GENERAL DYNAMICS
Electric Boat

Resource-01608
Supplier NDT Procedure Review Checklists
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The enclosed checklists are not all inclusive of the information that shall be included in testing procedures, it is only the minimum required by Electric Boat requirements. It is the responsibility of the Examiner to fill in steps that are required to be performed during testing but are not listed in these checklists or the technical publication. As an example of a step that the Examiner shall provide, the Technical Publication requires that adequate lighting be utilized for visible liquid penetrant testing and visible magnetic particle testing, it is the Examiners responsibility to include the steps that are going to be taken to obtain the adequate lighting required by the technical publication. These checklists are not designed to be utilized with MIL-STD-2132, NAVSEA 250-1500-1, or commercial standards (ASME, ASTM, etc.) and do not replace the minimum procedure requirements contained in MIL-STD-2132 and NAVSEA 250-1500-1 but they can be utilized as an aid in developing procedures to these standards.

Electric Boat purchase order standard clause 60-67 requires that any portion of a performance specification that has the word “shall”, must be included in the testing procedure. The requirement will add more than the minimum required in the pertinent section of the performance specification (e.g. 3.3.2 for radiography).

For ultrasonic testing, simple shapes are bars and rods (round, hexagon, square, etc.), rings (rolled on a ring roller), hollow cylindrical shapes (pierced and expanded), discs, pancake shapes, pipe/tubes, and plates. Shapes other than those listed above and parts with features will need specific instructions pertaining to how the parts are to be tested.

For liquid penetrant testing, when utilizing the water washable technique, you need to give all of the rinse details, not just the pressure and temperature of the water. You need to list the maximum rinse time, whether it is a clock time or the status of the part. For the post emulsifiable technique, you need to include all of the steps that are utilized during the removal process, including times for each step(s). If an aqueous developer is being utilized, the application steps must be included in the procedure. Stating that you will follow the manufacturer’s recommendations is not acceptable for any penetrant testing steps.

For magnetic particle testing and liquid penetrant testing, any system performance checks that are performed prior to testing need to be included in the testing procedure. If the performance checks are contained in a separate procedure, the procedure needs to be referenced in the testing procedure.

Furthermore, if you are not performing a technique within a testing method (e.g. not utilizing a radioactive source for radiography) the steps required for the technique do not need to be included in the testing procedure.

If you are performing testing with a procedure that is outside of the requirements in the performance specification, NAVSEA approval of the testing procedure will be required.

Electric Boat specification 2678 requires verbatim compliance with the purchase order requirements. The definition for “Contract Compliance” which can be found in Appendix C of the specification states that “Contract Compliance – is meant to be “Verbatim compliance”, i.e., word for word compliance whether the requirement is in the written word or drawing form.”

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Liquid Penetrant Testing Procedure Review Checklist

NAVSEA Technical Publication T9074-AS-GIB-010/271 Rev. 0 ACN 1 Dated 16 February 1999

Procedure number: _____ **Revision:** _____ **Date:** _____
Addendum number: _____ **Revision:** _____ **Date:** _____

Minimum attributes that are required to be in the procedure	Procedure contains the information? Sat	Unsat	N/A	Procedure section	TP271 Section	Peer Reviewer Initials
1. Has the procedure been previously submitted?	Yes ☐	No ☐	☐			
2. If the procedure was previously submitted, has the revision level and date been changed?	Yes ☐	No ☐	☐			
3. Procedure identified by a unique procedure number, date and revision.	☐	☐	☐			
4. Was the procedure written to the correct performance specification? (verify the required performance specification)	☐	☐	☐			
5. Procedure certification statement. (e.g. I verify that this procedure, this procedure is certified to meet the requirements, I attest to the fact that this procedure, etc.)	☐	☐	☐		1.7.1	
6. Level III Examiner's signature denoting approval. (electronic signatures shall meet the requirements from EB Spec 2678)	☐	☐	☐		1.7.3	
7. Personnel certification requirements. (certified to SNT-TC-1A as modified by TP-271)	☐	☐	☐		1.6, S/C 60-67 E.1	
8. Time of inspection.	☐	☐	☐		1.4	
9. Material type to be tested.	☐	☐	☐		S/C 60-67 E.2	

10. For welds in HY or HSLA materials, does the procedure have the required wait time prior to testing? (8 hours, 24 hours, 7 days) (TP-1688 Table 6-1, 6-2, 6-3) (When PT is used in lieu of MT TP-1688 8.5.1)	☐	☐	☐			
11. Brand name and manufacturer's identifying designation of the cleaning material (solvent) to be utilized for the pre-cleaning of the parts. “or equivalent” is not acceptable.	☐	☐	☐		5.4.2(b)	
12. Brand name and manufacturer's identifying designation of all penetrant materials to be used. “or equivalent” is not acceptable.	☐	☐	☐		5.4.2(a)	
13. Penetrant, emulsifiers, removers, developers on the latest edition of the qualified products list (QPL) of AMS-2644.	☐	☐	☐		5.4	
14. Verify that the materials in the procedure are on the qualified products list, QPL-AMS2644.	☐	☐	☐		5.4	
15. Total halogens and sulphur of each material shall be not greater than 1 percent by weight of the residue.	☐	☐	☐		5.4	
16. For in use material’s (in open tanks), the periodic tests (daily, monthly, quarterly) that are being performed to verify the materials are acceptable for use.	☐	☐	☐		5.4.1	
17. Lighting requirements for visible materials. The procedure cannot just list “adequate lighting”, the procedure needs to identify how adequate lighting is going to be achieved. (Use of auxiliary lighting, number foot candles, etc.)	☐	☐	☐		5.6.8	
18. When visible LED lights are utilized, approval of the type of LED light required by Examiner.	☐	☐	☐		5.6.8	
19. When performing testing with Fluorescent materials, the procedure shall identify the minimum intensity of the ultraviolet light, not less than 800 $mWcm^2$ on the surface.	☐	☐	☐		5.6.8	

