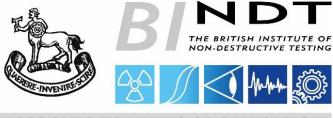


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**APPROVED TRAINING ORGANISATION** 

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# NASA 307

# Radiographic Testing Curriculum

Document Number:	Document Title:	Revision:	Issue Dated:	Page No:
Nasa 307	Radiographic Testing Curriculum	1	02-April-2025	1 of 6

Revision control sheet:

Rev No:	Date:	Compiled by:	Reviewed by:	Revision Description:
0	08-Jan-2019	Miechaal Sewcoomar	Nishaan Kanhaye	Implemented into QMS.
1	02-Apr-2025	Acacia Sureschandra	Nishaan Kanhaye	The document format was updated.

Document Number:	Document Title:	Revision:	Issue Dated:	Page No:
Nasa 307	Radiographic Testing Curriculum	1	02-April-2025	2 of 6

#### **1.0** Course Duration:

- 1.1 Level 1:
  - a) The minimum training hours administered in Level 1 shall be 40.
- 1.2 Level 2:
  - a) The minimum training hours administered in Level 2 shall be 120.

#### 2.0 Course Content:

2.1 Theory: The table below shows theory aspects covered:

Chapter Reference:	Level 1 and 2:
	Introduction
Chapter 1	Terminology
Chapter 1:	History
	Advantages and Limitations of Industrial Radiography

Chapter 2:	Properties of X and Gamma Rays
Chapter 2:	Electro-Magnetic Radiation

Chapter 3:	Electro-Magnetic Radiation Wavelength (λ) Frequency (Hz)
	Velocity (m/s)

	Absorption
Chapter 4:	Scatter
	Rayleigh scattering

	Production of X-Rays
	Circuits for X-rays Production
	Self-rectification
	Full wave rectified AC
	Fully rectified Tube
	Linear Accelerations (Linac), High Energy Machine and Betatrons
Chapter 5:	Betatron
	Gamma Ray Sources
	Atom
	Particulate Radiation
	Electromagnetic Radiation
	Properties of Gamma Rays
	Production of X and Gamma Rays

Document Number:	Document Title:	Revision:	Issue Dated:	Page No:
Nasa 307	Radiographic Testing Curriculum	1	02-April-2025	3 of 6

	X-ray Film
	Density Characteristic Curve
	Characteristic (H & D) Curve
	Contrast and Latitude
Charter C.	Film Speed
Chapter 6:	Intensifying screens
	Fluorescent (Salt) Screens
	Metal Screens
	Fluorometallic Screens
	Real Time (Fluoroscopic) System

	Film Processing
Chapter 7:	Automatic Processing
	Film Processing Faults

	Sensitivity	
	Factors affecting sensitivity	
	Subject Contrast	
	Film Contrast	
	Geometric Factors	
	Formula for Geometric Unsharpness	
Chapter 8:	Graininess Factors	
	Film Inherent Unsharpness (U <sub>f</sub> )	
	The Inverse Square Law	
	The Reciprocity Law	
	Safety Formula	
	Exposure Calculation Formula	

Chapter 9:	Measurement of Exposure and Sensitivity	
	Exposure Chart X-rays	
	Radiographic Sensitivity	
	Wire Image Quality Indicators	
	EN462-1 Wire IQI	
	Step Hole Plaque Type IQI	
	Step (Plaque)/Hole	
	American IQIs (Penetrameter)	

pter 10:	Isotopes used in Radiography
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Document Number:	Document Title:	Revision:	Issue Dated:	Page No:
Nasa 307	Radiographic Testing Curriculum	1	02-April-2025	4 of 6

	Calculation Information for Radiography			
	Exposure			
	Reciprocity Law			
	Inverse Square Law			
Chapter 11.	Exposure varies directly as the square of the distance			
Chapter 11:	Geometric Unsharpness			
	Radiographic Sensitivity			
	Intensity at 1m from 1 GBq			
	Tenth/half value Layers (mm)			
	Density Conversion Chart			

### **Note:** Level 2 requires a deeper knowledge of the content mentioned above.

# 2.2 Practical: The table below shows practical aspects covered:

Level 1:	Level 2:
X and Gamma radiography of welds (light and dense	X and Gamma radiography of welds (light and dense
alloys) in accordance to written instructions.	alloys) in accordance to codes and standards.
Film handling and processing.	Film handling, selection and processing.
Pre-test Checks (Calibrate and verify test equipment).	Define the limitations of the test method.
Assess and use safety equipment, radiation meters and	Compile techniques in accordance to codes / standards.
monitors.	Pre-test Checks (Calibrate and verify test equipment).
Report the results of Radiographic tests.	Assess and use safety equipment, radiation meters and
	monitors.
	Interpretation and evaluation according to codes,
	specifications or procedures.
	Report the results of Radiographic tests.

#### 3.0 Learning outcomes:

3.1 Upon completion of training, students should be able to carry out and / or understand the following regarding Radiographic Testing:

Level 1	Level 2
Basic principles.	Basic principles.
General advantages and limitations.	General advantages and limitations.
Discontinuity associated with manufacturing processes,	Discontinuity associated with manufacturing processes,
categories and types.	categories and types.
Carry out pre-test checks, set up equipment and	Select test technique to be used.
perform tests in accordance to written instructions.	Interpret codes, specifications and procedures.
Reporting of results.	Compile instructions according to specifications, codes
	or procedures.
	Carry out pre-test checks, set up equipment, perform
	tests and report results.
	Interpret and evaluate test results according to
	specifications, codes or procedures.

Document Number:	Document Title:	Revision:	Issue Dated:	Page No:
Nasa 307	Radiographic Testing Curriculum	1	02-April-2025	5 of 6

## 4.0 Course Outcome:

4.1 Successful Completion of Training:

Upon successful completion of the course, a successful completion of training certificate at the level attempted will be issued which meets eligibility to undertake the external PCN examination.

Document Number:	Document Title:	Revision:	Issue Dated:	Page No:
Nasa 307	Radiographic Testing Curriculum	1	02-April-2025	6 of 6