
Overview

This standard identifies the competences you need to determine the technical requirements for non-destructive testing (NDT) activities, in accordance with approved procedures. The principal objective of NDT is to generate data for the assessment of product quality achieved against prescribed acceptance criteria. This implies that the outcome of the tests will meet the testing objectives and, therefore, the first task in approaching the NDT of a product is to determine the consequent requirements for NDT sources, facilities and activities. You will determine these requirements from a review of relevant documentation and information, and will validate the efficiency of the tests prescribed in the NDT procedure specification. The NDT requirements will be recorded, ready for the development of the NDT instructions.

Your responsibilities will require you to comply with organisational policy and procedures for determining and specifying the NDT technical requirements. You will report any problems that you cannot personally resolve, or that are outside your permitted authority, to the relevant people. You will be expected to take personal responsibility for your own actions and for the quality and accuracy of the work that you carry out.

Your underpinning knowledge will provide a good understanding of your work, and will provide an informed approach to gathering the required information, and determining and specifying the NDT requirements. You will understand the prescribed method of NDT, the principles of the other common methods, and the advantages and limitations of each. You will appreciate how the different materials affect the feasibility of NDT, and will understand how quality required to meet design assumptions is checked against acceptance criteria. A working knowledge of relevant product technology is required, in particular that related to the incidence of defect manufacture. You will understand your organisation's methods of operation, in sufficient detail to enable you to make informed decisions.

You will be aware of any health, safety and environmental requirements applicable to your area of responsibility. You will be required to demonstrate safe working practices throughout, and will understand the responsibility you owe to yourself and others in the workplace.

Performance criteria

You must be able to:

1. work safely at all times, complying with health and safety legislation and other relevant regulations, directives and guidelines
2. obtain up-to-date, accurate and relevant information on the non destructive testing activity
3. make sure that all essential data are included
4. identify accurately the technical requirements to be met and make sure they meet the needs of the customer
5. produce technical requirements for the non-destructive testing activity
6. make sure that technical requirements take account of working conditions
7. confirm the technical requirements with the appropriate people
8. clearly identify and deal promptly and effectively with any problems occurring with the requirements and their interpretation

Knowledge and understanding

You need to know and understand:

1. the relevant health and safety information and issues relating to non-destructive testing methods
2. how to access appropriate information on health and safety regulations and guidelines
3. the implications of not taking account of legislation, regulations, standards and guidelines
4. how to interpret engineering drawings and related specifications to obtain any necessary information on the NDT activities
5. the codes and conventions that are used in the drawings and specifications
6. the various methods of non-destructive testing (to include liquid penetrant testing, magnetic particle inspection, ultrasonic testing and radiographic testing)
7. the advantages and limitations of each method (with respect to applications, sensitivity, flaw type location capabilities, flaw recognition, sizing and accuracy of measurements and its use for surface and volumetric testing)
8. how to obtain information on the NDT requirements, and the type of information that is available (such as customer order requirements and instructions, quality control requirements and the product specification)
9. the factors which will affect the NDT method to be used (such as material type, manufacturing process/technology used, type of flaws expected, degree of accuracy required)
10. the types of defect that are detectable by using the various detection methods
11. how to determine the level of defects that will be acceptable in the components, materials or structures
12. the influence of the defects on the service/performance of the components, materials or structures
13. how to identify the test objectives and the type of data that should be included in the technical information
14. the factors to be taken into account when determining the NDT technical requirements, especially those covering working conditions
15. principles and practice of quality management systems, and the role of NDT within the quality system
16. how to record the NDT requirements, and the format required by the

organisation

17. the type of information to be recorded, and where the records are kept
18. the problems that can occur when identifying NDT technical requirements, and how they can be minimised
19. the sources of technical expertise on NDT methods, if you have problems you cannot resolve
20. the extent of your own authority, and whom you should report to in the event of problems that you cannot resolve

Scope/range

1. Carry out all of the following activities when determining the technical requirements:
 - 1.1 use the correct issue of organisation information
 - 1.2 check that all essential information and data needed to identify the test objectives and derive the NDT instructions is available
 - 1.3 ensure that health and safety regulations and safe working practices are taken into account
 - 1.4 ensure that the influence of working conditions on technical performance, costs and timescales are recognised when identifying the technical requirements
 - 1.5 record and store information in the correct formats and in the appropriate organisation system
2. Produce NDT technical requirements for one of the following:
 - 2.1 penetrant flaw detection
 - 2.2 ultrasonic testing
 - 2.3 magnetic particle testing
 - 2.4 radiography
3. Produce NDT technical requirements for one of the following product ranges:
 - 3.1 welded joints
 - 3.2 castings
 - 3.3 wrought products or materials (such as forged, rolled, extruded)
 - 3.4 cold formed products (such as by bending, pressing, rolling)
 - 3.5 heat treated components
 - 3.6 structures (such as airframes, lifting beams, pressure vessels)
 - 3.7 other specific products
4. Review and extract the NDT requirements from all of the following sources:
 - 4.1 customers' orders and instructions
 - 4.2 acceptance criteria
 - 4.3 product specification
 - 4.4 relevant standards
 - 4.5 NDT procedure specification
5. Use the information extracted in the review to carry out all of the following:
 - 5.1 determine the types of test to be applied
 - 5.2 identify test objectives
 - 5.3 validate the feasibility of tests and timescales
 - 5.4 identify requirements for NDT activities to generate data required for assessment
 - 5.5 formulate risk assessment documentation
6. Record the NDT requirements covering ten of the following, as appropriate to the NDT test method identified:
 - 6.1 specific testing method to be applied

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- 6.2 acceptance criteria
 - 6.3 equipment resources and their specifications
 - 6.4 timescales
 - 6.5 consumables and their specification
 - 6.6 post-test restoration of product/site
 - 6.7 test site facilities and safety requirements
 - 6.8 applicable standards, specifications and codes
 - 6.9 personnel resource and qualifications
 - 6.10 non-routine conditions at test site which may affect NDT activities
 - 6.11 product areas to be tested
 - 6.12 objectives of tests
 - 6.13 environmental requirements
 - 6.14 NDT activities to generate required data

Glossary

Discontinuity – Any imperfection in the material / component / structure

Flaw – A significant discontinuity to be recorded but within specified limits and tolerances

Defect – A flaw outside specified limits and tolerances causing the material / component / structure to be non-compliant and rejected

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Determining technical requirements for non-destructive testing



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