20. When performing testing with Fluorescent materials, the procedure shall identify how a darkened area is being satisfied (e.g. area where testing is being performed less than 10 foot candles white light, blacked out with tarps, room without the lights on, etc.)	☐	☐	☐		5.6.8	
21. If an LED ultraviolet light is being utilized, the procedure needs to identify the warm up procedure for the light.	☐	☐	☐		5.6.8	
22. When performing testing with Fluorescent materials, the procedure shall identify the steps to be taken to allow for the Inspectors eyes to adjust to the darkened area prior to evaluating the part for indications. (dark adaptation)	☐	☐	☐			
23. Surface preparation / Pre-cleaning.	☐	☐	☐		5.5, 5.6.2	
24. 26. If acetone or alcohol is **not** used as the final cleaning step, the procedure must have the evaporation technique (forced or natural) and the evaporation time and temperature combination(s) (verified through testing) for the type of cleaner used.	☐	☐	☐	25.	5.6.2	
27. Finished surfaces.	☐	☐	☐		1.4, 5.5.1	
28. Details of method of penetrant application.	☐	☐	☐		5.6.4	
29. Details of penetrant dwell time (minimum and maximum).	☐	☐	☐		5.6.4	
30. Method A not for use on welds. Method C not for use on threads.	☐	☐	☐		5.4	
31. Penetrant testing prior to ultrasonic testing	☐	☐	☐		5.6.1	
32. Temperature of surface and penetrant during penetration. (should indicate that the temperature shall be maintained throughout the testing)	☐	☐	☐		5.6.3	

33. When applicable, the details of method of removing excess penetrant from the surface, method A (including maximum rinse time). The time may not be listed in minutes, it could be listed as "the penetrant removal shall stop when all traces of penetrant have been removed from the surface when viewed with an ultraviolet light".	☐	☐	☐		5.6.5.4	
34. When applicable, the details of method of removing excess penetrant from the surface for methods B and D. (including emulsifier application (details from the emulsifier manufacturer shall be included in the testing procedure, not a reference to the manufacturer's instructions.) and dwell time (minimum/maximum)).	☐	☐	☐		5.6.4.1, 5.6.5.3	
35. Water spray details. (coarse water spray at not less than 12" at an angle oblique angle, water pressure not greater than 40 psig water temperature not greater than 100° F)	☐	☐	☐			
36. When applicable, the details of method of removing excess penetrant from the surface for method C.	☐	☐	☐		5.6.5.1	
37. For method C, flushing of surface with solvent after penetrant application not allowed.	☐	☐	☐		5.6.5.2	
38. Details of surface drying after penetrant removal including the maximum drying time. (details from the manufacturer for surface drying may be included in the testing procedure, not a reference to the manufacturer's instructions.)	☐	☐	☐		5.6.6	
39. Details of how the developer will be applied to the part. (dipping, dust booth, spraying, etc.)	☐	☐	☐		5.6.7	
40. For non-aqueous developer, method for agitation of the developer prior to application (e.g. vigorously agitate the spray can a minimum of 30 seconds after the ball starts to rattle).	☐	☐	☐		5.6.7.1	
41. Length of developing time before inspection. (minimum and maximum)	☐	☐	☐		5.6.7	
42. Post cleaning requirements.	☐	☐	☐		5.6.9	

43. Applicable acceptance criteria. Acceptance criteria shall be self-standing (no references to other documents).	☐	☐	☐		1.3	
44. Non-relevant indication determination requirements.	☐	☐	☐		5.7.1	
45. Inspection record requirements.	☐	☐	☐		5.4.2.2	

Other attributes that should be in the procedure (optional)	**Sat**	**Unsat**	**N/A**	**Procedure Section**	**TP271 Section**	**Peer Reviewer Initials**
46. Definitions	☐	☐	☐		1.5, 5.2	

Concerns/Comments

Magnetic Particle Testing Procedure Review Checklist

NAVSEA Technical Publication T9074-AS-GIB-010/271 Rev. 0 ACN 1 Dated 16 February 1999

Procedure number: _____ **Revision:** _____ **Date:** _____
Addendum number: _____ **Revision:** _____ **Date:** _____

Minimum attributes that are required to be in the procedure	Procedure contains the information? Sat	Unsat	N/A	Procedure Section	TP271 Section	Peer Reviewer Initials
Has the procedure been previously submitted?	Yes ☐	No ☐	☐			
If the procedure was previously submitted, has the revision level and date been changed?	Yes ☐	No ☐	☐			
Procedure identified by a unique procedure number, date and revision.	☐	☐	☐			
Procedure certification statement (e.g. I verify that this procedure, this procedure is certified to meet the requirements, I attest to the fact that this procedure, etc.).	☐	☐	☐		1.7.1	
Level III Examiner's signature denoting approval. (electronic signatures shall meet the requirements from EB Spec 2678)	☐	☐	☐		1.7.3	
Personnel certification requirements. (certified to SNT-TC-1A as modified by TP-271)	☐	☐	☐		1.6, S/C 60-67 E.1	
Time of inspection.	☐	☐	☐		1.4	
The following definitions for Indication, Non-relevant indications, and Relevant indications as a minimum.	☐	☐	☐		4.2	
For HY or HSLA materials, does the procedure have the required wait time prior to testing? (8 hours, 24 hours, 7 days) (TP-1688 Table 6-1, 6-2, 6-3)	☐	☐	☐			
Lighting requirements. The procedure cannot just list "adequate lighting", the procedure needs to identify how adequate lighting is going to be achieved.	☐	☐	☐		4.3.1.1.1	

