PREPARING EXAMINATION OF COFREND CERTIFICATION

Aeronautical Sector COSAC

TRAININGS

Non Destructif Testing 2016

TESTIA

AN AIRBUS GROUP COMPANY

NEXT

4 GOOD REASONS FOR CHOOSING OUR TRAINING SCHEMES

Recognised experience in the aerospace sector for over 20 years

With 1600 trainees a year and a 90% satisfaction rate, our training centres have evolved and invested over time to offer a wide range of equipment and teaching facilities adapted to companies' requirements.

A rich and varied training offer

In addition to our basic catalogue, new training sessions are included throughout the year on our Internet site. We listen to you at all times and offer you the best solutions to meet your needs.

A limited number of participants

To ensure the right balance between the availability of the trainer and the richness of discussions with the trainees, the average annual training session is attended by 7 participants.

Experienced trainers who will listen to you

TESTIA France applies a very strict policy in choice of trainer, who must be pedagogically qualified and have significant technical experience.
Available and a listener, he adapts to and follows each participant. He creates a friendly approach to skills learning (professional techniques and behaviour, exercises and simulations).

They chose to work with us:

Airbus Group, Airbus Defence & Space, Airbus Helicopters, Lufthansa Technik Philippines, Safran, Daher, Sonaca,
Air France, Royal Air Maroc, Tunisair, Air Algérie, Silk Way Technics, Iran Aweekn Airlines, etc.

SUMMARY

SUMMARY

SUMMARY

RADIOLOGYE TESTING

COMPLEMENTARY TRAINING

TESTIA
AN AIRBUS GROUP COMPANY

Presentation
COMPANY

Through its different activities, TESTIA offer a global solution around non-destructive testing in the aerospace sector.

Testia is an AIRBUS GROUP company with over 20 years of experience in the field of Non-Destructive Testing, Quality Inspections and Training in Aerospace.

Following an ambitious development plan driven by increasing customer demand, Testia has now established a presence in major countries and can serve its clients globally: France, UK, Germany, Spain, Singapore, Russia, South Africa, Mexico.

Through its network TESTIA provides worldwide services and a global solution to the industry needs.

TESTIA offers a unique range of NDT and Quality Inspection Equipment and Augmented Reality software for quick and efficient analysis of structures, components and asweekly.

ACTIVITIES:

- Training
- Examination
- Engineering
- Testing
- In service inspection
- Consultancy
- NDT & Quality products

Presentation
COMPANY

TESTIA FRANCE APPROVALS

The training and examination centre is approved by COFREND/COSAC to standard EN 4179 / NAS 410.

EN 9100 – ISO 9001-2000.

EASA, FAA PART 145.

CESSNA, Bombardier, Airbus, Boeing, Safran, Spirit, Airbus Helicopter, Turbomeca, etc.

