



Auditing Multiple Standards

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IQC, Inc.

- **International Quality Consultants, Inc. (IQC, Inc.) is an auditing and inspection/testing company providing services globally to the Power Generation and Transportation Industries. Additionally, IQC, Inc. is one of the Authorized Auditing Agencies for the AAR. We perform both AAR and ISO audits in roughly about 19 countries.**

Auditing Techniques

- **Requirements**
- **Understanding the Standards**
- **Understanding Similarities**
- **Tools To Use**



Requirements

- **Quality Requirements**
 - Some standards require a certified Quality System
 - AAR Standards
 - EN standards
- **Certification Requirements**
 - Employee certifications
 - Equipment certifications
- **Product Requirements**



Quality Standards

- M-1003 and ISO 9001
 - Are We Comparing the Two Standards with this presentation?
 - Short Answer
 - No
 - While both standards have similarities.
 - They are both very different in other aspects that make them unique



Technical Standards

- **What is Standards are we talking about**
 - AAR
 - ASTM
 - ASNT
 - CSA
 - ISO
 - EN
 - GB
 - DIN



Understanding the Standards

- **Do you need to memorize these standards**
 - No
 - But a basic understanding of the requirements is good
- **During an audit take the time and read the standard**
- **Determine Common Standards**



Understanding Similarities

- **Find common requirements**
- **Find similar language**



Standards

What standard Is this?

GB/T 9445 Qualification and Certification of NDT Personnel

3 级的职责要求其知识要超出任何特定的 NDT 方法的技术范围。此广泛的知识可以通过各种不同的教育、培训和经历而获得。报考人员已经在技术学校成功完成学业或者在正规的大学或大专院校的理工科专业至少学习 2 年以上,其最低的经历要求已在表 3 详细说明。如果不是这样,那么此时间要乘以 2。
对于 3 级认证,本标准所指的工作经历包含了 2 级时间。如果申请人没有 2 级经历,而直接从 1 级报考 3 级资格,此经历应包含对于 2 级和 3 级要求的时间总和。不应允许减少此段经历。

7.3.3 可能的减少

7.3.3.1 以下为适当减少经历时间的条件,当有几个适用的减少时间,总的经历时间减少不能超过 50%。任何减少时间的申请需要得到认证机构的认可。

对于经历时间的适当减少,认证机构宜考虑到以下因素:

- 取得工业经历的效果不尽相同,在与申请认证方法高度相关且经验(知识)密集的环境中工作,可快而多地获得技能;
- 当同时在两个或多个表面 NDT 方法上获得工业经历,如 MT、PT 和 VT,则在一个 NDT 方法应用中获得的经历,可弥补其他一个或多个表面 NDT 方法所需要的经历;
- 已获得认证的 NDT 方法的一个门类的经历,可弥补同一 NDT 方法的其他门类的经历;
- 报考人员受教育水平和程度也宜考虑,这对 3 级报考人员特别重要,但这也适用于其他等级。

7.3.3.2 能同时在本标准所涵盖的两个或多个 NDT 方法上获得工作经历积分,并按如下减少总要求时间:

- 两种检测方法,减少总要求时间的 25%;
- 三种检测方法,减少总要求时间的 33%;
- 四种或更多检测方法,减少总要求时间的 50%。

任何情况都应要求报考人员出示证明,其所申请认证的任何检测方法,最低的时间要求需达到表 3 所示时间的 50%。

7.3.3.3 任何情况都应要求报考人员出示证明,其所申请认证的任何 NDT 方法/门类,至少达到工业经历所要求的一半时间,且决不应少于一个月。

7.3.3.4 如果申请认证在应用上范围是有限的(如超声测厚或自动检测),经历最多可减少 50%,但不应少于一个月。

7.3.3.5 从合适的实际操作课程上最多可获得 50% 的实际操作经历,此持续时间可按最大权重 5 来计算。此程序不应与 7.3.3.4 规定的同时使用。该课程应专注于经常发生的检测问题的实用应对措施,并且宜涉及检测已知缺陷试样的重要环节。该课程应得到认证机构的批准。

7.4 各个等级的视力要求

报考人员应提供满足如下要求的视力书面证明:

- 无论是否经过矫正,在不小于 30 cm 距离,一只或两只眼睛的近视力应能读出 Jaeger 1 号或 Times New Roman 4.5 号或同样大小字符(高为 1.6 mm);
- 报考人员应具有足够的色觉,以便能按雇主的规定辨别和区分相关 NDT 方法所涉及的颜色或灰度的差别。