When visible LED lights are utilized, approval of the type of LED light required by Examiner.	☐	☐	☐		4.3.1.1.1	
When performing testing with Fluorescent materials, the procedure shall identify how a darkened area is being satisfied (e.g. area where testing is being performed less than 10 foot candles white light, blacked out with tarps, room without the lights on, etc.)	☐	☐	☐		4.3.1.1.1	
If an LED ultraviolet light is being utilized, the procedure needs to identify the warm up procedure for the light.	☐	☐	☐		4.3.1.1.1	
When performing testing with Fluorescent materials, the procedure shall identify the steps to be taken to allow for the Inspectors eyes to adjust to the darkened area prior to evaluating the part for indications. (dark adaptation)	☐	☐	☐			
Equipment accuracy checks (calibration) interval requirements. (Amp meter and yoke lift test interval (MIL-I-45208))	☐	☐	☐		4.3.1.7	
The maximum amount of residual magnetism allowed in the part prior to testing (strong remnant field).	☐	☐	☐		4.3.1.6.1	
The method for demagnetizing if the part contains a strong remnant field from a previous operation including the amount of residual magnetism that would require demagnetizing prior to testing.	☐	☐	☐		4.3.1.6	
Surface preparation (finishing and cleaning).	☐	☐	☐		1.4, 4.3.1.4, 4.3.1.4.1	
Inspection through coatings requirements.	☐	☐	☐		4.3.1.3	
Method for determining maximum coating thickness (if any). (if the procedure states that testing may be performed with a coating in place, the procedure is required to have the instructions pertaining to how the coating will be measured)	☐	☐	☐		4.3.1.3	
Material type to be tested.	☐	☐	☐		4.3.1.2(a)	

Shape of parts to be tested.	☐	☐	☐		4.3.1.2(a)	
Sizes of parts to be tested.	☐	☐	☐		4.3.1.2(a)	
Inspection zone for welds (welds and ½" on each side of the weld).	☐	☐	☐		4.3.1.1	
Type of magnetization to be used (circular, longitudinal, or both).	☐	☐	☐		Note 1	
Two direction of magnetization.	☐	☐	☐		4.3.1.5	
Equipment to be used for magnetization. (e.g. Parker B-300, Magnaflux H-700, Gould-Bass 1560W, etc. "or equivalent" is not acceptable.)	☐	☐	☐		4.3.2.1.1,	
Whether wet or dry method to be used.	☐	☐	☐		4.3.2(Wet) 4.3.3(Dry)	
Wet Particle application.	☐	☐	☐		4.3.2.5, 4.3.3.2, 4.3.3.2.2	
Wet Particle removal.	☐	☐	☐		4.3.3.2.1	
Dry Particle application.	☐	☐	☐		4.3.2.5, 4.3.3.2, 4.3.3.2.2	
Dry Particle removal.	☐	☐	☐		4.3.3.2.1	
Type of magnetic particles to be used (e.g. Magnaflux 8A, Circle 778, Met-L-Chek WCP-81, etc. "or equivalent" is not acceptable.).	☐	☐	☐		4.3.2.1, 4.3.3.1	
Agitation of the wet particles (other than stationary unit)	☐	☐	☐		4.3.2.6.1	

The steps that are going to be taken to perform the suspension concentration measurement for the wet method. (it cannot be a copy of the steps in TP-271, the supplier needs to identify how they are performing it)	☐	☐	☐		4.3.2.6.1	
Suspension liquid vehicle requirements for wet method (e.g. Magnaflux Carrier II, Circle Sol M, etc. “or equivalent” is not acceptable.).	☐	☐	☐		4.3.2.2	
Whether continuous or residual method used, wet.	☐	☐	☐		4.3.2.5.1, 4.3.2.5.2	
Whether continuous or residual method is used, dry.	☐	☐	☐		4.3.3.4.3	
Magnetizing current, alternating current [AC] or direct current [DC] requirements. AC magnetization only for yokes.	☐	☐	☐		Note 1	
Coil Magnetizing current, amps	☐	☐	☐		4.3.2.5.7 Note 2	
Circular (direct/indirect) Magnetizing current, amps	☐	☐	☐		4.3.2.5.5 Note 2	
Prod Magnetizing current, amps	☐	☐	☐		4.3.3.3.4 Note 2	
For multi-directional and multi-vector equipment, the steps for the use of a QQI for verification of the field (use of pie gauge is not acceptable). The testing procedure shall be submitted to the Supervisor of Shipbuilding for approval.	☐	☐	☐			
Prod or yoke overlap requirements.	☐	☐	☐		4.3.3.4.1, 4.3.3.4.2	
Information pertaining to the system that will be utilized to positively demonstrate that overlap is being obtained during testing (marking grid on part, marking the leg placement locations, etc.)	☐	☐	☐		4.3.3.4.1, 4.3.3.4.2	
Yoke leg maximum and minimum spacing requirements.	☐	☐	☐		4.3.3.3.3	

