



# NavWeld

Intelligent Welding Procedure System



**NavWeld** is a secure, internet-based application that assists the user in developing Procedure Qualification Records (PQR), Welding Procedure Specifications (WPS) and Welder Performance Qualification Records (WPQ) that meet the requirements of various U.S. Navy specifications.

**NavWeld** contains the requirements for arc welding, stud welding, brazing and resistance welding according to the following specifications.

- NAVSEA S9074-AQ-GIB-010/248
- NAVSEA S9074-AR-GIB-010/278
- MIL-STD-1689A
- NAVSEA T9074-AD-GIB-010/1688
- ABS/ NVR – 2007
- NAVSEA 0900-LP-001-7000
- American Welding Society D17.2

## BENEFITS

- ✓ The time and cost required to develop procedures are reduced.
- ✓ The number of issues found by shipyards is reduced, which reduces the cost of revising procedures.
- ✓ The overall time required to review is reduced, thus allowing work to start sooner.

## NAWELD COST

There is NO COST to the suppliers of General Dynamics Electric Boat (GDEB) or Huntington Ingalls Newport News Shipbuilding (HII-NNS). This includes both direct suppliers and sub-tier suppliers.

Others should contact WeldQC for a quote.

## ACCESS TO NAVWELD

To obtain access to NavWeld, contact Troy Paskell at [paskell@weldqc.com](mailto:paskell@weldqc.com) or 614-487-7207 to obtain an User-Agreement. Once the User-Agreement is returned, a User-Name and Password is provided.

## FEATURES

**NavWeld** automatically determines:

- ✓ Essential Elements for PQR, WPS & WPQ,
- ✓ Non-Destructive Tests for PQR & WPQ
- ✓ Destructive Tests for PQR & WPQ,
- ✓ Qualified Ranges of the Essential Elements for PQR & WPQ, and
- ✓ Requirements of the Fabrication Document for PQR & WPS  
(e.g., Preheat & Interpass Temperatures, Base & Filler Combinations, etc.).

Additional features include:

- ✓ Entries are marked as required or optional, and documents are marked as complete or incomplete,
- ✓ Automatically create a WPS based on the qualified ranges of a PQR,
- ✓ Ability to track Vision Tests, Workmanship Training and Welding History for Welders & Brazers, and
- ✓ Ability to search for Welders & Brazers based on their qualifications,

# NavWeld Features

NavWeld identifies the Essential Elements that are required to ensure the document is complete.

Provides help to assist in filling out document.

**Electrical**

Polarity: DCEP - (Reverse)

Amperage: (amps)  \* To  Optional  
(##,##) (##,##)

Arc Voltage: (volts)  \* To  Optional  
(##,##) (##,##)

Wire Feed Speed: (in/min)  \* To  Optional  
(##,##) (##,##)

**Amperage**

The Amperage (Welding Current) that was actually used must be recorded on the PQR. If the Amperage was held constant throughout the entire weld, then enter the value in the minimum box. If the Amperage varied, enter the minimum and maximum values.

Also you may want to record the Amperage for each weld pass. Recording the Amperage per weld pass is especially important when toughness testing and/or control of Heat Input is required.

The Preheat & Interpass Temperatures ( i.e., MIN. & MAX. Temperatures) were checked accordingly to the requirements of the Fabrication Document.

Please review the following messages to determine if any actions are required.

**Preheat/Interpass Rule No. RNG\_MAX:**  
 Either the Maximum Temp. is higher than the Interpass (or lower than the Preheat) specified in the Fabrication Document. In some cases, the Fabrication Document may allow the use of an alternate Minimum Temp. as may be indicated in the following messages.

NavWeld checks the requirements of Fabrication Document.

In this example, the Interpass Temperature exceeded the limits specified in the Fabrication Document.

**Preheat / Interpass** Review Fab. Spec. Messages

Min: (F)   
(##,##)

Max: (F)   
(##,##)

NavWeld determines which NDE and Destructive tests are required on a PQR.