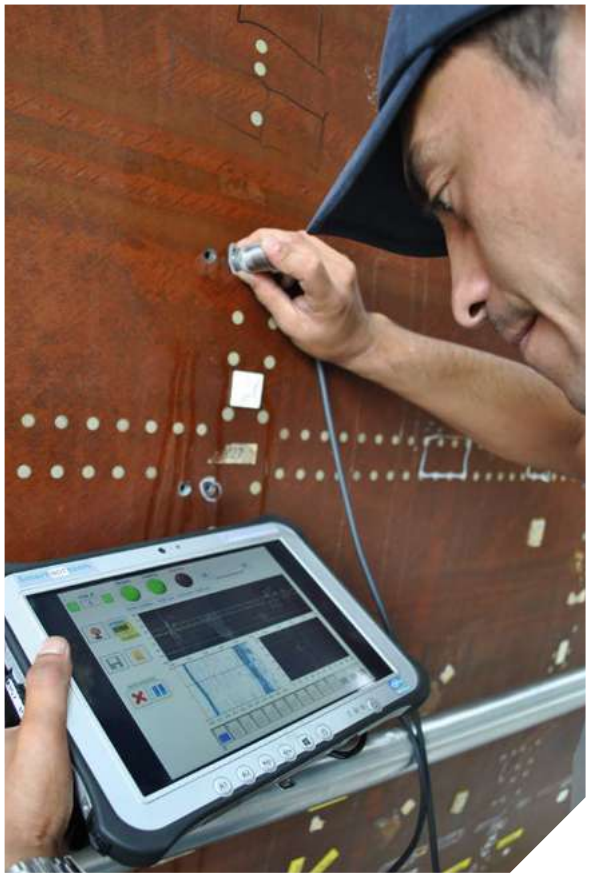
PHILOSOPHY

Competences: supported by all the aerospace certifications required for the NDT and also in terms of quality (EN 9100, NADCAP, etc.).

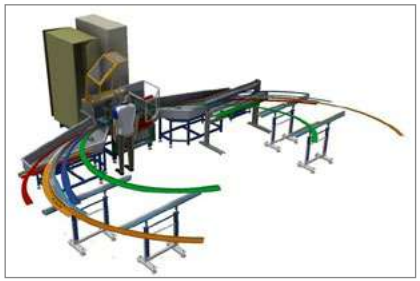
Reactivity and flexibility: the aeronautical sector and maintenance activities require operators able to step in in emergencies. TESTIA France has set up a management policy for its teams for responding to its customers' emergencies.

Research and development: one team is totally dedicated to technological investigations and the development of new NDT methods, new applications and transfer of know-how through expertise and training. Our experts therefore benefit from new technologies in their daily jobs (training expertise, procedures, etc.)

Future developments: TESTIA France offers an innovatory range of aeronautical non-destructive test systems.
Our engineers are creating the future of non-destructive testing.



IRT machine (5 cameras) for composite dome stiffeners



UTPA machine (256 channels) 100% automatic for testing composite profiles

TESTIA
AN AIRBUS GROUP COMPANY

Presentation
NDT PRODUCTS

TESTIA offer a unique range of NDT inspection equipment for quick and efficient analysis of aero-structures and components.

MOIREVIEW

3D mapping and measurement system dent, impact, rivet pull-in, trimming.

- On-site inspection;
- Defect depth and width measurement;
- 3D mapping or 2D profiles generation for reporting;
- Wireless, very lightweight.

SCRATCHVIEW

The easiest way to measure scratches.

- Ergonomic: only 4 control buttons – perfect fit and comfort;
- Easy: fast handling – very short training – no preliminary adjustment;
- Autonomous, wireless, light weight: ready for any kind of inspection;
- CScratch depth and width are automatically calculated within a few seconds – no extra computer necessary;
- Reliable, repeatable and operator independent;
- Safe: laser class 2, compatible with mass market regulations;
- Low cost : inexpensive at purchase and in operation;
- Qualified by AIRBUS GROUP.

LINEVIEW

The easiest way to measure gap and flush.

- Ergonomic: only 4 control buttons – perfect fit and comfort;
- Autonomous, wireless, light weight: ready for any kind of inspection;
- Easy: fast handling – very short training – no preliminary adjustment;
- Gaps and flushes are automatically calculated within a few seconds – no extra computer necessary;
- Reliable, repeatable and operator independent;
- Safe: laser class 2, compatible with mass market regulations;
- Low cost: inexpensive at purchase and in operation.

TESTIA
AN AIRBUS GROUP COMPANY

Presentation
NDT PRODUCTS

SMART NDT TOOLS

A new generation of ultrasound & eddy current testing instruments.

Based on application-specific modules with built-in assisted diagnosis, the SMART NDT TOOLS have been designed for non-expert operators (basic mode) as well as specialists (expert mode).

- Software modules dedicated to aerospace applications;
- Improved traceability with automatic reporting;
- Designed for in-service applications with user friendly interfaces;
- Desktop PC compatible application software for manufacturing;
- Easy access to NDT procedures & remote assistance.

ULTIS

An innovative software package dedicated to non-destructive testing, ultrasonic data analysis and automated diagnosis.

