NC-5400  FINAL EXAMINATION OF COMPONENTS

NC-5410  EXAMINATION AFTER PRESSURE TESTING

After the required pressure test of a component constructed of ferritic materials with properties enhanced by quenching and tempering, all pressure-retaining welded joints shall be examined by the magnetic particle or liquid penetrant method on all accessible surfaces.

NC-5500  QUALIFICATIONS AND CERTIFICATION OF NONDESTRUCTIVE EXAMINATION PERSONNEL

NC-5510  GENERAL REQUIREMENTS

Organizations performing Code required nondestructive examinations shall use personnel competent and knowledgeable to the degree specified by NC-5520. When these services are subcontracted by the Certificate Holder or Quality System Certificate Holder, he shall verify the qualification of personnel to the requirements of NC-5520. All nondestructive examinations required by this Subsection shall be performed by and the results evaluated by qualified nondestructive examination personnel.

NC-5520  PERSONNEL QUALIFICATION, CERTIFICATION, AND VERIFICATION

NC-5521  Qualification Procedure

(a) Personnel performing nondestructive examinations shall be qualified in accordance with the recommended guidelines of SNT-TC-1A. The ACCP Level II and III provisions for qualification and certification and the ASNT administered Level II certification provision for qualification and certification of NDE personnel shall not be used for Section III. The Employer’s written practice required by paragraph 5 of SNT-TC-1A shall identify his requirements relative to the recommended guidelines. The recommended guidelines of SNT-TC-1A shall be considered minimum requirements, except as modified in (1) through (5) below.

(1) Qualification of Level III nondestructive examination personnel shall be by examination.

(-a) The basic and method examinations, paragraphs 8.8.1 and 8.8.2 of SNT-TC-1A, may be prepared and administered by the Employer, ASNT, or an outside agency.

(-b) The specific examination, paragraph 8.8.3 of SNT-TC-1A, shall be prepared and administered by the Employer or an outside agency. The Employer or outside agency administering the specific examination shall identify the minimum grade requirement in the written program when the basic and method examinations have been administered by ASNT, which issues grades on a pass/fail basis. In this case, the minimum grade for the specific examination may not be less than 80%.

(2) The written practice identified in paragraph 5 of SNT-TC-1A and the procedures used for examination of personnel shall be referenced in the Employer’s Quality Program.

(3) The number of hours of training and experience for nondestructive examination personnel who perform only one operation of a nondestructive examination method that consists of more than one operation, or perform nondestructive examination of limited scope, may be less than that recommended in Table 6.3.1 A of SNT-TC-1A. The training and experience times shall be described in the written practice, and any limitations or restrictions placed on the certification shall be described in the written practice and on the certificate.

The minimum classroom training times for visual examination personnel identified in Table 6.3.1 A of SNT-TC-1A for Level II certification may be reduced from 16 hr to 8 hr.

(4) For the near-vision acuity examination, the Jaeger Number 1 letters shall be used in lieu of the Jaeger Number 2 letters specified in paragraph 8.2.1 of SNT-TC-1A. The use of equivalent type and size letters is permitted.

(5) An NDE Level I individual shall be qualified to properly perform specific setups, specific calibrations, specific NDE, and specific evaluations for acceptance or rejection determinations according to written instructions and to record results. The NDE Level I individual shall receive the necessary instruction and supervision from a certified NDE Level II or Level III individual. A Level I individual may independently accept the results of nondestructive examinations when the specific acceptance criteria are defined in the written instructions.

(b) For nondestructive examination methods not covered by SNT-TC-1A documents, personnel shall be qualified to comparable levels of competency by subjection to comparable examinations on the particular method involved.

(c) The emphasis shall be on the individual’s ability to perform the nondestructive examination in accordance with the applicable procedure for the intended application.

(d) For nondestructive examination methods that consist of more than one operation or type, it is permissible to use personnel qualified to perform one or more operations. As an example, one person may be used who is qualified to conduct radiographic examination and another may be used who is qualified to interpret and evaluate the radiographs.

NC-5522  Certification of Personnel

(a) The Employer retains responsibility for the adequacy of the program and is responsible for certification of Levels I, II, and III nondestructive examination personnel.
(b) When ASNT is the outside agency administering the Level III basic and method examinations [NC-5521(a)(2)], the Employer may use a letter from ASNT as evidence on which to base the certification.

