

**NAVAL SHIPS' TECHNICAL MANUAL  
CHAPTER 074 - VOLUME 2  
NON-DESTRUCTIVE TESTING  
OF METALS -  
QUALIFICATION AND  
CERTIFICATION  
REQUIREMENTS FOR NAVAL  
PERSONNEL  
(NON-NUCLEAR)**

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## CHAPTER 074

### VOLUME 2 NON-DESTRUCTIVE TESTING OF METALS - QUALIFICATION AND CERTIFICATION REQUIREMENTS FOR NAVAL PERSONNEL (NON-NUCLEAR)

#### SECTION 11. INTRODUCTION

##### 074-11.1 GENERAL

074-11.1.1 The various nondestructive testing (NDT) methods are effective tools for detection of discontinuities in metals and other materials. As the term implies, NDT does not result in alteration or destruction of the tested item. The degree of effectiveness of NDT depends primarily on the use of proper testing techniques that are performed only by qualified and certified personnel.

074-11.1.2 To ensure achievement of uniform and reliable NDT on naval materials and components, implementation of the training, qualification, and certification program described in this chapter shall be followed precisely unless deviations from the requirements are approved by NAVSEA or its authorized representative (see 074-12.1.3).

#### NOTE

THIS CHAPTER FURNISHES BOTH THE MINIMUM AND MANDATORY REQUIREMENTS (INDICATED BY THE WORD SHALL) AND GUIDANCE INFORMATION (INDICATED BY THE WORDS SHOULD OR MAY) NECESSARY FOR NDT AND SAFETY WHEN USED FOR SHIPS MAINTENANCE, REPAIR, AND ALTERATIONS.

##### 074-11.2 REFERENCE DOCUMENTS

#### CAUTION

**All NDT performed aboard or on naval ships shall be in accordance with the applicable mandatory documents.**

074-11.2.1 MANDATORY DOCUMENTS. Mandatory basic reference documents, such as fabrication and repair documents, used for all NDT requirements and NDT methods specified in this chapter are listed in [Table 074-11-1](#). These documents are required to be used as basic mandatory references except where requirements of the documents are specifically modified by this chapter.

074-11.2.2 GUIDANCE DOCUMENTS. In addition to the mandatory reference documents listed in [Table 074-11-1](#), certain documents provide valuable guidance for NDT Operators, NDT Inspectors, and NDT Examiners. They are listed in [Table 074-11-2](#).

074-11.2.2.1 All naval personnel performing NDT for non-nuclear applications shall be qualified and certified in accordance with this chapter.

074-11.2.2.2 All NDT required by the **Welding Standard**, NAVSEA 250-1500-1, shall be performed by personnel qualified to the requirements of NAVSEA 250-1500-1.

**Table 074-11-1. MANDATORY REFERENCE DOCUMENTS**

Identification *	Title
NAVSEA Technical Publication T9074-AD-GIB-010/1688	Requirements for Fabrication, Welding, and Inspection of Submarine Structure
MIL-STD-1689	Fabrication, Welding, and Inspection of Ship's Structure
MIL-STD-2035	Nondestructive Testing Acceptance Criteria
NAVSEA 0900-LP-001-7000	Fabrication & Inspection of Brazed Piping Systems
NAVSEA Technical Publication S9074-AR-GIB-010/278	Requirements for Fabrication Welding and Inspection, and Casting Inspection and Repair For Machinery, Piping and Pressure Vessels
NAVSEA Technical Publication T9074-AS-GIB-010/271	Requirements for Nondestructive Testing Methods
AWS A2.4	Standard Symbols for Welding, Brazing and Nondestructive Evaluation
NAVSEA 0900-LP-999-9000	Acceptance Standards for Surface Finish of Flame or Arc-Cut Material
NAVSEA Technical Publication S9074-AQ-GIB-010/248	Requirements for Welding and Brazing Procedure and Performance Qualification
NAVPERS 18068	Manual of Navy Enlisted Manpower and Personnel Classifications and Occupational Standards
ASTM-E-446	Reference Radiographs for Steel Castings Up to 2 Inches in Thickness
ASTM-E-155	Reference Radiographs for Aluminum and Magnesium Castings
ASTM-E-186	Reference Radiographs for Heavy Walled (2 to 4-1/2 in.) Steel Castings
ASTM-E-272	Reference Radiographs for High Strength Copper Base and Nickel Copper Alloy Castings
ASTM-E-310	Radiographic Acceptance Criteria for Tin Bronze Castings
MIL-STD-2195(SH)	Inspection Procedures for Detection and Measurement of Dealloying Corrosion on Aluminum Bronze and Nickel Aluminum Bronze Components

\* Latest edition of each at time of use.

