

MWI 3410.2

REVISION A

EFFECTIVE DATE: August 3, 1999

EXPIRATION DATE: August 3, 2004

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# **MARSHALL WORK INSTRUCTION**

**QS01**

## **PERSONNEL CERTIFICATION FOR NONDESTRUCTIVE EVALUATION**

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<b>Marshall Work Instruction QS01</b>		
<b>Personnel Certification for Nondestructive Evaluation</b>	<b>MWI 3410.2</b>	<b>Revision: A</b>
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**DOCUMENT HISTORY LOG**

<b>Status (Baseline/ Revision/ Canceled)</b>	<b>Document Revision</b>	<b>Effective Date</b>	<b>Description</b>
Baseline		5/14/99	Document converted from MSFC-P18.1-C02 to a Directive. Previous history retained in system as part of canceled or superseded ISO Document files.
Revision	A	8/3/99	Changed scope to limit personnel certification to work on flight or flight associated hardware. Added requirement for disposition of records after retention period. Updated for changes due to reorganization.

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## 1. PURPOSE

This instruction establishes the minimum requirements for the qualification and certification of MSFC personnel who perform or witness nondestructive testing (NDT) for flight or flight-associated hardware. This instruction provides training/certification requirements and guidelines to meet MWI 3410.1, "Personnel Certification Program," and MPG 3410.1, "Training."

## 2. APPLICABILITY

This instruction does not apply to personnel who perform nondestructive evaluation (NDE) for research only or who perform radiographic inspection of electrical, electronic, electro-mechanical parts.

## 3. APPLICABLE DOCUMENTS

- a. MPD 1280.1, "Marshall Management Manual"
- b. MPG 3410.1, "Training"
- c. MWI 3410.1, "Personnel Certification Program"
- d. SNT-TC-1A, "Personnel Qualification and Certification in Non-Destructive Testing"

## 4. REFERENCES

None

## 5. DEFINITIONS

Refer to MPG 3410.1 and MWI 3410.1 for general certification definitions. The following specific definitions apply:

5.1 NDE Instructor/Examiner. An individual that has the skills and knowledge to plan, organize, and present classroom, laboratory, or on-the-job training programs, in accordance with approved course outlines, in the method for which appointed. The individual shall be familiar with the codes, standards, and other contractual documents that control the method as utilized by MSFC. Contractor personnel certified to American Society of Nondestructive Testing (ASNT) Level III and specialists (see paragraph 6.4.1) may be used to perform instructor/examiner duties to facilitate certification of MSFC personnel.

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5.2 NDE Level I. An individual certified to perform specific calibrations, specific NDT, and specific evaluations for acceptance or rejection determinations according to written instructions and to record results. The Level I shall receive the necessary instruction or supervision from a certified Level II or III individual.

5.3 NDE Level II. An individual certified to set up and calibrate equipment and to interpret and evaluate results with respect to applicable codes, standards, and specifications. The Level II shall be thoroughly familiar with the scope and limitations of the methods for which certified and should exercise assigned responsibility for on-the-job training and guidance of trainees and Level I personnel. The Level II shall be able to organize and report the results of NDT.

5.4 NDE Level III. An individual certified to establish NDE techniques and procedures; interpret codes, standards, specifications, and procedures; and select the specific NDT method, technique, and procedures to be used. The Level III shall be responsible for the NDT operations for which certified and assigned and should be capable of interpreting and evaluating results in terms of existing codes, standards, and specifications. The Level III shall have sufficient practical background in applicable materials, fabrication, and product technology to establish techniques and to assist in establishing acceptance criteria when none are otherwise available. The Level III shall have general familiarity with other appropriate NDT methods, as demonstrated by the ASNT Level III Basic examination or other means. The Level III, in the methods in which certified, shall be capable of training and examining NDT Level I and II personnel for certification in those methods.

5.5 Trainee. An individual who is participating in a training program for a nondestructive inspection (NDI) or NDT method and is not certified. Trainees shall not independently conduct tests; make, accept, or reject decisions; or perform any other NDI or NDT functions.

## **6. INSTRUCTIONS**

This instruction details training, experience, and examination requirements for the following methods:

- a. Liquid Penetrant Testing (PT)
- b. Magnetic Particle Testing (MT)

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- c. Ultrasonic Testing (UT)
- d. Radiographic Testing (RT)
- e. Eddy Current Testing (ET)

6.1 Other Methods. This instruction may be used to certify individuals to other methods (i.e., thermography, computed tomography, shearography, or acoustic emissions). If certification is required, this procedure may be amended or the general guidelines may be used. In all cases, the personnel requirements of the process specification for which certification is being sought shall be met. Certification requirements for other methods shall be submitted to the certifying officer for approval.

6.2 Levels of Certification. The following levels of certification are established for each NDE method:

- a. NDE Level I
- b. NDE Level II
- c. NDE Level III

6.3 Levels of Qualification. There shall be five levels of personnel qualification:

- a. Trainee
- b. Level I
- c. Level II
- d. Instructor/Examiner
- e. Level III

6.4 Training and Experience Requirements. Candidates for certification as Level I or Level II shall complete sufficient organized training to become familiar with the principles and practices of the applicable test method and techniques. The training shall be conducted in accordance with a course outline developed using the training course outlines of SNT-TC-1A as a guide. The training will include requirements from the specifications and procedures used to perform the method. The

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training shall cover basic principles, products, equipment, operating procedures and techniques, and the applicable specifications, codes, and instructions used by MSFC. After May of 1998, all trainees shall maintain a logbook documenting hours of on-the-job experience for each method. The logbook shall reference work authorizing documents, test reports, and other supporting documents, as applicable.

