

ULTRASONIC TESTING (UT)

超声检测

Course Content:

课程内容:

Basic principles of sound; generation and detection of sound; behavior of sound in a material; the flaw detector; use of angled beam probes for weld scanning; welding processes and weld defects; practical exercises on test specimens containing simulated flaws; examination of parent plate, butt welds; instruction writing.

声音的基本原理；声音的产生和检测；声音在材料中的行为；探伤仪；使用倾斜光束探头进行焊缝扫描；焊接工艺和焊接缺陷；对含有模拟缺陷的试样进行实践练习；母板、对接焊缝的检查；指令编写。

Course Duration:

培训时长:

12 DAYS (120 hours)

12 天 (120 小时)

Entry Requirements:

报名要求:

No mandatory course entry requirements.

没有强制性的报名要求。

Training requirements:

培训要求:

The minimum required duration of training, which includes both theoretical and practical elements, is:

- Level 2 - 120 hours

The training hours requirement is fulfilled when candidates attend one of recognised training courses of CB.

最少所需的训练时间，包括理论和实践两方面，为：

- 二级- 120 小时

学员修读其中一项认可的培训课程，即符合培训时数要求。

Certification requirements:

认证要求：

The minimum duration for experience prior to or following success in the qualification examination is:

- Level 2 - 120 hours

Certification will not be issued until successful completion of the examination and the required experience is achieved.

在资格考试成功之前或之后的最短工作时间为：

- 二级- 120 小时

在成功完成考试并获得所需经验之前，将不会颁发证书。

Course Objectives:

课程目标：

-  To explain the theoretical background of the techniques
解释技术的理论背景
-  To calibrate ultrasonic equipment
校准超声波设备

-  To measure the thickness of steel plates and determine levels of attenuation
测量钢板的厚度并确定衰减程度
-  To locate and evaluate laminations
定位和评估叠片
-  To select the correct type of probe to examine welded butt joints in steel plate and aerospace components/structures
选择正确类型的探头, 以检查钢板和航空航天部件/结构中的焊接对接接头
-  To report on the location and size of defects in typical welded butt joints
报告典型焊接对接接头缺陷的位置和大小
-  To interpret code requirements
解释代码需求
-  To meet the syllabus requirements for ISO 9712 Level 2.
满足 ISO 9712 二级教学大纲的要求。

RADIOGRAPHY TESTING (RT)

射线检测

Course Content:

课程内容:

Welding processes and weld defects; properties of X- and gamma-rays; sensitometry; film selection; film processing and spurious indications; factors controlling contrast and definition; X- and gamma-ray equipment; ionizing radiation hazards; regulations; use of screens and filters; selection of angle of aspect; image quality indicators; defect depth location; castings; reporting.

焊接工艺和焊接缺陷；X射线和伽马射线的性质；感光测定；胶片选择；胶片处理和伪指征；控制对比度和清晰度的因素；X射线和伽马射线设备；电离辐射危害；章程；使用滤网和过滤器；视角的选择；图像质量指标；缺陷深度定位；铸件；报告。

Course Duration:

培训时长：

12 DAYS

12 天

Entry Requirements:

报名要求：

Must hold, as a minimum, a Basic Radiation Safety qualification

必须持有基本辐射安全资格

Training requirements:

培训要求：

The minimum required duration of training, which includes both theoretical and practical elements, is:

- Level 2 - 120 hours

The training hours requirement is fulfilled when candidates attend one of recognised training courses of CB.

最少所需的训练时间，包括理论和实践两方面，为：

- 二级- 120 小时

学员修读其中一项认可的培训课程，即符合培训时数要求。

Certification requirements:

认证要求:

The minimum required duration of training, which includes both theoretical and practical elements, is:

- Level 2 - 120 hours

Certification will not be issued until successful completion of the examination and the required experience is achieved.

