cwbgroup

NDT CERTIFICATION EXAM GUIDE (MT2/PT2)

Per CAN/CGSB-48.9712-2022

Form 506E/2025-03

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1 INTRODUCTION

Canadian Welding Bureau NDT Certification Body (CWB NDT CB) is a national, independent and not-for-profit entity acting as a certification body for NDT certification and recertification of personnel in accordance with CAN/CGSB-48.9712-2022.

The purpose of this guide is to inform individuals and existing certified NDT personnel about examinations for certifications to CAN/CGSB-48.9712-2022 through CWB's NDT Certification Body's Certification Scheme. This guide only applies to the CWB NDT Certification Body and may not apply in-part or in-full to other certification schemes adhering to CAN/CGSB-48.9712-2022.

Contact Information:

Toll-free Help Line: 1-800-844-6790

Email: info@cwbgroup.org

Website: https:/www.cwbgroup.org/

2 EXAMINATION INFORMATION

2.1 AUTHORIZED EXAMINATION CENTRES (AEC)

Due to the requirements of these examinations, they can only be performed at Authorized Examination Centres (AECs). The location of CWB AECs can be found on the CWB website at www.cwbgroup.org.

Both written and practical examinations will need to be booked directly with the above AECs and invigilation and/or facility use fees **must be paid directly** to the AEC. Please contact the specific AEC for pricing. Exam paper and grading costs for the *first* attempt is covered by CWB within the application fees per Form 505 or as listed on CWB's website.

2.2 EXAMINATION TYPES

There are two examination types: written (multiple choice) examinations or practical examinations.

All written examinations are multiple choice examinations which are exclusively delivered via a computer-based examination system. This allows CWB to ensure fairness and security of the examinations and immediately provide results to all candidates.

2.2.1 Practical Examinations

Practical examinations are hands-on or essay type examinations that are conducted in-person only at an Authorized Examination Centre (AEC) approved by CWB specifically for NDT Practical Examinations.

2.2.2 Situations Needing Examination

The following scenarios require examinations:

1. Initial Certification - any method/level.
2. Renewal - only if personnel is unable to satisfy the requirements for Structured Credit System or chooses not to use structured credit.
3. Recertification practical examinations are required for all levels. Level 3 also requires a written examination if personnel is unable to satisfy the requirements for Structured Credit System or chooses not to use structured credit.

More information can be found in CWB's Form 500 – NDT Personnel Application Guide.

2.3 NOTE ON EXAMINATIONS

CWB's NDT Personnel Certification examinations are designed to test an individual's competence based on the training materials and typical real-world situations. The exams do not present all situations or all requirements of a certified NDT personnel, nor does a pass guarantee certification. The competence and skills for any particular role must be attained during the course of work experience and continual training and education. It is the responsibility of the certified NDT personnel and their employer to ensure they have the correct training and experience to complete their job adhering to the code of ethics. Failure to do so may result in the suspension or cancellation of an individual's certification.

3 METHODS

3.1 METHODS FOR EXAMINATION

Within the scope of CWB's certification scheme, the following are the current methods and levels available for certification and examination under CAN/CGSB-48.9712-2022:

a) Magnetic (Particle) Testing (MT), Levels 2 and 3
b) Penetrant Testing (PT), Levels 2 and 3
a) Ultrasonic testing (UT), Levels 1, 2 and 3 (Coming soon)
b) Radiographic Testing (RT), Levels 1, 2 and 3 (Coming soon)
c) Eddy current Testing (ET), Levels 1, 2 and 3 (Coming soon)

Currently, there is only the EMC sector being offered by CWB, as below.

3.1.1 EMC Sector

The Engineering, Materials and Components (EMC) Sector includes manufacturing, fabrication, construction, and general inspections in Canadian industry. Below are the areas of products and industry it covers in general:

- Castings and forgings, composed of ferrous or non-ferrous metallic alloys
- Extrusions of shapes and seamless tubing composed of ferrous or nonferrous metallic alloys
- Wrought product that has been rolled to form plates, blooms, bars or rods and composed of ferrous or nonferrous metallic alloys
- Welds including brazing or soldering that is utilized during fabrication of ferrous or nonferrous metallic alloys
- Composite materials, concrete, plastics, and ceramics

4 MAGNETIC PARTICLE TESTING (MT)

4.1 LEVEL 2

4.1.1 Initial Examinations

4.1.1.1 Written Examination

4.1.1.1.1 Layout & Content

Written Examinations comprise of two elements:

1. General Examination Element which tests knowledge of the theory of the method.
2. Specific Examination Element (EMC Exam) which tests knowledge of the applications of the method. This may also include field related Materials & Processes (M&P) questions and Code related questions.

Below is a summary of the MT2 Initial Written Examinations:

Exam Elements	Exam Questions & Parts	Duration	Pass Grade
MT2 General Written	• 40 multiple choice questions on MT theory	1 hour 20 mins	70% or higher
MT2 Specific (EMC) Written	• 50 multiple choice questions ○ 20 M&P ○ 20 applications ○ 10 Codes (2 codes, 5 questions each, worth 4 marks each)	2.5 hours	70% or higher

4.1.1.1.2 Study References

Your MT2 training notes and material from your Recognized Training Organization (RTO) course should cover most of your required knowledge for the written examinations. The below references should also be studied in preparation for the written examination:

- Nondestructive Testing Handbook*, Vol. 8: Magnetic Particle Testing (MT),* Latest Edition by ASNT
- ASM Handbook, Volume 17: *Nondestructive Evaluation of Materials* by ASM International
- Metallurgy for the Non-Metallurgist, *Second Edition by ASM International*

4.1.1.1.2.1 Codes and Standards

The following codes and standards should be reviewed to familiarize and address the code portion of the Specific (EMC) exam:

- ASME BPVC Section V, Article 7, *Magnetic Particle Examination*, Latest Edition.
- ASTM A275: "*Standard Practice for Magnetic Particle Examination of Steel Forgings*", Latest Edition.
- ASTM A456/A456M: "*Standard Specification for Magnetic Particle Examination of Large Crankshaft Forgings*", Latest Edition.
- ASTM E709: "*Standard Guide for Magnetic Particle Testing*", Latest Edition.

