

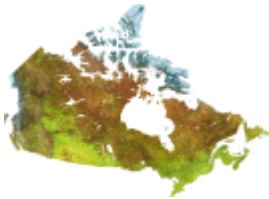


Natural Resources
Canada

Ressources naturelles
Canada

Minerals and
Metals Sector

Secteur des minéraux
et des métaux



Examination Guide for Recertification

Industrial Radiography

Ultrasonics

Magnetic Particle

Liquid Penetrant

Eddy Current

IMPORTANT NOTICE

A candidate who fails to achieve a grade of at least 80% on the recertification examination may retake the recertification examination according to the following criteria and schedule:

- until January 1, 2005, candidates will be allowed two (2) retakes of the recertification examination.
 - retakes of recertification examinations shall be allowed within **one year after the last examination**.
 - the NDT Certifying Agency will decide what portion of a failed recertification examination a candidate shall retake.
-

NDT Certifying Agency
CANMET Materials Technology Laboratory
Natural Resources Canada
568 Booth Street
Ottawa, Ontario
Canada K1A 0G1

Telephone: (613) 992-7956
Web Site: <http://ndt.nrcan.gc.ca>

Ce guide est aussi disponible en français à l'adresse suivante :

Organisme de certification en END
Laboratoire de la technologie des matériaux de CANMET
Ressources naturelles Canada
568, rue Booth
Ottawa (Ontario)
Canada K1A 0G1

Téléphone : (613) 992-7956
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INDUSTRIAL RADIOGRAPHY

A.1 LEVEL 1 E.M.C. SECTOR RECERTIFICATION EXAMINATION

The expected time to complete the practical recertification examination is 2.0 hours.

The level 1 Industrial Radiography practical recertification examination is a closed book examination. No books or notes other than those provided will be permitted during the test. A scientific calculator may be used provided it does not contain information or establish programs which provide solutions to examination problems.

The test will consist of two (2) test specimens:
one (1) heavy/light metal and one (1) weldment.

The candidate will be given adequate instruction in the operation of all equipment to produce the required results safely.

Candidates' questions will be answered unless the question is a test requirement. A supervisor may refuse to answer any question he considers to be part of the test.

The candidate may or may not be required to develop his/her own film. This decision will be made by the test supervisor.

The candidate is not allowed to bring or use his/her own equipment or film and is not allowed to take parts or film away from the test centre.

If, for any reason, the candidate must deviate from the supplied technique the circumstances for this deviation must be stated and supported by the exam supervisor.

Coverage of the test specimens:

The limits of coverage will be indicated in the technique provided. The candidate will produce results as indicated by the technique. Upon completion of the two techniques **all** film, both used and unused, will be handed in to the examiner along with the sample techniques. **NO** paper or film is allowed to leave the test centre.

Candidates will be given the opportunity to give feedback concerning the practical test. After completing the test, it will simply be a matter of filling in and returning the comment sheet provided to the test supervisor **or** completing it at home and sending it directly to:

Richard Wood
Natural Resources Canada,
NDT Certifying Agency, 568 Booth Street, Ottawa, Ontario K1A 0G1
Phone: (613) 992-9276; Fax: (613) 943-8297

Note: There is concern about candidates who appear confused and unsure of themselves while attempting their practical test. It is the prerogative of the supervisor to discuss this situation with the candidate and, in the extreme, terminate the practical test. *All such actions, as well as any special assistance given to the candidate, must be reported to the examiner on the supervisors assesment sheet.*

INDUSTRIAL RADIOGRAPHY

A.2 LEVEL 2 ALL SECTORS RECERTIFICATION EXAMINATION INFORMATION

The duration of *each* Level 2 Industrial Radiography Sector Recertification practical examination is 4 hrs.

Each Level 2 Industrial Radiography Sector Recertification exam is evaluated in the following three (3) areas:

i) Radiographic Techniques; ii) Film Interpretation; and iii) General Safety.

Information concerning these evaluated areas can be found in the individual Sector Test Program pages within this document. Please refer to the Sector that best identifies your recertification requirements.

The level 2 Industrial Radiography practical recertification examination is a closed book examination. No books or notes other than those provided will be permitted during the test. A scientific calculator may be used provided it does not contain information or establish programs which provide solutions to examination problems.

A Standard will be supplied which will identify the limitations of specific quality factors eg. sensitivity; unsharpness; density limitations; and penetrometer selection.

Note: The diagonal measurement of the source/effective focal spot is to be used for all unsharpness mathematical calculations. The candidate should be prepared to calculate this diagonal measurement.

The candidate will be required to read the written instructions prior to his/her beginning the test.

Candidates' questions will be answered unless the question is a test requirement eg. questions concerning quantity, quality and completeness of candidates' radiographs and techniques. A supervisor may refuse to answer any question he considers to be part of the test.

The operation of all equipment will be explained and/or demonstrated to the candidate.