最少所需的训练时间，包括理论和实践两方面，为：

- 二级- 120 小时

在成功完成考试并获得所需经验之前，将不会颁发证书。

Course Objectives:

课程目标:

- ☒ To explain the basic theory of X - and gamma radiography
解释 X 射线和伽马射线的基本理论
- ☒ To select film type and energy levels, select and prepare techniques for a given specimen
选择胶片类型和能级，为给定样本选择和准备技术
- ☒ To state the theory of film processing and carry out practical dark-room work
阐述胶片处理理论并进行实际暗室工作
- ☒ To have a working knowledge of basic radiation safety
具备基本的辐射安全知识

-  To recognize film faults
绘制和评估胶片特性（感光测定）
-  To meet the syllabus requirements for ISO 9712 Level 2
满足 ISO 9712 2 级的教学大纲要求
-  To understand and apply digital processing processes
(SAFT, linearization, averaging, filters etc)
理解并应用数字处理过程（SAFT、线性化、平均化、滤波器等）

MAGNETIC PARTICLE TESTING (MT)

磁粉检测

Course Content:

课程内容

Principles of magnetism; magnetic fields; induction; permeability and reluctance; magnetization; lines of force, methods of testing; interpretation of indications; demagnetization; practical exercises; methods of assessing sensitivity; instruction writing.

磁性原理；磁场；感应；渗透率和磁阻；磁化；力线、测试方法；迹象解释；去磁；实践练习；评估敏感性的方法；指令编写。

Course Duration:

培训时长

5 DAYS

5 天

Entry Requirements:

报名要求

No Mandatory Course Entry Requirements.

无强制性报名要求。

Training Requirements:

培训要求:

The minimum required duration of training, which includes both theoretical and practical elements, is:

- Level 2 - 40 Hours

The training hours requirement is fulfilled when candidates attend one of recognized training courses of the CB.

最少所需的训练时间，包括理论和实践两方面，为：

- 二级- 40 小时

学员修读其中一项认可的培训课程，即符合培训时数要求。

Certification requirements:

认证要求:

The minimum required duration of training, which includes both theoretical and practical elements, is:

- Level 2 - 3 Months

Certification will not be issued until successful completion of the examination and the required experience is achieved.

最少所需的训练时间，包括理论和实践两方面，为：

- 2 - 3 个月

在成功完成考试并获得所需经验之前，将不会颁发证书。

Course Objectives:

课程目标:

- ☒ To explain the basic principles of magnetic particle inspection methods
解释磁粉检测方法的基本原理
- ☒ To carry out magnetic particle inspection
进行磁粉检验
- ☒ To write clear and concise inspection instructions and test reports
编写清晰简洁的检验说明和测试报告
- ☒ To meet syllabus requirements for ISO 9712 Level 2.
满足 ISO 9712 第 2 级的教学大纲要求。

PENETRANT TESTING (PT)

渗透检测

Course Content:

课程内容:

Materials, methods, compatibility of materials, equipment and safety aspects; practical exercises; methods of assessing sensitivity, Interpretation and evaluation, reporting, instruction writing.

材料、方法、材料、设备和安全方面的兼容性；实践练习；评估敏感性的方法、解释和评估、报告、指令编写。

Course Duration:

培训时长

5 DAYS

5 天

Entry Requirements:

报名要求

No Mandatory Course Entry Requirements.

无强制性报名要求。

Training Requirements:

培训要求:

The minimum required duration of training, which includes both theoretical and practical elements, is:

- Level 2 - 40 Hours

The training hours requirement is fulfilled when candidates attend one of recognized training courses of CB.

最少所需的训练时间，包括理论和实践两方面，为：

- 二级- 40 小时

学员修读其中一项认可的培训课程，即符合培训时数要求。

Certification requirements:

认证要求:

The minimum duration for experience prior to or following success in the qualification examination is:

- Level 2 - 3 months

Certification will not be issued until successful completion of the examination and the required experience is achieved.

资格考试成功之前或之后的最低经验期限为:

- 2 级-3 个月

在成功完成考试并获得所需经验之前，不会颁发证书。

Course Objectives:

课程目标:

-  To explain the basic principles of penetrant inspection methods
解释渗透检验方法的基本原理
-  To carry out penetrant inspection using solvent-removable, water-washable and post-emulsifiable/removal processes
使用溶剂可去除、水洗和后乳化/去除工艺进行渗透检查
-  To write clear and concise inspection instructions and test reports
编写清晰简洁的检验说明和测试报告
-  To meet syllabus requirements for ISO 9712 Level 2
满足 ISO 9712 2 级教学大纲要求

