



NZ Non Destructive Testing Association

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Please note – The information contained within this document is published for the sole reason to assist with the preparation for sitting NDT examinations. It is subjective and based on the experience of the author.

NDT Method SPECIFIC EXAMINATION

ISO 9712 requires that NDT qualification to Level 1 and 2 consist of a general, specific and practical exam.

The specific exam (according to ISO 9712) shall consist of at least 30 questions relating to the applicable industry sector. When dealing with a “Multi Sector” exam covering all sectors, the questions shall be evenly spread between sectors. This is the case with the current CBIP exams

The specific questions differ from the “general” exam questions in that they are designed to test more than just the candidate’s theoretical knowledge. Although some theoretical knowledge will be required in order to answer the specific questions, most of the knowledge will come from dealing with “Codes” and “Standards”, using the equipment and practical experience gained in the field.

Most questions in the specific exam can be divided into three broad categories. These are;

- Codes, Standards and Specifications
- Procedures and Equipment
- Interpretation and Evaluation

Codes, Standards and Specifications

Normally the scope of exam questions in this area is very narrow and would normally be identified by the certification body.

As an example the CBIP “Standard of Proficiency” for magnetic particle inspection has listed the following documents.

- CBIP Standard of Proficiency for MT, including the Code of Ethics
- SO 9712
- AS 1171
- ASTM E1444 (Level 2 certification only)

It is a fundamental requirement that all NDT inspectors be fully aware of their responsibilities and scope of their authority. In order to assure the certification body this is the case, the specific exam will contain several questions along this line. (SOP and ISO9712)

There will also be questions that relate to the interpretation of inspection standards (eg. For MT, AS 1171 and ASTM E1444).

At Level 2 the questions relating to these documents will normally require the candidate to carry out some form of interpretation rather than just locating the answer in the document

As an example, the exam question could ask for the candidate to work out the correct current value to be used when longitudinally magnetizing a 100mm Dia solid shaft 350mm long, using a cable wrap.

AS 1171 gives two equations for working out the required current when using a coil. One for a “low fill factor” coil and one for “high”.

The candidate should know that the cable wrap will be associated with a “high fill factor” and that the answer will be in “ampere turns” rather than “amperes”.

Specific questions requiring the candidate to recall actual values should not be asked unless the reference material is specified and in most cases the reference material should be made available to the candidate during the exam.

The reason for this is that these values can change over time and not all international standards are identical.

Examples of these types of questions could relate to the following.

- Maximum water wash temperature and pressure values during penetrant removal (AS 2062, ASTM E 1417)
- Minimum UV light intensity at inspection surface (AS 2062 and AS 1171)
- Wet particle concentration limits (AS 1171, ASTM E1444)
- Maximum residual magnetism following de magnetisation. (AS 1171, ASTM)
- Maximum emulsifier contact time (AS 2062, ASTM E1417)

Procedures and Equipment

The specific exam will also contain questions relating to common practices and procedures used in the industry. The answers to these questions are generally not found in any text book or official document. They are more associated with how the industry has evolved in a practical sense.

Questions of this nature tend to more subjective, and open to debate, however it will test the extent of the candidates overall practical experience.

Examples of practices that have become part of the inspection process are:

- Using a black cape to reduce the ambient white light during Fluorescent Penetrant Inspection in the field
- The use of the “residual method” to assist with evaluation during MT

This area of the exam will also have a number of questions designed to test the candidate’s knowledge with respect to the setup, operation and testing of the equipment.

The following are examples of items that could be included within this scope:

- Use of “known Defect Standards” (eg star burst chrome plated panels) to check penetrant lines
- Checks carried out on UV lights
- Calibration requirements for MT bench units (ammeter, quick break and timer)
- Portable yoke checks
- Tool steel ring (KETOS) used for DC MT bench units
- Ultrasonic unit vertical and horizontal linearity checks
- Ultrasonic probe index and angle checks

Interpretation and evaluation

The majority of questions within the specific exam will be from this category

This area will cover a wide range of topics but is directly related to determining the extent of the candidate's knowledge regarding "indications"

In order to maintain the required quality level of the inspection, the NDT inspector must be able to call on additional knowledge and experience other than just the performance of the inspection. Especially at Level 2

A variety of areas will be addressed in this section, and none more important than the common manufacturing and finishing processes. Along with the actual processes themselves the candidate will need to be conversant with typical discontinuities that can be introduced at each stage

Examination questions could be asked about:

- Steel and aluminium production
- Heat treatment, annealing and tempering
- Rolling, forging and casting
- Basic welding processes and associated terminology
- Machining, grinding and plating

Questions relating to typical discontinuities and their appearance could include the following"

- Stress and fatigue cracks
- Corrosion
- Stress corrosion cracking
- Welding defects
- Hydrogen embrittlement cracking
- Forging and casting defects
- Heat treatment cracks
- Stringers, seams and laminations