Prod spacing minimum and maximum requirements.	☐	☐	☐		4.3.3.3.4	
Magnetization with center conductor, area of inspection on the surface cannot be greater than four times (4X) the diameter of the center conductor,	☐	☐	☐		4.3.1.8, 4.3.3.3.3	
Complex shape requirements.	☐	☐	☐		4.3.1.8, 4.3.3.3.3	
Sketches or a chart showing the typical inspection grid to be used.	☐	☐	☐		Note 1	
Evaluation of indications.	☐	☐	☐		4.4	
The maximum gauss measurement acceptable after testing is complete	☐	☐	☐		4.3.1.6.1	
How the part will be demagnetizing after the completion of testing if demagnetization is required.	☐	☐	☐		4.3.1.6	
Arc strikes requirements (arc strikes from bench, prods, clamps, etc. not welding)	☐	☐	☐		4.7	
Examination record requirements.	☐	☐	☐		4.3.1.9	
Post cleaning requirements.	☐	☐	☐		4.6	
Applicable acceptance criteria. Acceptance criteria shall be self-standing (no references to other documents).	☐	☐	☐		1.3	
Non-relevant indication determination requirements.	☐	☐	☐		4.5	

Note 1: The technical publication does not give specific guidance about what information must be included to satisfy this requirement, section 4.3.1.2 only requires that the information be included.

Note 2: When calculating the amperage for magnetization while developing your technique sheet you are required to use the largest cross section of the part for the calculation. For fasteners the largest cross section would be the distance from opposing corners on the head of the fastener, not the flats. In addition, you will need to calculate an amperage for each different thickness of the part for each direction of magnetization that will be utilized.

Concerns/Comments

Visual Testing Procedure Review Checklist

NAVSEA Technical Publication T9074-AS-GIB-010/271 Rev. 0 ACN 1 Dated 16 February 1999

Procedure number: _____ **Revision:** _____ **Date:** _____
Addendum number: _____ **Revision:** _____ **Date:** _____

Minimum attributes that are required to be in the procedure	Procedure contains the information? Sat	Unsat	N/A	Procedure Section	TP271 Section	Peer Reviewer Initials
Has the procedure been previously submitted?	Yes ☐	No ☐	☐			
If the procedure was previously submitted, has the revision level and date been changed?	Yes ☐	No ☐	☐			
Procedure identified by a unique procedure number, date and revision.	☐	☐	☐			
Procedure certification statement (e.g. I verify that this procedure, this procedure is certified to meet the requirements, I attest to the fact that this procedure, etc.).	☐	☐	☐		1.7.1	
Level III Examiner's signature denoting approval. (electronic signatures shall meet the requirements from EB Spec 2678)	☐	☐	☐		1.7.3	
Personnel certification requirements. (certified to SNT-TC-1A as modified by TP-271)	☐	☐	☐		1.6, S/C 60-67 E.1	
Time of inspection.	☐	☐	☐		1.4	
Lighting requirements. The procedure cannot just list "adequate lighting", the procedure needs to identify how adequate lighting is going to be achieved.	☐	☐	☐		8.7	
When visible LED lights are utilized, approval of the type of LED light required by Examiner.	☐	☐	☐		8.7	
Type of welds or surfaces to be inspected.	☐	☐	☐		Note 1, Note 2	
Specific measuring devices to be used.	☐	☐	☐		Note 1	

Calibration of measuring and test equipment (M&TE).	☐	☐	☐		8.6	
Visual aids, reference standards, workmanship standards.	☐	☐	☐		8.2	
List of inspection attributes (visual characteristics).	☐	☐	☐		Note 1	
The maximum distance the eyes can be away from the weld/part (e.g. 24 inches)	☐	☐	☐		Note 1	
The minimum angle the eyes must be from the surface to be inspected (e.g. 30 degrees)	☐	☐	☐		Note 1	
Indirect visual testing (equipment, acceptance, comparison to reference standard)	☐	☐	☐		8.5	
Visual attributes for inspecting titanium welds (if used for titanium)	☐	☐	☐		TP-278	
Classification of defects.	☐	☐	☐		Note 1	
Applicable acceptance criteria. Acceptance criteria shall be self-standing (no references to other documents).	☐	☐	☐		1.3	
If there is welding on titanium, the titanium color acceptance criteria shall be included. (TP-278 10.3.13 or other specification)	☐	☐	☐		1.3	
Inspection record requirements.	☐	☐	☐		8.4	

Other attributes that Should be in the procedure (optional)	**Sat**	**Unsat**	**N/A**	**Procedure Section**	**TP271 Section**	**Peer Reviewer Initials**
Definitions	☐	☐	☐		1.5	

Note 1: The technical publication does not give specific guidance about what information must be included to satisfy this requirement, section 8.3 only requires that the information be included.

Note 2: This requirement can be satisfied by simply offering an opening statement to the effect that this procedure specifies the requirements for performing the visual inspection of completed fabrication weldments in accordance with (enter applicable specification).