VISUAL TESTING (VT)

目视检测

Course Content:

课程内容:

ISO NDT Certification Programs – Introduction to Visual Testing – Physics of Light – The Eye and Vision – Environmental Conditions – Light Sources – Measuring Equipment – Surface Conditions – Materials and Processes – Temperature Measurement – Optical Aids – Inspection Procedures – Technique and sequence of performing test – Capability and limitations of VT Detect ability – Typical defects according to the manufacturing process (forgings, castings, rolling welding, cold working processes; heat treatment processes, surface finishing, material composition, In-service aspects etc.) – instruction writing – Product technology – interpretation and evaluation; acceptance criteria – codes and standards, procedures, and written practices– reporting and preparation procedure for various application.

ISO 无损检测认证计划-视觉测试介绍-光物理-眼睛和视觉-环境条件-光源-测量设备-表面条件-材料和工艺-温度测量-光学辅助设备-检查程序-执行测试的技术和顺序-VT 检测能力的能力和限制-典型缺陷根据制造工艺（锻件、铸件、滚焊、冷加工工艺；热处理工艺、表面光洁度、材料成分、在役方面等）-说明书编写-产品技术-解释和评估；验收标准。规范和标准、程序和书面实践。各种应用的报告和准备程序。

Course Duration:

培训时长

4 days training + 1 day examination for Level 2 4 days training + 1 day examination for Level 3

4 天培训+ 1 天二级考试 4 天培训+ 1 天三级考试

Entry Requirements:

培训要求

The minimum duration for experience prior to or following success in the qualification examination is 3 months for level 2. It is strongly recommended that ISO 9712 Level 2 certification in the method sought is achieved prior to undertaking Level 3 exams.

在资格考试成功之前或之后的最少工作时间为 2 级为 3 个月。建议在参加 3 级考试之前，先通过 ISO 9712 2 级认证。

Course Objectives:

课程目标:

-  To explain the basic principles of visual inspection methods and to carry out magnetic particle inspection.
解释目视检查方法的基本原理并进行磁粉检查。
-  To write clear and concise inspection instructions and test reports.
编写清晰简洁的检验说明和测试报告。
-  To state the parameters relating to inspection of welds, forgings and castings.
说明与焊缝、锻件和铸件检查相关的参数。
-  To devise and write NDT procedures and instructions for the inspection of component in the chosen method.
按照所选择的方法设计和编写部件无损检测程序和说明。
-  To meet syllabus requirements for ISO 9712/TR25107.

满足 ISO 9712/TR25107 的教学大纲要求。

PHASED ARRAY ULTRASONIC TESTING (PAUT)

相控阵超声检测 (paut)

Course Content:

课程内容:

Principles of phased array inspection; principles of phased array probes; principles of inspection sensitivity; phased array instrument; scanning with phased array probes; calibration and checks; software for data collection and data analysis; principles of data analysis; software familiarity; use of software tools for defect detection and sizing; data analysis; procedures for verification of flaw existence and position; reporting. Typical equipment used on the course: Olympus Omniscan equipment. If your course is equipment specific please contact us to confirm the equipment that will be used for the event.

相控阵检测原理;相控阵探头原理;检测灵敏度原则;相控阵仪器;相控阵探头扫描;校正及检查;用于数据收集和分析的软件;数据分析原理;软件熟悉;使用软件工具进行缺陷检测和分级;数据分析;缺陷存在和位置的验证程序;报告。球场上使用的典型设备:Olympus Omniscan 设备。如果您的课程是特定于设备的,请与我们联系以确认将用于活动的设备。

Course Duration:

培训时长

12 DAYS (phased array theory and data acquisition practical and analysis practical)

12 天(相控阵理论与数据采集实践与分析实践)

Entry Requirements:

培训要求

ISO 9712 candidates must be qualified to a minimum of ISO 9712 Level 2 Ultrasonic Testing.

PCI certification is available for candidates holding ASNT UT Welds. It will be considered on an individual basis and evidence of training and experience presented to the training centre on application. Additionally, holders of ASNT UT Welds qualification will be required to sit the PCI UT Welds Level 2 General Paper.