- ASTM E1444/E1444M: *"Standard Practice for Magnetic Particle Testing for Aerospace",* Latest Edition.
- ASTM E3024/E3024M: "*Standard Practice for Magnetic Particle Testing for General Industry*", Latest Edition

4.1.1.2 Practical Examination

Below is a summary of the Initial MT2 practical exam:

Exam Elements	Exam Questions & Parts	Duration	Pass Grade

MT2 Practical	• Verification / Performance Checks
	• Inspect 4 specimens
	  ○ 2 yoke using visible, prepared MT black suspension.
	  ○ 2 wet bench using fluorescent bath
	• Written Instruction for one of the inspected specimen.
		8 hours	70% or higher for each part

4.1.1.2.1 Layout & Content

There are four components to the practical examination that the candidate will need to pay attention to for the initial examinations. Below are those components and *suggested* timing, each candidates' preferences may differ.

Initial Exam Components	Suggested Time Spent*
1. Review Instruction Manual	*½ hour*
2. Verification / Performance Checks	*1 hour*
3. MT of Four Test Specimens	*5½ hours*
4. MT Instruction Writing for 1 of the 4 MT Specimens	*1 hour*
Total Duration	***8 Hours***

*The above timings are suggestions. Each candidate may require more or less time for each section of the exam; CWB does not require any candidate to adhere to these timings.

4.1.1.2.1.1 Reviewing Instruction Manual

The Instruction Manual for MT2 provided during the examination must be reviewed in detail prior to performing any exam tasks. The candidate is expected to adhere to the requirements outlined in the Instruction Manual and clarify any misunderstandings with the Invigilator.

General Instructions may include:

1. SAFETY: Take all required Safety Precautions during laboratory use of equipment, accessories and relevant material/chemicals. Required Personnel Protective Equipment shall be properly worn as directed by the Invigilator.
2. Candidates approved for 'Special Accommodation' by the CWB NDT Certification Body, shall verify the required accommodation is provided with the Invigilator.
3. This is a closed book examination.
4. No reference or access to any material(s) or electronic device is allowed.
5. All required equipment, accessories, and paperwork shall be provided at the exam centre.

6. No exam related paperwork or material shall leave the exam room. All sheets in the examination package, including blank or rough work sheets, shall be returned to the Invigilator at the end of the exam.
7. Carefully read all the questions and answer in the space provided.
8. Comply to all examination instructions including those provided by the Authorized Exam Centre and the Invigilator.
9. The candidate shall be shown proper use of the equipment as required by the Invigilator.
10. Completely fill in the information in the Examination Reporting Sheets using a dark pen or pencil.
11. Record units for all measurements taken. Only the metric units (mm, deg. C, etc.) shall be used.
12. In case of violation of the examination requirements or unsafe operation of the equipment, the Invigilator may terminate the examination immediately.
13. No examination specimen surface preparation is allowed.
14. DO NOT make any permanent markings on the test specimens.

4.1.1.2.1.2 Verification/Performance Checks

There are four verification/performance checks that are to be completed:

- Determine Particle Concentration using Settling Test for In-Use, Fluorescent, Wet Bath
- Measure highest light intensity for U.V 'A' light
- Measure highest light intensity for white light source
- Perform lift test for the electromagnetic yoke

Be sure to familiarize yourself with the equipment and fill out all the required parameters **and include all units**.

4.1.1.2.1.3 MT of Test Specimens

MT of the test specimens should occur after the performance/verification checks above are completed. The inspection of the test specimens should adhere to the following:

1. Visually inspect the specimen test area, prior to MT. Report visual indications.
2. Only AC/DC Electromagnetic Yoke shall be used for examination, Permanent Yoke is not allowed.
3. Perform required calibration verification/performance check(s).
4. Perform MT for the required Specimen Surface Area for 100% coverage. The specimen drawing provides the information in the 'Scope of MT' section.
5. Map indications and record details in the MT Specimen Drawing using a red color pen only.
    - Indication # assigned to an indication along with the indication details are recorded in the drawing.
6. Post MT, demagnetize each MT Specimen. Verify the residual magnetic field is less than 4 Gauss.
7. No post cleaning is required for MT Specimens.