Concerns/Comments

Ultrasonic Testing Procedure Review Checklist

NAVSEA Technical Publication T9074-AS-GIB-010/271 Rev. 0 ACN 1 Dated 16 February 1999

Procedure number: _____ **Revision:** _____ **Date:** _____
Addendum number: _____ **Revision:** _____ **Date:** _____

Minimum attributes that are required to be in the procedure	Procedure contains the information? Sat	Unsat	N/A	Procedure Section	TP271 Section	Peer Reviewer Initials
Has the procedure been previously submitted?	Yes ☐	No ☐	☐			
If the procedure was previously submitted, has the revision level and date been changed?	Yes ☐	No ☐	☐			
Is the procure for UT of castings? If it is for UT of castings it must have a scan plan and be sent to SUPSHIP for approval (TP-1688 - 15.3, TP-278 - 12.3.5).	Yes ☐	No ☐	☐			
Procedure identified by a unique procedure number, date and revision.	☐	☐	☐			
Procedure certification statement (e.g. I verify that this procedure, this procedure is certified to meet the requirements, I attest to the fact that this procedure, etc.).	☐	☐	☐		1.7.1	
Level III Examiner's signature denoting approval. (electronic signatures shall meet the requirements from EB Spec 2678)	☐	☐	☐		1.7.3	
Personnel certification requirements. (certified to SNT-TC-1A as modified by TP-271)	☐	☐	☐		1.6, S/C 60-67 E.1	
The following definitions for angle beam weld testing, as a minimum: Acoustically similar material, ARL, Calibration, Continuous scan, DRL, Full screen height, Peak Indication, Reference calibration standard, Ultrasonic test sensitivity, Ultrasonically sound material.	☐	☐	☐		6.2	

The following definitions for base material testing, as a minimum: Acoustically similar material, ARL, Calibration, Continuous scan, Full screen height, Peak indication, Reference calibration standard, Ultrasonic test sensitivity, Ultrasonically sound material.	☐	☐	☐		6.2	
Time of inspection / Stage of manufacture when test will be performed.	☐	☐	☐		1.4	
For weld testing of HY or HSLA materials, does the procedure have the required wait time prior to testing? (8 hours, 24 hours, 7 days)	☐	☐	☐		TP-1688 Table 6-4	
The Instrument model(s) allowed for the inspection. “or equivalent” is not acceptable.	☐	☐	☐		S/C 60-67 E.2	
Does the procedure address that a single transducer shall be utilized for the instrument qualifications	☐	☐	☐		6.5.1.1	
Equipment qualification method or reference to a qualification procedure. “ASTM E317 or other approved method” not allowed, must identify the actual method to be utilized. If the testing procedure references a separate qualification procedure, the qualification procedure must be submitted if it is not already on file.	☐	☐	☐		6.5.1, S/C 60-67 E.2	
Does the procedure identify the correct acceptance criteria for the basic instrument qualification?	☐	☐	☐		6.5.1.1	
Does the procedure identify that the Resolution is being checked on a standard that is equal to or greater than the thickness of the material to be tested?	☐	☐	☐		6.5.1.1.1.3	
For thickness testing, equipment qualification method or reference to a qualification procedure. If the testing procedure references a separate qualification procedure, the qualification procedure must be submitted if it is not already on file.	☐	☐	☐		6.5.1.3	
Frequency of basic instrument qualification. (6 months max.)	☐	☐	☐		6.5.1.4	
Surface finish.	☐	☐	☐		6.3.2	

Material type to be tested or to be exempt from testing.	☐	☐	☐		6.1	
Shape of parts to be tested or to be exempt from testing.	☐	☐	☐		6.1	
Sizes of parts to be tested or to be exempt from testing.	☐	☐	☐		6.1	
If utilized, automatic defect alarm and recording equipment or both.	☐	☐	☐		Note 1	
Mode of transmission.	☐	☐	☐		6.6.1 thru 6.8.4.4	
Transducer size	☐	☐	☐		6.6.1 thru 6.8.4.4	
Transducer frequency	☐	☐	☐		6.6.1 thru 6.8.4.4	
Transducer angle for angle beam testing, the refracted beam angle for the contact method and the incident beam angle for the immersion method. (if the procedure has both straight and angle beam, must include both angles)	☐	☐	☐		6.5.1.2, 6.6.1 thru 6.8.4.4	
For contact angle beam testing, when knowledge of the exit point is integral to the exam, the method for verification of sound exit point	☐	☐	☐		6.5.1.2	
For contact angle beam testing, the method for verification of testing angle.	☐	☐	☐		6.5.1.2	
For contact testing, the angle of the transducer shall be within 3° of the designated angle	☐	☐	☐		6.5.1.2	
If utilized, special search units, wedges, shoes, or saddles. (this would include any focused search units)	☐	☐	☐		Note 1	
If utilized, rotating, revolving, feeding mechanisms.	☐	☐	☐		Note 1	

The surface from which the test shall be performed. (May be identified on scan plan, technique sheet, figures, etc.)	☐	☐	☐		Dependent upon material and method, Note 1	
Couplant. (The actual couplant to be utilized, not just the description of couplant from TP-271, “or equivalent” is not acceptable.).	☐	☐	☐		6.3.4	
The couplant that is utilized for the calibration is the same as the couplant utilized during the testing.	☐	☐	☐		Table VI note 6	
Description of calibration standard for the appropriate application. (Preferably include a sketch of the standard)	☐	☐	☐		S/C 60-67 E.2	
For longitudinal wave base material testing, calibration standard thickness within 1/8” of part.	☐	☐	☐		Note 3 table VI	
For angle beam base material testing, calibration standard thickness same nominal thickness of the part.	☐	☐	☐			
For base material testing, calibration standard curvature similar to part curvature	☐	☐	☐		Note 3 table VI	
For longitudinal wave base material testing, calibration standard hole diameter.	☐	☐	☐		1.4, Table VI	
For longitudinal wave base material testing, calibration standard hole depth.	☐	☐	☐		1.4, Table VI	
For angle beam base material testing, calibration standard notch size and description.	☐	☐	☐		1.4, Table VII	
When calibration rechecks are required.	☐	☐	☐		6.3.6	
When performed, details of the calibration method for shear wave testing of rings (simple shape).	☐	☐	☐		6.6.1.2.1	
When performed, details of the calibration method for longitudinal wave testing of rings (simple shape).	☐	☐	☐		6.6.1.2.3.1	