(c) When an outside agency is the examining agent for Level III qualification of the Employer’s personnel, the examination results shall be included with the Employer’s record.

NC-5523 Verification of Nondestructive Examination Personnel Certification

The Certificate Holder has the responsibility to verify the qualification and certification of nondestructive examination personnel employed by Material Manufacturers and Material Suppliers qualified by them in accordance with NCA-3820 and subcontractors who provide nondestructive examination services to them.

NC-5530 RECORDS

Personnel qualification records identified in paragraph 9.4 of SNT-TC-1A shall be retained by the Employer.

NC-5700 EXAMINATION REQUIREMENTS FOR EXPANSION JOINTS

NC-5720 BELLOWS EXPANSION JOINTS

The examinations stipulated in (a) through (f) below are required to verify the integrity of bellows expansion joints for installation in components.

(a) The formed bellows shall be determined to be free of defects such as notches, crevices, material buildup or upsetting, weld spatter, etc., by visual examination. Suspect surface areas shall be further examined by liquid penetrant examination in accordance with NC-5110.

(b) The longitudinal seam welds in the bellows shall be examined by the liquid penetrant method in accordance with NC-5110. When the individual ply thickness exceeds \( \frac{1}{6} \) in. (3 mm), the weld shall also be radiographed in accordance with NC-5110. These examinations may be performed either before or after the bellows is formed.

(c) The circumferential attachment welds between the bellows and pipe or flange shall be liquid penetrant examined in accordance with NC-5110 when the total bellows thickness is \( \frac{1}{6} \) in. (6 mm) or less. When the total thickness exceeds this limit, the weld shall be radiographed in accordance with NC-5110 except where radiography is not meaningful, such as when the weld thickness constitutes less than 20% of the total thickness being radiographed, liquid penetrant examination may be substituted.

(d) In the case of liquid penetrant examination of bellows welds, imperfections producing the following indications are unacceptable:

1. cracks or linear indications;
2. four or more rounded indications in a line separated by \( \frac{1}{16} \) in. (1.5 mm) or less edge to edge;
3. five or more randomly distributed rounded indications in a weld length of 6 in. (150 mm);
4. any rounded indication exceeding the lesser of one-half the bellows thickness or \( \frac{1}{16} \) in. (1.5 mm) in diameter.

(e) The examination of all other welds in the expansion joint shall comply with Article NC-5000.

(f) The variation of the cylindrical end thickness of the formed bellows from the nominal or specified thickness shall not exceed the values given in Table 2 of SA-480. Thinning of the bellows material during forming shall be considered in the design and selection of material thickness, but need not be limited to the values specified in Table 2 of SA-480.
ND-5500 QUALIFICATIONS AND CERTIFICATION OF NONDESTRUCTIVE EXAMINATION PERSONNEL

ND-5510 GENERAL REQUIREMENTS

Organizations performing Code required nondestructive examinations shall use personnel competent and knowledgeable to the degree specified by ND-5520. When these services are subcontracted by the Certificate Holder or Quality System Certificate Holder, he shall verify the qualification of personnel to the requirements of ND-5520. All nondestructive examinations required by this Subsection shall be performed by and the results evaluated by qualified nondestructive examination personnel.

ND-5520 PERSONNEL QUALIFICATION, CERTIFICATION, AND VERIFICATION

ND-5521 Qualification Procedure

(a) Personnel performing nondestructive examinations shall be qualified in accordance with the recommended guidelines of SNT-TC-1A. The ACCP Level II and III provisions for qualification and certification and the ASNT administered Level II certification provision for qualification and certification of NDE Personnel shall not be used for Section III. The Employer’s written practice required by paragraph 5 of SNT-TC-1A shall identify his requirements relative to the recommended guidelines. The recommended guidelines of SNT-TC-1A shall be considered minimum requirements, except as modified in (1) through (5) below.

(1) Qualification of Level III nondestructive examination personnel shall be by examination.

(-a) The basic and method examinations, paragraphs 8.8.1 and 8.8.2 of SNT-TC-1A, may be prepared and administered by the Employer, ASNT, or an outside agency.