**Table 074-11-2. GUIDANCE REFERENCE DOCUMENTS**

Identification *	Title	Publisher
ASTM-E-125	Standard Reference Photographs for Magnetic Particle Indications on Ferrous Castings	American Society for Testing and Materials
ASTM E-1316	Standard Terminology for Nondestructive Examinations	American Society for Testing and Materials
Volumes One - Ten	Nondestructive Testing Handbook	American Society for Nondestructive Testing
	Programmed Instruction Books	American Society for Nondestructive Testing
	Radiography in Modern Industry	Eastman Kodak Company
	Welding Inspection Handbook	American Welding Society
Recommended Practice	American Society for Nondestructive Testing Recommended Practice SNT-TC-1A	American Society for Nondestructive Testing



\* Latest edition of each at time of use.

## **SECTION 12.**

### **NOMENCLATURE**

#### **074-12.1 DEFINITIONS**

074-12.1.1 OVERVIEW. Definitions and terminology applicable to this chapter are given in paragraphs 074-12.1.2 through 074-12.1.17.

074-12.1.2 ACTIVITY. All sites of an organization under the same quality assurance management and using the same quality assurance plan performing work to which this chapter is applicable.

074-12.1.3 APPROVAL. The term approval (or approved) means that the item under consideration requires formal acceptance by the Naval Sea Systems Command (NAVSEA) or its authorized representative(s).

074-12.1.4 AUTHORIZED REPRESENTATIVE. An authorized representative is any government representative specifically authorized by NAVSEA to approve equipment, material, or procedures within the scope of the applicable NAVSEA document.

074-12.1.5 CERTIFICATION. Certification (certified) is a written, recorded verification that all qualification requirements have been met.

074-12.1.6 CERTIFICATION EXAMINATION. Certification examination refers to a three-phase (general, specific and practical) examination administered to all NDT levels as the final step to obtain certification in a specific NDT method. Successful completion of this examination is a qualification requirement but is referred to as certification examination to distinguish it from other examinations such as those administered in a formal training course.

074-12.1.7 COGNIZANT NDT EXAMINER. The individual certified as NDT Examiner in one or more specific NDT methods, and who, as a function of that certification, is responsible for training, examination (see section 19), certification, recertification, technical oversight and monitoring of the activity's NDT Inspectors and NDT Operators who are certified, or are candidates for certification, in the same NDT method as the NDT Examiner. The cognizant NDT Examiner may or may not be the work supervisor of the NDT Inspectors and NDT Operators for whom he or she has NDT cognizance.

074-12.1.8 NAVSEA TEST EXAMINER CERTIFICATION AGENCY. The term used to designate a NAVSEA approved agency for examination and certification of naval (fleet) NDT Examiners, and civilian NDT Examiners attached to naval (fleet) activities when specified by NAVSEA. The approved NAVSEA Test Examiner Certification Agency is co-located with the NDT School (see 074-12.1.16). The certification agent is the Commanding Officer, Service School Command, Great Lakes, Illinois, or his or her delegated representative.

074-12.1.9 NDT. The abbreviation used for nondestructive test or nondestructive testing.

074-12.1.10 NDT EXAMINER. An NDT Examiner is an individual examined and certified by the NAVSEA Test Examiner Certification Agency (or other qualification facility authorized by NAVSEA), and designated by the activity to conduct, on an individual basis, written and operational examinations to certify and recertify per-

sonnel to the level of NDT Operator or NDT Inspector, as applicable. The NDT Examiner also approves NDT procedures in accordance with NAVSEA specifications, and monitors NDT performance of NDT Operators and NDT Inspectors. NDT Examiner is an equivalent term to American Society for Nondestructive Testing (ASNT) Level III.

074-12.1.11 NDT INSPECTOR. The individual who accepts or rejects the inspected part or item in accordance with the provisions of the applicable fabrication document and pertinent acceptance standard. For radiography, the film interpreter is the NDT Inspector. For VT, MT, PT, ET and UT, the NDT Inspector conducts the test and evaluates the results. NDT Inspector is an equivalent term to ASNT Level II.

074-12.1.12 NDT LEVELS. An NDT level indicates a level of qualification and certification within a specific NDT method. These levels are NDT Operator, NDT Inspector and NDT Examiner. The terms are equivalent to ASNT Level I, II and III, respectively.

074-12.1.13 NDT METHODS. Six NDT methods currently are in use for purposes of this chapter. They are:

- a. Radiographic Testing (RT)
- b. Ultrasonic Testing (UT)
- c. Magnetic Particle Testing (MT)
- d. Liquid Penetrant Testing (PT)
- e. Visual and Dimensional Testing (VT)
- f. Eddy Current Testing (ET)

074-12.1.14 NDT OPERATOR. An NDT Operator performs or applies the RT method, unless NDT Operator certification for other test methods is approved by NAVSEA. The NDT Operator does not perform evaluation for acceptance or rejection of the inspected component. NDT Operator is an equivalent term to ASNT Level I.

074-12.1.15 NDT PERSONNEL. NDT personnel are certified individuals performing or evaluating any of the NDT methods.

074-12.1.16 NDT SCHOOL. The designated school for the training of NDT personnel (except NDT Examiners). The NDT School is located at US Naval Training Center, Service School Command, NDT School, Great Lakes, Illinois, 60088.

074-12.1.17 QUALIFICATION. The term applied to compliance with training, examinations, and prerequisites as defined in this chapter.