When performed, details of the calibration method for longitudinal wave testing of rectangular forgings (simple shape).	☐	☐	☐		6.6.1.3.1	
When performed, details of the calibration method for longitudinal wave testing of bars, disc, and pancake forgings (simple shape).	☐	☐	☐		6.6.1.4.1	
When performed, details of the calibration method for shear wave testing of plate.	☐	☐	☐		6.6.2.2.1	
When performed, details of the calibration method for longitudinal wave testing of plate.	☐	☐	☐		6.6.2.3	
When performed, details of the calibration method for shear wave testing of pipe and tube.	☐	☐	☐		6.6.3.2	
For base material testing, settings cannot be changed after calibration for forged, wrought, and extruded material.	☐	☐	☐		6.6.1	
When performed, details of the calibration method for thickness testing.	☐	☐	☐		6.7.2	
When performed, details of the calibration method of bond testing.	☐	☐	☐		6.8.3	
When performed, details of the calibration method bond testing of non-parallel surface.	☐	☐	☐		6.8.4.3	
When performed, details of the calibration method for forgings that are other than a simple shape.	☐	☐	☐		Note 1	
When performed, details of the calibration method for butt welds, corner welds, tee welds for discontinuities into the through member, and tee weld volumetric inspection.	☐	☐	☐		6.6.4.3.3	
When performed, details of the calibration method for detection of lack of penetration in full penetration tee welds	☐	☐	☐		6.6.4.4.1.2	

When performed, details of the calibration method for detection of discontinuities into the through member of tee joints	☐	☐	☐		6.6.4.4.2.3	
When utilized, the steps for setting the distance amplitude correction (DAC) curve, the time corrected gain (TCG), or time varied gain (TVG).	☐	☐	☐		6.5.2(i), Note 1	
Scanning speed	☐	☐	☐		6.3.3	
Percent of overlap from one pass to the next to be utilized while testing (except when not required by base material specification).	☐	☐	☐		6.3.4	
Scanning sketch for base material testing, (used to convey any pertinent information such as testing surface, scanning direction, direction of wave propagation, part dimensions, etc.)	☐	☐	☐		Note 1	
When performed, scanning method for shear wave testing of rings	☐	☐	☐		6.6.1.2.2	
When performed, scanning method for longitudinal wave testing of rings	☐	☐	☐		6.6.1.2.3.2	
When performed, scanning method for longitudinal wave testing of rectangular forgings	☐	☐	☐		6.6.1.3.2	
Scanning method for longitudinal wave testing of bars, disc, and pancake forgings	☐	☐	☐		6.6.14.2	
When performed, scanning method for shear wave testing of Plate and sheet	☐	☐	☐		6.6.2.2	
When performed, scanning method for longitudinal wave testing Plate and sheet	☐	☐	☐		6.6.2.3.2	
When performed, scanning method for shear wave testing of pipe and tube	☐	☐	☐		6.6.3.3	

When performed, scanning method for forgings that are other than a simple shape.	☐	☐	☐		Note 1	
When performed, scanning method Butt and Corner Welds and the Volumetric Inspection of Tee Welds.	☐	☐	☐		6.6.4.3.4	
When performed, scanning method for Transverse discontinuities (special case).	☐	☐	☐		6.6.4.3.5	
When performed, scanning method for detection of lack of penetration in full penetration tee welds	☐	☐	☐		6.6.4.4.1.3	
When performed, scanning method for Detection of discontinuities into the through member of tee joints	☐	☐	☐		6.6.4.4.2.4	
When performed, scanning method for Volumetric inspection of full penetration tee welds	☐	☐	☐		6.6.4.4.3	
When testing for back wall echo, the method for setting up the back echo attenuator or the method for performing a separate scan. If the acceptance talks about 50% loss of back wall, the procedure should mention how they are monitoring for the loss.	☐	☐	☐			
For angle beam weld testing, the method utilized for differentiating non-relevant (geometric) from relevant indications	☐	☐	☐		Note 1	
For angle beam weld testing, lamination scan of the base material for base material discontinuities that will interfere with the angle beam testing	☐	☐	☐		6.6.4.2.1	
For angle beam weld testing, the method for determining indication length.	☐	☐	☐		6.6.4.3.4.4	
For angle beam weld testing, the method for determining indication depth.	☐	☐	☐		6.6.4.3.4.4	
For angle beam weld testing, the method for determining indication position within the weld zone.	☐	☐	☐		6.6.4.3.4.4	

