



# Standard Guide for Establishing Procedures to Qualify and Certify Personnel Performing Coating and Lining Work Inspection in Nuclear Facilities<sup>1</sup>

This standard is issued under the fixed designation D4537; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon ( $\epsilon$ ) indicates an editorial change since the last revision or reapproval.

## 1. Scope

1.1 This guide delineates the requirements for development of procedures for the qualification and certification of personnel who perform inspection of coating and lining work. Establishment of qualification requirements to verify conformance to specified requirements for nuclear facility coating and lining work is necessary to assure satisfactory performance of the inspections and to avoid compromising safety-related coating systems.

1.2 The intent of this guide is to provide a uniform interpretation of the requirements in ANSI/ASME N45.2.6 or ANSI/ASME NQA-1 as applicable, for the inspection of coating and lining work in nuclear facilities.

1.3 It is the intent of this guide to provide a recommended basis for qualification and certification, not to mandate a singular basis for all qualifications. Variations or simplifications of the qualifications described in this guide may be appropriate for special coating and lining work other than safety-related coating and lining systems. Similarly, the qualification and certification process might be abbreviated for work of minor scope such as touch-up.

1.4 *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of whoever uses this standard to consult and establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.*

## 2. Referenced Documents

- 2.1 *ASTM Standards:*<sup>2</sup>  
[D4538 Terminology Relating to Protective Coating and](#)

<sup>1</sup> This guide is under the jurisdiction of ASTM Committee D33 on Protective Coating and Lining Work for Power Generation Facilities and is the direct responsibility of Subcommittee D33.04 on Quality Systems and Inspection.

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<sup>2</sup> For referenced ASTM standards, visit the ASTM website, [www.astm.org](http://www.astm.org), or contact ASTM Customer Service at [service@astm.org](mailto:service@astm.org). For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

[Lining Work for Power Generation Facilities](#)  
[D5144 Guide for Use of Protective Coating Standards in Nuclear Power Plants](#)

[D5498 Guide for Developing a Training Program for Personnel Performing Coating and Lining Work Inspection for Nuclear Facilities](#)

2.2 *ANSI/ASME Standards:*<sup>3</sup>

[ANSI/ASME N45.2.6 Qualifications of Inspection, Examination, and Testing Personnel for Nuclear Power Plants](#)

[ANSI/ASME NQA-1 Quality Assurance Program Requirements for Nuclear Facilities](#)

## 3. Terminology

3.1 *Definitions*—Definitions for use with this standard are shown in Terminology [D4538](#) or other applicable standards.

3.2 *Definitions of Terms Specific to This Standard:*

3.2.1 *certification, n*—written documentation of qualification.

3.2.2 *coating and lining work inspection, n*—a phase of quality control that, by means of examination, observation, or measurement, determines the conformance of safety-related coating or lining system applications to predetermined quality requirements. The term inspection as used in this standard shall be understood to mean coating and lining work inspection.

3.2.3 *Level I, II, and III inspection, n*—indicative of the time in grade classification for personnel who perform coating and lining work inspection. Each level reflects progressive experience and responsibility. This term is separate from and differs distinctly from Coating Service Levels. The latter term reflects differing locations throughout a nuclear plant where safety-related and other coatings are found. (See Terminology section of Guide [D5144](#) for definitions of Coating Service Levels I, II, and III.)

3.2.4 *personnel performing coating work inspection, n*—individuals whose job functions include but are not necessarily limited to coating and lining work inspection.

<sup>3</sup> Available from American National Standards Institute (ANSI), 25 W. 43rd St., 4th Floor, New York, NY 10036, <http://www.ansi.org>.

3.2.5 *qualifications, n*—skills, training, and experience required for personnel to perform properly the duties and execute the responsibilities of the appropriate certification level.

3.2.6 *safety-related coating or lining system, n*—a coating or lining system used inside or outside of the reactor containment, the detachment of which could adversely affect the safety function of safety-related structures, systems, or components (SSC).

3.2.7 *training, n*—the program developed to ensure that personnel receive the knowledge and skills necessary for qualification.

#### 4. Significance and Use

4.1 The requirements of this guide apply to personnel who perform coating and lining work inspection during (1) fabrication, (2) receipt of items at the construction site, (3) construction, (4) pre-operational and startup testing, and (5) operational phases of nuclear facilities.

4.2 It is the responsibility of each organization participating in the project to ensure that only those personnel within their respective organizations who meet the requirements of this guide are permitted to perform coating and lining work inspection activities covered by this guide.

4.3 The organization(s) responsible for establishing the applicable requirements for activities covered by this guide shall be identified, and the scope of their responsibility shall be documented. Delegation of this responsibility to other qualified organizations is permitted and shall be documented.

4.4 It is the responsibility of the organization performing these activities to specify the detailed methods and procedures for meeting the requirements of this guide, unless those methods and procedures are otherwise specified in the contract documents.

4.5 In the event of conflict, users of this guide must recognize that the licensee’s plant-specific quality assurance program and licensing commitments shall prevail with respect to the process of qualifying personnel performing inspection of coating and lining work.

