



National Aeronautics and
Space Administration

John C. Stennis Space Center
Stennis Space Center, MS 39529-6000

SSTD-8070-0017-WELD Rev. A-1
June 2015

John C. Stennis Space Center

GAS TUNGSTEN ARC WELDING OF

AUSTENITIC STAINLESS STEEL PIPE/PLATE

Original signed by:

see revision A

NASA SSC Center Operations Directorate Date
Operations & Maintenance Division

Issued by:

Issued CEF

Central Engineering Files 6-29-2015
Date

Stennis Standard	SSTD-8070-0017-WELD	A-1
	<i>Number</i>	<i>Rev.</i>
	Effective Date:	June 29, 2015
	Review Date:	October 17, 2017
Page 2 of 28		
Responsible Office: NASA SSC Center Operations Directorate		
SUBJECT: Welding Procedure for GTAW of Austenitic S/S Pipe/Plate		

Document History Log

Status/Change/ Revision	Change Date	Originator/Phone	Description
Basic	02.12.2010	Doug Dike x8-2803	Initial release, supersedes SSC STD 34-010. Grammatical and format changes made, added “plate” to the standard, and updated Attachments A and B.
A	10-17-12	Benny Mcgrath	Add WPS- 8-8-GT-LT-1, PQR-WP10208, PQR-MT10391 and PQR- AFRL8A. These WPS and PQR’S will update the procedure thickness range from .600” max thickness to 1.5” max thickness. Delete: SSC-34-004 class of weld inspection and Add SSTD-8070-0013-WELD class of weld inspection. Delete : SSC Standard 34-002, <i>Introduction of Welding Standards</i>
A-1	06-29-2015	R. Carol Wolfram 8-1164	Administrative Changes: Rescanned Attachments A and B to improve legibility. Updated Table of Contents.

Stennis Standard	SSTD-8070-0017-WELD		A-1
	Number	Rev.	
	Effective Date: June 29, 2015		
	Review Date: October 17, 2017		
	Page 3 of 28		
Responsible Office: NASA SSC Center Operations Directorate			
SUBJECT: Welding Procedure for GTAW of Austenitic S/S Pipe/Plate			

Table of Contents

1.0 PURPOSE.....	4
2.0 APPLICABILITY	4
3.0 REFERENCES AND APPLICABLE DOCUMENTS	4
4.0 RESPONSIBILITIES	4
5.0 REQUIREMENTS AND PROCEDURES.....	4
6.0 RECORDS AND FORMS.....	5
7.0 ACRONYMS AND ABBREVIATIONS.....	6
ATTACHMENT A Nitrogen Backing Gas.....	7
A.1 WPS NASA 300-1-1-1	7
A.2 PQR NASA 300-1-1	9
A.3 PQRD NASA 300-1	11
ATTACHMENT B Argon Backing Gas.....	13
B.1 WPS NASA 300-2-1-1	13
B.2 PQR NASA 300-2-1	14
B.3 PQRD NASA 300-2	16
B.4 WPS 8-8-GT-LT-1	19
B.5 PQR WP10208	21
B.6 PQR MT10391	24
B.7 PQR AFRL8A	27

Stennis Standard	SSTD-8070-0017-WELD		A-1
	Number	Rev.	
	Effective Date: June 29, 2015		
	Review Date: October 05, 2017		
	Page 4 of 28		
Responsible Office: NASA SSC Center Operations Directorate			
SUBJECT: Welding Procedure for GTAW of Austenitic S/S Pipe/Plate			

1.0 PURPOSE

This John C. Stennis Space Center (SSC) Standard (SSTD) provides for a qualified American Society of Mechanical Engineers (ASME) weld procedure for Gas Tungsten Arc Welding (GTAW) of austenitic stainless steel pipe or plate from 0.063-inch to 1.500-inch wall thickness using argon, helium, or nitrogen as a backing gas..

2.0 APPLICABILITY

This SSTD is valid for welding of all austenitic stainless steel pipe or plate that will be used in, but not be limited to, nitrogen, helium, air, oxygen, hydrogen. This SSTD applies to all contractor and subcontractor personnel involved with the GTAW welding of stainless steel pipe.

3.0 REFERENCES AND APPLICABLE DOCUMENTS

Applicable documents shall be the latest version unless otherwise specified.