The candidate may or may not be required to develop his/her own film. This decision will be made by the test supervisor.

There is no internal access for film placement in any of the test specimens.

The candidate is not allowed to bring or use his/her own equipment and is not allowed to take parts or film away from the test centre.

There are many different ways to radiograph a test specimen. Grading of a technique will be according to the guidelines of coverage, density, sensitivity attained and clarity of the technique so that a Level 1 would be able to follow the instructions easily.

Candidates will be given the opportunity to give feedback concerning the practical test. After completing the test, it will simply be a matter of filling in and returning the comment sheet provided to the test supervisor **or** completing it at home and sending it directly to:

Richard Wood

Natural Resources Canada,

NDT Certifying Agency, 568 Booth Street, Ottawa, Ontario K1A 0G1

Phone: (613) 992-9276; Fax: (613) 943-8297

Note: There is concern about candidates who appear confused and unsure of themselves while attempting their practical test. It is the prerogative of the supervisor to discuss this situation with the candidate and, in the extreme, terminate the practical test. *All such actions, as well as any special assistance given to the candidate, must be reported to the examiner on the supervisors assesment sheet.*

INDUSTRIAL RADIOGRAPHY

A.3 LEVEL 2 E.M.C. SECTOR TEST PROGRAM

RADIOGRAPHIC TECHNIQUES

The candidate will be required to inspect and produce a written technique for one (1) of the three (3) test samples supplied. The parts will consist of one (1) heavy/light casting or forging and two (2) weldments. One of the weldments will be designated gamma ray and one will be designated x-ray. The one selected by the candidate must be completed as designated by the supervisor. (eg. If you select the weld for gamma, you must inspect it with gamma.)

The candidate will be provided with:

- three (3) test samples;
- the Standard Method For Radiographic Examination of Weldments, Castings and Forgings;
- a current isotope decay curve;
- film characteristic curves;
- logarithmic and anti-logarithmic tables;
- source size and effective x-ray focal spot size;
- sketches of the test specimens;
- exposure curves; and
- sufficient radiographic film of required speeds to carry out the techniques

The candidate will be given adequate instruction in the operation of all equipment to produce the required results safely. It should be noted that, although the test centre supplies each candidate with exposure curves, it should not be assumed that the exposure curves are accurate for all test specimens as alloying materials vary greatly from one metal to another. Following a test shot, the candidate is expected to have the necessary wherewithal to quickly zero-in on the correct exposure.

FILM INTERPRETATION

The candidate will be required to interpret five (5) of the ten (10) identified defect indications. If the candidate interprets more than five (5) defect indications only the first five (5) will be graded.

The candidate will be provided with:

- a high intensity film viewer;
- ten (10) radiograph indications;
- sufficient radiograph reporting sheets

GENERAL SAFETY

The candidate will be **observed** on the general safety requirements of radiography namely; the use of a calibrated survey meter; wearing of a TLD; wearing of a DRD; as well as maintaining safe exposure perimeter barriers when not working within the confines of a radiographic exposure room. **These specific safety items will be a graded element and noncompliance could result in failure to be recertified as a Level 2 Option B radiographer.**

INDUSTRIAL RADIOGRAPHY

A.4 LEVEL 2 HEAVY CASTINGS/FORGINGS SECTOR TEST PROGRAM

RADIOGRAPHIC TECHNIQUES

The candidate will be required to inspect and produce a written technique for one (1) of the three (3) test samples supplied. The parts will consist of three (3) heavy casting/forging.

The candidate will be provided with:

- three (3) test samples;
- the Standard Method For Radiographic Examination of Weldments, Castings and Forgings;
- film characteristic curves;
- logarithmic and anti-logarithmic tables;
- effective X-ray focal spot size;
- sketches of the test specimens;
- exposure curves; and
- sufficient radiographic film of required speeds to carry out the techniques

The candidate will be given adequate instruction in the operation of all equipment to produce the required results safely. It should be noted that, although the test centre supplies each candidate with exposure curves, it should not be assumed that the exposure curves are accurate for all test specimens as alloying materials vary greatly from one metal to another. Following a test shot, the candidate is expected to have the necessary wherewithal to quickly zero-in on the correct exposure.

FILM INTERPRETATION

The candidate will be required to interpret five (5) of the ten (10) identified defect indications. If the candidate interprets more than five (5) defect indications only the first five (5) will be graded.

The candidate will be provided with:

- a high intensity film viewer;
- ten (10) radiograph indications;
- sufficient radiograph reporting sheets

GENERAL SAFETY

The candidate will be **observed** on the general safety requirements of radiography namely; the use of a calibrated survey meter; wearing of a TLD; wearing of a DRD; as well as maintaining safe exposure perimeter barriers when not working within the confines of a radiographic exposure room. **These specific safety items will be a graded element and noncompliance could result in failure to be recertified as a Level 2 Option B radiographer.**

INDUSTRIAL RADIOGRAPHY

A.5 LEVEL 2 LIGHT CASTINGS/FORGINGS SECTOR TEST PROGRAM

RADIOGRAPHIC TECHNIQUES

The candidate will be required to inspect and produce a written technique for one (1) of the three (3) test samples supplied. The parts will consist of three (3) light metal casting/forging.