- 100% composite oriented;
- Compatible with most inspection systems;
- Full harmonization of the ultrasonic data analysis process;
- Faster diagnosis;
- 100% compliant with AIRBUS GROUP requirements;
- Cycle and cost reduction;
- Automated defect detection;
- Automated reporting;

Compatible data formats: Areva/IntelligeNDT, Clemessy, ExteNDE/Civa, GE, M2M, Metalscan, Midas-NDT, Mistras, Olympus, Sepema, Sonatest, Tecnatom...

Find all specificities, demonstrations and our products flyers on our website : www.testia.com

TESTIA
AN AIRBUS GROUP COMPANY

Presentation
THE TRAINING & EXAMINATION CENTER

TESTIA France receive, train and certify your inspectors in our dedicated facilities and on your sites*.

FACILITIES

Rooms over a surface of 800 m².
Certified trainers.
7 air conditioned training rooms.
7 field work laboratories equipped with high-technology devices.
Common room.

METHODS AND PEDAGOGIC MEANS

Limited number of trainees.
discussions, exchanges and experience feedback.
Pedagogy based on participation.
Careful trainee monitoring.
Some multimedia training courses.
A training courses and a practical field work book given to each trainees.

YOUR CORRESPONDENTS FOR THE TRAINING

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**Under conditions, consult us.*

TRAINING TEAM


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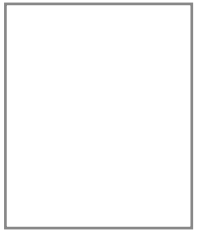
Rodolphe LACALLE


David CANDEIAS


Julie CHAIGNEAU


Karine PAGÈS

TESTIA
AN AIRBUS GROUP COMPANY

The training and examination center

ACCOMMODATIONS

ZENITUDE – APARTHOTEL **** (1)

8, rue de Caulet
31300 Toulouse
Tél. : +33 5 61 72 60 00

Bus line 64 – Bus stop Max Fishl/By foot : 5 min

"Class A 4-star tourist residence, the Zenitude has a restaurant, a bar, a private car park, air conditioning and WiFi connection in every room. To help you relax, a fitness room, a golf practice facility and an open air swimming pool from May to the end of September are at your disposal. Do not hesitate to look at their à la carte services."

NÉMÉA TOULOUSE CONTELLATION– APARTHOTEL **** (1)

160, rue Dominique Clos
31300 Toulouse
Tél. : +33 5 61 99 28 09

Bus line 64 – Bus stop Terce/By foot : 5 min

"Class A 4-star tourist residence, the Nemea welcomes you to its furnished and fully equipped apartments: kitchenette with refrigerator, ceramic hotplates, microwave, kitchen utensils, coffee percolator, toaster, kettle, crockery, ironing board, television with satellite channels and Canal+, air conditioning and iFi connection. We offer a breakfast service in a dedicated room, a private car park, access to persons with reduced mobility, a laundry, a tea room and a massage parlour. You can relax free of charge in a SPA (sauna, hammam, whirlpool baths) and a fitness room. Do not hesitate to look at their à la carte services."

NÉMÉA TOULOUSE SAINT-MARTIN – APARTHOTEL **** (1)

4, rue Alain Fourier
Parc d'activité de Saint Martin du Touch
31300 Toulouse
Tél. : +33 5 34 46 60 82

Bus line 64 – Bus stop Jardinerie/By foot : 15 min

"Class A 4-star tourist residence, the Nemea welcomes you to its furnished and fully equipped apartments: kitchenette with refrigerator, ceramic hotplates, microwave, kitchen utensils, coffee percolator, toaster, kettle, crockery, ironing board, television with satellite channels and Canal+, air conditioning and WiFi connection. We offer a breakfast service in a dedicated room, a private car park, access to persons with reduced mobility, and a laundry. You can relax free of charge in a heated indoor swimming pool and a fitness room. Do not hesitate to look at their à la carte services."

(1) Tariffs have been negotiated with Zenitude and Néméa.
When booking, state that you are coming on a TESTIA France training course to benefit and show your course notification to reception on arrival.

