

RADIOGRAPHIC TESTING – DIGITAL

DR

Qualification training according to the ISO 9712

PROCESS	SYSTEM	METHOD	LEVEL / TECHNIQUE	SECTOR	CODE	VALID FROM	PREPARED BY
NDT	ISO 9712	RT	DR, CR	MS	-	1 / 2023	JURÁČEK

INTRODUCTION

Purpose of Radiographic Testing Digital Radiography technique (RT-DR) is detection of mainly internal defects in industrial parts and components using advanced RT technique.

RT-DR qualified personnel has to have knowledge of its **physics principles of conventional (film) RT**, be familiar with overall **requirements of most widely codes and standards of DR technique**, be able to expand them to new applications and be **able to perform and document testing**.

Training is suitable for currently certified conventional RT2 and RT3 personnel. It focuses on **gaining knowledge and essential skills** to be further strengthened when collecting experience. Duration and content of the training **depends on the product or industrial sector selected** (e.g. welding, casting, multisector applications etc.).

Training are designed to prepare participants for all examination parts to the technique – **specific** (use of standards and codes), and **practical** (performance of the method) acc. to EN ISO 9712 in the ATG CERT Examination Center.

RECOMMENDED PUBLICATIONS

ATG publications

- RT – Radiographic Testing, Level 1, 2 (ATG handbook)
- RT-DR – Radiographic Testing – Digital Radiography (ATG handbook)
- RT – Collections of formulas (published by ATG)

Other publications

- Personnel Training Publications: Radiographic Testing (RT) Programmed Instruction Series (ASNT handbook)
- Level III Study Guide: Radiographic Testing Method (RT) (ASNT handbook)
- Relevant Discontinuities – Radiographic Testing (RT) (ASNT handbook)
- Nondestructive Testing Handbook, Third Edition: Volume 4, Radiographic Testing (ASNT handbook)

SYLLABUS COVERAGE

Training provides theoretical and practical training to understand Radiographic Testing – Digital Radiography (RT-DR) technique principles, be familiar with various types of equipment, accessories, and other aids, and handling of tested parts and components to perform safely Digital Radiography testing, report and evaluate results of the testing.

TRAINING DURATION

		SECTOR	LEVEL I	LEVEL II	LEVEL III
MS	Multisector		N/A	5 d (40 h)	N/A

BODY OF KNOWLEDGE – GENERAL PART

SUBJECT		LEVEL I	LEVEL II	LEVEL III
1	Introduction			
1.1	DR/CR/FD - techniques	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
1.2	The history of DIR	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
1.3	Motivation for DIR	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
1.4	Problems of transition to DIR	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
1.5	Main definitions of DIR	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
1.6	Comparison of DIR and classical film technology	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
1.7	Advantages of Digital Industrial Radiography	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
1.8	Overall comparison with film	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
2	Components of DIR Systems			
2.1	Personal computer	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
2.2	Software (main functions)	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
2.3	Monitor	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
2.3.1	Monitor types and parameters	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
2.3.2	Pixel and meaning of resolution (e.g. DPI parameter)	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
2.3.3	Image zoom and 1:1 display mode	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
2.3.4	Aliasing effect	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
2.3.5	Monitor parameters to be checked	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
2.3.6	Monitor test patterns (locations to be tested, special images, week basis test)	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
3	Digital Images			
3.1	Bits, bytes, bit depth	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
3.2	Pixels	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
3.3	Gray value	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
3.3.1	Definition	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
3.3.2	Bith depth	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
3.3	Image size calculation	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
4	Image formats, data storage and archiving			
4.1	Identification - hard ID, soft ID, metadata	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
4.2	Traceability of image to report and part	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
4.3	Lossless format (DICONDE (DCM), TIFF ...)	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
4.5	Loss format (E.g.: JPG, PDF)	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
4.6	Data storage and archiving	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
4.6.1	Removable media – Single media (CD, DVD, tape)	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
4.6.2	Redundant Array of Inexpensive Disks (RAID)	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
4.6.3	Central archive	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
4.7	Communication with the customer	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