Reporting and documentation are an essential part of the exam, and may include mark-up of drawings, report completion and technique sheet completion. The following are the expectations of reporting/documentation for the MT2 Practical Exam:

MT SPECIMEN AND REPORTING DOCUMENTATION:

1. Each specimen is traceable to a Unique Specimen Number.
2. MT reporting documentation for each specimen is provided, which includes:
    a) MT Report.
    b) Specimen Drawing.
    c) MT Technique Sheet. **NOTE:** This is applicable for the Wet Bench Specimen Only.
3. MT REPORT:
    a) There are two separate MT Report Forms based on the technique used. For Yoke, there is 'MT Report - Yoke' and for Wet Bench there is 'MT Report - Wet Bench'.
    b) Each of these MT Reports can be used for up to two specimens that are tested by the same technique. For Example: Up to two specimens tested by Yoke will have one common 'MT Report - Yoke' and up to two specimens tested by Wet Bench will have one common 'MT Report - Wet Bench'.
    c) Based on the technique used for the specimen(s), complete the relevant MT report(s).
4. SPECIMEN DRAWING:
    Each MT Specimen will have a unique specimen drawing sheet that includes the following information:

    a) Specimen # (*generic*), Specimen Name and Description.
    b) Scope of MT and Surface Area to be Tested.
    c) MT Technique to be used, such as Yoke or Wet Bench.
    NOTE: Record Specimen # **AS STAMPED** on the Specimen in the MT reporting documentation.
5. TECHNIQUE SHEET:
    a) NOTE: The technique sheet is applicable only for Wet Bench technique.
    b) There is unique technique sheet for each MT - Wet Bench specimen.
    c) The technique sheet includes the specimen's drawing along with its geometric dimensions.
    d) MAP AND RECORD DETAILS OF THE REQUIRED TECHNIQUE SHOTS. ENSURE COMPLETE COVERAGE OF THE TEST AREA.
    e) Use the pictorial representations to show each shot, such as Head Shot, Central Conductor, and Coil Shot.
    f) Each shot shall include required details, example Current for Central Conductor state applicable rotations and central conductor bar information, etc.
    g) Demagnetization shot - include type of demagnetizing coil used with number of turns.

EXAMPLES OF MT COMPLETED DOCUMENTATION AS BELOW:

Note that the below are examples only and may not represent actual exam documents, specimens or data.

1) Yoke – example of completed MT Report and Specimen Drawing:

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MT REPORT - YOKE

SPECIMEN(S) & MT REQUIREMENT:		
	1st SPECIMEN - INFORMATION RECORDED BELOW:	2nd SPECIMEN - INFORMATION RECORDED BELOW: (when applicable)
SPECIMEN #:	TS12	
SPECIMEN NAME:	Butt Welded CS Plate	

EQUIPMENT, MATERIAL & TECHNIQUE:		
CURRENT: ☑ AC ☐ DC (Check mark ✓)	MAGNETIZATION: ☑ CONTINUOUS ☐ RESIDUAL (Check mark ✓)	MT MEDIUM (BATH/PARTICLES): ☑ WET ☐ DRY (Check mark ✓)

YOKE:		MT PREPARED BATH / PARTICLES:		WHITE CONTRAST PAINT:	
MAKE:	TAS	MANUFACTURER:	TOJNU	MANUFACTURER:	TOJNU
MODEL:	T3				
SERIAL #:	1990	TYPE/BRAND:	KJ2	TYPE/BRAND:	WC3

MT RESULTS	
1ST SPECIMEN (Specimen # as above. Check mark ✓) ☐ ACCEPT ☑ REJECT	2ND SPECIMEN (Specimen # as above. Check mark ✓) ☐ ACCEPT ☐ REJECT
FIRST SPECIMEN: (1st SPECIMEN # as above) DRAWING ATTACHED ☑ YES ☐ NO (Check mark ✓)	SECOND SPECIMEN: (When applicable, 2nd SPECIMEN # as above) DRAWING ATTACHED ☐ YES ☐ NO (Check mark ✓)
COMMENTS	COMMENTS
Indications mapped on the attached drawing.	

SIGNATURE & CERTIFICATION:			
NAME: (PRINT)	SIGNATURE:	CWB REGISTRATION #:	DATE:
Terry Singh	TSingh	032690	03/26/2024

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MTL2 PRACTICAL EXAM

SPECIMEN DRAWING- TO MAP INDICATIONS & RECORD DETAILS

SPECIMEN #: TS12 SPECIMEN NAME: Butt welded CS plate

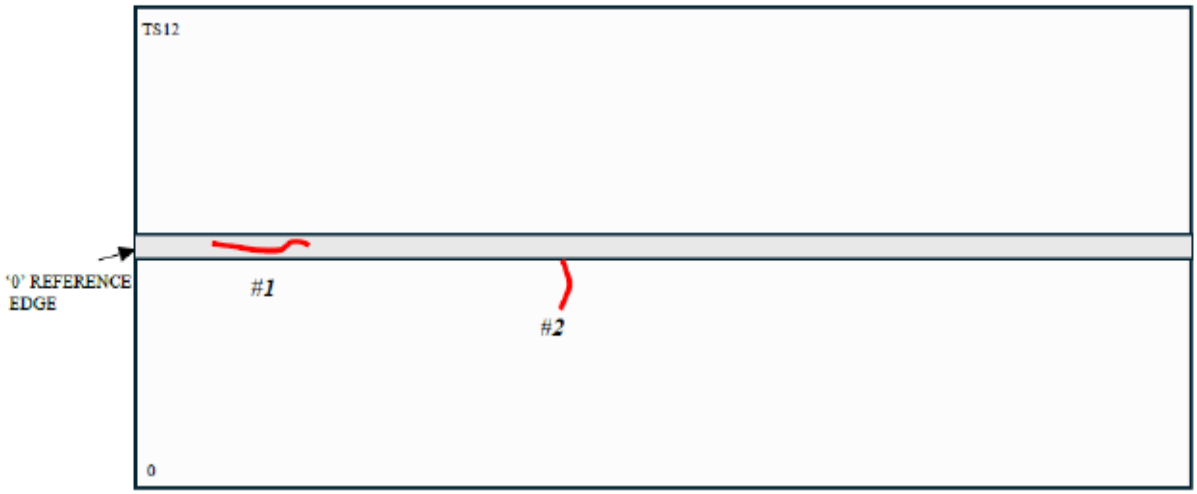
SPECIMEN DESCRIPTION: Butt welded plate. Welding process-FCAW. Plate has been in service.