#### 5. General Requirements

5.1 Provisions shall be made for the indoctrination of personnel performing coating and lining work inspection as to the technical objectives of the project, the codes and standards that are to be used, and the quality assurance elements that are to be employed.

5.2 The need for and content of formal training programs shall be determined, and such training activities shall be conducted as required to qualify personnel who perform coating and lining work inspection. The extent of on-the-job participation (“time in grade”) also shall be addressed in the program, with emphasis on first-hand experience gained through actual performance of inspections.

5.3 A candidate’s qualifications for certification shall be initially determined by a suitable evaluation of the candidate’s education, experience, training, examination results and by a capability demonstration. The qualifying organization’s deter-

minations must reflect definitive criteria with respect to the extent and currency of a candidate’s experience and training.

5.4 The job performance of personnel who perform coating and lining work inspection shall be reevaluated at periodic intervals not to exceed three years. The reevaluation process shall weigh evidence of continued satisfactory performance of inspection for the required extent or determine capability in accordance with 5.3. If, during this evaluation or at any other time, it is determined by the responsible organization that the capabilities of an individual are not in accordance with the qualifications specified for the job, that person shall be removed from that activity until the required capability has been demonstrated.

5.5 Qualification is considered revoked for any person who has not been actively engaged in the performance or supervision of coating and lining work inspection for a period of one year during the certification period. Reevaluation in accordance with 5.3 is required to restore qualification.

#### 6. Functional Qualifications

6.1 All physical coating work inspection activities can be performed by personnel certified as qualified to perform coating and lining work inspection as Level I, Level II, or Level III status as described in the following.

6.2 Personnel certified as having attained Level I status shall be capable of the following:

6.2.1 Implementing and recording all inspections required by the applicable procedures.

6.2.2 Verifying instrument calibration.

6.2.3 Performing hold point inspections in accordance with the applicable procedures.

6.3 Personnel certified as having attained Level II status shall be capable of the following:

6.3.1 Performing all of the duties and responsibilities of Level I status personnel.

6.3.2 Planning and supervising inspections, initiating and reviewing inspection procedures, and evaluating the adequacy of inspection activities performed.

6.3.3 Reviewing, organizing, and approving results of inspections.

6.3.4 Monitoring the performance of and supervising the work of Level I status personnel.

6.3.5 Training and verifying, for certification, the qualifications of candidates for Level I inspection.

6.3.6 Initiating changes to quality procedures.

6.3.7 Implementing the Quality Assurance Program if assigned that authority by company policy or the Quality Assurance Program.

6.3.8 Reviewing and, to the extent permitted under project/plant procedures, documenting approval of quality related aspects of safety-related coating and lining specifications.

6.4 Personnel certified as having attained Level III status, shall have verifiable experience in the U.S. commercial nuclear power industry. As indicated in 5.3, criteria with respect to the extent and currency of that experience must be established. Further, the following capabilities are required:

6.4.1 Carrying out all of the duties and responsibilities of Level II status personnel.

6.4.2 Training and verifying, for certification, the qualifications of candidates for Level I, Level II, and Level III inspection.

6.4.3 Evaluating the adequacy of programs used to train and certify personnel who will perform coating and lining work inspection.

6.4.4 Authorizing personnel certified to perform Level II inspection to carry out training and examination duties.

6.4.5 Approving safety-related coating and lining work inspection procedures.

## 7. Physical Qualifications

7.1 Individuals who perform coating and lining work inspection shall be examined annually to ensure natural or corrected near-distance visual acuity in at least one eye. The individual shall read the J-1 letters on a Standard Jaeger Test Chart, or equivalent, at a distance of not less than 12 in. with one or both eyes, uncorrected or corrected.

7.2 Each candidate shall be examined for color perception using the Ishihara Test or the Farnsworth D-15 Test when being certified or recertified. If a candidate does not pass the Red/Green Sensitive Ishihara Test, the candidate may take the Farnsworth D-15 Test.

7.3 If a candidate does not pass the Farnsworth D-15 Test, the candidate may be evaluated by a licensed medical practitioner to provide the necessary data to determine the candidate's color perception. An individual certified after an evaluation by a licensed medical practitioner may only be certified to perform inspection work that is within the candidates's color perception capability.

7.4 The examinations required by 7.1 and 7.2 shall be administered by a licensed medical practitioner or a person familiar with the tests involved. The results of vision tests shall be documented on a Vision Test Record (Fig. 1 or equivalent form).

7.5 The responsible organization shall identify any other physical qualifications required to perform the assigned inspection duties. Personnel performing inspection activities requiring the identified physical qualifications shall have those qualifications confirmed by examinations at intervals not to exceed one year.

## 8. Education, Training, and Experience Qualifications

8.1 Candidates for certification to perform coating and lining work inspection shall have sufficient education, experience, and training to ensure an understanding of the principles and procedures in those areas of inspection, examination, and testing activities for which they are being considered for certification.

8.2 Candidates for certification to perform Level I inspection shall, as a minimum, meet one or more of the following requirements:

8.2.1 High school graduation or equivalent plus six months of related experience in equivalent inspection activities.

8.2.2 Completion of college level work leading to an Associate Degree or higher, plus three months of related experience in equivalent inspection activities.