**SECTION 13.**  
**PERSONNEL RADIATION SAFETY**

**074-13.1 GENERAL**

074-13.1.1 PERSONNEL PROTECTION. Personnel must be protected from radiation hazards when performing RT and when using X-Ray machines or radioactive isotopes. Established standards for protection against radiation hazards are in the federal regulations of the Nuclear Regulatory Commission (NRC), and are prescribed in the activity's Navy Radioactive Material Permit (NRMP) issued by the Naval Sea Systems Command Detachment, Radiological Affairs Support Office (RASO), Naval Weapons Station, Yorktown, Virginia, 23691-0260. The use of X-ray machines as energy sources for radiography is subject to the requirements of NAVSEA S0420-AA-RAD-010, Radiological Affairs Support Program (RASP) manual. The standards for radiation protection prescribed by the RASP manual and the NRMP, or other applicable regulations, shall be adhered to precisely.

074-13.1.2 SAFETY PROVISIONS. Some of the safety provisions to protect personnel from radiation hazards are:

- a. Procure an NRMP through the Radiological Affairs Support Office.
- b. Apply NRC regulations and the conditions of the NRMP for all work performed in the NDT area.
- c. Post a copy of the regulations, license, and operating procedures that apply to the work.
- d. Assign only qualified personnel to supervise, operate, and perform work with radiation equipment.
- e. Provide security measures for a radiation area and periodic inspection of the radiographic operations.

## SECTION 14.

### NAVY ENLISTED CLASSIFICATION

#### 074-14.1 GENERAL

074-14.1.1 The skill level and certification level of NDT personnel shall be based on the Navy Enlisted Classification (NEC) rating system. Requirements for certification, recertification, and maintenance of certification of the NECs are described in this section.

074-14.1.2 The NDT School provides formal training courses for achievement of various levels of competence and associated NECs in the six NDT methods (see [074-12.1.13](#)).

074-14.1.3 The NECs that identify levels of competence for NDT personnel are assigned by the Bureau of Naval Personnel, and are listed and described in the Manual of Navy Enlisted Manpower and Personnel Classification and Occupational Standards, NAVPERS 18068(Series), Volume II for NECs (NEC Manual).

#### 074-14.2 NEC ACHIEVEMENT FOR NDT OPERATOR AND NDT INSPECTOR

074-14.2.1 COMPLETION OF FORMAL TRAINING. To achieve an NEC for NDT Operator or NDT Inspector, a trainee must pass examinations at the NDT School covering all course material and, in the case of radiography, is also required to demonstrate the ability to safely handle radioactive isotopes and protect personnel from radiation hazards, in accordance with the rules and regulations of the NRC and the NRMP (see section [13](#)).

074-14.2.2 NEC RECOMMENDATION. Personnel attaining an NDT course completion certificate may be given opportunity to be certified at the NDT School as NDT Operator or NDT Inspector, and shall be recommended for appropriate NEC assignment in accordance with the NEC Manual.

#### NOTE

Personnel failing any or all of the certification examinations at the NDT School may, after further training, be re-examined by the cognizant NDT Examiner attached to the activity.

#### 074-14.3 NEC RETENTION FOR NDT OPERATOR AND NDT INSPECTOR

074-14.3.1 GENERAL. NDT Operators and NDT Inspectors shall be recertified by examination (see section [19](#)) at intervals not greater than three years. This re-examination shall be as comprehensive as that employed in the initial certification. To maintain certification and NEC assignment, not more than nine months (see [074-18.4.1](#)) shall elapse between recorded use of the applicable NEC skills, unless otherwise specified in the governing document. NDT Operators and NDT Inspectors whose certification has lapsed due to failure to use the respective NEC skill in the specified time period shall be re-certified by examination. This examination need only consist of an operational examination administered by the cognizant NDT Examiner. Personnel unable to meet recertification requirements shall be recommended by their commanding officer for removal of their NDT NECs in accordance with the NEC Manual.

074-14.3.2 CERTIFICATION OR RECERTIFICATION AT FLEET ACTIVITIES. Unless otherwise authorized (see 074-14.3.3.), NDT Operators and NDT Inspectors shall be certified or re-certified to retain NECs by the cognizant NDT Examiner attached to the activity. The NDT Examiner shall provide records of the certification or recertification as specified in 074-18.3.2.

074-14.3.3 CERTIFICATION OR RECERTIFICATION OF NDT PERSONNEL FROM ANOTHER ACTIVITY. An activity's NDT Examiner may certify and recertify NDT Operators and NDT Inspectors from another activity provided that a formal request for such services is provided by the requesting activity. If the requesting activity has allowance (NEC billet) for an NDT Examiner, the request shall state actions initiated to obtain a certified NDT Examiner in the NDT method(s) for which certification or recertification services are requested. The request shall state how performance monitoring requirements (see 074-17.1.1) will be accomplished until an NDT Examiner has been obtained. The requesting activity shall provide copies of the applicable NDT procedures in use. The cognizant NDT Examiner shall review the procedures to assure that the certification examination to be administered covers all relevant requirements in the procedures. The NDT Examiner shall notify the requesting activity of the results of the examination and certification as specified in 074-18.3.2.