MT SCOPE: 100% weld.

TECHNIQUE: MT using Yoke and a can of visible, wet prepared bath.

ACCEPTANCE CRITERIA: Refer Acceptance Criteria in the given document # 26.

Dimensions:
length= xx mm
width = xy mm
thickness=xz mm



INDICATION #	INDICATION SIZE/LENGTH	DISTANCE FROM '0' REFERENCE EDGE	DESCRIPTION	ACCEPT/ REJECT
1	*13 mm length*	*25 mm*	*Fatigue, surface, longitudinal crack on weld cap.*	*Reject.*
2	*9 mm length*	*75 mm*	*Fatigue, surface, transverse, crack in the HAZ.*	*Reject.*
NAME: PRINT TERRY SINGH			**SIGN:** *TSingh*	**DATE:** *03/26/2024*

2) Wet Bench - completed MT Report, Specimen Drawing and Technique Sheet:

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MT REPORT - WET BENCH

SPECIMEN(S) & MT REQUIREMENT:		
	1ST SPECIMEN, INFORMATION RECORDED BELOW:	2ND SPECIMEN, INFORMATION RECORDED BELOW: *(when applicable)*
SPECIMEN #:	WS12	
SPECIMEN NAME:	Forged TSW Pin	

EQUIPMENT, MATERIAL & TECHNIQUE:		
CURRENT:	**MAGNETIZATION:**	**MT MEDIUM (BATH/PARTICLES):**
☐ AC ☐ DC ☐ HWDC ☑ 3ϕ FWDC	☑ CONTINUOUS ☐ RESIDUAL	☑ WET ☐ DRY
(Check mark ✓)	*(Check mark ✓)*	*(Check mark ✓)*

MT RESULTS:	
1ST SPECIMEN *(Specimen # as above. Check mark ✓)*	2ND SPECIMEN *(Specimen # as above. Check mark ✓)*
☐ ACCEPT ☑ REJECT	☐ ACCEPT ☐ REJECT
1ST SPECIMEN - ATTACHMENT: *(1st Specimen - as above)*	2nd SPECIMEN - ATTACHMENT: *(2nd Specimen, when applicable)*
(Check mark ✓)	*(Check mark ✓)*
1. SPECIMEN DRAWING: ☑ YES ☐ NO	1. SPECIMEN DRAWING: ☐ YES ☐ NO
2. TECHNIQUE SHEET: ☑ YES ☐ NO	2. TECHNIQUE SHEET: ☐ YES ☐ NO
1st SPECIMEN - COMMENTS	2nd SPECIMEN - COMMENTS
Indications mapped on the attached specimen drawing.	

SIGNATURE & CERTIFICATION:			
NAME: *(PRINT)*	SIGNATURE:	CWB REGISTRATION #:	DATE:
Terry Singh	TSingh	90326	03/06/2024

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MTL2 PRACTICAL EXAM

SPECIMEN DRAWING- TO MAP INDICATIONS & DETAILS

SPECIMEN #: WS12 SPECIMEN NAME: Forged TSW Pin	Dimensions:
SPECIMEN DESCRIPTION: Material: Carbon Steel. Forging-MT required for In-Service Specimen.	Length: xx mm
MT SCOPE: MT 100% Specimen Surface Area.	Diameter: xx to xx mm.
TECHNIQUE: MT using Wet Bench and Fluorescent Bath.	
ACCEPTANCE CRITERIA: Refer to the Acceptance Criteria as stated in the given document.	

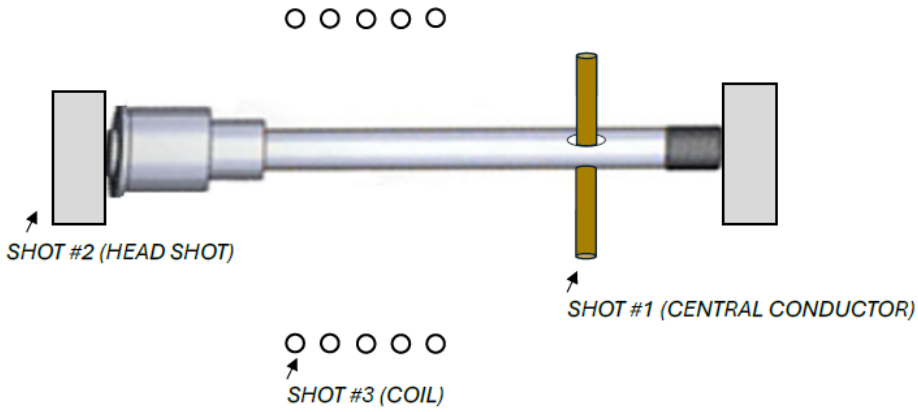
REFERENCE EDGE #1 #2

INDICATION #	INDICATION SIZE/LENGTH	DISTANCE FROM REFERENCE EDGE	DESCRIPTION	ACCEPT/REJECT
1	*9 mm length*	*67 mm*	*Fatigue Crack at the Surface, Transversely Oriented.*	*Reject.*
2	*4 mm length*	*202 mm*	*Fatigue Crack at the Surface, Starting from the Hole. Longitudinally oriented.*	*Reject.*

NAME:	SIGN:	DATE:
TERRY SINGH	TSingh	03/26/2024

MT TECHNIQUE- WET BENCH

PART # WS12	PART DESCRIPTION: Forged TSW Pin



SHOT #	TECHNIQUE SELECTION	CURRENT	COMMENTS
SHOT# 1	CENTRAL CONDUCTOR	800 A	COPPER BAR, LENGTH MINIMUM 10" WITH 0.5" DIAMETER. CENTRAL CONDUCTOR CLAMPED BETWEEN HEADS. NO ROTATION REQUIRED.
SHOT# 2	HEAD SHOT	1,000 A	-
SHOT# 3	COIL	1,200 A	5 TURN COIL.
SHOT# 4	DEMAGNETIZE	--	STAND ALONE AC DEMAGNETIZATION COIL USED, HENCE NO CURRENT SELECTION. RESIDUAL MAGNETISM LESS THAN 4 GAUSS.

