**EDDY CURRENT TESTING
EN4179 LEVEL 2 SYLLABUS**

DOCUMENT APPROVAL			
Function	**Name**	**Signature**	**Date**
Nominated Level 3	**KEITH PHILLIPS**		**19/02/2015**
CEO Testia Ltd	**BRIAN HALL**		**19/02/2015**

General Theory

Instruction shall be given in the principles, limitations and theoretical aspects of the following:

- Introduction – Brief history of the development of Eddy Current testing, philosophy of NDT andEddy Current testing capabilities in relation to other methods.Basic aerospace product technology.

- Terms and definitions in Eddy Current testing.

- Electrical theory.

- Basic principles of DC and AC theory – Ohms Law, power formulae, Alternating Current simple circuits, impedance, frequency and phase relationship.

- Basic principles of magnetisation – Magnetic effect of current flow, magnetic field intensity, hysteresis loop and permeability.

- Principles of Eddy Currents.

- Simple circuits – Series and parallel resonance and bridge circuits.

- Coils and coil arrangements, inducing Eddy Currents by coil and the effects of frequency and impedance diagrams.

- Factors affecting the Eddy Current field.

- Effective depth of penetration and factors affecting penetration, test coil information from impedance, coupling, phase change and phase analysis.

- Eddy Current equipment.

- Basic types of Eddy Current instruments.

Document Number: TESTIA-UK-TRA-ET-001-EN – Issue 2
Testia Limited
Quadrant House, Celtic Springs, Coedkernew, Newport, NP10 8FZ, UK

Registered in England and Wales
Company No. 08360678

- Coil arrangements and types of coil – In-depth principles of probe design; Types of circuits including bridge and resonance; Construction of eddy current probes.

- Advantages and disadvantages of the Eddy Current method.

- Sensitivity in the Eddy Current method.

Specific Theory

Instruction shall be given in the following:

- Surface preparation – Method used for surface preparation, importance of correct surface preparation.

- Techniques – Probe characteristics and selection; factors affecting sensitivity; selection of equipment; lift-off compensation; design and application of test reference standards; selection of frequency; low frequency systems; multi-frequency systems; limitations of the various methods and types of test equipment; examples of when to use various techniques; selection of the appropriate technique to ensure complete coverage.

- Methods of assessing sensitivity of technique.

- Test procedures – Reasons for NDT instructions and general contents required.

- Correct use of meter, CRT and flat screen (LCD, LED) instruments – Impedance change instruments including conductivity measurements, coating thickness measurement and crack detection; phase change instruments including volumetric measurements and crack detection; methods of presenting information.

- Probes and calibration standards; selection of probes for surface and bolt hole inspection; advantages and disadvantages of differential and absolute probes; probe handling factors which can affect indications.

- Detectablility of defects – Advantages and limitations of the test method with regard to defect detection; characteristics of indications; basic metallurgical factors that can affect Eddy Current readings; types of discontinuity and their identification; relevant, non-relevant and false indications and their causes; interpretation of indications; equipment faults, causes and corrective actions; off scale readings on instrument, reasons and corrective actions.

- Presentation and reporting of inspection results.

- Standards and specifications.

Document Number: TESTIA-UK-TRA-ET-001-EN – Issue 2
Testia Limited
Quadrant House, Celtic Springs, Coedkernew, Newport, NP10 8FZ, UK

Registered in England and Wales
Company No. 08360678

Reference material

- ASNT – Study guide

- Metals Handbook Volume 17 Non-destructive evaluation of quality control

- Supplement to SNT-TC-1A as appropriate

- Non-destructive testing handbook - R McMaster

- Inspection of metals: Visual Examination. - R Anderson

- Basic Metallurgy for NDT - JL Taylor

- Electromagnetic testing classroom training book - ASNT

Document Number: TESTIA-UK-TRA-ET-001-EN – Issue 2
Testia Limited
Quadrant House, Celtic Springs, Coedkernew, Newport, NP10 8FZ, UK

Registered in England and Wales
Company No. 08360678