#### **074-14.4 NEC ACHIEVEMENT FOR NDT EXAMINERS.**

NDT Examiners are certified and recommended for the appropriate NEC specified in the NEC Manual upon satisfactory completion of the certification examination at the NAVSEA Test Examiner Certification Agency, or other qualification activity when authorized by NAVSEA.

#### **074-14.5 NEC RETENTION FOR NDT EXAMINER.**

NDT Examiner NECs shall be retained by examination and recertification in each applicable NDT method at intervals not to exceed five years. The interval may be extended to the last day of the sixtieth calendar month from the month of previous certification. Recertification shall also be required when the NAVSEA Test Examiner Certification Agency verifies that the NDT Examiner is unable to competently perform his or her duties, or as directed by NAVSEA or its authorized representative. Recertification shall be accomplished by repeating all of the examination requirements for original certification (see section 19). The NAVSEA Test Examiner Certification Agency shall recommend removal of NDT Examiner NECs upon failure of the NDT Examiner's activity to schedule recertification examinations within three months of certification lapse, or upon the NDT Examiner's failure to successfully complete the recertification examination after three attempts (see 074-19.4.2). The NAVSEA Test Examiner Certification Agency may defer the recommendation for NEC removal if examination scheduling constraints, or other extenuating circumstances (e.g., forward deployment of the candidate), warrant such deferment.

## SECTION 15.

### REQUIREMENTS FOR NDT EXAMINER QUALIFICATION AND CERTIFICATION

#### 074-15.1 SCHEDULING OF CERTIFICATION EXAMINATION

074-15.1.1 Unless other qualification activities are specified by NAVSEA, NDT Examiner candidates subject to requirements of this chapter shall be examined and certified at the NAVSEA Test Examiner Certification Agency. To obtain certification examination services, each activity shall apply in writing to:

Commanding Officer  
 Service School Command  
 NDT School, NAVSEA Test Examiner Certification Agency  
 US Naval Training Center  
 Great Lakes, IL 60088

074-15.1.1.1 The NAVSEA Test Examiner Certification Agency will inform the requesting activity of the time and location of examination should the candidate meet the minimum prerequisites defined in this chapter.

#### 074-15.2 APPLICATION INFORMATION FOR NDT EXAMINER CANDIDATES

074-15.2.1 The letter of application shall include the names of the individuals to be examined and the assigned activity.

074-15.2.2 The application shall specify the NDT method(s) and applicable specification(s) for which the certification will apply.

074-15.2.3 The NDT Examiner candidate's formal (classroom), and on-the-job training shall be listed along with information on currently held NEC and date the NEC was awarded.

#### 074-15.3 MINIMUM REQUIREMENTS FOR NDT EXAMINER CERTIFICATION IN SPECIFIC NDT METHODS

074-15.3.1 GENERAL. Unless otherwise authorized by NAVSEA, NDT Examiner candidates for certification by the NAVSEA Test Examiner Certification Agency shall be pay grade E-7 or above, or E-6 candidates who are recommended by the activity's commanding officer.

074-15.3.2 RADIOGRAPHIC TESTING. Prerequisites for application for certification as NDT Examiner in RT include satisfactory completion of the NDT School training course for RT Operator and RT Inspector as specified in the NEC Manual. The candidate also must have held the NEC code number, and have been certified for RT, for a minimum period of three years, of which a minimum of one year shall have been at the RT Inspector level of certification.

074-15.3.3 VISUAL AND DIMENSIONAL, MAGNETIC PARTICLE OR LIQUID PENETRANT TESTING. Prerequisites for application for certification as NDT Examiner in VT, MT, or PT include satisfactory completion of the VT, MT, and PT training course specified in the NEC Manual. The candidate also must have held the NEC code number and have been certified as NDT Inspector in VT, MT or PT, as applicable, for a period of one year.

074-15.3.4 ULTRASONIC TESTING. Prerequisites for application for certification as NDT Examiner in UT include satisfactory completion of the UT training course specified in the NEC Manual. The candidate also must have held the NEC and have been certified as UT Inspector for a period of one year.

074-15.3.5 EDDY CURRENT TESTING. Prerequisites for application for certification as NDT Examiner in ET include satisfactory completion of the ET training course specified in the NEC manual. In addition, the applicant must have held the NEC and have been certified as ET Inspector for a period of one year.



**SECTION 16.**  
**CERTIFICATION OF NAVAL NDI PERSONNEL**

**074-16.1 GENERAL**

Naval Air Systems Command (NAVAIR) Nondestructive Inspection (NDI) personnel specialize in nondestructive inspection of aircraft systems and components. NDI personnel receive NAVAIR-invoked training and certification in the same NDT methods specified in this chapter. NDI personnel may be collocated at activities with NDT personnel certified to requirements of this chapter. At the discretion of the activity, NDI personnel may be trained and certified to perform NDT in accordance with this chapter and therefore provide for more efficient utilization of personnel with overlapping NDT knowledge and skills. NDI personnel may achieve certification equivalent to that of NDT personnel certified to requirements of this chapter, or limited certification. Limited certification restricts NDI personnel to perform NDT in accordance with one or more of the activity's specific NDT procedures.