Compressional wave testing	☐	☐	☐		6.6.4.3.4.3	
Flaw Plotting for bond testing.	☐	☐	☐		6.8.6	
Maximize the signal from discontinuity for evaluation.	☐	☐	☐		6.5.3	
Removal of couplant at the end of testing	☐	☐	☐		6.3.4	
Method of recording inspection results.	☐	☐	☐		6.5.4, 6.6.4.5	
Applicable acceptance criteria. Acceptance criteria shall be self-standing (no references to other documents).	☐	☐	☐		1.3	
If the procedure is for testing a forging that is other than a simple shape (simple shapes are bar, ring, disk, pancake, or rectangular), the procedure shall include specific instructions for calibration and testing. The shape of the forging shall be considered as a whole, not individual features on the forging. Selection of a test method or combination of methods shall be based upon the configuration and the orientation of expected discontinuities in the items to be inspected.	☐	☐	☐		6.3, 6.3.1	
For immersion testing: Method for obtaining search unit alignment (normalization)	☐	☐	☐		Note 1	
For immersion testing: Instructions for setting water path.	☐	☐	☐		Note 1	
Any other variables or requirements which may affect ultrasonic test results.	☐	☐	☐			

Other attributes that Should be in the procedure (optional)	**Sat**	**Unsat**	**N/A**	**Procedure Section**	**TP271 Section**	**Peer Reviewer Initials**
Scanning sketch for base material testing, (used to convey any pertinent information such as testing surface, scanning direction, direction of wave propagation, part dimensions, etc.).	☐	☐	☐		Note 1	

Note 1: The technical publication does not give specific guidance about what information must be included to satisfy this requirement, section 6.5.2 only requires that the information be included.

Concerns/Comments

Radiographic Testing Procedure Review Checklist

NAVSEA Technical Publication T9074-AS-GIB-010/271 Rev. 0 ACN 1 Dated 16 February 1999

Procedure number: _____ **Revision:** _____ **Date:** _____
Addendum number: _____ **Revision:** _____ **Date:** _____

Minimum attributes that are required to be in the procedure	Procedure contains the information? Sat	Unsat	N/A	Procedure Section	TP271 Section	Peer Reviewer Initials
Has the procedure been previously submitted?	Yes ☐	No ☐	☐			
If the procedure was previously submitted, has the revision level and date been changed?	Yes ☐	No ☐	☐			
Procedure identified by a unique procedure number, date and revision.	☐	☐	☐			
Procedure certification statement (e.g. I verify that this procedure, this procedure is certified to meet the requirements, I attest this procedure meets, etc.).	☐	☐	☐		1.7.1	
Level III Examiner's signature denoting approval. (electronic signatures shall meet the requirements from EB Spec 2678)	☐	☐	☐		1.7.3	
Personnel certification requirements. (certified to SNT-TC-1A as modified by TP-271)	☐	☐	☐		1.6, S/C 60-67 E.1	
Statement pertaining to what the procedure will be utilized for (weld, castings, or casting repairs, etc.) and the radiation source (x-ray or isotope).	☐	☐	☐			
Time of inspection.	☐	☐	☐		1.4	
Inspection of heat treated items	☐	☐	☐		3.3.1.2	
Inspection of machined items / castings and forgings	☐	☐	☐		3.3.1.3	
Inspection of weldments	☐	☐	☐		3.3.1.4	

Definition for Material Thickness T_m	☐	☐	☐		3.2.1	
Definition for Specimen Thickness T_s	☐	☐	☐		3.2.4	
Definition for Maximum Effective Radiation Source Dimension	☐	☐	☐		3.2.2	
For HY or HSLA materials, does the procedure have the required wait time prior to testing? (8 hours, 24 hours, 7 days)	☐	☐	☐		(TP-1688 Table 6-4)	
X-ray machine information.	☐	☐	☐		3.3.2.1(a)	
Isotope source information.	☐	☐	☐		3.3.2.1(b)	
Maximum voltage settings and source type for the material type and thickness	☐	☐	☐		3.4.5	
Darkroom facilities	☐	☐	☐		3.4.10	
Film processing method	☐	☐	☐		Note 1	
Film viewing facilities.	☐	☐	☐		3.4.11	
Film viewing equipment. (e.g. LCNDT FV-2010, Cassia DL-1417, etc. “or equivalent” is not acceptable.)	☐	☐	☐		3.4.11.1	
Density-measuring equipment used. (e.g. X-Rite 301, ESECO SM-10T, etc. “or equivalent” is not acceptable.)	☐	☐	☐		3.4.11.1(e)	
Densitometer daily check	☐	☐	☐		3.4.11.1(e), Note 1	
Densitometer periodic (90 day) calibration steps	☐	☐	☐		3.4.11.1(e), Note 1	
Surface preparation.	☐	☐	☐		3.4.12	

Direction of radiation.	☐	☐	☐		3.4.1	
Intensifying screens including type and thickness to be utilized (i.e. .005 Pb front, .010 Pb back)	☐	☐	☐		3.4.2(a)	
Front filters including type, thickness, and location (i.e. .020" thick copper placed on the x-ray tube).	☐	☐	☐		3.4.2(b)	
Back filters.	☐	☐	☐		3.4.2(c)	
1/2" lead letter "B"	☐	☐	☐		3.4.2(c)	
If masking is being utilized, when to utilize masking, where it is placed, and type of material.	☐	☐	☐		3.4.2	
Film type (e.g. Agfa D4, Carestream M100, Fuji IX80, etc. "or equivalent" is not acceptable).	☐	☐	☐		3.4.3	
Film Quality.	☐	☐	☐		3.4.3.1	
Film density.	☐	☐	☐		3.4.3.2	
Multiple film techniques.	☐	☐	☐		3.4.3.3	
Source to film distance.	☐	☐	☐		3.4.6	
Film not in contact with specimen. (Note, verify the wording states to "multiplied" by the ratio not "increased" by the ratio)	☐	☐	☐		3.4.6.2	
Reduced source to film distance.	☐	☐	☐		3.4.6.3	
Radiographic location markers.	☐	☐	☐		3.4.7	
Film identification.	☐	☐	☐		3.4.8	
Penetrameters	☐	☐	☐		3.5	