认证机构可考虑按照其他合适的要求来更换 a) 的要求。

认证后,应每年做近视力检查,并经雇主验证。

8 资格鉴定考试

8.1 概述

资格鉴定考试应涵盖一个给定的应用于一个工业门类、或一个或多个产品门类的 NDT 方法。认

GB/T 9445—2015/ISO 9712:2012

证机构应规定和公布报考人员完成每门考试允许的最大时间量,最大时间量应视试题的数量和难度而定。答题所需的平均允许时间应由认证机构确定。

8.2 1 级和 2 级的考试内容和评分

8.2.1 通用考试

通用考试应仅包含在考试当日从认证机构或授权的资格鉴定机构的有效通用考试题库中随机选取的试题。应要求报考人员最少回答表 4 的选择题数量。

射线检测考试还应增加针对安全方面的考试,除非另有注明。



Common Standards

- **Links**

- GB/T 9445
- ISO 9712
- ANST SNT-TC-1A
- AAR Standard Requirements



Common Requirements

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7.3.3.5 从合适的实际操作课程上最多可获得 50% 的实际操作经历,此持续时间可以按最大权重 5 来计算。此程序不应与 7.3.3.4 规定的同时使用。该课程应专注于经常发生的检测问题的实用应对措施,并且宜涉及检测已知缺陷试样的重要环节。该课程应得到认证机构的批准。

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8.1.8 In no case shall an examination be administered by one's self or by a subordinate.

8.2 Vision Examinations

8.2.1 Near-Vision Acuity. The examination should ensure natural or corrected near-distance acuity in at least one eye such that the applicant is capable of reading a minimum of Jaeger Number 2 or equivalent type and size letter at the distance designated on the chart but not less than 12 in. (30.5 cm) on a standard Jaeger test chart. The ability to perceive an Ortho-Rater minimum of 8 or similar test pattern is also acceptable. This should be administered annually.

8.2.2 Color Contrast Differentiation. The examination should demonstrate the capability of distinguishing and differentiating contrast among colors or shades of gray used in the method as determined by the employer. This should be conducted upon initial certification and at five-year intervals thereafter.

8.2.3 Vision examinations expire on the last day of the month of expiration.

8.3 General (Written - for NDT Levels I and II)

8.3.1 The general examinations should address the basic principles of the applicable method.

8.3.2 In preparing the examinations, the NDT Level III should select or devise appropriate questions covering the applicable method to the degree required by the employer's written practice.

8.3.3 See Appendix A for example questions.

8.3.4 The minimum number of questions that should be given is shown in Table 8.3.4.

8.3.5 A valid ACCP Level II or ASNT NDT Level II certificate may be accepted as fulfilling the general examination criteria for each applicable method if the NDT Level III has determined that the ASNT examinations meet the requirements of the employer's written practice.

8.4 Specific (Written - for NDT Levels I and II)

8.4.1 The specific examination should address the equipment, operating procedures, and NDT techniques that the individual may encounter during specific assignments to the degree required by the employer's written practice.

8.4.2 The specific examination should also cover the specifications or codes and acceptance criteria used in the employer's NDT procedures.

8.4.3 The minimum number of questions that should be given is shown in Table 8.3.4.

Similar Language

8.2 Vision Examinations

- 8.2.1 **Near-Vision Acuity.** The examination should ensure natural or corrected near-distance acuity in at least one eye such that the applicant is capable of reading a minimum of Jaeger Number 2 or equivalent type and size letter at the distance designated on the chart but not less than 12 in. (30.5 cm) on a standard Jaeger test chart. The ability to perceive an Ortho-Rater minimum of 8 or similar test pattern is also acceptable. This should be administered annually.
- 8.2.2 **Color Contrast Differentiation.** The examination should demonstrate the capability of distinguishing and differentiating contrast among colors or shades of gray used in the method as determined by the employer. This should be conducted upon initial certification and at five-year intervals thereafter.
- 8.2.3 Vision examinations expire on the last day of the month of expiration.

7.4.2 Near vision acuity

Prior to certification, and annually thereafter, near vision acuity shall be verified to be in accordance with the requirements of ISO 18490 or shall permit reading a minimum of Jaeger number 1 or Times Roman N4.5 or equivalent letters at not less than 30 cm with one or both eyes, either corrected or uncorrected.