TESTIA
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The training and examination center

ACCOMMODATIONS

IBIS BUDGET – HOTEL **

2, avenue Hermès
31770 Colomiers
Tél. : +33 8 92 68 32 79

Bus line 63 ou 64 – Bus stop Caulet/By foot : 15 min

"Ibis Budget, a 2-star hotel, has a private car park, access to persons with reduced mobility, air conditioning and a WiFi connection in each room. There is an ample and balanced buffet breakfast service."

PARK & SUITES COLOMIERS – APARTHOTEL *** (1)

10, avenue André-Marie Ampère
31770 Colomiers
Tél. : +33 5 62 12 27 40

Free shuttle: from Monday to Friday from 7.30 am to 9.30 am and 5.00 pm to 7.00 pm/By car: 10 min
"Classified as a 3 star tourist residence, the Park & Suites Colomiers has a private car park, access to rooms for persons of reduced mobility, a laundry, air conditioning and a WiFi connection in every room. To help you relax, a sauna, an outdoor swimming pool with deckchair and fitness room are at your disposal free of charge. There is a breakfast service between 7.30 am and 9.30 am. Don't hesitate to look at their à la carte services".

(1) Tariffs have been negotiated with Park & Suites.
When booking, state that you are coming on a TESTIA France training course to benefit and show your course notification to reception on arrival.

TESTIA
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ACCESS

BY AIRCRAFT

Airport Toulouse Blagnac
Website : www.toulouse.aeroport.fr
Taxi Columérins : +33 5 61 15 43 18

BY TRAIN

Station Toulouse Matabiau
Website : www.gares-en-mouvement.com/fr/
Capitole Taxi : +33 5 34 25 02 50

BY TER

Station Ramassiers + Bus line 63 – Bus stop Caulet
Station Colomiers + Bus line 64 – Bus stop Terce
Website : www.ter-sncf.com

BY BUS LINE

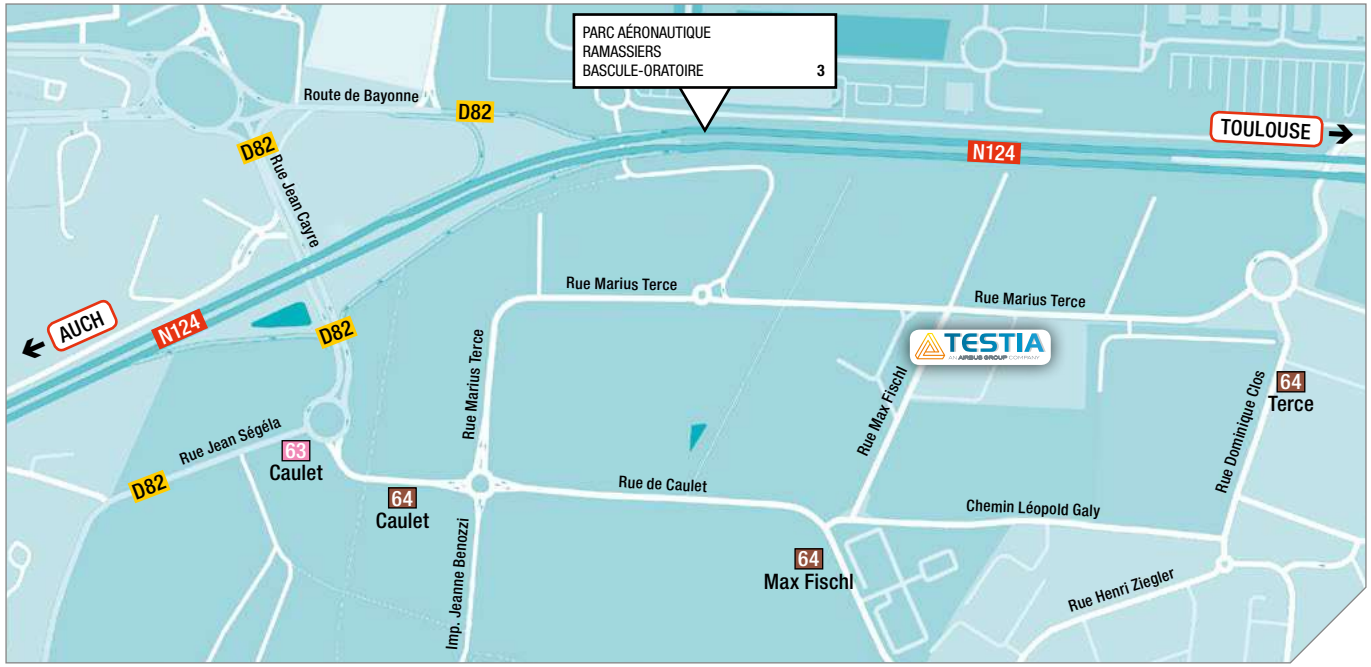
Bus line 63 – Bus stop Caulet
Bus line 64 – Bus stop Terce ou Max Fischl
Website : www.tisseo.fr