Penetrameter material.	☐	☐	☐		3.5.1	
Dissimilar metal welds.	☐	☐	☐		3.5.1.1	
Penetrameter dimensions	☐	☐	☐		3.5.2	
Penetrameter identification	☐	☐	☐		3.5.3	
Circular penetrameter number placement (only required with high energy radiation sources)	☐	☐	☐		3.5.3.2	
Penetrameter selection for welds	☐	☐	☐		3.5.4.1	
Penetrameter selection for castings	☐	☐	☐		3.5.4.2	
Penetrameter location	☐	☐	☐		3.5.5.1	
Number of penetrameters and placement for welds.	☐	☐	☐		Table IV	
Film-side penetrameter technique (double-wall exposure)	☐	☐	☐		3.5.5.1.1	
Film-side penetrameter technique (single-wall exposure)	☐	☐	☐		3.5.5.1.2	
When utilizing Ir-192, film side penetrameter requirements	☐	☐	☐		3.5.5.1.2	
Separate block technique.	☐	☐	☐		3.5.5.1.3	
Density requirements for castings and forgings.	☐	☐	☐		3.5.5.2	
Penetrameter requirements for welds.	☐	☐	☐		3.5.5.3	
Shims	☐	☐	☐		3.6	
Shims for backing ring welds	☐	☐	☐		3.6.1	
Shims for consumable insert welds	☐	☐	☐		3.6.2	

Radiographic quality levels	☐	☐	☐		3.7	
X-Ray radiography quality level.	☐	☐	☐		3.7.1	
Isotope radiography quality level.	☐	☐	☐		3.7.2	
Single wall radiography	☐	☐	☐		3.8.1	
Double wall radiograph / Single wall viewing	☐	☐	☐		3.8.2.1	
Double wall radiography / double wall viewing	☐	☐	☐		3.8.2.2	
Radiography of casting repair welds.	☐	☐	☐		3.9	
Radiography of castings and forgings.	☐	☐	☐		3.10	
Applicable acceptance criteria. Acceptance criteria shall be self-standing (no references to other documents).	☐	☐	☐		1.3	
Interpretation of radiographs.	☐	☐	☐		3.4.14	
Radiographic records.	☐	☐	☐		3.4.9, 3.4.15	

Other attributes that Should be in the procedure (optional)	**Sat**	**Unsat**	**N/A**	**Procedure Section**	**TP271 Section**	**Peer Reviewer Initials**
Examples of typical film blemishes	☐	☐	☐		3.4.3.1	
Radiography of other metals.	☐	☐	☐		3.5.1.2	
Radiography of parts.	☐	☐	☐		3.5.5.4	

Note 1: The technical publication does not give specific guidance about what information must be included to satisfy this requirement, section 3.3.2 only requires that the information be included. In addition, paragraph 1.7 of TP-271 requires that testing shall be performed in accordance with written procedures which identifies that the testing procedure shall contain all of the steps to perform the testing.

Concerns/Comments

Eddy Current Testing Procedure Review Checklist

NAVSEA Technical Publication T9074-AS-GIB-010/271 Rev. 0 ACN 1 Dated 16 February 1999

Procedure number: _____ **Revision:** _____ **Date:** _____
Addendum number: _____ **Revision:** _____ **Date:** _____

Minimum attributes that are required to be in the procedure	Procedure contains the information? Sat	Unsat	N/A	Procedure Section	TP271 Section	Peer Reviewer Initials
Has the procedure been previously submitted?	Yes ☐	No ☐	☐			
If the procedure was previously submitted, has the revision level and date been changed?	Yes ☐	No ☐	☐			
Procedure identified by a unique procedure number, date and revision.	☐	☐	☐			
Procedure certification statement (e.g. I verify that this procedure, this procedure is certified to meet the requirements, I attest to the fact that this procedure, etc.).	☐	☐	☐		1.7.1	
Level III Examiner's approval/signature of procedure. (electronic signatures shall meet the requirements from EB Spec 2678)	☐	☐	☐		1.7.3	
Personnel certification requirements. (certified to SNT-TC-1A as modified by TP-271)	☐	☐	☐		1.6, S/C 60-67 E.1	
Time of inspection.	☐	☐	☐		1.4	
Material to be tested (type of alloy)	☐	☐	☐		Note 1	
Summary of process used (Volumetric, non-volumetric, steps utilized to perform testing).	☐	☐	☐		Note 1	
Surface finish.	☐	☐	☐		7.3.1.2	
Equipment description.	☐	☐	☐		7.4	

Performance verification description / Calibration	☐	☐	☐		7.5	
Surface preparation.	☐	☐	☐		7.3.1.2	
Normalization technique.	☐	☐	☐		7.5	
Scanning technique.	☐	☐	☐		7.6	
Evaluation of test results.	☐	☐	☐		7.7	
Inspection record requirements.	☐	☐	☐		7.3.3	
Applicable acceptance criteria. Acceptance criteria shall be self-standing (no references to other documents).	☐	☐	☐		1.3	

Other attributes that Should be in the procedure (optional)	**Sat**	**Unsat**	**N/A**	**Procedure Section**		**Peer Reviewer Initials**
Definitions	☐	☐	☐		1.5	

Note 1: The technical publication does not give specific guidance about what information must be included to satisfy this requirement, section 7.3.2 only requires that the information be included.

Concerns/Comments