**074-16.2 REQUIREMENTS FOR EQUIVALENT CERTIFICATION.**

The following conditions shall apply for NAVAIR NDI personnel to achieve equivalent NDT certification.

074-16.2.1 The cognizant NDT Examiner shall establish and oversee a program of on-the-job training applicable to the NDT method for which certification is attempted. Such training may be accomplished primarily by NDT Inspectors imparting working knowledge to NDI counterparts. Such on-the-job training may be supplemented by additional training specified by the cognizant NDT Examiner. The cognizant NDT Examiner shall be responsible to ensure that training is sufficient to result in NDI personnel having achieved the supplemental knowledge and skills needed to perform and evaluate NDT to the requirements of this chapter and the applicable NAVSEA specification(s). Evidence of training effectiveness shall be demonstrated by the NDI Inspector's successful completion of a certification examination that is prepared and administered by the cognizant NDT Examiner. The examination shall meet the requirements of section 19.

074-16.2.2 NDI personnel to be certified under this provision shall be currently certified at the inspector level in the applicable corresponding NDI method and shall successfully complete the certification examination.

074-16.2.3 Evidence of successful completion of NAVAIR-administered formal NDT training in the applicable NDT method may be considered equivalent to completion of the requirement for formal training specified in this chapter.

074-16.2.4 NDI personnel certified under this provision shall not be eligible for NECs specified in the NEC Manual for NDT personnel certified to the requirements of this chapter. Certification under this provision shall not be transferable to another activity, however, the cognizant NDT Examiner at the activity receiving NDI personnel previously certified in accordance with this provision may accept evidence of prior certification for a specific NDT method or technique as evidence of completion of training for that NDT method or technique. The cognizant NDT Examiner shall require the transferee to complete a period of NDT performance evaluation, further training to the extent considered necessary by the NDT Examiner, and the certification examination.

074-16.2.5 NDI personnel shall not be certified to perform isotope radiography to specifications referenced in this chapter.

074-16.2.6 All other requirements of this chapter such as recertification interval (see 074-18.4), conditions for maintenance of certification (see 074-18.4.1), and current vision test (see 074-18.5), shall apply for NDI personnel certified in accordance with this provision.

### **074-16.3 REQUIREMENTS FOR ALTERNATIVE LIMITED CERTIFICATION.**

As an alternative to equivalent certification prescribed in 074-16.1 and 074-16.2, NDI personnel may be certified to perform inspections limited to application of one or more of the activity's specific NDT procedures. In these cases, the applicable NDT procedure shall be a stand-alone document containing all of the requirements and information necessary to perform and evaluate results of the applicable NDT method or inspection technique. For example, limited certification in the UT method may encompass certification to apply the NDT procedure for ultrasonic thickness gauging, ultrasonic weld inspection, or both. The extent and type of procedure-specific certification shall be determined by the activity. When the alternative limited certification method is utilized, the conditions specified in 074-16.1 and 074-16.2 shall apply except as follows.

074-16.3.1 Phase II and Phase III (see section 19) of the certification examination may, to the extent practical, be based on the specific NDT procedure for which certification is attempted. For example, written examination material may be entirely derived from contents of the applicable procedure in lieu of being derived from procedure source documents or basic fabrication specifications referenced in the procedure. For Phase III of the examination, the cognizant NDT Examiner may include only test specimens relating to the specific NDT procedure for which certification is attempted.

074-16.3.2 Certification records provided by the cognizant NDT Examiner (see 074-18.3.2) shall clearly specify limitations such as the applicable inspection procedure title and number.

**SECTION 17.**  
**NDT PERSONNEL RESPONSIBILITIES**

**074-17.1 NDT EXAMINER RESPONSIBILITIES.**

The certified NDT Examiner shall be responsible for the training, examination, certification, recertification and performance monitoring of NDT Operators and NDT Inspectors in the method(s) for which the NDT Examiner is certified. The NDT Examiner shall certify or recertify only those individuals who have successfully completed the NDT School course of instruction as specified in the NEC Manual. In addition, the cognizant NDT Examiner shall be responsible for closely supervising initially certified NDT personnel until such time that the NDT Examiner achieves and maintains a high level of confidence that the NDT Operator or NDT Inspector is properly performing his or her NDT responsibilities.

