



**Major Tool and Machine, Inc.**  
 1458 E. 19th St, Indianapolis, IN 46218  
**Welding Procedure Specification (WPS)**  
 Weldspec for Windows

WPS record number	WPS390-PPPL	Revision 1	Qualified to	ASME IX
Date	12/15/03		Company name	Major Tool and Machine, Inc.
Supporting PQR(s)	PQR390 - Rev 0			
Reference docs.				

Scope	All Groove welds (i.e Single Vee, Double Vee, Single U, Double U, Single Bevel, Double Bevel) and Fillet Welds Groove, fillet, no PWHT (As-welded)
Joint	Joint details for this welding procedure specification in: Production drawings

**BASE METALS (QW-403)**

Type	Ni-Cr-Mo alloys (P43)	P-no. 43	Grp-no. -
Welded to	Ni-Cr-Mo alloys (P43)	P-no. 43	Grp-no. -
Backing:	Weld or base metal	P-no.	Grp-no. -
Retainers	None		
Notes			

**THICKNESS RANGE QUALIFIED** (in.)

	As-welded		With PWHT	
	Min.	Max.	Min.	Max.
Complete pen.	0.063	0.75	-	-
Impact tested	-	-	-	-
Partial pen.	0.063	0.75	-	-
Fillet welds	no min.	no max.	-	-

**DIAMETER RANGE QUALIFIED** (in.)

	As-welded		With PWHT	
	Min.	Max.	Min.	Max.
Nominal pipe size	no min.	no max.	-	-

**FILLER METALS (QW-404)**

	SFA	Classification	F-no.	A-no.	Chemical analysis or Trade name	As-welded		With PWHT	
						Min.	Max.	Min.	Max.
GTAW	5.14	ERNiCrMo-3	43	N/A	INCONEL 625	no min.	0.75	-	-
Cons. insert	-	-	-	-	-	- None -			
Flux	-	-	-	-	-	- None -			

**WELDING PROCEDURE**

Welding process	GTAW	
Type	Manual	
Preheat temperature (°F)	60	
Maximum interpass temperature (°F)	350	
Tungsten size (in.)	.093	
Tungsten type	SFA 5.12 EWTh-2	
Filler metal size (in.)	.062	.093
Layer number	All	All
Position of groove	All	All
Weld progression	Uphill for vertical welding.	Uphill for vertical welding.
Current/polarity	DCEN (straight polarity)	DCEN (straight polarity)
Amperes	75 - 175	100 - 210
Volts	manual	manual
Travel speed (in./min)	manual	manual
Maximum heat input (kJ/in.)	Not controlled	Not controlled
DC pulsing current	Not used	Not used
Shielding: Gas type	Argon	
Flow rate (cfh)	25 - 45	25 - 45
Trailing: Gas type	None	
Flow rate (cfh)	-	
Backing: Gas type	Argon	
Flow rate (cfh)	5 - 20	5 - 20
String or weave	Stringer	
Orifice/gas cup size	#7 (.44" dia)	
Multi/Single pass per side	Single or Multiple passes	
Weld deposit chemistry	See manufacturers data	
Notes		



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**TECHNIQUE (QW-410)**

Peening	Not used
Surface preparation	Brushing and/or grinding as required. See Notes for additional information.
Initial/interpass cleaning	Brushing and/or grinding as required. See Notes for additional information.
Back gouging method	Grinding

**NOTES**

1. Initial cleaning requirements: Grind a minimum of 0.50" clean on each side of the weld joint. Solvent wipe to remove all oil, grease, coolant, etc.
2. Interpass cleaning requirements: Wire brush each pass to remove oxides. Light grinding may be required to remove oxide other contaminants. Wire brush as needed. Wire brush must be stainless steel and must be either new or previously used only on similar material.
3. Argon backing gas is required on full penetration, open root butt welds. Argon backing should be maintained until 3/16" of weld metal has been deposited.

**Welding Engineer**

Name	Signature
Date	



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Rev 0 - Initial release - 12/15/03 - D.H.L.

Rev 1 - Current range changed from 100 - 110 to 100 - 210 with 0.093 wire dia. 2/2/04 JLM  
- Gas cup size changed from #6 to #7. 2/2/04 JLM