7.4.3 Colour vision

Prior to certification, recertification or renewal, the candidate/certificate holder shall demonstrate that a colour vision test has been administered within the previous 5 calendar years.

It is required that colour vision and/or grey scale perception be sufficient for the individual to be able to distinguish and differentiate between the colours or shades of grey used in the NDT methods/techniques concerned as specified by the employer.

The colour vision test shall either confirm that the individual has acceptable colour vision without restriction or shall state any limitation(s) on colour perception.

Where any limitation in colour perception exists, the employer shall confirm whether or not this condition results in any limitation(s) to method or application specific techniques.



Understanding Similarities

- **Find common requirements**
- **Find similar language**



Similar Language (ASTM E10 and ISO 6506-1)

- **ASTM E10**
- **7.6 Measurement of Indentation:**
 - 7.6.1 Measure the diameter of each indentation in two directions, perpendicular (90°) to each other. Additional measurements of the indentation diameter may also be made.
 - The arithmetic mean of the measurements shall be used for the calculation of the Brinell hardness number



Similar Language (ASTM E10 and ISO 6506-1)

- **ISO 6506-1**
- **7.9 The optical measurement of the indentation diameter can be performed with either a manual or an automatic measuring system. The visual field for the optical device should be evenly illuminated, and the type of illumination shall be unchanged from that used during the machine's direct And indirect verifications and its daily verification. For manual measuring systems, measure the diameter of each indentation in two directions approximately perpendicular to each other. The arithmetic mean of the two readings shall be taken for the calculation of the Brinell hardness.**



Similar Language (ASTM E10 and ISO 6506-1)

- **ASTM E10**
 - 7.6.1 Measure the diameter of each indentation in two directions, perpendicular (90°) to each other.
- **ISO 6506-1**
 - For manual measuring systems, measure the diameter of each indentation in two directions approximately perpendicular to each other.



Common Standards

- **Links**

- GB/T 231.1
- ISO 6506-1
- ASTM E10
- AAR Standard Requirements



Understanding Similarities

- **Find common requirements**
- **Find similar language**



M-1003/ISO 9001 Cross Reference

Section	M-1003 Elements	ISO 9001 Clauses
2.1	Objective of Quality Assurance Program	4.1, 4.2, 4.3
2.2	Applicability and Scope	4.1, 4.2, 4.3
2.3	QA Program and Manual Requirements	4.1 – 4.4
2.4	Management Responsibility	5.0, 7.1.2, 7.1.3, 7.1.4, 7.3, 7.4, 9.3
2.5	Production, Inspection, and Test Planning	8.1, 8.5.1
2.6	Corrective and Preventative Actions	10.0
2.7	Document Control	7.5
2.8	Measuring and Testing Equipment	7.1.5
2.9	Purchasing/Subcontracting	8.4
2.10	Incoming Inspection	8.5.1, 8.6
2.11	In-Process Inspection	8.5.1, 8.6
2.12	Final Inspection	8.5.1, 8.6
2.13	Inspection Status	8.5.2
2.14	Identification and Traceability	8.5.2
2.15	Process Control	6.3, 8.1, 8.5.1
2.16	Preservation, Packaging and Shipping	8.5.4, 8.5.5
2.17	Quality Records	7.1.5
2.18	Nonconformance Control	8.7, 10.2
2.19	QA Program Review and Manual Revision	4.4, 7.5
2.20	Statistical Methods	6.2, 9.1, 10.3
2.21	Internal Quality Audits	9.2
2.22	Training	7.1.1, 7.1.2, 7.1.6, 7.2
2.23	Contract Review	8.2
2.24	Design Control	8.3



Auditing Tools

- **Standard Websites**
 - AAR.ORG or AAR.COM
 - ASTM.ORG
 - ASNT.ORG
 - AWS.ORG
 - ISO.ORG
- **Translation Apps**
 - Google Translate
 - Microsoft Translate
 - Chat GPT



Auditing Tools

- **Direct Observations**
 - Have the technician perform the process, test, verification, or inspection in front of you
 - Record reviews
- **Gap Analysis**
- **Cross Reference Tables**
- **And the #1 tool is Time**
 - Scheduling enough time to read, observe, and review is key
- **Other Helpful Websites**
 - TECHSTREET.COM



Auditing Multiple Standards

- **Questions/Comments?**





THANK YOU