESTS (QW-160)

TOUGHNESS TESTS (QW-170)

OTHER TESTS

CERTIFICATION

We certify that the statements in this record are correct and that the test welds were prepared, welded and tested in accordance with the requirements of the specified code.

Weldspec 4.2.006



Major Tool and Machine, Inc.
 1458 E. 19th St, Indianapolis, IN 46218
Procedure Qualification Record (PQR) - Additional information
 Weldspec for Windows

PQR record number	PQR434	Revision 0	WPS record number	WPS433	Revision
Date	5/9/2005		Company name	Major Tool and Machine, Inc.	
			Welding standard	NCSX-CSPEC-141-03-05	

*** WELD WIRE ***

Test Certificate: 193695

Name: Metrode ER316MNNF TIG 2.4mm

Specification: BS EN12072 W 20 16 3 Mn L

Batch No. W020132

Chemical AnalysisType: BS EN 10204: 2.2 / ASME SFA-5.01: Sch. H

Chemical Analysis: 0.015 C, 7.43 Mn, 0.42 Si, 0.006 S, 0.014 P, 19.9 Cr, 15.4 Ni, 2.62 Mo, 0.14 N, 0.20 Cu

*** BASE METAL ***

Metaltek Cast CF8MNMnMOD, Heat #133580 used for PQR433, Pour Date Dec. 19, 2004.

Example Chemical Anaysis from Heat #27731: 0.052 C, 17.96 Cr, 0.200 Cu, 2.620 Mn, 2.290 Mo, 0.250 N, 13.120 Ni, 0.010 P, 0.010 S, 0.300 Si

*** HEAT INPUT ***

Heat Input (J/in) = (V*A*60)/(travel speed in/min)

Pass	Side	Layer	in/min	V	A	Heat Input (J/in)	Pass	Side	Layer	in/min	V	A	Heat Input (J/in)
1	1	1	4.3	14.2	176	34989	19	1	6	4.1	17.7	220	57112
2	1	2	5.4	15.8	199	34848	20	1	6	5.7	16.3	198	33888
3	1	3	3.1	16.2	204	64444	21	1	7	5.6	15.9	190	32476
4	2	1	5.7	16.0	200	33600	22	1	7	4.1	15.3	185	41750
5	2	2	3.5	16.4	207	57995	23	1	7	6.1	16.2	203	32338
6	1	4	4.4	16.0	185	40700	24	1	7	9.1	16.5	208	22594
7	1	4	5.8	16.5	204	34782	25	2	6	6.0	16.2	195	31590
8	2	3	4.6	15.4	182	36203	26	2	6	5.7	16.2	199	34119
9	2	3	5.4	16.1	210	37473	27	2	6	5.2	16.9	207	40522
10	2	4	4.6	16.5	197	42257	28	2	6	4.7	17.0	201	43852
11	2	4	5.6	16.3	204	35746	29	2	7	9.6	15.1	184	17365
12	1	5	4.9	16.1	189	37276	30	2	7	6.3	15.0	182	26163
13	1	5	5.1	16.7	192	37408	31	2	7	6.5	15.0	190	26367
14	1	5	4.9	16.5	192	38544	32	2	7	10.2	15.3	191	17242
15	2	5	4.1	16.4	200	48380	33	1	8	9.9	15.5	178	16784
16	2	5	5.3	16.6	192	35856	34	1	8	11.6	15.2	180	14136
17	2	5	5.7	17.1	201	36376	35	1	8	9.9	15.5	194	18293
18	1	6	6.0	16.0	192	30720	36	1	8	12.0	16.2	196	15876
									Avg.	4.9	16.2	196	39866

*** Revision Information ***

Rev 0 - Created on 5/9/05 J.L.M.

- Qualified to NCSX-CSPEC-141-03-05 Sept. 23,2004 including addendum Letter No. 6-1 to Subcontract S005242-F's. 5/9/05 J.L.M.