BY CAR

On arrival in Toulouse, follow the direction
Auch/Blagnac and join the A620/E80;
Leave at exit 29 and continue
on the N124 in the direction of Auch;
Leave at exit 3 and continue on the D82;
At the roundabout, take the 04th exit, rue Jean Cayre;
At the roundabout, take the 02nd exit, rue de Caulet;
At the roundabout, take the 3nd exit, rue de Marius Terce.

BY FOOT

Parc d'activités de St Martin du Touch
18, rue Marius Terce
31300 Toulouse
+33 5 34 36 12 00



QUALIFICATION LEVELS

Apprentice skills and responsibilities in levels 1, 2 and 3 defined in prEN 4179 P5 2014, are as follows:

APPRENTICES

An apprentice is a person who follows a training programme in an NDT method and who is in the process of acquiring qualification to obtain level 1 or level 2 certification by direct access (i.e. without going through level1).

The apprentices:

- Must be documented by name as apprentices and must participate actively in a training programme in a given NDT method for a limited and specified period of time;
- Must acquire experience under the direct observation of level 2 or level 3 agents in the same method or, after approval by the level 3 Leader, under the direct observation of a level 1 agent or an instructor;
- Must not take acceptance or rejection decisions;
- Must not carry out testing or assessment tasks of products including or leading to acceptance or rejection without being under direct observation;
- Must not carry out any other NDT function without being under direct observation;
- Must undergo vision tests according to § 7.1.1.

LEVEL I

In the method in which he is certified, a level 1 agent must:

- Be able to follow working instructions;
- Have the knowledge and skills to process parts, record the results and carry out equipment adjustments according to the approved working instructions;
- Have the knowledge and skills to carry out any necessary preparation of parts before or after the test according to the approved working instructions;
- Have the knowledge and skills to conduct the performance assessment of systems according to the applicable standard;
- Receive the advice or supervision of level 2 or 3 agents in this method when necessary;
- Have the knowledge and skills to carry out the interpretations and assessments of a specified product, type of product for acceptance or rejection according to an approved instruction.

QUALIFICATION LEVELS

LEVEL II

In the method in which he is certified, a level 2 agent must:

- Have complete knowledge of the field of application and the technical/method limits in which he is certified;
- Be familiar with the codes, standards and other contractual documents applicable in the method used with the employer;
- Have the knowledge and skills to adjust the equipment, carry out tests,interpret and assess for acceptance or rejection and record;
- Have the knowledge and skills to conduct the performance assessment of systems according to the applicable standard;
- Be able to give the advice necessary and/or supervise apprentices and level 1 agents;
- Possess the basic knowledge on manufacturing technologies and product inspection;
- Be able to write working instructions from a general approved procedure; This instruction must be given final approval by a level 3 COSAC (Aerospace Sectoral Certification Committee) in the method;
- If necessary and specified in the internal procedure for application, have basic knowledge in the maintenance of aircraft and vehicles.