**074-17.1.1 PERIODIC MONITORING OF NDT PERFORMANCE.** The cognizant NDT Examiner shall be responsible for performing periodic NDT performance monitoring, to include but not be limited to personal observation and random re-inspection of previously accepted components. Such monitoring shall be conducted at intervals established by the cognizant NDT Examiner that will result in achieving and maintaining a high level of confidence in the performance of each NDT Operator or NDT Inspector. Monitoring shall be performed for each NDT method for which the NDT Operator or NDT Inspector is certified. If practical, the NDT Examiner shall monitor performance of the applicable NDT method on production work. If it is not practical to monitor production work, the NDT Examiner may administer a sample test specimen representative of components encountered in production inspections. If monitoring results indicate a performance deficiency, the NDT Examiner shall conduct remedial training, or remedial training followed by full or partial examination and recertification, depending on the magnitude of the deficiency as determined by the NDT Examiner. Records of performance monitoring shall be maintained for each NDT Operator or NDT Inspector.

**074-17.1.2 PROCEDURE APPROVAL.** The NDT Examiner shall be responsible for approval of NDT procedures used by personnel under his or her cognizance. Procedures that have been approved by an activity's prior cognizant NDT Examiner need not be re-approved provided the procedures are reviewed and confirmed to be accurate by the current NDT Examiner.

**074-17.1.3 KNOWLEDGE OF NDT METHOD.** The NDT Examiner is responsible for being knowledgeable in all areas required in the NDT method for which he or she is cognizant.

**074-17.2 NDT INSPECTOR RESPONSIBILITIES.**

The NDT Inspector is responsible for performing inspections, and evaluating results for acceptance or rejection, in accordance with the requirements of the applicable specifications and acceptance standards in the NDT method for which certified. The NDT Inspector is responsible for ensuring that personnel who assist him or her in performing an inspection shall also be a certified NDT Inspector in the method being performed, if such assistance may affect results of the inspection.

**074-17.2.1 NDT METHOD PERFORMANCE.** The NDT Inspector shall be thoroughly familiar with the appropriate inspection method and shall be capable of obtaining inspection results in accordance with the applicable specification and acceptance standard.

074-17.2.2 KNOWLEDGE OF EXPECTED DISCONTINUITIES. The NDT inspector shall be familiar with the type and location of expected discontinuities for the fabrication process, material, or stage of manufacture involved.

074-17.2.3 KNOWLEDGE OF METHOD PRINCIPLES. The NDT Inspector shall have a thorough understanding of the theory and principles of the NDT method.

**074-17.3 NDT OPERATOR RESPONSIBILITIES.**

Personnel certified as NDT Operators (certification as NDT Operator in NDT methods other than RT shall require approval, see 074.12.1.14) shall perform inspections in accordance with approved procedures and appropriate specifications and report results to the NDT Inspector. The NDT Operator shall not be permitted to accept or reject, or be responsible for acceptance or rejection of, any part or item inspected, except where the NDT Operator has been certified as NDT Inspector. The NDT Operator (RT) shall be responsible for production of acceptable radiographs, including, but not limited to, use of correct penetrameter, proper exposure technique, item identification, source-to-film distance, and radiographic density.

## SECTION 18

### CONTROL OF CERTIFIED NDT PERSONNEL

#### 074-18.1 GENERAL.

Certified personnel shall not be permitted to perform NDT in a capacity at a higher level than the level at which he or she has been certified. Certification of an individual at NDT Examiner or NDT Inspector in a given NDT method is inclusive of all levels up to and including the level for which he or she is certified.

#### 074-18.2 TRANSFER OF CERTIFIED NDT PERSONNEL.

A certified NDT Examiner may be transferred from one naval activity to another without recertification. NDT Inspectors and NDT Operators transferred from one naval activity to another shall be evaluated by the cognizant NDT Examiner at the receiving activity. After such evaluation, the cognizant NDT Examiner may accept certification of the NDT Inspector or NDT Operator, or may require full or partial examination and recertification.

#### 074-18.3 NDT PERSONNEL CERTIFICATION RECORDS

074-18.3.1 NDT EXAMINER CERTIFICATION RECORDS. Examination records and records indicating the extent of certification of NDT Examiners shall be maintained by the NDT Examiner Certification Agency.

074-18.3.2 NDT INSPECTOR AND NDT OPERATOR CERTIFICATION RECORDS. All certification or recertification actions conducted by the cognizant NDT Examiner shall be documented. The certification record shall be entered into the certified individual's official personnel record (Enlisted Service Record), with copies maintained by the NDT Examiner, placed in the individual's NDT qualification record, and provided to the certified individual. The records shall contain the following minimum information:

- a. Name, rate, and activity of the certifying NDT Examiner
- b. Name, rate, and activity of certified individual
- c. NDT method, and NEC for which certified or recertified
- d. Certification level
- e. Specifications and standards to which certified, including any limitations of the certification
- f. Date of certification or recertification

#### 074-18.4 RECERTIFICATION INTERVALS AND CONDITIONS FOR NDT INSPECTOR AND NDT OPERATOR

074-18.4.1 GENERAL. NDT Inspector and NDT Operator personnel shall be examined (see section 19) and re-certified as follows:

- a. At 3-year intervals from the date of the most recent previous certification in a given NDT method. The interval may be extended to the last day of the thirty-sixth calendar month from the month of previous certification.
- b. When a certified individual has not performed and documented the use of each NDT method for which certified at least once in a nine-month calendar period (see 074-14.3.1) or as specified in the governing document for the method being performed. The interval may be extended to the last day of the ninth calendar month from the month in which the applicable method was last performed.
- c. When the cognizant NDT Examiner has verification that an individual is unable to perform competently at the NDT level to which he or she is certified.
- d. Upon transfer to another activity, unless previous certification is accepted by the cognizant NDT Examiner at the receiving activity (see 074-18.2).

