

Preparing work areas for radiographic testing of castings

Overview

This standard identifies the competencies you need to prepare work areas in readiness for radiography testing activities on castings, in accordance with approved procedures and techniques. The work area for radiography is called a Controlled Test Area, because of the emission of ionising radiation and must be prepared in compliance with statutory regulations, local rules and instructions. You will ensure that the working environment is suitable for radiography and that all essential services in the test area are operating correctly. The term radiography is used in this standard and can include real time radiography or computed tomography (CT scanning) methods. Also the term radiographic testing can be using either photographic film or digital detectors.

You will be required to establish the Controlled Test Area, with a clearly identified boundary and to ensure that all required safety equipment is in place and working, to protect both the testing personnel and others working in the vicinity. All radioactive materials and devices must be correctly stored and transported. Your role will include checking that the radiographic equipment is fit for purpose and safe to use and preparing the image processing area.

Your responsibilities will require you to comply with organisational policy and procedures for the radiographic preparation activities undertaken and to report any problems with the work area preparations, or equipment in use, that you cannot personally resolve, or are outside your permitted authority, to the relevant people. You will be expected to work with a minimum of supervision, taking personal responsibility for your actions and for the quality and accuracy of the work that you carry out.

Your underpinning knowledge will provide a good understanding of all the factors involved in establishing a safe working site for radiography. You will have a good understanding of the principles of X-ray and gamma radiography and the nature of the ionising radiation and you will have a detailed knowledge of relevant health and safety legislation and practice. A sound knowledge of radiographic and associated equipment is essential and you will be expected to have a working knowledge of radiographic practice and image processing using both photographic film and digital detectors.

Your knowledge will include an appreciation of potential hazards and safe working practice and you will understand the safety precautions required when preparing the Controlled Test Area and radiography equipment. You will be required to demonstrate safe working practices throughout and will understand the responsibility you owe to yourself and others in the workplace.

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Performance criteria

You must be able to:

1. work safely at all times, complying with health and safety legislation, regulations, directives and other relevant guidelines
2. follow relevant job instructions and specifications for testing
3. ensure that the work environment is suitable for the test activities to be undertaken
4. ensure that all service supplies are connected and ready for use
5. prepare the work areas for the testing activities
6. report completion of preparations in line with organisational procedures
7. deal promptly and effectively with problems within your control and report those that cannot be solved
8. ensure that work records are completed, stored securely and available to others, as per organisational requirements
9. leave the work area in a safe condition on completion of the activities, as per organisational and legal requirements

Preparing work areas for radiographic testing of castings

Knowledge and understanding

You need to know and understand:

1. the specific safety precautions to be taken whilst carrying out the activities (including any specific legislation, regulations or codes of practice relating to the activities, equipment or materials)
2. the health and safety requirements of the work area and the activities, and the responsibility these requirements place on you
3. the hazards associated with the activities, and how to minimise them and reduce risks
4. the personal protective equipment and clothing (PPE) to be worn during the activities
5. the basic principles of radiographic testing (including the use of X ray and gamma radiation as a penetrating agent; shadow effect and the projection and capture of the image; developing, accretment, fixing, storing and the equipment used to view the images)
6. the sources of radiation used in radiographic testing activities (to include the X-ray tube generator and the use of radioactive isotopes)
7. the basic principles of real time radiography, computed tomography and digital processing of X-rays
8. how to obtain the test techniques, controlled test area setting-up procedures and other relevant specifications, directives and regulations and interpret the information
9. how to set up a controlled test area (including the identification and marking of boundary exclusions, the erection of physical barriers, warning lights and visual signs to restrict unauthorised entrance, the sighting of radiation survey meters, the positioning of appropriate radiation screens)
10. how to transport radioactive materials safely and correctly and the safe storage of the radioactive source containers
11. the setting up/maintenance of storage/archive facilities for unexposed film/detectors, exposed images and images which have been developed or digitised
12. the preparations required for processing or digitising the image (to include providing adequate preparation facilities/lighting conditions, ensuring essential services are connected and that sufficient supplies of processing consumables are available and stored safely)
13. the preparation requirements of the X-ray tube generator and how to set up the tube or radiation source (including equipment controls, focal spot size and safety devices)
14. the use of manipulators to help position the castings to aid radiography
15. the care and control of the equipment (to include checking condition of all electrical cables and connections, all mechanical functions and

Preparing work areas for radiographic testing of castings

- safety devices)
- 16. care of gamma-ray source containers and storage procedures for radioactive sources
- 17. the extent of your own responsibility and whom you should report to if you have problems that you cannot resolve
- 18. how to access, use and maintain information to comply with organisational requirements and legislation

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Scope/range related to performance criteria

1. Prepare radiographic work areas for testing, by carrying out all of the following activities:
 1. comply with Ionising Radiation Regulations/Directives, testing techniques, Controlled test Area preparation documentation and procedures
 2. adhere to health and safety regulations, systems and procedures to realise a safe system of work
 3. follow the defined preparation technique procedures and apply safe working practices and procedures at all times
 4. leave the work area in a safe condition on completion of the activities
2. Establish the Controlled Test Area, in accordance with regulations/directives, to include covering all of the following:
 1. take account of specified risk assessments
 2. set up a clearly identified boundary marking the exclusion area
 3. place prepared and calibrated radiation survey meters at specified locations
 4. position appropriate radiation shielding screens
 5. obtain appropriate exposure warning devices
 6. prepare/maintain an emergency escape route
 7. ensure appropriate staging is in place and is safe and secure
 8. maintain an authorised secure store for gamma-ray equipment
 9. ensure an approved means of transporting the gamma-ray containers is used
 10. ensure essential services are connected (electricity, water/fluids, compressed air/gases) as appropriate
3. Check that all of the following are fit for purpose and fully functional:
 1. the radiographic equipment and its mounting facilities
 2. safety devices and interlocks
 3. exposure control equipment
4. Prepare for image processing, carrying out all of the following:
 1. despatch/receipt of exposed/developed films/digital detectors
 2. ensuring safe storage for unexposed film/digital detectors, images awaiting processing and processed film/digital media
 3. process film using an automatic processor (as appropriate)
 4. maintaining adequate, clean facilities for processing and drying the film or processing the digital image

Preparing work areas for radiographic testing of castings

5. checking correct operation of viewers, optical or digital (for checking the image quality)

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