NAME: (PRINT) TERRY SINGH	SIGNATURE: TSingh	DATE: 03/26/2024

4.1.1.2.1.4 Detailed Written Instruction of One Test Specimen

Write MT instruction for any one specimen that was examined. Use lined papers provided for instruction writing. FIVE lined sheets are provided.

Follow the Written Instructions format as follows:

1. Foreword (scope, reference documents)
2. Personnel
3. Equipment/media to be used
4. Product (description or drawing, including area of interest and purpose of test)
5. Test conditions include preparation for testing
6. Detailed instructions for application of the test, including settings
7. Recording and classifying the results of the test results
8. Reporting the results

4.1.1.2.1.5 Grading of Practical Examination

The grading of the MT2 Practical Examination element shall be based on the following:

Item	Subject	Weighting (%)
1	Knowledge of NDT equipment and NDT media.	10
2	Application of NDT method	26
3	The detection of indications or discontinuities and reporting	64
Total		**100**

The grading of the Detailed Written Instruction of One Test Specimen element shall be per the following:

Item	Subject	% maximum
a)	Foreword (scope, reference documents)	5
b)	Personnel	5
c)	Equipment/media to be used	5
d)	Product (description or drawing, including area of interest and purpose of the test)	10
e)	Test conditions, including preparation for testing	10
f)	Detailed instructions for application of the test, including settings	40
g)	Recording and classifying of the test results	20
h)	Reporting the results	5
Total		**100**

All candidates must achieve a minimum grade of 70% of each element to pass the examinations.

4.1.2 Renewal & Recertification Examinations

Renewal and Recertification exam content will be similar to that of the Initial Examinations except the number of test specimens will change and the technique required will be based upon the candidates' work experience.

Note that for Renewals, examination is only required if the candidate chooses not to renew via Structured Credit or is unable to achieve the Structured Credit requirement.

Below is a summary of the renewal and recertification exams.

	Exam	Exam Questions & Parts	Duration	Pass Grade
Renewal	MT2 Renewal Practical (EMC)	• Verification / Performance Checks • Inspect 1 specimen	4 hours	70% or higher for each part
Recertification	MT2 Recertification Practical (EMC)	• Verification / Performance Checks • Inspect 2 specimens • Written Instruction for one of the specimens	4 hours	70% or higher for each part

4.1.2.1 Layout & Content

Refer to the content for Initial Examinations per 4.1.1.2 except that:

One Calibration/Performance Check as below:

a) Measure highest light intensity for the U.V.'A' light or the white light source

5 LIQUID PENETRANT TESTING (PT)

5.1 LEVEL 2

5.1.1 Initial Examinations

5.1.1.1 Written Examination

5.1.1.1.1 Layout & Content

Written Examinations comprise of two elements:

1. General Examination Element which tests knowledge of the theory of the method.
2. Specific Examination Element (EMC Exam) which test knowledge of the applications of the method, this may also include field related Materials & Processes (M&P) questions and Code related questions.

Below is a summary of the PT2 Initial Written Examinations:

Exam Elements	Exam Questions & Parts	Duration	Pass Grade
PT2 General Written	• 40 multiple choice questions on PT theory	1hr 20mins	70% or higher
PT2 Specific (EMC) Written	• 50 multiple choice questions ○ 20 M&P ○ 20 applications ○ 10 Codes (2 codes, 5 questions each, worth 4 marks each)	2.5 hours	70% or higher

5.1.1.1.2 Study References

Your PT2 training notes and material from your Recognized Training Organization (RTO) course should cover most of your required knowledge for the written examinations. The below references should also be studied in preparation for the written examination:

- Nondestructive Testing Handbook*, Vol. 1: Liquid Penetrant Testing (PT),* Latest Edition by ASNT
- ASM Handbook, Volume 17: *Nondestructive Evaluation of Materials* by ASM International
- Metallurgy for the Non-Metallurgist, *Second Edition by ASM International*

5.1.1.1.2.1 Codes and Standards

The following codes and standards should be reviewed to familiarize and address the code portion of the Specific (EMC) exam:

- ASME BPVC Section V, Article 6, *Liquid Penetrant Examination*, Latest Edition.
- ASTM A903/A903M-99: "*Standard Specification for Steel Castings, Surface Acceptance Standards, Magnetic Particle and Liquid Penetrant Inspection*", Latest Edition.
- ASTM E165/E165M: "*Standard Practice for Liquid Penetrant Testing for General Industry*", Latest Edition.
- ASTM E433: "*Standard Reference Photographs for Liquid Penetrant Inspection*", Latest Edition.