The minimum required duration of training, which includes both theoretical and practical elements, is:

- Level 2 - 120 hours

The minimum required duration of training, which includes both theoretical and practical elements, is:

- Level 2 - 120 hours

ISO 9712 考生必须具备 ISO 9712 2 级超声检测的最低资格。

持有 ASNT UT 焊接的学员可获得 PCI 认证。将根据个人情况进行考虑，并在申请时向培训中心提交培训和经验证明。此外，持有 ASNT UT 焊接资格证书者将被要求参加 PCI UT 焊接 2 级普通考试。

最少所需的训练时间，包括理论和实践两方面，为：

- 二级- 120 小时

最少所需的训练时间，包括理论和实践两方面，为：

- 二级- 120 小时

The minimum duration for experience prior to or following success in the qualification examination is:

在资格考试成功前后的最短工作时间为：

- Level 2 - 6 months

- 2 - 6 个月

Course Objectives:

课程目标:

-  To explain the theoretical background of phased array applications
解释相控阵应用的理论背景
-  To correctly select probe/wedge to examine welded butt joints
正确选择探头/楔子以检查焊接对接接头
-  To calibrate and set up the phased array ultrasonic equipment
对相控阵超声设备进行校准和安装
-  To locate and evaluate flaws in the weld body, HAZ, and parent metal lamination
定位和评估焊缝体、热影响区和母材层合层的缺陷
-  To analyse scan data for location and size of defects in typical welded butt joints
分析扫描数据，确定典型对接焊接接头缺陷的位置和大小
-  To accurately report weld condition
准确报告焊接状况
-  To differentiate defects from geometric features
区分缺陷和几何特征
-  To compile a written instruction

编写书面指令

-  To meet the ISO 9712 syllabus requirements

满足 ISO 9712 教学大纲的要求

PAUT DATA INTERPRETATION

Paot 数据解释

Course Content:

课程内容:

Reminiscence of conventional and advanced ultrasonic testing – Principle of phased array inspection; phased array equipment and probes; familiarisation of PAUT equipments and scan plans – phased array inspection calibrations – velocity, Wedge delay, sensitivity, TCG and encoder – PAUT data scanning, data acquisition; and data analysis; data integrity – scan representations – software familiarity; use of software tools for defect detection and sizing; evaluation – acceptance criteria procedures for verification of flaw existence and position; reporting; welding processes and weld defects – number of practical exercises on scanned data for interpretation familiarisation data analysis and interpretation.

传统与先进超声检测回顾。相控阵检测原理相控阵设备及探头;熟悉 PAUT 设备和扫描计划-相控阵检查校准-速度,楔形延迟,灵敏度,TCG 和编码器-PAUT 数据扫描,数据采集;和数据分析;数据完整性。扫描表示。软件熟悉度;使用软件工具进行缺陷检测和分级;评定。缺陷存在和位置验证的验收标准程序。报告;焊接工艺和焊接缺陷。用于解释熟悉数据分析和解释的扫描数据实践练习的数量

Course Duration:

培训时长

Level II – 6 Days Training and 1 Day Examination

二级:6 天培训, 1 天考试

Eligibility:

资格:

Candidate has to possess a valid ISO 9712 Level 2 in UT or ASNT Level 3 in UT. Candidate without valid ISO9712 Level 2 or ASNT Level 3 is eligible to write the ISO9712 Level 2 in PAUT provided candidate has to appear and Pass a 40 questions General paper in Ultrasonic Testing.

考生必须在 UT 拥有有效的 ISO 9712 2 级或 ASNT 3 级证书。没有有效 ISO9712 2 级或 ASNT 3 级的考生有资格在 pot 中写 ISO9712 2 级，前提是考生必须在超声检测中出现并通过 40 道问题。

Course Objectives:

课程目标:

- ☒ To explain the theoretical background of PAUT welds inspections
理解焊接检验的理论背景
- ☒ To calibrate and set up the phased array ultrasonic equipment
对相控阵超声设备进行校准和安装
- ☒ To locate, analyse, evaluate & size of defects in typical weld joints
对典型焊接接头缺陷进行定位、分析、评估及尺寸确定
- ☒ To differentiate defects from geometric features
从几何特征中区分缺陷
- ☒ To accurately report weld condition
准确报告焊接状况

-  To comply applicable procedure and codes/standards
遵守适用的程序和规范/标准

TIME OF FLIGHT DIFFRACTION ULTRASONIC TESTING (TOFD)

超声衍射时间差法

Course Content:

课程内容:

TOFD theory and principles of diffraction, ToFD hardware (pulsers, receivers, motor control, encoders), ToFD data acquisition and interpretation, ToFD techniques, ToFD applications, equipment selection, calibration and optimisation, optimising PCS and angles, flaw location and sizing, limitations of detection and resolution, codes and standards, reporting.

