Ultrasonic testing (UT) — Levels 1, 2 and 3

The Ultrasonic testing training shall be in accordance with Tables 13 and 14.

Table 3 — General content

Content		Level 1	Level 2	Level 3
6.1	Introduction to terminology and history of ultrasonic testing (UT)	1	1	1
6.2	Physical principles of the method and associated knowledge	12	12	22
6.3	Product knowledge and capabilities of the method and its derived techniques	30	24	3
6.4	Equipment	15	8	13
6.5	Information prior to testing	1	11	13
6.6	Testing	30	27	19
6.7	Evaluation and reporting	10	8	11
6.8	Assessment	0	5	6
6.9	Quality aspects	1	4	7
6.10	Developments	0	0	5

Table 4 — Ultrasonic testing (UT) — Levels 1, 2 and 3

Content			Level 1	Level 2	Level 3
6.1 Introduction to terminology and history of UT	Task of NDT personnel		X	X	
	Overview of general and product standards				X
	Terminology		X	X	X
6.2 Physical principles of the method and associated knowledge	Review of mathematical basics		X		
			X		
			X		
	Physical definitions and typical parameters		X	X	
			X	X	
			X	X	
			X	X	
			X	X	
			X	X	
			X	X	X
				X	
			X		X
				X	X
	Waves		X		
		Amplitude	X		
		Frequency	X		
		Wavelength	X		

		Propagation velocity	X		
		Longitudinal	X	X	
		Transverse	X	X	
		Rayleigh waves (surface waves)	X	X	X
		Greeping waves		X	X
		Guided waves		X	X
	Transmission and reflection		X	X	
			X	X	
			X	X	
				X	
			X	X	X
			X	X	
					X
			X	X	
			X	X	
			X	X	
			X	X	
			X	X	
			X	X	
			X	X	
					X
					X
					X
					X
			X	X	
			X	X	
	Transducer characteristics		X	X	
			X	X	
			X	X	
			X	X	
	Sound fields of disc shaped transducers		X	X	
			X	X	
			X	X	
			X	X	
6. 3 Product knowledge and related capability of the metho d and derived techniques	General defects		X	X	
			X	X	
		Welding	X	X	
		Tubes and pipes	X	X	
		Wrought products	X	X	
		Composite material	X	X	
		According to products	X	X	

	Implementation of the testing techniques	According to expected discontinuities	X	X	
		Standards, specifications and codes		X	
	Overall properties of the specimen	Influence of surface conditions	X	X	
		[illegible]	X	X	
		[illegible]	X	X	
		[illegible]	X	X	
		[illegible]		X	
		[illegible]			X
		[illegible]		X	
6.4 Equipment	Ultrasonic instruments	[illegible]			X
		[illegible]	X	X	
		[illegible]	X	X	
		[illegible]	X	X	
		[illegible]	X	X	
		[illegible]	X	X	
		[illegible]	X	X	
		[illegible]	X	X	
		[illegible]	X	X	
		[illegible]	X	X	
		[illegible]	X	X	
		[illegible]	X	X	
		[illegible]		X	X
		[illegible]			X
		[illegible]			X
		[illegible]			X
		[illegible]			X
		[illegible]			X
	Probes	[illegible]	X	X	
		[illegible]	X	X	
		[illegible]	X	X	
		[illegible]	X	X	
		[illegible]	X	X	
		Effects at interface wedge/specimen	X	X	
		Critical angles	X	X	
		Typical angles for testing of steel	X	X	

		Sound fields	X	X	
		Probe index	X	X	
		Beam angle	X	X	
		Change of probe index and beam angle due to abrasion or probe shoes	X	X	
		[illegible]	X	X	
		[illegible]	X	X	
		[illegible]	X	X	
		[illegible]	X	X	
		[illegible]	X	X	
		[illegible]	X	X	
		[illegible]	X	X	
		[illegible]	X	X	
		[illegible]	X	X	
		[illegible]			X
		[illegible]		X	X
		[illegible]			X
		[illegible]			X
		[illegible]			X
	Couplant		X	X	
	Connecting cables	[illegible]	X	X	X
		[illegible]	X	X	X
	Adjustment reference and transfer blocks	[illegible]	X	X	X
		[illegible]	X	X	X
		[illegible]	X	X	X
		[illegible]	X	X	X
		[illegible]	X	X	X
		[illegible]	X	X	X
6.5 Information prior to testing	Information about the test object	[illegible]	X	X	X
		[illegible]	X	X	X
		[illegible]	X	X	X
		[illegible]	X	X	X
		[illegible]	X	X	X
	Test conditions and application of standard	[illegible]		X	X
		[illegible]		X	
		[illegible]		X	X
		[illegible]		X	X
		Selected examination points, service life when testing is to be carried out			X
		Standards assigned to the test object		X	X

		Requirements of test personnel		X	X
		Acceptance criteria			X
	Technique and sequence of performing test	Surface condition	X	X	
		Surface preparation	X	X	
		Post-test documentation		X	
	Instructions	Preparation of written p			X
		P i		X	
		P a i	X		
6.6 Testing	Techniques	P t		X	
		C		X	
		T		X	
		I		X	
		T		X	
		P		X	
		T t	X	X	
		R (s		X	
		V e	X	X	
		D		X	
		M			X
		E		X	
		R	X	X	
		S	X	X	
		T	X	X	
		S	X	X	
		R S	X	X	
		S (	X	X	
		A t			X
		C		X	X
		T t		X	X
		D techniques		X	
		Principles		X	
		Limitations		X	
		Requirements for reference blocks	X	X	

		DAC-technique	X	X	
		Transfer correction	X	X	
		Recording gain (testing level)	X	X	
		Errors at echo height evaluation	X	X	
		Laser-UT			X
		V a e			X
6.7 Evaluation and reporting	Interpretation	R			X
		R			X
		R			X
		E o n t			X
		D A			X
	Detecting, locating and sizing techniques	D	X	X	
		D d	X	X	
		L t	X	X	
		I		X	
		E		X	
		A	X	X	X
		B		X	X
		C		X	X
		D			X
		E			X
		F			X
		P			X
		S			X
		R	X	X	
		C	X	X	
		A	X	X	
		E w		X	
		S te	X		
		S a		X	
		E with single reflector technique and DAC-method	X	X	
		Reporting	X	X	

		Check content and matching of test reports, i			X
6.8 Assessment	Evaluation and confirmation of test reports	A a a c		X	
6.9 Quality aspects	Personnel qualification	I	X	X	X
		C a		X	X
	Documentation	T s		X	X
		I		X	X
		I r		X	X
		I			X
6.10 Developments	Newest developments for industrial and scientific applications of UT	I	X	X	X
		T	X	X	X
		L	X	X	X
		Computer modelling			X