NAV28 XXVIII BRAZE/BRAZING PROCESS

I: REQUIREMENTS		
1. Identify the standard the supplier uses for performing brazing.	___ MIL- B-007883B ___ MIL- B-007883 Rev_____ ___ NAVSEA 0900-LP-001-7000	___ OTHER (IF Other, Specify :)

II: ATTRIBUTES:	**YES**	**NO**	**N/A**
2a. Does a written detailed procedure exists and is it utilized for the brazing process? Identify procedure number and revision.	____	____	____
2b. Does a written detailed procedure exist for assembly of components prior to brazing? Identify procedure number and revision.	____	____	____
3. Are procedures readily available?	____	____	____
4. Are inspection procedures utilized for brazing? Identify procedure number and revision:	____	____	____
5. Are inspection and manufacturing personnel trained in use of procedures? Is this recorded and part of employee's file?	____	____	____
6. Are brazing procedures written based on contract invoked requirements or generic and company based standards?	____	____	____

7. Is the procedure approved by the Customer? List Reference Approval Number, if applicable: _____	____	____	____
8. Are procedures/work instructions adequate for control of:			
a. Proper Equipment, etc.	____	____	____
b. Proper Materials, etc.	____	____	____
9. What types of tools are required in the use of the procedures? Specify sample of tools	____	____	____
Remarks:			
10. Does procedure include system for identification of inspection status on parts and documentation? (e.g. inspection stamp)	____	____	____

SECTION II: Record Review:	**YES**	**NO**	**N/A**
11. Identify inspection methods used to verify conformance with procedures and standards	____	____	____
12. a. What inspection documents exist and are they maintained to confirm inspection process was performed?	____	____	____
b. Review and record number of samples:	_____		
ATTRIBUTES:	**YES**	**NO**	**N/A**
13. Is trace ability maintained for material, which has been brazed?	____	____	____
15. Are all tools, gages, meters, utilized for monitoring and/or Inspection a part of the manufacturer's calibration program?	____	____	____
16. Are certifications for raw materials used in brazing process reviewed for acceptance and maintained on file for review?	____	____	____
17. Adequate inspection work records are maintained.	____	____	____
18. The shop traveler and work records can be traced to the inspection personnel.	____	____	____

19. Verify that all completed records are properly reviewed, approved and maintained.	____	____	____
20. Verify Brazer Qualifications.	____	____	____
21. Verify Qualifications database is correct and up to date.	____	____	____
22. Follow up on any past audit findings and corrective actions.	____	____	____
23. Review work packages, Drawings that identify brazing requirements.	____	____	____
24. Randomly select Braze records that have been completed over a period of three (3) months (or longer if few joints were completed) and verify compliance to procedure.	____	____	____
25. Select in-process Braze joint to audit.	____	____	____
SECTION III: OBSERVATION OF BRAZING PROCESS	**SAT** **____**	**UNSAT** **____**	**N/A** **____**

NAV28 XXVIII BRAZE/BRAZING PROCESS

ATTRIBUTES:	SAT	UNSAT	N/A
26. Detailed observation of brazer (complete one section for each brazer observed). NOTE: if determined to be N/A, provide an explanation.	____	____	____
Additional Comments:			

NAV28 XXVIII BRAZE/BRAZING PROCESS

27. Identify process observed. Specify class and type and/or grade.			
	_____	TY-I	Torch
	_____	TY-II	Furnace Brazing
	_____	TY-III	Induction
	_____	TY-IV	Resistance
	_____	TY-V	Dip

28. Brazer identification:			
NAME:	BADGE	CLOCK#	SHIFT

Base material(s) being brazed.

STAINLESS	CARBON STEEL	COPPER	NICKEL	CU/NI	ALUM

* If transition joint mark both materials	SAT	UNSAT	N/A
29. Check Brazing process			

a. Procedure number:

b. Is the Brazer familiar with details of the procedure?	SAT ____	UNSAT ____	N/A ____
30) Verify procedure compliance for:	____	____	____
a) Base material applicability	____	____	____
b) Fitting/Joint dimensions are in accordance with Military specifications or an approved Drawing	____	____	____
c) Braze alloy receipt inspection records are correct.	____	____	____
d) Braze alloy requirements are in compliance (specific combination allowed by procedure is allowed by specification).	____	____	____
II: ATTRIBUTES:	**YES**	**NO**	**N/A**
1. Ensure Brazer qualifications are in accordance with procedure (training records, test, maintenance, requalification, eye exams, corrective lenses, proficiency records, etc.)	____	____	____