**Visual Test**

NDE Procedure No. (Optional)	Test Performed According to	Acceptance Criteria	Results	Notes/Comments (Optional)
	T9074-AS-GIB-010/271	MIL-STD-2035 Rev.A Class	PASS	

**Radiographic Test**

NDE Procedure No. (Optional)	Test Performed According to	Acceptance Criteria	Results
	T9074-AS-GIB-010/271	MIL-STD-2035 Rev.A Class	PASS

**Liquid Penetrant Test**

NDE Procedure No. (Optional)	Test Performed According to	Acceptance Criteria	Results
	T9074-AS-GIB-010/271	MIL-STD-2035 Rev.A Class	PASS

**Remove this Destructive Test Upon Saving**

**Transverse Tensile Tests -- (Minimum of 2 Full Thickness Tests Required)**

Specimen No.	Test Type	Width/Dia. (in)	Thickness (in)	Area (sq. in)	Total Load (lbs)	Unit Stress (psi)	Failure Type	Failure Location	Specimen Prep Performed Ac
<input type="checkbox"/> Tensile 1	Reduced	0.75	0.5	0.375	14250	38000	Ductile	Base Meta	AWS B4.0-2007
<input type="checkbox"/> Tensile 2	Reduced	0.75	0.5	0.375	14250	38000	Ductile	Base Meta	AWS B4.0-2007

**Remove this Destructive Test Upon Saving**

**Side Bend Tests -- (Minimum of 3 Full Thickness Tests Required)**

Specimen No.	Specimen Width (in)	Specimen Thickness (in)	Bend Radius (in)	Bend Angle (deg)	Specimen Prepared & Test Performed According to	Acceptance Criteria
<input type="checkbox"/> Side Bend 1	0.5	0.25	1.5	180	AWS B4.0-2007	S9074-AQ-GIB-010/248 (4.5.2.3.1)
<input type="checkbox"/> Side Bend 2	0.5	0.25	1.5	180	AWS B4.0-2007	S9074-AQ-GIB-010/248 (4.5.2.3.1)
<input type="checkbox"/> Side Bend 3	0.5	0.25	1.5	180	AWS B4.0-2007	S9074-AQ-GIB-010/248 (4.5.2.3.1)

# NavWeld Features

NavWeld generates a "Qualified Range Report" which defines the range of the Essential Elements that can be used on a WPS based on the PQR.

The qualification range for Thickness from Table 6 of S9074-AQ-GIB-010/248 is displayed in a easier to understand format.

Qualified Range Report for: PQR No.: Stainless Rev No.: PQR Date: 01/20/2013

Scope: This Qualified Range Report lists the qualified ranges of the Essential Elements on a PQR for each Welding Process. The ranges are based on NAVSEA Technical Publication S9071-AQ-GIB-010/248.