The candidate will be provided with:

- three (3) test samples;
- the Standard Method For Radiographic Examination of Weldments, Castings and Forgings;
- film characteristic curves;
- logarithmic and anti-logarithmic tables;
- effective X-ray focal spot size;
- sketches of the test specimens;
- exposure curves; and
- sufficient radiographic film of required speeds to carry out the techniques

The candidate will be given adequate instruction in the operation of all equipment to produce the required results safely. It should be noted that, although the test centre supplies each candidate with exposure curves, it should not be assumed that the exposure curves are accurate for all test specimens as alloying materials vary greatly from one metal to another. Following a test shot, the candidate is expected to have the necessary wherewithal to quickly zero-in on the correct exposure.

FILM INTERPRETATION

The candidate will be required to interpret five (5) of the ten (10) identified defect indications. If the candidate interprets more than five (5) defect indications only the first five (5) will be graded.

The candidate will be provided with:

- a high intensity film viewer;
- ten (10) radiograph indications;
- sufficient radiograph reporting sheets

GENERAL SAFETY

The candidate will be **observed** on the general safety requirements of radiography namely; the use of a calibrated survey meter; wearing of a TLD; wearing of a DRD; as well as maintaining safe exposure perimeter barriers when not working within the confines of a radiographic exposure room. **These specific safety items will be a graded element and noncompliance could result in failure to be recertified as a Level 2 Option B radiographer.**

INDUSTRIAL RADIOGRAPHY

A.6 LEVEL 2 WELDS/WELDMENTS SECTOR TEST PROGRAM

RADIOGRAPHIC TECHNIQUES

The candidate will be required to inspect and produce a written technique for one (1) of the three (3) test samples supplied. The parts will consist of three (3) weldments. One of the weldments will be designated gamma ray and two (2) will be designated x-ray. The one selected by the candidate must be completed as designated by the supervisor. (eg. If you select the weld for gamma, you must inspect it with gamma.)

The candidate will be provided with:

- three (3) test samples;
- the Standard Method For Radiographic Examination of Weldments, Castings and Forgings;
- a current isotope decay curve;
- film characteristic curves;
- logarithmic and anti-logarithmic tables;
- source size and effective x-ray focal spot size;
- sketches of the test specimens;
- exposure curves; and
- sufficient radiographic film of required speeds to carry out the techniques

The candidate will be given adequate instruction in the operation of all equipment to produce the required results safely. It should be noted that, although the test centre supplies each candidate with exposure curves, it should not be assumed that the exposure curves are accurate for all test specimens as alloying materials vary greatly from one metal to another. Following a test shot, the candidate is expected to have the necessary wherewithal to quickly zero-in on the correct exposure.

FILM INTERPRETATION

The candidate will be required to interpret five (5) of the ten (10) identified defect indications. If the candidate interprets more than five (5) defect indications only the first five (5) will be graded.

The candidate will be provided with:

- a high intensity film viewer;
- ten (10) radiograph indications;
- sufficient radiograph reporting sheets

GENERAL SAFETY

The candidate will be **observed** on the general safety requirements of radiography namely; the use of a calibrated survey meter; wearing of a TLD; wearing of a DRD; as well as maintaining safe exposure perimeter barriers when not working within the confines of a radiographic exposure room. **These specific safety items will be a graded element and noncompliance could result in failure to be recertified as a Level 2 Option B radiographer.**

INDUSTRIAL RADIOGRAPHY

A.7 LEVEL 2 AEROSPACE SECTOR TEST PROGRAM

RADIOGRAPHIC TECHNIQUES

This recertification test will consist of three (3) test specimens. **The candidate is required to complete the inspection of, and produce a technique on, one (1) of the three (3) specimens.**

The candidate will be provided with:

- three test samples;
- film characteristic curves;
- logarithmic and anti-logarithmic tables;
- effective x-ray focal spot size;
- sketches of the test specimens;
- exposure curves; and
- sufficient radiographic film of required speeds to carry out the techniques.

The candidate will be given adequate instruction in the operation of all equipment to produce the required results safely. It should be noted that, although the test centre supplies each candidate with exposure curves, it should not be assumed that the exposure curves are accurate for all test specimens as alloying materials vary greatly from one metal to another. Following a test shot, the candidate is expected to have the necessary wherewithal to quickly zero-in on the correct exposure.

FILM INTERPRETATION

The candidate will be required to interpret five (5) of the ten (10) radiographs identified. If the candidate interprets more than five (5) only the first five (5) will be graded.