8.3 Candidates for certification to perform Level II inspection shall, as a minimum, meet one or more of the following requirements:

8.3.1 High school graduation or equivalent plus one year of satisfactory performance of Level I inspection in a corresponding inspection activity.

8.3.2 High school graduation or equivalent plus three years of related experience in equivalent inspection activities.

8.3.3 Completion of college level work leading to an Associate Degree plus one year of related experience in equivalent inspection activities.

8.3.4 Four-year college graduation plus six months of related experience in equivalent inspection activities.

8.4 Candidates for certification to perform Level III inspection shall meet one or more of the following requirements:

8.4.1 High school graduation or equivalent plus six years of satisfactory performance of Level II inspection in a corresponding inspection activity.

8.4.2 High school graduation or equivalent plus ten years of related experience in equivalent inspection activities; or high school graduation plus eight years experience in equivalent inspection activities, with at least two years satisfactory performance of Level II inspection. The candidate shall have at least two years associated with nuclear facilities or sufficient training to be knowledgeable of the quality assurance requirements for nuclear coating work.

8.4.3 Completion of college level work leading to an Associate Degree and seven years of related experience in equivalent inspection activities. The candidate shall have at least two years of this experience associated with nuclear facilities.

8.4.4 Four-year college graduation plus five years of related experience in equivalent inspection activities. The candidate shall have at least two years of this experience associated with nuclear facilities.

8.5 Compliance with the requirements of 8.1, 8.2, 8.3, and 8.4 shall be documented on an Education and Experience Record (Fig. 2 or equivalent form).

8.6 Training leading to qualification or requalification to perform coating and lining work inspection shall be documented on an Organizational Training Record (Fig. 3 or equivalent form). Guidance on developing training for personnel performing coating and lining work inspection is provided in Guide D5498.

VISION TEST RECORD

Expires \_\_\_\_\_

NAME: \_\_\_\_\_  
(Last)
(First)
(Middle Initial)

JOB NUMBER: \_\_\_\_\_ JOB NAME: \_\_\_\_\_

NEAR DISTANCE VISUAL ACUITY

1. Jaeger J-1 letters  
 Uncorrected, normal YES NO  
 Corrected, normal YES NO  
 -OR-

2. Alternative Method: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 Uncorrected, normal YES NO  
 Corrected, normal YES NO

COLOR VISION

1. Ishihara's test chart YES NO  
 2. Alternative Method: \_\_\_\_\_

Color vision test findings: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

The above-named individual has Passed/Failed the vision test as specified in Section 7 of this Guide.

THIS CERTIFICATION IS VALID FOR ONE YEAR FROM THE DATE OF EXAMINATION.

EXAMINER: \_\_\_\_\_  
Type or print name followed by signature

TITLE: \_\_\_\_\_ DATE: \_\_\_\_\_

**FIG. 1 Sample Vision Test Record**

**9. Examination**

9.1 Each candidate shall be given an examination covering the general, specific, and practical aspects of coating and lining work inspection. The general and specific portions of the examination may be written, in the form of a personal interview, or a combination of both. The examination results shall be documented in accordance with 11.1.

9.1.1 The general portion of the examination shall cover the basic principles of quality assurance and coating and lining work inspection.

9.1.2 The specific portion of the examination shall cover specific coating and lining work requirements and inspection procedures.

9.1.3 The practical portion of the examination shall cover the use of coating and lining work inspection equipment and inspection procedures.

9.1.4 All parts of the examination for candidates to perform Level I or Level II inspection shall be administered by an individual certified to perform Level III inspection or a duly authorized individual certified to perform Level II inspection.

9.1.5 Examinations for candidates to perform Level III inspection shall be administered by an individual certified to perform Level III inspection or by the responsible organization's management.

**10. Performance**

10.1 Personnel assigned the responsibility and authority to perform functions covered by this guide shall have, as a minimum, the appropriate level of functional qualifications given in Section 6. When a single inspection requires implementation by a team or group, personnel not meeting the requirements of this guide may be used in data-taking assignments or in plant or equipment operation provided they are supervised or overseen by an individual participating in the inspection who is certified as qualified per this guide.

10.2 Personnel certified to perform coating and lining work inspection shall submit an annual a summary of coatings and lining-related inspection/testing activities performed between certification anniversary dates in order to maintain the validity of the certification. For personnel certified as qualified to



ORGANIZATIONAL TRAINING RECORD

NAME: \_\_\_\_\_  
(Last)
(First)
(Middle Initial)

TRAINING COURSES, SEMINARS, LECTURES, ETC.

Given by and Date	Description of Training	Test Score	Pass/Fail	Initials

**FIG. 3 Sample Organization Training Record**

**12. Records**

12.1 A personnel qualification records file shall be established and maintained by the employer. Collection, storage, and control of records required by this guide shall be in accordance with the requirements of the responsible organization and appropriate specifications.

**13. Keywords**

13.1 coating and lining work inspection; individuals certified to perform Level I, II, and III inspection