#### **074-18.5 VISION TEST.**

All certified NDT personnel and candidates for the certification examination (see section 19) must show proof of a current satisfactory vision test. NDT personnel or candidates for certification examination not having a current vision test shall not perform NDT or be administered the certification examination until the prescribed vision test has been passed satisfactorily.

074-18.5.1 The vision test shall be repeated annually. The interval may be extended to the last day of the twelfth month from the month of the previous test. The test shall be conducted by a qualified technician using standard test methods for determining visual acuity. The standard for acceptance for vision tests shall be:

- a. Natural or corrected near distance acuity to prove the applicant is capable of reading J-1 letters on the standard Jaeger type chart for near vision.
- b. Ability to distinguish between colors when required by the NDT test method being applied.

#### **074-18.6 HEARING TEST.**

An audiogram is required for personnel performing inspections using equipment with audio and alarm capabilities.

## SECTION 19.

### CERTIFICATION EXAMINATION REQUIREMENTS

#### 074-19.1 GENERAL

074-19.1.1 Certification examination materials shall be oriented toward the NDT application requirements of a naval conversion or repair activity. The examination for all levels of NDT personnel shall consist of the three phases listed in 074-19.2. Development and administration of certification examinations for NDT Inspectors and NDT Operators shall be in accordance with this chapter, the American Society for Nondestructive Testing Recommended Practice SNT-TC-1A as invoked by NAVSEA Technical Publication T9074-AS-GIB-010/271, the governing document listed in [Table 074-11-1](#) for the applicable NDT method, and written instructions provided to the NDT Examiner upon certification by the NAVSEA Test Examiner Certification Agency.

#### 074-19.2 THE THREE-PHASE CERTIFICATION EXAMINATION

074-19.2.1 PHASE I - THEORY AND PRINCIPLES. Phase I of the examination shall be written and shall cover inspection principles relative to the NDT method and level of certification for which the candidate is being tested. This phase of the examination is closed book (without access to reference material except for materials supplied with or in the examination by the cognizant NDT Examiner) and is applicable to all levels of certification. Recommended training references are listed in [Table 074-19-1](#).

074-19.2.2 PHASE II - SPECIFICATIONS AND STANDARDS. Phase II shall be written and shall test the candidate's knowledge of the requirements of the reference documents listed in [section 11](#), and the activity's NDT procedure(s) utilized in the NDT method for which the examination applies. This phase of the examination is closed book (without access to reference material except for materials supplied with or in the examination by the cognizant NDT Examiner), and is applicable to all levels of certification. Phase II shall be comprehensive, but shall be limited to the requirements, specifications, NDT procedures and acceptance standards of the applicable NDT method. For NDT Operator candidates this phase shall not contain questions on acceptance or rejection criteria.

074-19.2.3 PHASE III - OPERATIONAL. Phase III of the examination is applicable to all levels of certification. Phase III shall require the candidate to demonstrate proficiently the ability to employ the necessary equipment and technique in accordance with the requirements of the applicable reference document(s).

#### NOTE

In addition, as part of phase III, a candidate for RT Inspector or RT Examiner shall be required to interpret a selected film group satisfactorily to check for proper radiographic technique, proper film processing, and proper identification and evaluation of discontinuities and conditions detected by radiography.

074-19.2.3.1 Candidates for NDT level other than NDT Operator shall also demonstrate ability to evaluate inspection results for acceptance or rejection.

### 074-19.3 CERTIFICATION EXAMINATION GRADING AND EVALUATION

074-19.3.1 GRADING. The evaluation or grading system applies to both the written and operational portions of the examinations. The evaluation is to be applied uniformly to all individuals, for each phase. A minimum final grade of no less than 80 in any phase is required for all certification levels (NDT Examiner, NDT Inspector, and NDT Operator).

074-19.3.2 PREVENTION OF EXAMINATION COMPROMISE. To ensure that the results of certification examinations will be meaningful in determining the NDT knowledge and skills of examination candidates, the examination material shall be handled by the cognizant NDT Examiner in such a manner that prior knowledge of written material or operational test specimens is known only to the NDT Examiner.

### 074-19.4 CERTIFICATION EXAMINATION RETESTS

074-19.4.1 NDT INSPECTOR AND NDT OPERATOR RETESTS. NDT Inspector and NDT Operator candidates who fail any phase of the certification examination shall be given additional formal (e.g., classroom) or informal (e.g., on-the-job) training, as determined by the cognizant NDT Examiner, prior to retesting in the phase failed.