ASME Boiler and Pressure Vessel Codes, Section IX

SPR 1440.1, *SSC Records Management Program Requirements*

SPR 8715.1, *SSC Safety and Health Program Requirements*

SSTD-8070-0013-WELD, *Classes of Welding Inspection*

SSTD-8070-0005-CONFIG, *Preparation, Review, Approval and Release of SSC Standards*

SSTD-8070-0014-WELD, *Qualifying Welders and Welding Procedures*

4.0 RESPONSIBILITIES

Responsibilities for the use and control of this SSTD and for the review and approval of revisions or cancellation of this SSTD shall be as specified in SSTD-8070-0005-CONFIG and the applicable documents referenced therein.

5.0 REQUIREMENTS AND PROCEDURES

- All procedures shall be performed in compliance with applicable requirements in SPR 8715.1, *SSC Safety and Health Program Requirements*. If ever there is a conflict between this SSTD and the SPR, the SPR takes precedence.
- Items denoted as essential variables in the attached weld procedure specifications (WPS) shall not be altered when using the WPS. An alternate WPS may be used only if approved prior to use by the NASA SSC Center Operations Directorate Project Management Division, the NASA SSC Engineering and Test Directorate (E&TD), and the NASA SSC Safety and Mission Assurance (S&MA) Office.

Stennis Standard	SSTD-8070-0017-WELD		A-1
	Number	Rev.	
	Effective Date: June 29, 2015		
	Review Date: October 05, 2017		
	Page 5 of 28		
Responsible Office: NASA SSC Center Operations Directorate			
SUBJECT: Welding Procedure for GTAW of Austenitic S/S Pipe/Plate			

- c. The attached WPS NASA 300-1-1-1, WPS NASA 300-2-1-1, WPS 8-8-GT-LT-1 and Procedure Qualification Record (PQR), and NASA 300-1-1, NASA 300-2-1, WP10208, MT10391, AFRL8A and Procedure Qualification Record Data (PQRD) NASA 300-1 and NASA 300-2 are the WPS, PQRs and PQRDs within this SSTD. When performing new qualifications, a new, approved WPS, PQR and PQRD shall be completed showing all pertinent data and results of the weld procedure qualification.
- d. For each WPS requiring Charpy impact testing per ASME Boiler & Pressure Vessel Code Section IX, the minimum toughness test temperature under the supporting PQR(s) shall be equal to or less than the minimum service temperature of the weldment or -320°F whichever is greater.
- e. Welders shall be qualified in accordance with SSTD-8070-0014-WELD, *Qualifying Welders and Welding Procedures*.
- f. Inspection methods for welds shall be in accordance with SSTD-8070-0013-WELD *Classes of Welding Inspection*.
- g. Qualification tests shall be performed on test coupons welded with nitrogen, argon or helium as the backing gas.

6.0 RECORDS AND FORMS

- a. Records required by the procedures of this SSTD shall be maintained in accordance with SPR 1440.1 and as specified in this SSTD.
- b. All records and forms are the latest version unless otherwise indicated.
- c. The original, signed WPSs and PQRs (copies of which are provided in Attachments A and B of this SSTD) and the accompanying Certificate(s) of Analysis validation test documents shall be maintained in CEF together with the original, signed hardcopy of this SSTD.

Stennis Standard	SSTD-8070-0017-WELD	A-1
	<i>Number</i>	<i>Rev.</i>
	Effective Date: June 29, 2015	
	Review Date: October 05, 2017	
	Page 6 of 28	
Responsible Office: NASA SSC Center Operations Directorate		
SUBJECT: Welding Procedure for GTAW of Austenitic S/S Pipe/Plate		

7.0 ACRONYMS AND ABBREVIATIONS

ASME	American Society of Mechanical Engineers
CEF	Central Engineering Files
E&TD	Engineering and Test Directorate
GTAW	Gas Tungsten Arc Welding
NASA	National Aeronautics and Space Administration
PQR	Procedure Qualification Record
PQRD	Procedure Qualification Record Data
psi	pounds per square inch
S&MA	Safety and Mission Assurance
SPR	John C. Stennis Space Center Procedural Requirement
SSC	John C. Stennis Space Center
SSTD	John C. Stennis Space Center Standard
WPS	Weld Procedure Specifications

Stennis Standard	SSTD-8070-0017-WELD	A-1
	Number	Rev.
	Effective Date: June 29, 2015	
	Review Date: October 05, 2017	
Page 7 of 28		
Responsible Office: NASA SSC Center Operations Directorate		
SUBJECT: Welding Procedure for GTAW of Austenitic S/S Pipe/Plate		