(-b) The specific examination, paragraph 8.8.3 of SNT-TC-1A, shall be prepared and administered by the Employer or an outside agency. The Employer or outside agency administering the specific examination shall identify the minimum grade requirement in the written program when the basic and method examinations have been administered by ASNT, which issues grades on a pass/fail basis. In this case, the minimum grade for the specific examination may not be less than 80%.

(2) The written practice identified in paragraph 5 of SNT-TC-1A and the procedures used for examination of personnel shall be referenced in the Employer’s Quality Program.

(3) The number of hours of training and experience for nondestructive examination personnel who perform only one operation of a nondestructive examination method that consists of more than one operation, or perform nondestructive examination of limited scope, may be less than that recommended in Table 6.3.1 A of SNT-TC-1A. The training and experience times shall be described in the written practice, and any limitations or restrictions placed on the certification shall be described in the written practice and on the certificate.

The minimum classroom training times for visual examination personnel identified in Table 6.3.1 A of SNT-TC-1A for Level II certification may be reduced from 16 hr to 8 hr.

(4) For the near-vision acuity examination, the Jaeger Number 1 letters shall be used in lieu of the Jaeger Number 2 letters specified in paragraph 8.2.1 of SNT-TC-1A. The use of equivalent type and size letters is permitted.

(5) An NDE Level I individual shall be qualified to properly perform specific setups, specific calibrations, specific NDE, and specific evaluations for acceptance or rejection determinations according to written instructions and to record results. The NDE Level I individual shall receive the necessary instruction and supervision from a certified NDE Level II or Level III individual. A Level I individual may independently accept the results of nondestructive examinations when the specific acceptance criteria are defined in the written instructions.

(b) For nondestructive examination methods not covered by SNT-TC-1A documents, personnel shall be qualified to comparable levels of competency by subjecting to comparable examinations on the particular method involved.

(c) The emphasis shall be on the individual’s ability to perform the nondestructive examination in accordance with the applicable procedure for the intended application.

(d) For nondestructive examination methods that consist of more than one operation or type, it is permissible to use personnel qualified to perform one or more operations. As an example, one person may be used who is qualified to conduct radiographic examination and another may be used who is qualified to interpret and evaluate the radiographic film.

ND-5522 Certification of Personnel

(a) The Employer retains responsibility for the adequacy of the program and is responsible for certification of Levels I, II, and III nondestructive examination personnel.

(b) When ASNT is the outside agency administering the Level III basic and method examinations, the Employer may use a letter from ASNT as evidence on which to base the certification.

(c) When an outside agency is the examining agent for Level III qualification of the Employer’s personnel, the examination results shall be included with the Employer’s record.
(4) ten or more rounded indications in any 6 in.$^2$
(4 000 mm$^2$) of surface with the major dimension of this
area not to exceed 6 in. (150 mm) with the area taken in
the most unfavorable location relative to the indications
being evaluated.

NE-5520 PERSONNEL QUALIFICATION,
CERTIFICATION, AND VERIFICATION

NE-5521 Qualification Procedure

(a) Personnel performing nondestructive examinations
shall be qualified in accordance with the recommended
guidelines of SNT-TC-1A.$^{14, 15}$ The ACCP Level II and III
provisions for qualification and certification and the
ASNT administered Level II certification provision for
qualification and certification of NDE Personnel shall
not be used for Section III. The Employer’s$^{16}$ written prac-
tice required by paragraph 5 of SNT-TC-1A shall identify
his requirements relative to the recommended guidelines.
The recommended guidelines of SNT-TC-1A shall be con-
sidered minimum requirements, except as modified in (1)
through (5) below.

(1) Qualification of Level III nondestructive examina-
tion personnel shall be by examination.

(-a) The basic and method examinations, para-
graphs 8.8.1 and 8.8.2 of SNT-TC-1A, may be prepared
and administered by the Employer, ASNT, or an outside
agency.

(-b) The specific examination, paragraph 8.8.3 of
SNT-TC-1A, shall be prepared and administered by the
Employer or an outside agency. The Employer or outside
agency administering the specific examination shall iden-
tify the minimum grade requirement in the written pro-
gram when the basic and method examinations have
been administered by ASNT, which issues grades on a
pass/fail basis. In this case, the minimum grade for the
specific examination may not be less than 80%.

(2) The written practice identified in paragraph 5 of
SNT-TC-1A and the procedures used for examination of
personnel shall be referenced in the Employer’s Quality
Program.

(3) The number of hours of training and experience
for nondestructive examination personnel who perform
only one operation of a nondestructive examination
method that consists of more than one operation, or per-
form nondestructive examination of limited scope, may
be less than that recommended in Table 6.3.1 A of SNT-
TC-1A. The training and experience times shall be de-
scribed in the written practice, and any limitations or re-
strictions placed on the certification shall be described in
the written practice and on the certificate.

The minimum classroom training times for visual ex-
amination personnel identified in Table 6.3.1 A of SNT-
TC-1A for Level II certification may be reduced from
16 hr to 8 hr.
(4) For the near-vision acuity examination, the Jaeger Number 1 letters shall be used in lieu of the Jaeger Number 2 letters specified in paragraph 8.2.1 of SNT-TC-1A. The use of equivalent type and size letters is permitted.

(5) An NDE Level I individual shall be qualified to properly perform specific setups, specific calibrations, specific NDE, and specific evaluations for acceptance or rejection determinations according to written instructions, and to record results. The NDE Level I individual shall receive the necessary instruction and supervision from a certified NDE Level II or Level III individual. A Level I individual may independently accept the results of nondestructive examinations when the specific acceptance criteria are defined in the written instructions.

(b) For nondestructive examination methods not covered by SNT-TC-1A documents, personnel shall be qualified to comparable levels of competency by subjecting to comparable examinations on the particular method involved.

(c) The emphasis shall be on the individual's ability to perform the nondestructive examination in accordance with the applicable procedure for the intended application.

(d) For nondestructive examination methods that consist of more than one operation or type, it is permissible to use personnel qualified to perform one or more operations. As an example, one person may be used who is qualified to conduct radiographic examination and another may be used who is qualified to interpret and evaluate the radiographic film.

NE-5522 Certification of Personnel

(a) The Employer retains responsibility for the adequacy of the program and is responsible for certification of Levels I, II, and III nondestructive examination personnel.

(b) When ASNT is the outside agency administering the Level III basic and method examinations, the Employer may use a letter from ASNT as evidence on which to base the certification.

(c) When an outside agency is the examining agent for Level III qualification of the Employer’s personnel, the examination results shall be included with the Employer’s record.

NE-5523 Verification of Nondestructive Examination Personnel Certification

The Certificate Holder has the responsibility to verify the qualification and certification of nondestructive examination personnel employed by Material Organizations qualified by them in accordance with NCA-3820 and subcontractors who provide nondestructive examination services to them.

NE-5530 RECORDS

Personnel qualification records identified in paragraph 9.4 of SNT-TC-1A shall be retained by the Employer.

NE-5700 EXAMINATION REQUIREMENTS FOR EXPANSION JOINTS

NE-5710 BELLOWS EXPANSION JOINTS

The examinations stipulated in (a) through (f) below are required to verify the integrity of bellows expansion joints for installation in nuclear containment systems.

(a) The formed bellows shall be determined by visual examination to be free of defects, such as notches, crevices, material buildup or upsetting, and weld spatter which may serve as points of local stress concentration. Suspect surface areas shall be further examined by liquid penetrant examination in accordance with NE-5110.

(b) The longitudinal welds in the bellows shall be examined by the liquid penetrant method in accordance with NE-5111. When the individual ply thickness exceeds \( \frac{1}{32} \) in. (3 mm), the weld shall also be radiographed in accordance with NE-5111. These examinations may be performed either before or after the bellows is formed.

(c) The circumferential attachment weld between the bellows and weld ends or flanges shall be liquid penetrant examined in accordance with NE-5110 when the total bellows thickness is \( \frac{1}{32} \) in. (6 mm) or less. When the total thickness exceeds this limit, the weld shall be radiographed in accordance with NE-5110 except where radiography is not meaningful, i.e., when the weld thickness constitutes less than 20% of the total thickness being radiographed, liquid penetrant examination may be substituted.

(d) In the case of liquid penetrant examination of bellows weld joints, imperfections producing the following indications are unacceptable:

1. cracks or linear indications;
2. four or more rounded indications in a line separated by \( \frac{1}{32} \) in. (1.5 mm) or less edge to edge;
3. five or more randomly distributed rounded indications in a weld length of 6 in. (150 mm);
4. any rounded indication exceeding the lesser of one-half the bellows thickness or \( \frac{1}{16} \) in. (1.5 mm) in diameter.

(e) The examination of all other welds in the expansion joint shall comply with Article NE-5000.

(f) The variation of the cylindrical end thickness of the formed bellows from the nominal or specified thickness shall not exceed the values given in Section II, Part A, SA-480/SA-480M, Table 2. Thinning of the bellows material during forming shall be considered in the design and selection of material thickness but need not be limited to values specified in Section II, Part A, SA-480/SA-480M, Table 2.
NG-5350 LIQUID PENETRANT ACCEPTANCE STANDARDS

NG-5351 Evaluation of Indications

(a) Mechanical discontinuities at the surface are revealed by bleeding out of the penetrant; however, localized surface discontinuities such as may occur from machining marks or surface conditions may produce similar indications which are nonrelevant.

(b) Any indication which is believed to be nonrelevant shall be reexamined to verify whether or not actual defects are present. Surface conditioning may precede the reexamination. Nonrelevant indications and broad areas of pigmentation which would mask defects are unacceptable.

(c) Relevant indications are indications which result from imperfections. Linear indications are indications in which the length is more than three times the width. Rounded indications are indications which are circular or elliptical with the length equal to or less than three times the width.

NG-5352 Acceptance Standards

(a) Only imperfections producing indications with major dimensions greater than \( \frac{1}{16} \) in. (1.5 mm) are required to be evaluated for acceptance.

(b) Imperfections producing the following indications are unacceptable:

1. Linear indications with dimensions greater than \( \frac{1}{16} \) in. (1.5 mm)
2. Rounded indications with dimensions greater than \( \frac{5}{64} \) in. (5 mm)
3. Four or more rounded indications in a line separated by \( \frac{1}{32} \) in. (0.8 mm) or less edge to edge
4. Ten or more rounded indications greater than \( \frac{1}{32} \) in. (0.8 mm) in any 6 in.\(^2\) (4 000 mm\(^2\)) of surface with the major dimension of this area not to exceed 6 in. (150 mm) with the area taken in the most unfavorable location relative to the imperfections being evaluated.

NG-5360 VISUAL EXAMINATION ACCEPTANCE STANDARDS

NG-5361 General Acceptance Standards

When visual examination is performed in accordance with NG-5261, the following acceptance standards shall be met:

(a) Weld reinforcement, underfill, undercut, and overlap shall not exceed the allowable limits of this Subsection.

(b) The examined surface shall be free of abrupt irregularities.

NG-5362 Acceptance Standards for Visual Examination for Weld Surface Integrity

(a) When visual examination is performed in accordance with NG-5262, the weld surface shall meet the acceptance criteria given in NG-5361.

(b) The following imperfections are unacceptable:

1. Any imperfection characterized as a crack, or lack of penetration
2. Rounded imperfections whose major dimension exceeds \( \frac{1}{32} \) in. (3 mm)
3. Four or more rounded imperfections greater than \( \frac{1}{32} \) in. (0.8 mm) in a line separated by \( \frac{1}{16} \) in. (1.5 mm) or less edge to edge
4. Ten or more rounded imperfections greater than \( \frac{1}{32} \) in. (0.8 mm) in any 6 in.\(^2\) (4 000 mm\(^2\)) of surface with the major dimension of this area not to exceed 6 in. (150 mm) with the area taken in the most unfavorable location relative to the imperfections being evaluated.

NG-5500 QUALIFICATIONS AND CERTIFICATION OF NONDESTRUCTIVE EXAMINATION PERSONNEL

NG-5510 GENERAL REQUIREMENTS

Organizations performing Code-required nondestructive examinations shall use personnel competent and knowledgeable to the degree specified by NG-5520. When these services are subcontracted by the Certificate Holder or Quality System Certificate Holder, he shall verify the qualification of personnel to the requirements of NG-5520. All nondestructive examinations required by this Subsection shall be performed by, and the results evaluated by, qualified nondestructive examination personnel.