The candidate will be provided with:

- a high intensity film viewer;
- ten (10) radiographs; and
- sufficient radiograph reporting sheets

GENERAL SAFETY

The candidate will be **observed** on the general safety requirements of radiography namely; the use of a calibrated survey meter; wearing of a TLD; wearing of a DRD; as well as maintaining safe exposure perimeter barriers when not working within the confines of a radiographic exposure room. **These specific safety items will be a graded element and noncompliance could result in the failure to be recertified as a Level 2 Option B radiographer.**

INDUSTRIAL RADIOGRAPHY

A.8 LEVEL 3 E.M.C. SECTOR RECERTIFICATION EXAMINATION

The level 3 recertification examination is a closed book *written examination*. No books or notes other than those provided will be permitted during the test. A scientific calculator may be used provided it does not contain information or establish programs which provide solutions to examination problems.

The duration of the written examination is 1½ hours. The test will consist of forty-five (45) multiple choice questions pertaining to codes/specifications, Can/CGSB 48.9712 standard and radiographic testing applications.

The candidate shall answer forty (40) of the (45) questions, as follows:

5 out of 6 questions on the codes/specifications section

5 out of 6 questions on the Can/CGSB 48.9712 standard section

30 out of 33 questions on the applications section

A grade of at least 80% must be achieved on the recertification examination.

Written Procedure Examination

The Written Procedure Examination must also be completed for those individuals who did not complete it for Level 3 certification. Individuals seeking recertification in more than 1 method or sector need only write one procedure in the method and sector of their choice. A mark $\geq 70\%$ must be obtained on the written procedure.

It is realized that writing a comprehensive NDT procedure which meets industrial standards would normally take many days to complete. Therefore, to simplify the task and still have a meaningful examination, the applicant will be provided with, at the time of application, a pretest package having all the information and details needed.

A candidate who is successful on the sector recertification examination but fails to obtain the 70% pass grade on the Written Procedure Examination, may retake the failed examination once.

INDUSTRIAL RADIOGRAPHY

A.9 LEVEL 3 AEROSPACE SECTOR RECERTIFICATION EXAMINATION

The level 3 recertification examination is a closed book *written examination*. No books or notes other than those provided will be permitted during the test. A scientific calculator may be used provided it does not contain information or establish programs which provide solutions to examination problems.

The duration of the written examination is 1½ hours. The test will consist of forty-five (45) multiple choice questions pertaining to codes/specifications, Can/CGSB 48.9712 standard and radiographic testing applications.

The candidate shall answer forty (40) of the (45) questions, as follows:

5 out of 6 questions on the codes/specifications section

5 out of 6 questions on the Can/CGSB 48.9712 standard section

30 out of 33 questions on the applications section

A grade of at least 80% must be achieved on the recertification examination.

Written Procedure Examination

The Written Procedure Examination must also be completed for those individuals who did not complete it for Level 3 certification. Individuals seeking recertification in more than 1 method or sector need only write one procedure in the method and sector of their choice. A mark $\geq 70\%$ must be obtained on the written procedure.

It is realized that writing a comprehensive NDT procedure which meets industrial standards would normally take many days to complete. Therefore, to simplify the task and still have a meaningful examination, the applicant will be provided with, at the time of application, a pretest package having all the information and details needed.

A candidate who is successful on the sector recertification examination but fails to obtain the 70% pass grade on the Written Procedure Examination, may retake the failed examination once.

INDUSTRIAL ULTRASONICS

B.1 LEVEL 1 E.M.C. SECTOR RECERTIFICATION EXAMINATION

The duration of the practical examination is 3 hours.

The level 1 ultrasonic practical examination is a closed book examination. No books or notes other than those provided will be permitted during the examination. A scientific calculator may be used provided it does not contain information or established programs which provide solutions to examination problems.

The candidate will be shown the operation and placement of equipment and accessories required to complete the examination.

The candidate will be required to complete the following:

- inspect one section of a welded specimen by the contact method.
- inspect one section of a metal formed specimen by the contact method.
- for each of the 2 specimen sections to inspect, fill in completely the paperwork provided for each specimen and *find only 1 reportable indication per specimen*. For the reportable indication selected, give, in millimetres or inches, its length, depth and location from one of the ends of the specimen by completing the relevant sketch provided in the paperwork.

The candidate will be shown the accessible surfaces of the test specimens and reference samples.

No surface preparations are permitted on the test specimens, they must be used as is.

No permanent markings shall be placed on equipment, test pieces and reference samples.

The candidate is not allowed to take the paperwork nor the examination specimens out of the laboratory. Thus, all reporting must be completed within the testing room or facility.

Candidates' questions will be answered unless the question is an examination requirement. A supervisor may refuse to answer any question he considers to be part of the examination.