NAV28 XXVIII BRAZE/BRAZING PROCESS

2. Verification joint preparation (Squared, De-Burred, any required scribe marks are applied and noted if any deviation is required)	____	____	____
3. Verification of the joint preparation and assembly is performed in accordance with approved procedures	____	____	____
4. Markings Verification	____	____	____
5. Identification markings on fitting for pipe or tube below .125" wall thickness is per procedure.	____	____	____
6. Pre-cleaning	____	____	____
7. Fabrication process (proper brazing technique is being applied, proper size torch tip, joint bends are locked in place, proper face feeding, supplemental face feeding when required and Scribe Lines verified/documented). (When required preheat is verified by use of a surface contact pyrometer or other temp indicating device such as temp sticks, etc.)	____	____	____
8. Type of Filler metal	____	____	____
9. Type of Flux and correct consistency	____	____	____
10. Re-Fit due to time limits (Flux Dries)	____	____	____
11. Preheat	____	____	____
12. Brazing Temperature	____	____	____
13. Repair	____	____	____
14. Face Feed	____	____	____
15. Post cleaning	____	____	____
16. Cooling	____	____	____
17. Flux Removal	____	____	____

18. Heat Treat	____	____	____
19. Passivation	____	____	____
Remarks:			

SECTION IV: INSPECTION	**SAT** ____	**UNSAT** ____	**N/A** ____
ATTRIBUTES:		**SAT**	**UNSAT**
20. Aided Visual Inspection (5X)			
21. Ultrasonic Test (UT) satisfactory?			
22. Contour of joint?			
23. Dimensions? (Especially for evidence of any deviation from fit-up dimensions (e.g., "pull-out" and angular distortion "cocked", verification of material meets fit-up requirements by use of previously applied scribe line to ensure material fabrication is within limits).			
24. Porosity limits?			

Defects Present:	**YES**	**NO**	**N/A**
Pinholes	____	____	____
Concentrated	____	____	____
Linear	____	____	____
Blisters	____	____	____
Residual Flux?	____	____	____
Excess Braze Metal?	____	____	____
Un-melted Alloy?	____	____	____
Undercutting?	____	____	____
Penetration?	____	____	____
Internal Defects (if applicable)?	____	____	____

SECTION V: MATERIAL CONTROL PROCESS	**SAT** ____	**UNSAT** ____	**N/A** ____
ATTRIBUTES:		**SAT**	**UNSAT**
25. Sample material process per ANSI Z1.4, AQL 2.5 or Other approved procedure? Document which Procedure: _____ _____		____	____
26. Are their adequate methods of segregating accepted and rejected materials in use?		____	____
27. Brazing wire, rings, flux, and raw materials have traceable markings on containers.		____	____

What types of brazing materials are used? (List)

	1	**2**	**3**	**4**	**5**	**6**

SECTION V: **CLEANLINESS\ENVIORMENTAL CONTROLS:**	**SAT** ____	**UNSAT** ____	**N/A** ____
ATTRIBUTES:	**SAT**	**UNSAT**	**N/A**
28. Work areas are clean from debris and separate from other areas for brazing operations.	____	____	____
29. Exhaust equipment is utilized in brazing areas to provide fresh air for personnel.	____	____	____
30. Controls exist for handling and disposing of brazing waste.	____	____	____
SECTION VI: **FURNACE CONTROLS**	**SAT** ____	**UNSAT** ____	**N/A** ____
ATTRIBUTES:	**SAT**	**UNSAT**	**N/A**
31. Are automatic temperature controlling and recording devices (potentiometer, e.g.,) provided to controls furnace temperatures?	____	____	____
32. Are de-carbonization tests run when carbon and low alloy steel items are furnace brazed? If so are the Decarburization limits allowed correct (e.g., .003")?	____	____	____
33. Are periodic surveys conducted? Is data available?	____	____	____

34. Is calibration status noted on control/recording equipment?	____	____	____
35. Is the dew point and composition of atmospheres controlled to prevent oxidation or carbonization of carbon, low alloy and stainless steels?	____	____	____
36. What furnace atmosphere is used? a. Argon b. Hydrogen c. Other?	____	____	____
38. Are joint clearances controlled: a. Furnace Braze b. Other Methods c. Aluminum	____	____	____

SECTION VII: OTHER PROCESS CONTROLS	**SAT** ____	**UNSAT** ____	**N/A** ____
ATTRIBUTES:	**SAT**	**UNSAT**	**N/A**
39. Induction Brazing: Are induction coils designed to assure uniform heating?	____	____	____
40. Is Dip brazing bath controlled?	____	____	____
41. Are written instructions provided for the removal of brazing salts and or fluxes? Verify if process is in control.	____	____	____

SECTION VIII: REWORK CONTROLS	**SAT** ____	**UNSAT** ____	**N/A** ____
ATTRIBUTES:	**SAT**	**UNSAT**	**N/A**
42. Are re-worked Braze joints controlled (documented and number of repair attempts prior to requirement for disassembly)?	____	____	____
43. Verify instruction for use of brazing alloy for repair.	____	____	____
44. Ensure Braze joint is re-fluxed prior to repair attempt.	____	____	____
45. Verify the same NDT is used for acceptance of repaired joints during initial fabrication.	____	____	____

46. Ensure proper instructions are prepared and followed for routine repairs.	____	____	____

Additional Comments/Concerns: