

<b>TRAINING DOCUMENTS</b>	Doc. Nr.:	INF-020-TD
Title: Penetrant Testing Training Program – Level 1, 2, and Level 3	Revision No.:	00
	Valid from:	06.05.2022

## 1 REASON FOR LATEST REVISION

Revision No.:	Keywords:	Chapter:	Valid from:	Respon.
00	Development document	All	06.05.2022	Ch.Dürager

## 2 SCOPE OF APPLCATION

This document contains the information about the required training for the NDT method “Penetrant Testing” provided by IMITec NDT Training School.

The training course is offered for Level1 (L1), Level 2 (L2), and Level 3 (L3) personnel which are intend to qualify for Non-destructive Testing personnel based on the standard EN4179 (Aerospace applications).

The training program covers the required course content for the general part based on the EN4179 and in some points the requirements for the specific and practical part. However, it may be necessary to adapt the specific part to the specific reequipments of IMITec clients.

### 2.1 Information for the reader

In principle the training program is provided for the different Levels. Level 3 candidates, however, are expected to have already learned and tested a large part of the theory material in the Level 2 course. These parts are required for the Level 3 course and will be tested during the final exam.

### 2.2 Information about the Trainee

<b>Name:</b>	<b>Start of Training:</b>	<b>Estimated End date of Training:</b>
<b>Signature Trainee:</b>	<b>Signature RL3:</b>	

## 3 REFERENCE DOCUMENTS

Document	Addition	Remarks / Description
Penetrant Testing – Aerospace Applications	2022	Training book IMITec NDT Training School.
EN 4179	2022	Aerospace series – Qualification and approval of personnel for non-destructive testing.
Syllabus -Penetrant testing	2019	NANDTB-Germany

## 4 SYLLABUS EDDY CURRENT TESTING

Chapter	Training Content	Done:	Comment / Date
Basic physical information / Penetrant Testing	Density of fluids		
	Surface tension of fluids		
	Surface tension of solids		
	Wetting		
	Contact angle		
	Capillarity		
	Viscosity		
	Flash point		
	Vapor pressure		
	Stability of penetrants		

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Chapter	Training Content	Done:	Comment / Date
		Shelf life	
		Testing of corrosive ingredients	
		Sensitivity of penetrants	
		Properties of excess penetrant removal agents	
		Properties of developers	
	Classification of penetrants by standards	Color contrast penetrants	
		Fluorescent penetrants	
		Fluorescent color contrast penetrants	
	Types of developers	Dry developer	
		Wet developers, water spendable	
		Wet developers, solvent based	
		Wet developer for special applications	
	Test media systems	Penetrants	
Excess penetrant removal agent			
Developers			
Classification of test media			
properties of the human eye	Visual acuity		
	Color discrimination capability		
	Contrast sensitivity		
	Brightness-darkness adaptation		
	Astigmatism		
Selection criteria for the application of the penetrant testing method	Delimitation from other surface testing methods	Visual inspection	
		MT	
		ET	
		Special penetrant testing methods	
Procedure		Potential surface contaminations	
		Pre-cleaning methods	
		Influence of mechanical surface treatment	
		Influence of honing used as surface treatment	
		Influence of grinding used as surface treatment	
		Drying after pretreatment	
		Drying after pretreatment	

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Chapter	Training Content		Done:	Comment / Date
		Drying temperature from various rules and standards		
	Precleaning processes	Precleaning methods		
	Mechanical precleaning	Mechanical precleaning		
		Influence of mechanical precleaning		
		Influence on indications after honing		
		Influence on indications after grinding, 180K		
		Influence on indications after grinding, 240K		
		Influence on indications after shot peening		
		Pickling		
	Chemical precleaning	Necessary pickling ablations		
		Chemical precleaning		
		Water-based degreasing		
		Decoction degreasing		
		Electrolytic degreasing		
		Rust removal agents		
	Cleaning verification	Descaling		
Water break test				
Application of penetrant	Methods for applying the penetrant			
Penetration procedure	The penetration procedure			
Procedure monitoring	Procedure monitoring in general			
Rules and standards / test instruction	Standards	General information on standards		
		National standards		
		International standards		
		Process instruction		
	Test instruction	Requirements for a test instruction		
		Preparation of test instruction		
Example of a test instruction				
Capabilities of the method	General information on Penetrant testing			
	Limits of the method			

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Chapter	Training Content	Done:	Comment / Date
	Other NDT methods		
	Comparison with different surface crack testing methods		
	Comparison with test methods for subsurface cracks		
	Comparison with corrosion test methods		
Material science	Material defects generated during manufacture	Inclusions	
		Pores	
		Shrinkage cavities	
		Segregations	
	Defects generated during processing	Cracks	
		Rolling and forging defects	
		Turning, grinding defects	
	Defects caused by operational loads	Defects caused by hardening	
Cracks			
Design concepts in Aviation	Corrosion		
	Safe-life		
	Fail-safe		
Safety regulations	Damage Tolerance		
	General safety regulations		
Practical exercises	Handling of test equipment and tools		
	Exercises practicing the handling of aeronautical parts		
	Preparation of a case study		
	Preparation of a test instruction		
	Development of a test problem		