Candidates will be given the opportunity to give feedback concerning the practical test. After completing the test, it will simply be a matter of filling in and returning the comment sheet provided to the test supervisor **or** completing it at home and sending it directly to:

Jack Newbury

Natural Resources Canada

NDT Certifying Agency, 568 Booth Street, Ottawa, Ontario K1A 0G1

Phone: (613) 996-4480 Fax: (613) 943-8297

Note: There is concern about candidates who appear confused and unsure of themselves while attempting their practical test. It is the prerogative of the supervisor to discuss this situation with the candidate and, in the extreme, terminate the practical test.

INDUSTRIAL ULTRASONICS

B.2 LEVEL 2 E.M.C. SECTOR RECERTIFICATION EXAMINATION

The duration of the practical examination is 3 hours.

The level 2 ultrasonic practical examination is a closed book examination. No books or notes other than those provided will be permitted during the examination. A scientific calculator may be used provided it does not contain information or established programs which provide solutions to examination problems.

The candidate shall be shown the operation and placement of equipment and accessories required to complete the examination.

The candidate will be required to complete the following:

- inspect one (1) welded specimen by the contact method.
- inspect *either* one (1) metal formed specimen by the contact method *or* one (1) extruded aluminum specimen by the immersion method.
- for each of the 2 specimens selected to inspect, fill in completely the paperwork provided for each specimen and *find only 1 reportable indication per specimen*. For the reportable indication selected, give, in millimetres or inches, its length, depth and location from one of the ends of the specimen by completing the relevant sketch provided in the paperwork.

The candidate will be shown the accessible surfaces of the test specimens and reference samples.

No surface preparations are permitted on the test specimens, they must be used as is.

No permanent markings shall be placed on equipment, test pieces and reference samples.

The candidate is not allowed to take the paperwork nor the examination specimens out of the laboratory. Thus, all reporting must be completed within the testing room or facility.

Candidates' questions will be answered unless the question is an examination requirement. A supervisor may refuse to answer any question he considers to be part of the examination.

Candidates will be given the opportunity to give feedback concerning the practical test. After completing the test, it will simply be a matter of filling in and returning the comment sheet provided to the test supervisor *or* completing it at home and sending it directly to:

Jack Newbury

Natural Resources Canada

NDT Certifying Agency, 568 Booth Street, Ottawa, Ontario K1A 0G1

Phone: (613) 996-4480 Fax: (613) 943-8297

Note: There is concern about candidates who appear confused and unsure of themselves while attempting their practical test. It is the prerogative of the supervisor to discuss this situation with the candidate and, in the extreme, terminate the practical test.

INDUSTRIAL ULTRASONICS

B.3 LEVEL 3 E.M.C. SECTOR RECERTIFICATION EXAMINATION

The level 3 recertification examination is a closed book *written examination*. No books or notes other than those provided will be permitted during the test. A scientific calculator may be used provided it does not contain information or establish programs which provide solutions to examination problems.

The duration of the written examination is 1½ hours. The test will consist of forty-five (45) multiple choice questions pertaining to codes/specifications, Can/CGSB 48.9712 standard and ultrasonic testing applications.

The candidate shall answer forty (40) of the (45) questions, as follows:

5 out of 6 questions on the codes/specifications section

5 out of 6 questions on the Can/CGSB 48.9712 standard section

30 out of 33 questions on the ultrasonic testing applications section

A grade of at least 80% must be achieved on the recertification examination.

Written Procedure Examination

The Written Procedure Examination must also be completed for those individuals who did not complete it for Level 3 certification. Individuals seeking recertification in more than 1 method or sector need only write one procedure in the method and sector of their choice. A mark $\geq 70\%$ must be obtained on the written procedure.

It is realized that writing a comprehensive NDT procedure which meets industrial standards would normally take many days to complete. Therefore, to simplify the task and still have a meaningful examination, the applicant will be provided with, at the time of application, a pretest package having all the information and details needed.

A candidate who is successful on the sector recertification examination but fails to obtain the 70% pass grade on the Written Procedure Examination, may retake the failed examination once.

MAGNETIC PARTICLE

C.1 LEVEL 1 E.M.C. SECTOR RECERTIFICATION EXAMINATION

The test must be completed within 1.5 hours.

The level 1 magnetic particle practical recertification examination is a closed book examination. No books or notes other than those provided will be permitted during the test. A scientific calculator may be used provided it does not contain information or established programs which provide solutions to examination problems.

The candidate will be shown the operation and placement of equipment and accessories (such as black light meter, field indicator and a graduated cylinder) required to complete the test.

The candidate will be required to complete the following:

- measure black light intensity and particle concentration, report results and ensure they meet the minimum required before proceeding with the examination;
- inspect three (3) test specimens, two (2) using the fluorescent wet bench and one (1) using a yoke and black magnetic fluid. The required paperwork and instructions on how to proceed will be provided;
- demagnetize the test specimens at the completion of the examination.

The candidate's final examination grade will be based on his/her best two (2) specimens.

The candidate shall not mark the test specimens.

The candidate is not allowed to take the paperwork nor the test specimens out of the laboratory. All reporting must be completed within the testing room or facility.