- ASTM E1209: "*Standard Practice for Fluorescent Liquid Penetrant Testing Using the Water-Washable Process*", Latest Edition.
- ASTM E1210: "*Standard Practice for Fluorescent Liquid Penetrant Testing Using the Hydrophilic Post-Emulsification Process*", Latest Edition.
- ASTM E1219: "*Standard Practice for Fluorescent Liquid Penetrant Testing Using the Solvent-Removable Process*", Latest Edition.
- ASTM E1220: "*Standard Practice for Visible Penetrant Testing Using Solvent-Removable Process*", Latest Edition.
- ASTM E1417/E1417M: "*Standard Practice for Liquid Penetrant Testing*", Latest Edition.
- ASTM E1418/E1418M: *"Standard Practice for Visible Penetrant Testing Using the Water-Washable Process",* Latest Edition.

5.1.1.2 Practical Examination

Below is a summary of the Initial PT2 practical exam:

Exam Elements	Exam Questions & Parts	Duration	Pass Grade

PT2 Practical (EMC)	• Verification / Performance Checks
	• Inspect 4 specimens:
	  ○ 3 - fluorescent
	  ○ 1 - colour contrast, solvent removable
	• Written Instruction for one of the inspected specimen.
		4 hours	70% or higher for each part

5.1.1.2.1 Layout & Content

There are four components to the practical examination that the candidate will need to pay attention to for the initial examinations. Below are those components and *suggested* timing, each candidates' preferences may differ.

Initial Exam Components	Suggested Time Spent*
1. Review Instruction Manual	*0.25 hour*
2. Verification/Performance Checks	*0.5 hour*
3. PT of Four Test Specimens	*1.75 hours*
4. PT Instruction Writing for 1 of the 4 PT Specimens	*1 hour*
Total Duration	**4 Hours**

*The above timings are suggestions. Each candidate may require more or less time for each section of the exam; CWB does not require any candidate to adhere to these timings.

5.1.1.2.1.1 Reviewing Instruction Manual

The Instruction Manual for PT2 provided during the examination must be reviewed in detail prior to performing any exam tasks. The candidate is expected to adhere to the requirements outlined in the Instruction Manual and clarify any misunderstandings with the Invigilator.

General Instructions may include:

1. SAFETY: Take all required Safety Precautions during laboratory use of equipment, accessories and relevant material/chemicals. Required Personnel Protective Equipment shall be properly worn as directed by the Invigilator.
2. Candidates approved for 'Special Accommodation' by the CWB NDT Certification Body, shall verify the required accommodation is provided with the Invigilator.

3. This is a closed book examination.
4. No reference or access to any material(s) or electronic devices is allowed.
5. All required equipment, accessories, and paperwork shall be provided at the exam center.
6. No exam related paperwork or material shall leave the exam room. All sheets in the examination package, including blank or rough work sheets, shall be returned to the Invigilator at the end of the exam.
7. Carefully read all the questions and answer in the space provided.
8. Comply with all examination instructions including those provided by the Authorized Exam Centre and the Invigilator.
9. The candidate shall be shown proper use of the equipment as required by the Invigilator.
10. Completely fill in the information in the Examination Reporting Sheets using a dark coloured pen or pencil.
11. Record units for all measurements taken. Only the metric units (mm, deg. C, etc.) shall be used.
12. In case of violation of the examination requirements or unsafe operation of the equipment, the Invigilator may terminate the examination immediately.
13. No examination specimen surface preparation is allowed.
14. DO NOT make any permanent markings on the test specimens.

5.1.1.2.1.2 Verification/Performance Checks

There are four verification/performance checks that are to be completed:

1. Measure highest light intensity for U.V. 'A' light
2. Measure highest light intensity for white light source
3. Record water temperature and pressure at the water wash station
4. Measure dryer temperature

Be sure to familiarize yourself with the equipment and fill out all the required parameters **and include all units**.

5.1.1.2.1.3 PT of Test Specimens

PT of the test specimens should occur after the performance/verification checks above are completed. The inspection of the test specimens should adhere to the following:

1. <u>Visually inspect the specimen test area, prior to PT. Report visual indications.</u>
2. The PT Instructions are applicable for the following Techniques:
    i) Colour Contrast, Visible, Solvent Removable using non-aqueous developer.
    ii) Fluorescent Water Washable using dry developer.
    iii) Fluorescent-Post Emulsifiable Hydrophilic using dry developer.
3. Specimen drawing provides information for the surface area to be tested using the stated PT technique. Recommended PT parameters are also provided in the specimen drawing.
4. Penetrant Dwell Times are between **20 to 30 minutes for all specimens and techniques**.
5. Draw and report each indication on the PT documentation provided:
    - As accurately as possible using a **red color pen only.**
    - Each indication is assigned an 'indication #'.
    - It shows their size, length, shape and location.

- Each indication is **interpreted and evaluated correctly** based on the indication's appearance, specimen form, manufacturing process(es) and service condition of the specimen. **Do not just report as 'linear' or 'rounded' indication.**

6. **Do not post-clean the PT specimen(s).** The Invigilator is required to verify PT processed specimen(s).