TOFD 理论和衍射原理, TOFD 硬件(脉冲器, 接收器, 电机控制, 编码器), TOFD 数据采集和解释, TOFD 技术, TOFD 应用, 设备选择, 校准和优化, 优化 PCS 和角度, 缺陷定位和尺寸, 检测和分辨率的限制, 代码和标准, 报告。

Course Duration:

培训时长

12 DAYS

12 天

Entry Requirements:

报名要求

ISO 9712 candidates must be qualified to a minimum of ISO 9712 Level 2 Ultrasonic Testing.

PCNI certification is available for candidates holding ASNT UT Welds. It will be considered on an individual basis and evidence of training and experience presented to the training centre on application. Additionally, holders of ASNT UT Welds qualification will be required to sit the PCNI UT Welds Level 2 General Paper.

The minimum required duration of training, which includes both theoretical and practical elements, is:

- Level 2 – 80 hours

The minimum required duration of training, which includes both theoretical and practical elements, is:

- Level 2 – 12 months

ISO 9712 考生必须具备 ISO 9712 2 级超声检测的最低资格。

持有 ASNT UT 焊接的考生可获得 PCNI 认证。将根据个人情况进行考虑，并在申请时向培训中心提交培训和经验证明。此外，持有 ASNT UT 焊接资格证书者将被要求参加 PCNI UT 焊接 2 级普通考试。

最少所需的训练时间，包括理论和实践两方面，为：

- 2 级– 80 小时

最少所需的训练时间，包括理论和实践两方面，为：

- 2 级– 12 个月

Course Objectives:

课程目标：

-  To understand the theoretical background and limitations of ToFD applications
了解 ToFD 应用的理论背景和局限性
-  To correctly select probe/wedge to examine welded butt joints

正确选择探头/楔子以检查焊接对接接头

-  To calibrate and set up the ToFD ultrasonic equipment
ToFD 超声设备的校准和安装
-  To locate and evaluate flaws in the weld body, HAZ, and parent metal lamination
 - 定位和评估焊缝体、热影响区和母材层合层的缺陷
-  To locate and evaluate flaws in the weld body and HAZ
 - 定位和评估焊缝体和 HAZ 的缺陷
-  To differentiate defects from geometric features
从几何特征中区分缺陷
-  To analyse scan data for location and size of defects in typical welded butt joints
分析扫描数据，确定典型焊接对接接头缺陷的位置和大小
-  To understand and apply digital processing processes (SAFT, linearization, averaging, filters etc)
理解和应用数字处理过程(SAFT，线性化，平均，滤波器等)
-  To compile written instructions
编写书面说明
-  To meet syllabus requirements for ISO 9712 Level 2
满足 ISO 9712 2 级教学大纲要求

TOFD DATA INTERPRETATION

TOFD 数据解释

Course Content:

课程内容:

Reminiscence of Ultrasonic Testing and Advanced ultrasonic technologies – TOFD theory and principles of diffraction – TOFD technique – TOFD equipment – principle of TOFD inspection; software familiarisation – scan plans – TOFD inspection calibrations and optimising PCS and angles – data scanning with TOFD probes; TOFD data acquisition and interpretation, analysis; use of software tools for defect detection, flaw location and sizing; data analysis; Interpretation & Evaluation – acceptance Criteria – limitations of detection and resolution – procedures for verification of flaw existence and position; reporting; TOFD applications – welding processes and weld defects – number of practical exercises on test specimens containing simulated flaws.