The candidate may, at any particular time, ask any questions concerning the examination. A supervisor may refuse to answer any questions he/she considers to be part of the examination.

Candidates will be given the opportunity to give feedback concerning the practical test. After completing the test, it will simply be a matter of filling in and returning the comment sheet provided to the test supervisor **or** completing it at home and sending it directly to:

Doug Lusk

Natural Resources Canada
NDT Certifying Agency
568 Booth Street, Ottawa, Ontario K1A 0G1
Phone: (613) 992-0108
Fax: (613) 943-8297

Note: There is concern about candidates who appear confused and unsure of themselves while attempting their practical test. It is the prerogative of the supervisor to discuss this situation with the candidate and, in the extreme, terminate the practical test.

MAGNETIC PARTICLE

C.2 LEVEL 2 E.M.C. SECTOR RECERTIFICATION EXAMINATION

The test must be completed within 2.5 hours.

The level 2 magnetic particle practical recertification examination is a closed book examination. No books or notes other than those provided will be permitted during the test. A scientific calculator may be used provided it does not contain information or established programs which provide solutions to examination problems.

The candidate shall be shown the operation and placement of equipment and accessories (such as black light meter, field indicator and a graduated cylinder) required to complete the examination.

The candidate has the option of choosing two (2) yoke/one (1) wet bench **or** one (1) yoke/two (2) wet bench specimens for a total of three (3) test specimens.

The candidate will be required to complete the following:

- measure black light intensity and particle concentration, report results and ensure they meet the minimum required before proceeding with the examination;
- inspect the three (3) test specimens chosen;
- demagnetize the test specimens at the completion of the examination.

The candidate's final examination grade will be based on his/her best two (2) specimens.

The candidate is requested not to mark the test specimens.

The candidate is not allowed to take the paperwork nor the test specimens out of the laboratory. All reporting must be completed within the testing room or facility.

The candidate may, at any particular time, ask any questions concerning the examination. A supervisor may refuse to answer any questions he/she considers to be part of the examination.

Candidates will be given the opportunity to give feedback concerning the practical test. After completing the test, it will simply be a matter of filling in and returning the comment sheet provided to the test supervisor **or** completing it at home and sending it directly to:

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Note: There is concern about candidates who appear confused and unsure of themselves while attempting their practical test. It is the prerogative of the supervisor to discuss this situation with the candidate and, in the extreme, terminate the practical test.

MAGNETIC PARTICLE

C.3 LEVEL 3 E.M.C. SECTOR RECERTIFICATION EXAMINATION

The level 3 recertification examination is a closed book *written examination*. No books or notes other than those provided will be permitted during the test. A scientific calculator may be used provided it does not contain information or establish programs which provide solutions to examination problems.

The duration of the written examination is 1½ hours. The test will consist of forty-five (45) multiple choice questions pertaining to codes/specifications, Can/CGSB 48.9712 standard and magnetic particle testing applications.

The candidate shall answer forty (40) of the (45) questions, as follows:

5 out of 6 questions on the code/specification section

5 out of 6 questions on the Can/CGSB 48.9712 standard section

30 out of 33 questions on the applications section

A grade of at least 80% must be achieved on the recertification examination.

Written Procedure Examination

The Written Procedure Examination must also be completed for those individuals who did not complete it for Level 3 certification. Individuals seeking recertification in more than 1 method or sector need only write one procedure in the method and sector of their choice. A mark $\geq 70\%$ must be obtained on the written procedure.

It is realized that writing a comprehensive NDT procedure which meets industrial standards would normally take many days to complete. Therefore, to simplify the task and still have a meaningful examination, the applicant will be provided with, at the time of application, a pretest package having all the information and details needed.

A candidate who is successful on the sector recertification examination but fails to obtain the 70% pass grade on the Written Procedure Examination, may retake the failed examination once.

LIQUID PENETRANT

D.1 LEVEL 1 E.M.C. SECTOR RECERTIFICATION EXAMINATION

The test must be completed within 1.5 hours.

The level 1 liquid penetrant practical recertification examination is a closed book examination. No books or notes other than those provided will be permitted during the test. A scientific calculator may be used provided it does not contain information or established programs which provide solutions to examination problems.

The candidate shall be shown the operation and placement of equipment and accessories (including black light meter) required to complete the examination.

The candidate will be required to complete the following:

- measure black light intensity, report results and ensure intensity meets the minimum required before proceeding with the examination.
- inspect three (3) test specimens, two (2) using fluorescent penetrants and one (1) using colour contrast penetrant, according to the instructions provided, and report results.

The candidate's final examination grade will be based on his/her best two (2) specimens.

The candidate must not clean the specimen after testing since the supervisor must also inspect each specimen.

The candidate is requested not to mark the test specimens.

The candidate is not allowed to take the paperwork nor the test specimens out of the laboratory. All reporting must be completed within the testing room or facility.