Essential Element(Rule No.)	PQR	Level 1 Qualified Range	Level 2 Qualified Range	Tech Pub 248 References	Messages
<b>Welding Process</b>					
Welding Process (WP-1)	GTAW (Non-Pulsed)	PQR Value		4.7.4 b,c	
Process Type (WP-2)	Manual	PQR Value		4.7.4 d & f	
<b>Base Metal</b>					
Base Metal S-No. (BM-1)	0-8 To 0-8	See Base/Filler Table below.			
Base Metal S-No. (BMT-1)	0-8 To 0-8	Base Metals without Toughness.		Table 6 FN9	WPS must be in metals without requirements or if thickness on the less than 1/2-inch Base Metal which was used or
Base Metal Form (BM-22)	Plate To Plate	Unrestricted (See Message)			See Weld Types To Sockets are
Condition or Temper (NR)	Hot Rolled / Hot Rolled	Unrestricted			
Thickness (BM-12)	0.25 (in) / 0.25 (in)	See Thickness Table below.			
Does Base Metal Have Toughness Requirements? (BM-13)	NO / NO	See Table 6 FN9, for additional Qualified Thickness restrictions for welding Base Metals with toughness requirements. Base metals on WPS must be limited to those without toughness requirements or the maximum thickness must be limited to <1/2-inch.		Table 6 FN9	
Is thickness of Base Metal >= 1/2 inch? (BM-15)	NO / NO	See Thickness Table below.			
<b>Weld Joint</b>					
Joint Type (WJ-3)	BV, I (Single-V Butt Joint (welded on backing))	All standard weld joints in MIL-STD-22 or applicable Fabrication Documents, which do NOT cause another Essential Element to exceed its qualified range, and is appropriate for the weld type being used.		4.4.1.7, 4.4.1.8	The following Elements are not Joint Types Classification, Jo Welded from B Sides, Weld T Parameters, or
Joint Backing (WJ-17)	With Joint Backing	With Joint Backing Only for Welds Welded from Single Side Without Joint Backing for Welds Welded from Both Sides		4.7.3.1a	Welds made from are considered as with Back
Backing Type Description (WJ-23)	METAL (Fused)	PQR Value		4.7.3.1d	
Weld Type (WT-1)	Groove	Groove, Fillet, Buildup, Buttering, Repair, Seal (Fillet), & Socket (Fillet). See Message for restrictions.		4.4.1.7, 4.4.1.9, & 4.4.7.2	A Groove Weld Socket (Fillet & Welds in pipe thickness that is > 3/16-inch. Is as other Seal (Fillet (Groove)) V
Weld is Autogenous (no filler used) (WJ-20)	NO	Limited to welds with Filler Metal.		4.4.6	
Primer or Bare (WJ-1)	BARE	Bare Only		4.4.1.11 & 4.4.1.12	
Joint Penetration (WJ-6)	Full	Full or Partial Penetration		4.7.3.1 d	
Welded Single-Both Sides (WJ-13)	Single	Single or Both Sides		4.7.3.1d	
Joint Parameters (NR)	Y: (in) Z: (in) X: (Degrees)	As restricted by MIL-STD-22 or other applicable Fabrication Documents.			
Backing Manufacturer Designation (WJ-32)	Type 304	Unrestricted, but must be appropriate for base and filler metal on WPS.			
<b>Post Weld Heat Treatment</b>					
Postweld Heat Treatment Used (NR)	NONE	PQR Value (Cannot Omit or Add PWHT)			
<b>Filler Metal</b>					
Group No. (A-No.) (FM-1)	A-88	See Base/Filler Table below.			

Page: 1/4 Print Date: 2/19/2014 1:22

This is intended as an example of a document from NavWeld.

Qualified Range Report for: PQR No.: Stainless Rev No.: PQR Date: 01/20/2013

**Base Metal Thickness Table for Groove, Fillet, Socket, and Seal (Fillet) Welds**

Thickness(es) on PQR used to determine qualified thickness(es)	Qualified Base Metal Thickness <sup>1</sup>				Tech Pub 248 References	Additional Info
	Groove <sup>2</sup>		Fillet <sup>3</sup>	Socket & Seal (Fillet)		
	Pipe (min/max)	Plate (min/max)	Pipe & Plate (min/max)	Pipe (min/max)		
Thinnest Base Metal (T) (Tough-1)	0.25	0.058 / 0.499	0.125 / 0.499	0.058 / Unlimited	0.1875 / Unlimited	Table 6 FN(2d, 0.10a, 2f) & Sections 4.4.1.9 & 4.4.

1. If multiple rows are shown, use the most stringent.  
2. Qualified Thickness applies only to the Qualified Weld Types listed above.  
Since you answered NO to "Thickness in production will be >= 1/2 inch", the thickness must be limited to less than 1/2-inch or to the maximum listed in this table, whichever is less.