SUBJECT		LEVEL I	LEVEL II	LEVEL III
5	Image Quality			
5.1	Histogram	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
5.1.1	Histogram usage (full / area)	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
5.2	Image changes by LUT application	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
5.3	Image changes by gamma correction	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
6	Spatial Resolution and Unsharpness			
6.1	Inherent unsharpness	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
6.2	System unsharpness	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
6.3	Geometrical unsharpness	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
6.4	Total image unsharpness and measurements	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
6.5	Basic spatial resolution of image (SR_b^{image})	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
7	Basic spatial resolution (SR_b)			
7.1	Meaning	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
7.2	Measuring using duplex wire IQI	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
7.3	Measuring using MTF (modulation transfer function)	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
8	Signal to noise ratio (SNR)			
8.1	Meaning	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
8.2	Calculation (acc. to ASTM E2445 / EN 14784 / ISO 17636)	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
8.3	Difference of SNR and SNR_n	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
8.4	Practical recommendations	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
8.5	Forbidden actions	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
9	Modulation Transfer Function			
9.1	Meaning of MTF	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
9.2	Measuring of system MTF	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
10	Contrast Sensitivity			
10.1	Image contrast (radiographic contrast)	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
10.2	Contrast to noise ratio (CNR)	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
10.3	Compensation principles	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
11	Contrast Sensitivity			
11.1	Acquisition and viewing SW	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
11.2	Window (contrast), Level (brightness), automatic and manual adjustment (full / ROI)	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
11.3	Monitor zoom, adjustment of Zoom viewing "1:1"	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
11.4	Statistics window – calculation of standard deviation in ROI	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
11.5	Line profile usage (for this purpose) – line average (50 lines / 60%), perpendicularity, read out rules	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
11.6	Notification in image and saving	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
11.7	Image offset	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
11.8	Gain image acquisition	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
11.9	How to measure the offset	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

SUBJECT		LEVEL I	LEVEL II	LEVEL III
11.10	Filtering	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
11.10.1	Point operations	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
11.10.2	Look-up table (LUT) – Meaning and influence to image	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
11.10.3	Convolution filters	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
11.10.4	Offset – meaning for filtering	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
12	Exposure Parameters			
12.1	Radiation source energy, current /activity, focal spot size	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
12.2	Exposure time	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
12.3	Required exposure extent (recommended saturation of IP)	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
12.4	Geometry, unsharpness, SDD	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
12.5	Magnification (DR vs. CR)	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
13	Filters (Compton Scatter Filtering / Backscatter), screens and Shielding			
13.1	Characteristic radiation energy levels for different materials	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
13.2	Composition of backscatter shielding	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
13.3	Metal screen action	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
13.4	Material and metal screen thickness	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
14	IQIs, Shims and Blocks, RQIs			
14.1	Wire type IQI – usage and check prior to use (EN 19232-1, ASTM E747)	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
14.2	Hole type IQI – usage and verification prior to use (ASTM E1025)	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
14.3	Duplex wire IQI /duplex gauge – usage and check prior to use (EN 19232-5, ASTM E2002)	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
14.4	Contrast sensitivity IQI – usage and check prior to use (ASTM E 1647)	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
14.5	Representative quality indicator (RQI)	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
14.6	Correct positioning of IQIs (imaging paradox)	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
14.7	Equivalent penetrometer sensitivity	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
15	Long-term Stability			
15.1	Parameters to be controlled	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
15.2	Phantom block – composition, usage and verification prior to use	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
15.3	Monitoring plan	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
16	Digital Radiography			
16.1	Basic rules and terms	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
16.2	Sequence of operation of DR system	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
16.3	Classification of DR systems	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
17	Framing Modes			
17.1	Frame rate	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
17.2	Fps value	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
17.3	“Real time” digital radiography	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
18	Digital Detector Array			
18.1	Physics of DDA	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
18.2	Basic construction of DDA	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

SUBJECT		LEVEL I	LEVEL II	LEVEL III
18.3	Scintillators	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
18.3.1	Cesium Iodide (Csl)	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
18.3.2	Gadolinium Oxysulfide (GOS)	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
18.3.3	Glass Plates	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
18.3.4	Fiber-Optic	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
18.4	Flat Panels	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
18.4.1	Amorphous Silicon (am-Si)	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
18.4.2	Amorphous Selenium (am-Se)	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
18.4.3	Complementary metal-oxide-semiconductor (CMOS)	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
18.5	Cameras (2-D)	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
18.5.1	CCD	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
18.5.2	CMOS	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
18.5.3	CID	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
18.6	Linear Arrays (1-D)	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
18.6.1	Linear diode array (LDA)	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
18.6.2	CCD Line scan	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
19	Long-term Stability of DR System			
19.1	Parameters to be controlled	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
19.2	Phantom block – composition, usage and verification prior to use	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
19.3	Monitoring plan	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
20	Calibration Procedure			
20.1	Offset calibration	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
20.2	Gain Calibration	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
20.3	Bad pixel classification and calibration	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
21	Compensation Principles			
21.1	Basic knowledge	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
21.2	CPI, CPII, CPIII	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
22	Adjustment of Parameters			
22.1	kV, mA, Time, focal spot size	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
22.2	Geometry	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