Reporting and documentation are an essential part of the exam, and may include mark-up of drawings, report completion and technique sheet completion. The following are the expectations of reporting/documentation for the PT2 Practical Exam:

PT SPECIMEN AND REPORTING DOCUMENTATION:

1. Each specimen is traceable to a Unique Specimen Number.
2. PT reporting documentation for each specimen includes:
   i) PT report.
   ii) Specimen drawing.
3. PT REPORTS:
   i) Based on the PT technique used, appropriate PT Report form shall be used.
   Two types of PT Report forms are:
      a) PT Report- Color Contrast Technique.
      b) PT Report- Fluorescent Technique.
   ii) Each of these PT Reports can be used for up to three specimens that are tested by the same technique. **Example**: Generate one 'PT Report-Fluorescent Technique' for up to three specimens tested by fluorescent technique and one 'PT Report- Color Contrast Technique' is generated for up to two specimens tested by Color contrast solvent removable technique.
4. SPECIMEN DRAWING:
   Each PT specimen has a unique specimen drawing sheet that includes the following information:
   i) Specimen # (*generic*), Specimen name and description. **NOTE 2**
   ii) Scope of PT and surface area to be tested.
   iii) PT Technique to be used, such as:
      a) Colour Contrast, Solvent Removable.
      b) Fluorescent Water Washable.
      c) Fluorescent Post Emulsifiable Hydrophilic.

   NOTE 2: Record Specimen # **AS STAMPED** on the Specimen in the PT Report and PT drawing sheets.

EXAMPLES OF PT DOCUMENTATION AS BELOW:

PT report - Colour Contrast Solvent Removable Technique:

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PT REPORT

(COLOR CONTRAST, SOLVENT REMOVABLE TECHNIQUE)

SPECIMEN(S) & PT REQUIREMENT		
	1ST SPECIMEN, INFORMATION RECORDED BELOW:	2ND SPECIMEN, INFORMATION RECORDED BELOW: *(when applicable)*
SPECIMEN #:	TSW90	
SPECIMEN NAME:	*Tandem Equalizer*	

MATERIAL & TECHNIQUE:			
PENETRANT MATERIAL:	MANUFACTURER:	TYPE:	BATCH #:
CLEANER	NKSCL	SC1C	90326
PENETRANT	NKSCL	PC2P	16121
DEVELOPER	NKSCL	DC3D	03513

PENETRANT DWELL TIME:	EXCESS PENETRANT REMOVAL METHOD:	DEVELOPMENT TIME:
20 mins.	Solvent wipe and dry	10 mins.

PT RESULTS:	
1ST SPECIMEN *(Specimen # as above. Check mark ✓)* ☐ ACCEPT ☑ REJECT	2ND SPECIMEN *(Specimen # as above. Check mark ✓)*☐ ACCEPT ☐ REJECT
1ST SPECIMEN - ATTACHMENT: SPECIMEN DRAWING: ☑ YES ☐ NO	2ND SPECIMEN - ATTACHMENT: SPECIMEN DRAWING: ☐ YES ☐ NO
1ST SPECIMEN - COMMENTS	2ND SPECIMEN - COMMENTS
Specimen rejected	
Indications mapped on the attached specimen drawing.	

SIGNATURE			
NAME:	SIGNATURE:	CWB REGISTRATION #:	DATE:
Terry Jot	*Tjot*	*91263*	12/04/2024

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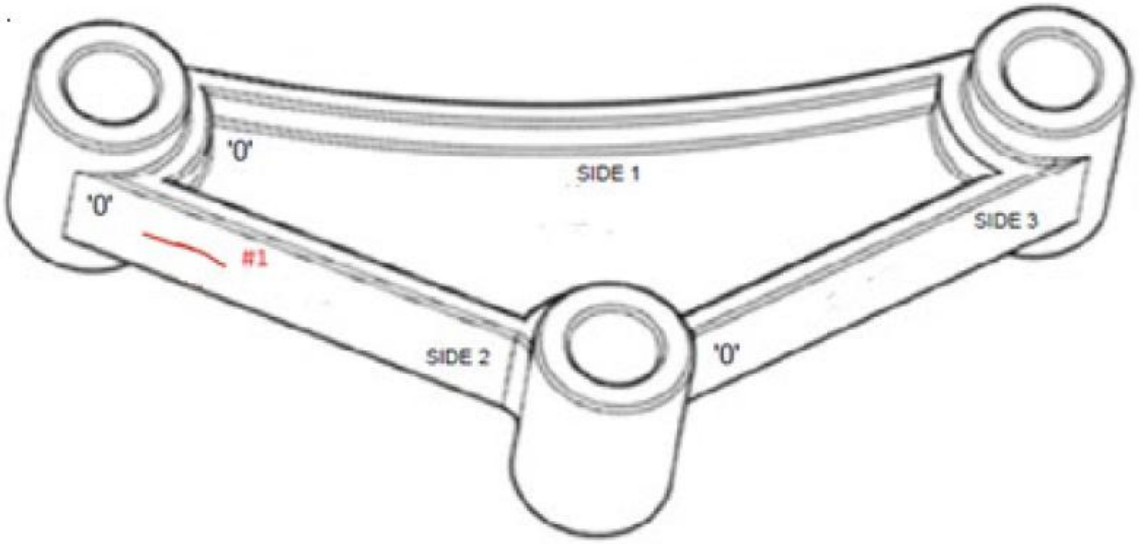
LIQUID PENETRANT TESTING L2 PRACTICAL EXAM – SPECIMEN DRAWING TO MAP AND RECORD INDICATION DETAILS

DATE: 12/4/2024	**SPECIMEN #:** TSW90 **SPECIMEN NAME: Tandem Equalizer.**
AS STAMPED ON PART **SPECIMEN#:** TSW90-XT	**DESCRIPTION:** Forged Equalizer, material ASTM S36. PT in as-forged condition prior to service .
NAME: Terry Jot	**SCOPE OF TESTING:** Surfaces- side 1, side 2, side 3 only.
SIGN:	**TECHNIQUE:** PT using Colour Contrast, Visible, Solvent Removable Technique.
	RECORDING & ACCEPTANCE CRITERIA: Reference 'PT2 DOCUMENT #20'.