**Base Metal and Weld Metal Deposit Thicknesses for Buildup, Buttering and Repair Welds qualified by Groove Welds.**

Thickness(es) on PQR used to determine qualified thickness(es)	Qualified Base Metal Thickness <sup>1</sup>		Qualified Weld Deposit Thickness <sup>1</sup>		Tech Pub 248 References	Additional Info
	Weld Buildup, Buttering & Repair Welds		Weld Buildup, Buttering & Repair Welds			
	Pipe (min/max)	Plate (min/max)	Plate (min/max)			
Thinnest Base Metal (T) (Tough-1)	0.25	0.058 / Unlimited	0.125 / Unlimited	Unlimited / 0.499		Table 6 FN(2d, 0.10a, 2f) & Sections 4.4.1.9 & 4.4.

1. If multiple rows are shown, use the most stringent.

**Welding Position Table**

Welding Position	Qualified Welding Positions <sup>1,2</sup>		Tech Pub 248 References	Additional Information
	PQR			
Welding Position (PLG-1)	1G	1F, 1FR, 1G, 1GR, 2F		

1. Qualified Welding Positions only apply to the qualified Weld Types above.  
2. If multiple rows are shown, use the most stringent.

**Base and Filler Metal Table**

PQR	Base Material		Filler Metal	Filler Metal Type	Tech Pub 248 References	Additional Information
	S-No. / Class	S-No. / Class				
PQR	S-8/304	S-8/304	A-88/High Alloy Steel (Austenitic)	MIL-316		
Qualified (AF-SGP-5)	S-8<ALL>	S-8<ALL>	A-88 / High Alloy Steel (Austenitic)		4.7.1a, 4.7.2a	Filler Metal must be appropriate for Base Metal Type. See Fabrication Document.

See base metal section in main table above to determine if Base Metals with Toughness are PERMITTED or NOT-PERMITTED on WPS.

The qualification ranges for Position from Table 4 of S9074-AQ-GIB-010/248 is displayed in a easier to understand format.

The Cross-Qualification of base and filler metals from Table 3 of S9074-AQ-GIB-010/248 is displayed in a easier to understand format.

NavWeld can create a WPS from a PQR using the information from the Qualified Range Report

NavWeld can create a Welder Performance Qualification from a PQR.

Create WPS

Create WPQ

# Frequently Asked Questions

## 1. Do I need to have a current contract with GDEB or NNS?

**NO.** As long as you in the supplier chain for either GDEB and HII-NNS and the company is a "Domestic Concern" which is not subject to foreign ownership, control or influence Foreign Ownership, Control, or Influence (FOCI), as defined in DFARS 225.003.

## 2. Am I required to use NavWeld?

**NO.** Both GDEB and HII-NNS do not require you to use NavWeld. However, since they have found a significant reduction in issues, they strongly encourage the use of NavWeld.

## 3. Can the shipyards or Navy access my procedures in NavWeld?

**NO.** The shipyards and Navy do not have access to your information in NavWeld. You create a PDF in NavWeld and then submit it to the shipyard.

## 4. Can multiple people from my company have access to NavWeld?

**YES.** Users can be added by you or you can contact WeldQC.

## 5. Can I use a consultant to assist with my procedures?

**YES.** The consultant can be given access to NavWeld under your company. However, the person that signs the documents must be an employee of your company.

## 6. Will my procedures be approved, the first time, if I use NavWeld?

**MAYBE.** NavWeld cannot guarantee that your procedure will be approved, the first time. In general, NavWeld has reduced the number of first-time rejections and has significantly reduced the number and severity of issues on a procedure.

## 7. Do I need to install software on my computer?

**NO.** NavWeld is entirely a web-based application. You only need Internet Explorer and a PDF Reader.

## 8. Is training available?

**YES.** Training is provided via a live web-meeting to a single company at a time. Training for the PQR and WPS modules require about 1 to 1-½ hours.

## 8. What does training and support cost?

**NOTHING.** If you are in the supplier chain for GDEB or HII-NNS, there is no cost to you.

## 9. Who do I contact if I have a question regarding NavWeld?

**WeldQC.** WeldQC provides training and support for NavWeld. WeldQC does not provide welding engineering support or provide clarification or interpretations of the Navy specifications. If you are unsure who to contact, start with WeldQC.