BODY OF KNOWLEDGE – SPECIFIC PART

The content of specific part is modified according to product sector which is covered by training. Multisector includes standards from all sectors.

STANDARD		LEVEL I	LEVEL II	LEVEL III
1	General Methodology			
EN ISO 17636-2	Non-destructive testing of welds - Radiographic testing - Part 2: X- and gamma-ray techniques with digital detectors	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
EN 14784-1	Non-destructive testing - Industrial computed radiography with storage phosphor imaging plates - Part 1: Classification of systems	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

STANDARD		LEVEL I	LEVEL II	LEVEL III
EN 14784-2	Non-destructive testing - Industrial computed radiography with storage phosphor imaging plates - Part 2: General principles for testing of metallic materials using X-rays and gamma rays	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
ISO 16371-1	Non-destructive testing - Industrial computed radiography with storage phosphor imaging plates - Part 1: Classification of systems	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
EN 16407-1	Non-destructive testing - Radiographic inspection of corrosion and deposits in pipes by X- and gamma rays - Part 1: Tangential radiographic inspection	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
EN 16407-2	Non-destructive testing - Radiographic inspection of corrosion and deposits in pipes by X- and gamma rays - Part 1: Double wall radiographic inspection	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
ASTM E2597	Standard Practice for Manufacturing Characterization of Digital Detector Arrays	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
ASTM E2737	Standard Practice for Digital Detector Array Performance Evaluation and Long Term Stability	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
ASTM E2699	Standard Practice for Digital Imaging and Communication Nondestructive Evaluation (DICONDE) for Digital Radiographic (DR) Test Methods	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
ASTM E2002	Standard Practice for Determining Total Image Unsharpness in Radiology	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
ASTM E1817	Standard Practice for Controlling Quality of Radiological Examination by Using Representative Quality Indicators (RQIs)	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
ASTM E2422	Standard Digital Reference Images for Inspection of Aluminium Castings	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
ASTM E2660	Digital Reference Images for Investment Steel Castings for Aerospace Applications	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
ASTM E2669	Digital Reference Images for Titanium Castings	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

BODY OF KNOWLEDGE – PRACTICAL PART

In the practical part of the training the trainees practice working with instructions and procedures as well as knowledge gained from the standards discussed in the specific part. Training an specimens are representative for given product sectors.

SUBJECT		LEVEL I	LEVEL II	LEVEL III
1	General			
1.1	Using of hardware	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
1.2	Using of software	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
1.3	Assessment of digital image sensitivity	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
1.4	System performance checks	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
1.4.1	Long-term stability of a system	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
2	Testing According To Instructions			
3.1	Welds	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
3.1.1	Single Wall Technique: Plane parts; Centric; Eccentric; Curved objects – Source Inside	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
3.1.2	Double Wall Technique: Single Wall Image; Double Wall Image – elliptic, perpendicular	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
3.2	Castings	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

SUBJECT		LEVEL I	LEVEL II	LEVEL III
3.2.1	Overview Technique	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
3.2.2	Single Wall Technique	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

BODY OF KNOWLEDGE – DOCUMENTATION

In the practical part of the training the trainees practice dealing with process documentation from reporting results to reports, drafting instructions and procedures.

SUBJECT		LEVEL I	LEVEL II	LEVEL III
1	Test Report			
1.1	Purpose	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
1.2	Tested part	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
1.3	Testing conditions	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
1.4	Reporting findings	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
1.5	Evaluation	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
2	Written Instruction			
2.1	Validity range	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
2.2	Personnel requirements	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
2.3	Inspection range and area of interest	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
2.4	Equipment and accessories	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
2.5	Testing parameters and their verification	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
2.6	Evaluation, acceptance criteria	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
2.7	Reporting	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
2.8	Post-testing activity	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>