DIMENSIONS	
Thickness:	xx-xy mm
Dimensions:	yy-zz mm



Indication #	Indication Length / Size	Location.	Indication Description	Accept / Reject
1.	20 mm	Indication on side 2 surface, located at 13 mm from '0' reference on side 2.	Surface, linear indication, visually verified as having metal fold over- Forging Lap.	Reject

5.1.1.2.1.4 Detailed Written Instruction of One Test Specimen

Write PT instruction for any one specimen that was examined. Use lined papers provided for instruction writing. FIVE lined sheets are provided.

Follow the Written Instructions format as follows:

1. Foreword (scope, reference documents)
2. Personnel
3. Equipment/media to be used
4. Product (description or drawing, including area of interest and purpose of test)
5. Test conditions include preparation for testing
6. Detailed instructions for application of the test, including settings
7. Recording and classifying the results of the test results
8. Reporting the results

5.1.1.2.1.5 Grading of Practical Examination

The grading of the PT2 Practical Examination element shall be based on the following:

Item	Subject	Weighting (%)
1	Knowledge of NDT equipment and NDT media.	10
2	Application of NDT method	26
3	The detection of indications or discontinuities and reporting	64
Total		**100**

The grading of the Detailed Written Instruction of One Test Specimen element shall be per the following:

Item	Subject	% maximum
1	Foreword (scope, reference documents)	5
2	Personnel	5
3	Equipment/media to be used	5
4	Product (description or drawing, including area of interest and purpose of the test)	10
5	Test conditions, including preparation for testing	10
6	Detailed instructions for application of the test, including settings	40
7	Recording and classifying of the test results	20
8	Reporting the results	5
Total		**100**

All candidates must achieve a minimum grade of 70% of each element to pass the examination.

5.1.2 Renewal & Recertification Examinations

Renewal and Recertification exam content will be similar to that of the Initial Examinations except the number of test specimens will change and the technique required will be based upon the candidates' work experience.

Note that for Renewals, examination is only required if the candidate chooses not to renew via Structured Credit or is unable to achieve the Structured Credit requirement.

Below is a summary of the renewal and recertification exams.

	Exam	Exam Questions & Parts	Duration	Pass Grade
Renewal	PT2 Renewal Practical (EMC)	• 1 Verification / Performance Check • Inspect 1 specimen	4 hours	70% or higher for each part
Recertification	PT2 Recertification Practical (EMC)	• 1 Verification / Performance Check • Inspect 2 specimens • Written Instruction for one of the specimens	4 hours	70% or higher for each part

5.1.2.1 Layout & Content

Refer to the content for Initial Examinations per 4.1.1.2 except as below:

One Calibration/Performance Check: Measure highest light intensity for the U.V. 'A' light or the white light source

6 RE-EXAMINATIONS

The requirements for re-examinations are as follows:

1. A candidate failing for reasons of unethical behaviour shall wait at least 12 months before reapplying or as determined by CWB.
2. Fees for re-examinations must be paid prior to granting of a re-exam by CWB. AEC invigilation costs must be paid to the AEC directly.
3. For Initial Certifications:
    a) A candidate who fails one or more elements of an examination (i.e. general, specific, practical, etc.) may retake the failed examination no more than twice:
        i. after a minimum time of one month (which may be reduced if further training acceptable to the certification body has been satisfactorily completed)
        ii. no later than two years after the initial examination
    b) A candidate failing two re-examinations on one or more elements shall complete further training, acceptable to the CWB, and be required to retake all examination elements
4. For Renewals
    a) Two re-examinations of the renewal examination shall be allowed after at least 7 days and within 12 months of the first attempt at the renewal examination.
    b) In the event of failure in the two allowable re-examinations, the certificate shall be withdrawn. In order to reinstate certification, a candidate shall:
        i. complete further training, acceptable to CWB; and
        ii. retake all examination elements required for recertification.
5. For Recertifications:
    a) Two re-examinations of the recertification examination shall be allowed after at least 7 days and within 12 months of the first attempt at the recertification examination.
    b) In the event of failure in the two allowable re-examinations, the certificate shall be withdrawn. In order to reinstate certification, a candidate shall:
        i. complete further training, acceptable to CWB; and
        ii. retake all examination elements required for initial certification.
6. Practical Re-examinations:

A person failing practical examination of a particular specimen needs only re-examination of that failed specimen, for example, with a UT2 EMC Practical Exam, a candidate achieves the following results:

Element 1: Specimens

- Specimen 1: 86%
- Specimen 2: 90%
- Specimen 3: 57%

Element 2: Work Instruction

- Grade: 75%

Overall Result: **Fail**, as minimum of 70% in each specimen and section not achieved.
Re-examination Required:

- Re-examination of Element 1, Specimen 3.

The specimens to be re-examined as part of the practical examination element will be assigned by CWB and the time limit will vary depending on the number of specimens that need to be re-examined for the element.

7 COMPLAINTS AND APPEALS

The CWB Group is committed to ensure a transparent and impartial approach to our certification programs for companies, individuals and products.

Complaints and appeals related to the activities and/or decisions of the CWB Group or related to the organizations, individuals and products we certify, can be made to the CWB Group's Registrar. All complaints and appeals and resulting outcomes will be documented and communicated back to the complainant or appellant.

Complaints and appeals can be made directly to CWB Group by calling 1-800-844-6790 or can be made through our external ConfidenceLine program (1-800-661-9675).

8 FEES

See Form 505 for the fee schedule. Pricing is subject to change at CWB's discretion.