The candidate may, at any particular time, ask any questions concerning the examination. A supervisor may refuse to answer any questions he/she considers to be part of the test.

Candidates will be given the opportunity to give feedback concerning the practical test. After completing the test, it will simply be a matter of filling in and returning the comment sheet provided to the test supervisor **or** completing it at home and sending it directly to:

Doug Lusk

Natural Resources Canada
NDT Certifying Agency
568 Booth Street, Ottawa, Ontario K1A 0G1
Phone: (613) 992-0108
Fax: (613) 943-8297

Note: There is concern about candidates who appear confused and unsure of themselves while attempting their practical test. It is the prerogative of the supervisor to discuss this situation with the candidate and, in the extreme, terminate the practical test.

LIQUID PENETRANT

D.2 LEVEL 2 E.M.C. SECTOR RECERTIFICATION EXAMINATION

The test must be completed within 1.5 hours.

The level 2 liquid penetrant practical recertification examination is a closed book examination. No books or notes other than those provided will be permitted during the test. A scientific calculator may be used provided it does not contain information or established programs which provide solutions to examination problems.

The candidate shall be shown the operation and placement of equipment and accessories (including black light meter) required to complete the test.

The candidate will be required to complete the following:

- measure the black light intensity, report results and ensure intensity meets the minimum required to complete the test;
- inspect three (3) specimens, two (2) using fluorescent penetrants and one (1) using colour contrast.

The candidate's final examination grade will be based on his/her best two (2) specimens.

The candidate must not clean the specimen after testing since the supervisor must also inspect each specimen.

The candidate is requested not to mark the test specimens.

The candidate is not allowed to take the paperwork nor the test specimens out of the laboratory. All reporting must be completed within the testing room or facility.

The candidate may, at any particular time, ask any questions concerning the test. A supervisor may refuse to answer any questions he/she considers to be part of the test.

Candidates will be given the opportunity to give feedback concerning the practical test. After completing the test, it will simply be a matter of filling in and returning the comment sheet provided to the test supervisor **or** completing it at home and sending it directly to:

Doug Lusk

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568 Booth Street, Ottawa, Ontario K1A 0G1
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Fax: (613) 943-8297

Note: There is concern about candidates who appear confused and unsure of themselves while attempting their practical test. It is the prerogative of the supervisor to discuss this situation with the candidate and, in the extreme, terminate the practical test.

LIQUID PENETRANT

D.3 LEVEL 3 E.M.C. SECTOR RECERTIFICATION EXAMINATION

The level 3 recertification examination is a closed book *written examination*. No books or notes other than those provided will be permitted during the test. A scientific calculator may be used provided it does not contain information or establish programs which provide solutions to examination problems.

The duration of the written examination is 1½ hours. The test will consist of forty-five (45) multiple choice questions pertaining to codes/specifications, Can/CGSB 48.9712 standard and liquid penetrant testing applications.

The candidate shall answer forty (40) of the (45) questions, as follows:

5 out of 6 questions on the code/specification section

5 out of 6 questions on the Can/CGSB 48.9712 standard section

30 out of 33 questions on the applications section

A grade of at least 80% must be achieved on the recertification examination.

Written Procedure Examination

The Written Procedure Examination must also be completed for those individuals who did not complete it for Level 3 certification. Individuals seeking recertification in more than 1 method or sector need only write one procedure in the method and sector of their choice. A mark $\geq 70\%$ must be obtained on the written procedure.

It is realized that writing a comprehensive NDT procedure which meets industrial standards would normally take many days to complete. Therefore, to simplify the task and still have a meaningful examination, the applicant will be provided with, at the time of application, a pretest package having all the information and details needed.

A candidate who is successful on the sector recertification examination but fails to obtain the 70% pass grade on the Written Procedure Examination, may retake the failed examination once.

EDDY CURRENT

E.1 LEVEL 1 E.M.C. SECTOR RECERTIFICATION EXAMINATION

The duration of the practical examination is 3 hours.

The level 1 eddy current practical examination is a closed book examination. No books or notes other than those provided will be permitted during the examination. A scientific calculator may be used provided it does not contain information or established programs which provide solutions to examination problems.

The candidate shall be shown the operation and placement of the equipment and accessories required to complete the examination.

The candidate will be required to complete the following:

- perform three (3) non-conductive coating thickness measurements.
- perform a crack sizing.
- perform a tube inspection with an I.D. coil probe. Fill in completely the paperwork provided and *report only 1 indication per tube with the exception of baffle plate signals*. For the indication selected, give, in millimetres or inches, its length and location from one of the ends of the tube by completing the relevant sketch provided in the paperwork.

The candidate will be shown the accessible surfaces of the test specimens and reference samples.

No surface preparations are permitted on the test specimens, they must be used as is.

No permanent markings shall be placed on equipment, test pieces and reference samples.