LEVEL III

In the method in which he is certified, a level 3 agent must:

- Have the knowledge and skills to interpret the codes, standards and other contractual documents governing the method used by the employer;
- Be able to assume the technical responsibility for NDT installations and personnel;
- Be able to choose the method and technique for a specific inspection;
- Be able to prepare and check the suitability of working procedures and instructions;
- Approve NDT working procedures and instructions after checking their technical suitability;
- Have a general knowledge of other NDT method(s), product technologies used by the employer and associated defects;
- If necessary and specified in the internal procedure for application, have basic knowledge in the maintenance of aircraft and vehicles.
- Be able to inform the Engineering Design Office of the limits of the methods and techniques, part geometries most suitable for effective industrial testing;
- Be able to provide or administer the training, examinations (according to the requirements of the following subparagraph) and the personnel certification for the method in which he is certified;
- Carry out NDT for the acceptance of parts only if the skills for carrying out the tasks have been proven (§ 7.1.4.3 et § 8.6b);
- Administer the level 1 and 2 examinations according to this procedure only if he has already obtained level 2 certification or the inspection option;
- When required by the internal application procedure, be able to audit the external agencies to ensure that the requirements for the internal application procedure are satisfied.

Certification
ELIGIBILITY CONDITIONS

TRAINING

The general requirements according to prEN 4179 P5 2014 are as follows:

Candidates for level 1, 2 or 3 certification must have followed sufficient formal training to have acquired the principles and practices of the text techniques concerned, and be able to carry out specific tasks at the qualification levels.

Formal training will be carried out prior to training at the workplace, or in parallel with it. All NDT training must be documented.

The general, specific and practical formal training must be completed by documented training at the workstation with the employer

The minimum number of hours of training for level 1 and 2 agents is given in tables II and IIA for the NDT methods and techniques indicated.

TABLE II

Number of hours of level 1 & 2 formal training:

Methods	Technics	Level I (Experience as an apprentice)	Level II (Experience as a level 1 certified agent)	Level II - Direct access (Without level 1 certification)
PT	TT	16	16	32
MT	TT	16	16	32
ET	TT	40	40	80
RT	Film and Non-film	40	40	80
	Film and Non-film	60	60	120
UT	TT	40	40	80
IRT	TT	20	40	60
ST	TT	20	40	60
LT	TT	40	80	120

TABLE IIA

In radiology, the number of hours' complementary formal training in the missing technique to advance from film or non-film to film and non-film.

Level I current	Level II current	Level I current towards Level II Film and Non-film
20	40	80

Certification
ELIGIBILITY CONDITIONS

LEVEL III

Given the scientific and technical potential of level 3 certified candidates, it is considered that the qualification can be acquired in various ways: training sessions, participation in conferences or colloquia such as those organised by industrial or independent associations, studies of manuals, reviews and other specialised literature.

TECHNIQUES IN METHODS

Some methods can be divided into several techniques; these are all treated in our training courses, but you may choose one or more when compiling your examination file.

Methods	Technics
Eddy currents Testing - ET	M : Measurement (tickness, conductivity, sorting materials, etc.)
	DD : Searching defect (HF, BF, etc.)
Magnetic particle Testing - MT	BF : Fixed benches
	BM : Mobil benches
Liquid penetrant Testing - PT	A : Water-washable dye penetrant
	D : Hydrophilic emulsifier-washable dye penetrant
	C : Solvent-washable dye penetrant
Radiology Testing - RT	RA : Silver film : Films
	CR : Computed radiography : No films
	DR : Digital radiography : No films
Ultrasonic Testing - UT	DI : Searching defect by immersion
	DC : Searching defect by contact
	M : Measurement (tickness, physical quantity, etc.)
Leak Tightness - LT	GT : Gas tracer
	VP : Pressure variation
Shearography Testing - ST	TT : All technics
Infrared Testing - IRT	TT : All technics

Certification examination
ELIGIBILITY CONDITIONS

INDUSTRIAL EXPERIENCE

According to prEN 4179 P5 2014, level 1, 2 or 3 certification candidates must have had sufficient practical experience to ensure that they can carry out the tasks corresponding to the certification level applied for..

Training at the work station can only be included in experience time if the following two conditions are fulfilled:

- The training is given by personnel certified to prEN 4179 P5 2014;
- The internal application procedure authorises this practice.

Previous experience

According to prEN 4179 P5 2014, a candidate's experience acquired with a previous employer must be documented and approved by a Responsible level 3.