6.4.1 Specialist Personnel. The training shall be presented by an instructor or a Level III with the exception that specialist personnel not qualified to this standard may be used to provide instruction on highly specialized topics.

6.4.2 Exams. An individual must pass a final exam in order to receive credit for a block of training hours.

6.4.3 Minimum Required Training and Experience Hours. The minimum training and experience hours for Levels I and II are given in Table I for a variety of NDI/NDT methods. The minimum training and experience hours for those methods not covered by Table I shall be as determined by the Level III and agreed upon by the certifying officer. There are no additional training requirements to transition from Level II to Level III, nor can an individual have sufficient training to allow certification to Level III without prior certification as a Level II or performance equivalent to a Level II.

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TABLE I. TRAINING AND EXPERIENCE REQUIREMENTS

Examination Method	Level	Initial Training (Hours)		Experience Level (Months)
		High School Graduate or Equivalent	Completion with a Passing Grade of at Least 2 Years of Study in Science or Engineering at a College Level	
ET	I	40	24	3
	II	40	40	9
MT	I	12	8	1
	II	8	4	3
PT	I	4	4	1
	II	8	4	2
RT	I	39	29	3
	II	40	35	9
UT	I	40	30	3
	II	40	40	9

Notes:

(1) For Level II certification, the experience shall consist of the time at Level I or equivalent. If an individual is being initially certified at Level II without prior Level I experience, then the experience required is the sum of the experience required for Levels I and II and the training required is the sum of the training required for Levels I and II.

(2) Listed training hours may be adjusted by the examiner/certifying officer depending on the candidate's formal education level.

6.4.4 Previous Training/Experience. Training or experience obtained from a prior employer shall be documented before it may be accepted by MSFC.

6.4.5 Equivalent Experience. For personnel certified under other qualification/certification programs, the equivalency of their previous experience to the requirements of Table I will be determined and documented.

6.4.6 Experience Required for Witnessing. The experience requirements for certification to witness NDT are one-fourth of the values in Table I.

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6.4.7 Examinations. Verification of technical qualifications of personnel shall consist of a general, specific, and a practical examination. Development of an NDT procedure may be substituted for the Level III practical exam if the individual does not perform NDT for acceptance of in-scope hardware. SNT-TC-1A may be used as a guide in developing examinations.

6.4.7.1 Physical. Near vision and color perception tests shall be administered prior to certification or recertification. These tests shall be documented on MSFC Form 4293. The tests will be per the following requirements:

a. Near Vision. When tested using a Jaeger #2 test chart or equivalent at not less than 12 inches, vision in one eye must be 20/20, either natural or corrected.

b. Color Perception. Distinguish and differentiate between the colors used in the method for which certification is sought.

## 6.5 Certification.

6.5.1 Certification. Personnel who have demonstrated that they possess the appropriate qualifications shall be certified by the MSFC certifying officer in accordance with this instruction. A minimum composite score of 80 percent is required for certification. The composite score is the simple average of the general, specific, and practical exams.

6.5.2 Revocation of Certification. Certification shall be revoked when the individual does not perform NDI/NDT in the method certified for at least 24 months or the individual's performance is found to be deficient.

6.5.3 Recertification. Levels I and II personnel shall be recertified at intervals not to exceed 3 years. Level III personnel shall be recertified at intervals not to exceed 5 years. The physical and practical examinations, equivalent to those required for initial certification, shall be given prior to recertification. Alternately and with prior approval of the certifying officer, the practical exam may be replaced by a demonstration of proficiency with the results documented or by a documented audit of actual work performed.

## 7. **NOTES**

General training and certification responsibilities are detailed in MPG 3410.1 and MWI 3410.1.

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**8. SAFETY PRECAUTIONS AND WARNING NOTES**

None

**9. RECORDS**

The certifying officer or examiner shall maintain certification records for personnel for 10 years from the date of certification/recertification. The records shall include:

- a. Name of the individual certified.
- b. Level, method, and techniques for which individual is certified.
- c. Results of all qualification examinations and audits of work performed.
- d. Date and expiration of current certification(s).
- e. History of all previous NDT/NDI certifications with current employer.
- f. Training history which identifies source and dates of training and course hours.
- g. Experience history, both with current and previous employers, sufficient to justify satisfaction of experience requirements for certification. A statement from the current supervisor may be used as a substitute.
- h. Results of physical examinations including MSFC Form 4293, MSFC Medical Center Eye Exam.
- i. Extent and documentation of formal education.

After 10 years, the records shall be maintained as historical records if the employee is still active in the method; otherwise they shall be destroyed.

**10. PERSONNEL TRAINING AND CERTIFICATION**

None

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**11. FLOW DIAGRAM**

None

**12. CANCELLATION**

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Original Signed by

A. G. Stephenson  
Director