The candidate is not allowed to take the paperwork nor the examination specimens out of the laboratory. Thus, all reporting must be completed within the testing room or facility.

Candidates' questions will be answered unless the question is an examination requirement. A supervisor may refuse to answer any question he considers to be part of the examination.

Candidates will be given the opportunity to give feedback concerning the practical test. After completing the test, it will simply be a matter of filling in and returning the comment sheet provided to the test supervisor **or** completing it at home and sending it directly to:

Jack Newbury

Natural Resources Canada

NDT Certifying Agency, 568 Booth Street, Ottawa, Ontario K1A 0G1

Phone: (613) 996-4480 Fax: (613) 943-8297

Note: There is concern about candidates who appear confused and unsure of themselves while attempting their practical test. It is the prerogative of the supervisor to discuss this situation with the candidate and, in the extreme, terminate the practical test.

EDDY CURRENT

E.2 LEVEL 2 E.M.C. SECTOR RECERTIFICATION EXAMINATION

The duration of the practical examination is 3 hours.

The level 2 eddy current practical examination is a closed book examination. No books or notes other than those provided will be permitted during the examination. A scientific calculator may be used provided it does not contain information or established programs which provide solutions to examination problems.

The candidate shall be shown the operation and placement of equipment and accessories required to complete the examination. Unless otherwise specified, it is the candidate's choice to use the proper probes for inspection of the test specimens.

The candidate will be required to complete the following:

- inspect 1 fastened assembly for **either** fastener holes inspection using ring (encircling) probes **or** plate inspection using surface probes, and complete the report forms provided. When inspecting layered plates, indicate on the sketch provided, in millimetres or inches, the length, width, depth and location flaws detected.
- inspect 1 tube with an I.D. coil probe and complete the report forms provided. Report, on the appropriate sketch, only 1 indication per tube which is not a baffle plate signal. Give the depth of the indication in percentage of wall lost and give its length and location from the end of the tube, in millimetres or inches. No reporting of signal analysis is required.

The candidate will be shown the accessible surfaces of the test specimens and reference samples.

No surface preparations are permitted on the test specimens, they must be used as is.

No permanent markings shall be placed on equipment, test pieces and reference samples.

The candidate is not allowed to take the paperwork nor the examination specimens out of the laboratory. Thus, all reporting must be completed within the testing room or facility.

Candidates' questions will be answered unless the question is an examination requirement. A supervisor may refuse to answer any question he considers to be part of the examination.

Candidates will be given the opportunity to give feedback concerning the practical test. After completing the test, it will simply be a matter of filling in and returning the comment sheet provided to the test supervisor **or** completing it at home and sending it directly to:

Jack Newbury

Natural Resources Canada

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568 Booth Street, Ottawa, Ontario K1A 0G1

Phone: (613) 996-4480 Fax: (613) 943-8297

Note: There is concern about candidates who appear confused and unsure of themselves while attempting their practical test. It is the prerogative of the supervisor to discuss this situation with the candidate and, in the extreme, terminate the practical test.

IMPORTANT NOTICE

Inspection of Fastened Assembly

If you inspect the fastener holes, you will find some which are definitely flawed, others which are definitely sound. Identify, on the sketch provided, the flawed fastener holes.

There will be cases where the signal obtained from a fastener hole is so small that it will be difficult to interpret. Indicate such discrepancies on the sketch. Try to explain the source of the signal. The NDT Certifying Agency is looking for a "reasonable" explanation and not necessarily the "accurate" explanation.

EDDY CURRENT

E.3 LEVEL 3 E.M.C. SECTOR RECERTIFICATION EXAMINATION

The level 3 recertification examination is a closed book *written examination*. No books or notes other than those provided will be permitted during the test. A scientific calculator may be used provided it does not contain information or establish programs which provide solutions to examination problems.

The duration of the written examination is 1½ hours. The test will consist of forty-five (45) multiple choice questions pertaining to codes/specifications, Can/CGSB 48.9712 standard and eddy current testing applications.

The candidate shall answer forty (40) of the (45) questions, as follows:

5 out of 6 questions on the codes/specifications section

5 out of 6 questions on the Can/CGSB 48.9712 standard section

30 out of 33 questions on the Eddy Current testing applications section

A grade of at least 80% must be achieved on the recertification examination.

Written Procedure Examination

The Written Procedure Examination must also be completed for those individuals who did not complete it for Level 3 initial certification. Individuals seeking recertification in more than 1 method or sector need only write one procedure in the method and sector of their choice. A mark $\geq 70\%$ must be obtained on the written procedure.

It is realized that writing a comprehensive NDT procedure which meets industrial standards would normally take many days to complete. Therefore, to simplify the task and still have a meaningful examination, the applicant will be provided with, at the time of application, a pretest package having all the information and details needed.

A candidate who is successful on the sector recertification examination but fails to obtain the 70% pass grade on the Written Procedure Examination, may retake the failed examination once.