NG-5520 PERSONNEL QUALIFICATION, CERTIFICATION, AND VERIFICATION

NG-5521 Qualification Procedure

(a) Personnel performing nondestructive examinations shall be qualified in accordance with the recommended guidelines of SNT-TC-1A. The ACCP Level II and III provisions for qualification and certification and the ASNT administered Level II certification provision for qualification and certification of NDE Personnel shall not be used for Section III. The Employer’s written practice required by paragraph 5 of SNT-TC-1A shall identify Employer requirements relative to the recommended guidelines. The recommended guidelines of SNT-TC-1A shall be considered minimum requirements except as modified in the following:

1. Qualification of Level III nondestructive examination personnel shall be by examination.
(a) The basic and method examinations, paragraphs 8.8.1 and 8.8.2 of SNT-TC-1A, may be prepared and administered by the Employer, ASNT, or an outside agency.

(b) The specific examination, paragraph 8.8.3 of SNT-TC-1A, shall be prepared and administered by the Employer or an outside agency. The Employer or outside agency administering the specific examination shall identify the minimum grade requirement in a written program when the basic and method examinations have been administered by ASNT which issues grades on a pass/fail basis. In this case, the minimum grade for the specific examination may not be less than 80%.

(2) The written practice identified in paragraph 5 of SNT-TC-1A and the procedures used for examination of personnel shall be referenced in the Employer’s Quality Program.

(3) The number of hours of training and experience for nondestructive examination personnel who perform only one operation of a nondestructive examination method that consists of more than one operation, or perform a nondestructive examination of limited scope, may be less than that recommended in Table 6.3.1 A and Table 6.3.1 B of SNT-TC-1A. The time of training and experience shall be described in written practice, and any limitations or restrictions placed on the certification shall be described in the written practice and on the certificate.

The minimum classroom training times for visual examination personnel identified in Table 6.3.1 A of SNT-TC-1A for Level II certification may be reduced from 16 hr to 8 hr.

(4) For the near-vision acuity examination, the Jaeger Number 1 letters shall be used in lieu of the Jaeger Number 2 letters specified in para. 8.2.1 of SNT-TC-1A. The use of equivalent type and size letters is permitted.

(5) An NDE Level I individual shall be qualified to properly perform specific setups, specific calibrations, specific NDE, and specific evaluations for acceptance or rejection determinations according to written instructions and to record results. The NDE Level I individual shall receive the necessary instruction and supervision from a certified NDE Level II or Level III individual. A Level I individual may independently accept the results of nondestructive examinations when the specific acceptance criteria are defined in the written instructions.

(b) For nondestructive examination methods not covered by SNT-TC-1A documents, personnel shall be qualified to comparable levels of competency by subjection to comparable examinations on the particular method involved.

(c) The emphasis shall be on the individual’s ability to perform the nondestructive examination in accordance with the applicable procedure for the intended application.

(d) For nondestructive examination methods that consist of more than one operation or type, it is permissible to use personnel qualified to perform one or more operations. As an example, one person may be used who is qualified to conduct radiographic examination and another may be used who is qualified to interpret and evaluate the radiographic film.

NG-5522 Certification of Personnel

(a) The Employer retains responsibility for the adequacy of the program and is responsible for certification of the Levels I, II, and III nondestructive examination personnel.

(b) When ASNT is the outside agency administering the basic and method examinations [see NG-5521(a)(1)(a)], the Employer may use a letter from ASNT as evidence on which to base the certification.

(c) When an outside agency is the examining agent for Level III qualification of the Employer’s personnel, the examination results shall be included with the Employer’s record.

NG-5523 Verification of Nondestructive Examination Personnel Certification

The Certificate Holder has the responsibility to verify the qualification and certification of nondestructive examination personnel employed by Material Organizations qualified by them in accordance with NCA-3820 and subcontractors who provide nondestructive examination services to them.

NG-5530 RECORDS

Personnel qualification records identified in paragraph 9.4 of SNT-TC-1A shall be retained by the Employer.
reexamination. Nonrelevant indications and broad areas of pigmentation that would mask defects are unacceptable.

(c) Relevant indications are indications that result from imperfections. Linear indications are indications in which the length is more than three times the width. Rounded indications are indications that are circular or elliptical with the length equal to or less than three times the width.

WD-5352 Acceptance Standards

(a) Only imperfections producing indications whose major dimensions are greater than \(\frac{1}{16}\) in. (1.5 mm) shall be considered relevant imperfections.