074-19.4.2 NDT EXAMINER CANDIDATE RETEST. If an NDT Examiner candidate fails one or more phases of the certification examination, the NAVSEA Test Examiner Certification Agency may administer one immediate retest in the phase(s) that were failed. The retest shall only be administered if the candidate has demonstrated understanding of the principles and applications of the NDT method, but failed the examination due to other apparent reasons such as a mathematical error or misunderstanding of examination instructions. Written examinations administered for retest shall not duplicate the original examination by more than twenty percent of the original examination material. Different test specimens or materials shall be used for Phase III (operational) retest. If the NAVSEA Test Examiner Certification Agency considers that the candidate should not be immediately retested, or if the candidate fails the immediate retest, the candidate=s activity shall request re-examination only after the candidate has further prepared for the examination.

074-19.4.2.1 RE-EXAMINATION AFTER MULTIPLE FAILURES. Requests for re-examination after failure of a second examination cycle at the NAVSEA Test Examiner Certification Agency shall describe the additional training or other remedial actions taken in the interim. The NAVSEA Test Examiner Certification Agency shall recommend removal of the applicable NDT Examiner NEC after a third failure. The candidate shall complete at least six months additional NDT Inspector level experience in the NDT method that was failed after the third and each subsequent failure.

### 074-19.5 RECOMMENDED TRAINING REFERENCES

074-19.5.1 Recommended training references, giving document title and author or source, are listed in [Table 074-19-1](#).

**Table 074-19-1 RECOMMENDED TRAINING REFERENCES**

Title *	Author/Source
<b>GENERAL</b>	



**Table 074-19-1** RECOMMENDED TRAINING REFERENCES - Continued

<b>Title *</b>	<b>Author/Source</b>
Metals Handbook, Nondestructive Inspection and Quality Control	ASM
<b>VISUAL/DIMENSIONAL</b>	
Nondestructive Testing Handbook, Vol. Eight	ASNT
<b>RADIOGRAPHY</b>	
Nondestructive Testing Handbook, Vol. Three	ASNT
Handbook of Industrial Radiography Radiography in Modern Industry	J.A. Crowther
	Eastman Kodak Co.
American Society for Testing Materials and Methods, and Recommended Practices: E52, E142, E99, E94, E71, E155	ASTM
<b>MAGNETIC PARTICLE/LIQUID PENETRANT</b>	
Nondestructive Testing Handbook, Vol. Two and Vol. Six	ASNT
Principles of Magnetic Particle Testing	C.E. Betz
Principles of Liquid Penetrant Testing	C.E. Betz
Welding Handbook, Sec. I	American Welding Society
American Society for Testing and Materials: A275, E138, E109, F125, A456	ASTM
<b>EDDY CURRENT</b>	
Nondestructive Testing Handbook, Vol. Four	ASNT
<b>ULTRASONIC</b>	
Nondestructive Testing Handbook, Vol. Seven	ASNT
Nondestructive Testing	W.J. McGonnagle
Ultrasonics	B. Carlin
Welding Handbook, American Society for Testing and Materials, Recommended Practices: E113, E213, E127, E164, E114, E214	ASTM

\*Latest edition of each at time of use

**SECTION 20.**  
**AUDIT AND COMPLIANCE**

**074-20.1 GENERAL.**

To ensure compliance with the provisions of this chapter, the Commanding Officer or Fleet Commander should establish an internal audit system to ascertain that all critical items are properly fabricated or repaired, and properly inspected by qualified and certified NDT personnel. This will help provide assurance of their integrity and reliability.

**NOTE**

Fabrication and repair inspection and acceptance in these areas shall be in strict compliance with all applicable NAVSEA specifications and standards to ensure the necessary quality and reliability.

**074-20.2 COMPLIANCE.**

Compliance must be based on continuous and comprehensive checks of the actual work. No waivers of existing requirements for fabrication, inspection, and acceptance of critical items shall be granted unless written approval has been obtained from NAVSEA or its authorized representative.

**APPENDIX A****TECHNICAL MANUAL DEFICIENCY/EVALUATION REPORT (TMDER)****NOTE**

Ships, training activities, supply points, depots, Naval Shipyards, and Supervisors of Shipbuilding are requested to arrange for the maximum practical use and evaluation of NAVSEA technical manuals. All errors, omissions, discrepancies, and suggestions for improvement to NAVSEA technical manuals shall be reported to the Commander, NAVSURFWARCENDIV, 4363 Missile Way, Port Hueneme, CA 93043-4307 on NAVSEA/ SPAWAR Technical Manual Deficiency/Evaluation Report (TMDER), NAVSEA Form 4160/1. To facilitate such reporting, print, complete, and mail NAVSEA Form 4160/1 below or submit TMDERS at web site <http://nsdsa.phdnswc.navy.mil/tmder/tmder.htm>. All feedback comments shall be thoroughly investigated and originators will be advised of action resulting therefrom. Extra copies of NAVSEA Form 4160/1 may be requisitioned from DDSP Susquehanna Pennsylvania, 05 E Street, Mechanicsburg, PA 17055-5003. (S/N 0116-LP-019-5300)

**TMDER / MAILER**

