Opleidingsprogramma TOFD (Time of Flight Diffraction)

Het opleidingsprogramma dient de kandidaat voor te bereiden voor de examens. Voor kandidaten niveau 3 wordt er tevens vanuit gegaan dat deze tevens de kennis bezitten van de hieronder aangevinkte onderwerpen bij niveau 2. De totale minimale cursus duur is vermeld in de Hobéon SKO Regelingen SKNDO (par. 6).

structure ISO/TS 25107:2019			**TOPICS**	
Content			**Level 2**	**Level 3**
15.1.1 Introduction to terminology and history of ultrason-ic time-of-flight diffraction (UT-TOFD)	History		**X**	**X**
	Introduction to ultrasonic time-of- flight diffraction technique	Overview	**X**	**X**
			X	**X**
15.1.2 Physical principles and associated knowledge	Mathematical and physical basics	Basics of sound beam	**X**	
		Waves	**X**	
		— Sinusoidal movement	**X**	
		— Amplitude	**X**	
		— Frequency	**X**	
		— Wavelength	**X**	
		— Propagation velocity	**X**	
		— Longitudinal waves	**X**	
		— Transverse waves	**X**	
		Principle of wave-diffraction	**X**	**X**
		Sound-field of UT-TOFD probes	**X**	**X**
		Visualization of UT-TOFD images	**X**	**X**
		Probe centre separation (PCS)	**X**	**X**
15.1.3 Product knowledge and related capability of the method and derived techniques	Various defects related to the manufacturing processes and service-induced defects related to the defined sectors	Defects related to the manufacturing processes (welding)	**X**	
		Implementation of UT-TOFD technique according to prod-ucts and to expected discontinuities (weld defects)	**X**	
	Overall properties of specimen	Influence of surface conditions	**X**	**X**
		Geometry	**X**	**X**
		Attenuation	**X**	**X**
		Reference reflectors (SDH), notch)	**X**	**X**
15.1.4 Equipment	Test instrument and combined equipment	UT-TOFD instrument	**X**	**X**
		UT-TOFD probes	**X**	**X**

		Adaption of probes to curved scanning surfaces	**X**	**X**
		Encoders and scanning mechanisms	**X**	**X**
		Different types of scanners	**X**	**X**
		Reference blocks	**X**	**X**
		Different reference blocks	**X**	**X**
15.1.5 Information prior to test	Items to be defined by specification	Purpose	**X**	
		Extent of UT-TOFD testing	**X**	
		Information required by the operator	**X**	
		Written test instruction or procedure	**X**	
15.1.6 Testing		Setting of test range and sensitivity	**X**	
		Setup of probes	**X**	**X**
		— Scan increment setting	**X**	**X**
		— Geometry considerations	**X**	**X**
		— Preparation of scanning surfaces	**X**	**X**
		— Couplant and coupling techniques	**X**	**X**
		Range and sensitivity settings	**X**	**X**
		— Time window	**X**	**X**
		— Time-to-depth conversion	**X**	**X**
		— Sensitivity settings	**X**	**X**
		— Checking of settings	**X**	**X**
		Reference blocks	**X**	**X**
		— Material	**X**	**X**
		— Dimensions	**X**	**X**
		— Shape	**X**	**X**
		— Reference reflectors, SDH and notch	**X**	**X**
		Interpretation and analysis of UT-TOFD images	**X**	**X**
		— Assessing the quality of the UT-TOFD image	**X**	**X**
		— Identification and classification of relevant UT-TOFD indications	**X**	**X**

		— Determination of location and size	**X**	**X**
15.1.7 Evaluation and reporting		Evaluation according to acceptance criteria	**X**	
		Test report	**X**	
		— Information relating to the test object	**X**	
		— Equipment	**X**	
		— Test technique	**X**	
		— Test results	**X**	
		Storage of data-files	**X**	
		Generation of reports	**X**	
		Near surface and opposite surface resolution	**X**	**X**
		Defect location and length measurement	**X**	**X**
15.1.8 Assessment		Evaluation and confirmation of test reports	**X**	
		Application of the acceptance criteria according to standards, codes and procedures	**X**	**X**
		Offline evaluation using PC software	**X**	
15.1.9 Quality aspects	Personnel qualification	ISO 9712	**X**	
		Other NDT qualification and certification systems	**X**	
15.1.10 Developments	Not applicable			**X**