(b) Imperfections producing the following indications are unacceptable:

(1) any cracks or linear indications

(2) rounded indications with dimensions greater than \(\frac{1}{16}\) in. (5 mm)

(3) four or more rounded indications in a line separated by \(\frac{1}{16}\) in. (1.5 mm) or less edge to edge

(4) ten or more rounded indications in any 6 in.\(^2\) (4 000 mm\(^2\)) of surface with the major dimension of this area not to exceed 6 in. (150 mm) with the area taken in the most unfavorable location relative to the indications being evaluated

WD-5360 Visual Examination Acceptance Standards

WD-5361 General Acceptance Standards

When visual examination is performed in accordance with WD-5261, the following acceptance standards shall be met:

(a) Weld reinforcement, underfill, undercut, and overlap shall not exceed the allowable limits of this Subsection.

(b) The examined surface shall be free of abrupt irregularities.

WD-5362 Acceptance Standards for Visual Examination for Weld Surface Integrity

(a) When visual examination is performed in accordance with WD-5262, the weld surface shall meet the acceptance criteria given in WD-5361.

(b) The following imperfections are unacceptable:

(1) any imperfection characterized as a crack, or lack of penetration

(2) rounded imperfections whose major dimension exceeds \(\frac{1}{16}\) in. (3 mm)

(3) four or more rounded imperfections greater than \(\frac{1}{32}\) in. (0.8 mm) in a line separated by \(\frac{1}{16}\) in. (1.5 mm) or less edge to edge

(4) ten or more rounded imperfections greater than \(\frac{1}{32}\) in. (0.8 mm) in any 6 in.\(^2\) (4 000 mm\(^2\)) of surface with the major dimension of this area not to exceed 6 in. (150 mm) with the area taken in the most unfavorable location relative to the imperfections being evaluated
(2) The written practice identified in paragraph 5 of SNT-TC-1A and the procedures used for examination of personnel shall be referenced in the Employer’s Quality Program.

(3) The number of hours of training and experience for nondestructive examination personnel who perform only one operation of a nondestructive examination method that consists of more than one operation, or perform a nondestructive examination of limited scope, may be less than that recommended in Table 6.3.1 A of SNT-TC-1A. The training and experience times shall be described in written practice and any limitations or restrictions placed on the certification shall be described in the written practice and on the certificate.

The minimum classroom training times for visual examination personnel identified in Table 6.3.1 A of SNT-TC-1A for Level II certification may be reduced from 16 hr to 8 hr.

(4) For the near-vision acuity examination, the Jaeger Number 1 letters shall be used in lieu of the Jaeger Number 2 letters specified in paragraph 8.2.1 of SNT-TC-1A. The use of equivalent type and size letters is permitted.

(5) An NDE Level I individual shall be qualified to properly perform specific setups, specific calibrations, specific NDE, and specific evaluations for acceptance or rejection determinations according to written instructions and to record results. The NDE Level I individual shall receive the necessary instruction and supervision from a certified NDE Level II or Level III individual. A Level I individual may independently accept the results of nondestructive examinations when the specific acceptance criteria are defined in the written instructions.

(b) For nondestructive examination methods not covered by SNT-TC-1A documents, personnel shall be qualified to comparable levels of competency by subject to comparable examinations on the particular method involved.

(c) The emphasis shall be on the individual’s ability to perform the nondestructive examination in accordance with the applicable procedure for the intended application.

(d) For nondestructive examination methods that consist of more than one operation or type, it is permissible to use personnel qualified to perform one or more operations. As an example, one person may be used who is qualified to conduct radiographic examination and another may be used who is qualified to interpret and evaluate the radiographic film.

**WD-5522 Certification of Personnel**

(a) The Employer retains responsibility for the adequacy of the program and is responsible for certification of the Levels I, II, and III nondestructive examination personnel.

(b) When ASNT is the outside agency administering the Level III basic and method examinations [see WD-5521(a)(2)], the Employer may use a letter from ASNT as evidence on which to base the certification.

(c) When an outside agency is the examining agent for Level III qualification of the Employer’s personnel, the examination results shall be included with the Employer’s record.

**WD-5523 Verification of Nondestructive Examination Personnel Certification**

The Certificate Holder has the responsibility to verify the qualification and certification of nondestructive examination personnel employed by Material Organizations qualified by them in accordance with NCA-3820 and subcontractors who provide nondestructive examination services to them.

**WD-5530 RECORDS**

Personnel qualification records identified in paragraph 9.4 of SNT-TC-1A shall be retained by the Employer.