ATTACHMENT A Nitrogen Backing Gas with Argon Shielding Gas

A.1 WPS NASA 300-1-1-1

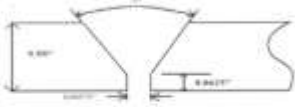
		Southern Inspection & Testing, Inc. 1236 Mac Arthur Ave., Harvey, LA 70058, (504) 347-1752 Welding Procedure Specification - Page 1 WeldOffice WPS	
WPS record number	NASA 300-1-1-1	Revision	1
Date	8/27/2008	Qualified by	ASME Section IX and B31.3, ASME Section VIII
Supporting PQR(s)	NASA 300-1-1 - Rev 1	Company name	Jacobus Technology
Reference docs.			
Scope	Groove, fillet, no PWHT (As-welded), impact testing		
Joint	Joint details for this welding procedure specification in JOINTS section of the WPS		
BASE METALS (QW-403)			
Type	Austenitic stainless steel	P-no.	8
Welded to	Austenitic stainless steel	P-no.	8
Backing	None	Grp-no.	1
Parameters	None	P-no.	8
Notes			
THICKNESS RANGE QUALIFIED			
		As-welded	With PWHT
		Min.	Max.
Complete pen.	0.063	0.8	-
Impact tested	0.3	0.8	-
Partial pen.	0.063	0.8	-
Fillet welds	no min.	no max.	-
DIAMETER RANGE QUALIFIED			
		As-welded	With PWHT
		Min.	Max.
Nominal pipe size	no min.	no max.	-
THICKNESS RANGE QUALIFIED			
		As-welded	With PWHT
		Min.	Max.
Nominal pipe size	no min.	0.8	-
FILLER METALS (QW-404)			
GTAW	S.S.	ER308L	8
Chemical analysis or Trade name	Oxford Alloys 308L		
Cons. insert	-	-	-
Flux	-	-	-
Consumable insert size	- Optional - - None -		
WELDING PROCEDURE			
Welding process	GTAW		
Type	Manual		
Minimum preheat/interpass temperature (°F)	50		
Maximum interpass temperature (°F)	400		
Tungsten size	0.08075		
Tungsten type	SFA 5.12 EWTh-2		
Fillet metal size	0.08075		
Layer number	All		
Position of groove	All		
Weld progression	UpHill		
Current/polarity	DCEN (straight polarity)		
Amperes	130 - 180		
Volts	14.2 - 15.4		
Travel speed	4 - 5		
Maximum heat input	20.568		
DC pulsing current	55.000% AC		
Shielding:	Gas type	Argon	
	Flow rate	10	
Trailing:	Gas type	None	
	Flow rate	-	
Backing:	Gas type	Nitrogen	
	Flow rate	35	
Sting or weave	Weave		
Orifice/gas cup size	8		
Multi/Single pass per side	Multiple passes		
Weld deposit chemistry			
Notes			

Stennis Standard	SSTD-8070-0017-WELD A-1
	Number Rev.
	Effective Date: June 29, 2015
	Review Date: October 05, 2017
Page 8 of 28	
Responsible Office: NASA SSC Center Operations Directorate	
SUBJECT: Welding Procedure for GTAW of Austenitic S/S Pipe/Plate	

Southern Inspection & Testing, Inc.
1236 Mac Arthur Ave., Harvey, LA 70058, (504) 347-1752
Welding Procedure Specification - Page 2
WeldOffice WPS

WPS record number	NASA 300-1-1-1	Revision	1	Qualified to	ASME Section IX and 331.3, ASME Section VIII
Date	8/27/2008	Company name			Jacobs Technology

JOINTS (QW-402) Typical joints. See actual production drawings and engineering specifications for details.



PREHEAT TABLE

Applicable standard	Preheat
ASME 331.3	50 (°F)
ASME Section VIII Div. 1	50 (°F)
ASME Section VIII Div. 2	50 (°F)

TECHNIQUE (QW-410)

Peening	Not Applicable
Surface preparation	All weld joint surfaces shall be cleaned of oil, grease, paint, markings, etc.
Interpass cleaning	Brushing and Grinding
Back gouging method	None

NOTES

Welding Engineer		QA Manager	
Name	Signature	Name	Signature
Renee Swanson	<i>Renee Swanson</i>	Glen Parker	<i>Glen Parker</i>
Date		Date	8/11/09
Customer		Inspector	
Name	Signature	Name	Signature
Douglas G. Pike	<i>Douglas G. Pike</i>	Benjamin McGrath	<i>Benjamin McGrath</i>
Date	8/11/09	Date	8/11/09

WeldOffice WPS 2008 12/3/16
Copyright © 2008 G. Pike Software. All rights reserved. multiple
Page 2 of 3