超声检测与先进超声技术回顾。TOFD 理论与衍射原理。TOFD 技术。TOFD 设备。TOFD 检测原理。软件熟悉。扫描计划。TOFD 检验校准和优化 PCS 和角度。TOFD 探头的的数据扫描;TOFD 数据采集与解释、分析;使用软件工具进行缺陷检测, 缺陷定位和尺寸;数据分析;解释和评价-验收标准-检测和解决的局限性-缺陷存在和位置的验证程序报告;TOFD 应用。焊接工艺和焊接缺陷。含有模拟缺陷的试样的实际练习的数量。

Course Duration:

培训时长

Level II – 4 Days Training and 1 Day Exam

二级:4 天培训和 1 天考试

Eligibility:

资格:

Candidate without valid ISO9712 Level 2 or ASNT Level 3 is eligible to write the ISO9712 Level 2 in TOFD provided candidate has to appear and Pass a 40 questions General paper in Ultrasonic Testing.

没有有效 ISO9712 2 级或 ASNT 3 级的考生有资格在 TOFD 中写 ISO9712 2 级，前提是考生必须在超声检测中出现并通过 40 道问题。

Course Objectives:

课程目标:

-  To understand the theoretical background of TOFD
了解 TOFD 的理论背景
-  To correctly select probe/wedge to examine weld joints
正确选择探头/楔子以检查焊缝
-  To calibrate and set up the TOFD equipment
校准和安装 TOFD 设备
-  To analyse scan data for location and size of defects in typical welded butt joints
分析扫描数据，确定典型焊接对接接头缺陷的位置和大小
-  To differentiate defects from geometric features
从几何特征中区分缺陷
-  To understand and apply digital processing
理解和应用数字处理

LEVEL 3

3 级

Course Content:

课程内容

Basic exam – product technology (materials, cast, wrought, welding, heat treatments, etc); certification scheme information; revision of NDT methods at Level 2. Main method exams – general preparation and revision of chosen method at Level 3; sector specific preparation and revision of the NDT method including use of applicable standards; NDT procedure preparation and creation with use of applicable standards and specifications

基础考试-产品技术(材料, 铸造, 锻造, 焊接, 热处理等);认证方案信息;修订第2级无损检测方法。主要方法考试-3级所选方法的一般准备和复习;部门特定的无损检测方法的准备和修订, 包括适用标准的使用;使用适用的标准和规范准备和创建无损检测程序

Course Duration:

培训时长

Contact the Training organization with the details of your qualifications.

请与培训机构联系, 了解您的资格证书。

Additional Information:

附加信息:

ISO 9712 mandates training hours prior to Level 3 examination. It is strongly recommended that prospective Level 3 candidates ascertain their exact training requirements by contacting the training centre with details of ISO 9712 qualifications held and other supporting documentation.

Exam exemptions may be available, these shall be obtained directly from CB using the Exemption form

It is strongly recommended that ISO 9712. Level 2 certification in the method sought is achieved prior to undertaking Level 3 exams; this will significantly reduce the training hour requirements.

Refer to the certification manual (CM 01) for more details

ISO 9712 规定了 3 级考试前的培训时间。强烈建议潜在的 3 级候选人通过与培训中心联系，详细了解所持有的 ISO 9712 资格和其他支持文件，以确定其确切的培训要求。

可以获得考试豁免，这些豁免应使用豁免表直接从 CB 处获得

强烈建议 ISO 9712。在参加 3 级考试之前，获得所寻求方法的 2 级认证；这将大大减少训练时间要求。

有关详细信息，请参阅认证手册 (CM 01)

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Course Objectives:

课程目标:

-  To state the responsibilities of a Level 3 as directed by the relevant scheme
根据有关计划的指示，说明第 3 级人员的职责
-  To state the parameters relating to inspection of welds, forgings and castings
说明与焊缝、锻件及铸件检验有关的参数
-  To be familiar with the main certification scheme requirements
熟悉主要认证方案的要求
-  To explain the principles of the major complementary NDT methods
解释主要的互补无损检测方法的原理

-  To prepare for chosen method exam at Level 3 through revision and assessment in general and sector specific terms
通过一般和特定领域的复习和评估，为三级选择方法考试做准备
-  To devise and write NDT procedures and instructions for the inspection of component and/or weld configurations in the chosen method
设计并编写无损检测程序和说明，以检查所选方法中的部件和/或焊缝配置