Equivalence of experience

According to prEN 4179 P5 2014, personnel qualified in other programmes, the previous experience must be documented and its equivalence with the requirements in table III or IV must be determined by the Responsible level 3.

TABLE III

Méthodes	Techniques	Level I (Experience as an apprentice)	Level II (Experience as a level 1 certified agent)	Level II - Direct access (Without level 1 certification)
PT	TT	130	270	400
MT	TT	130	400	530
ET	TT	200	600	800
RT	Film or Non-film	200	600	800
	Film or Non-film	220	780	1 000
UT	TT	200	600	800
IRT	TT	200	600	800
ST	TT	400	1 200	1 600
LT	TT	200	600	800

TABLE IIIA

In radiology, the number of hours' complementary experience in the missing technique to advance from film or non-film to film and non-film for persons certified to EN 4179 P4.

Level I current	Level II current	Level I current towards Level II Film and Non-film
200	200	800

Certification examination

ELIGIBILITY CONDITIONS

TABLE IV

Level 3 responsibilities require knowledge in the technical domain of any non-destructive testing method at all. This broad knowledge can be acquired in various ways combining education, training and experience.

Institute or university	Being at least Level II certified
Baccalaureat, Baccalaureat level or lower	4 years
DUT or BTS level in a scientific or industrial domain	2 years
Graduate degree, Engineering diploma in a scientific or industrial domain	1 year

N.B.: 240 hours' complementary RT experience in the missing technique to advance from film or non-film to film and non-film.

PRICES

GENERAL TRAINING LEVEL 1 & 2 - COFREND/COSAC

MT/PT – 4 days	1 145 €
ET/RT/UT – 5 days	1 370 €
IRT/ST – 5 days	2 150 €

SPECIFIC TRAINING LEVEL 1 & 2 COSAC

MT/PT – 4 days	1 700 €
ET/RT/UT – 5 days	2 120 €
IRT/ST – 5 days	2 270 €

TRAINING LEVEL 3 COSAC

General training level 3 – 5 days	2 120 €
Specific training level 3 – 5 days	2 120 €

COMPLEMENTARY TRAINING

Ultis – 4 days	1 700 €
Ultis en E-learning NEW	consult us
CAMARI X-Ray option – 4 days	1 555 €
Composite Materials Testing – 4 days	1 490 €
NDT Initiation – 4 days	1 490 €
Materials Initiation – 3 days	950 €
Materials In-Depth Study – 5 days	1 940 €
Ultrasons Immersion – 5 days	2 120 €
Ultrasons Phased Array– 5 days	2 120 €
Digital radiology – 5 days NEW	2 120 €
Eddy Currents Array – 3 days	1 270 €
Field works - All method – 1 day	460 €

CERTIFICATION COFREND/COSAC *(These prices do not include COSAC costs)*

Certification level 1 & 2 – 1 day	1 145 €
Certification level 1 & 2 (shearography testing) – 1 day	1 450 €
Pratical Certification level 3 – 1 day	710 €
Technical supplement in a method – 1 day	710 €
Partial re-examination (written only) – 1 day	295 €

TESTIA
AN AIRBUS GROUP COMPANY

Training courses

LES ULTRASONIC TESTING

General training level 1	General training level 2	General training level 3
Specific training level 1	Specific training level 2	Specific training level 3

The time allowed to practical works is most important for training level 1.
It is advised to the trainees to have a calculator, paper, pencils and rule.

TESTIA
AN AIRBUS GROUP COMPANY

General training
ULTRASONIC TESTING

FGUT1

PEOPLE CONCERNED

Every people beginning in the method and wishing taking the certification level 1 under norms EN 4179.

PREREQUISITE

Level adviced: leaving certificate.

AIMS

To prepare at specific training of aerospace sector (SP1) in the method.
To know the field of application of the method and the limits.
To assimilate the theorical knowledge necessary to a control.
To be able to verify, to set and use the equipment with an operational mode.
To be able to interpret and classify indication.

EDUCATIONAL RESOURCES AND GUIDANCE

Theorical training given in classroom with book and multimedia and in laboratory for the field works.
Each student has a workstation equipped for practical work.
Permanent presence of an experienced trainer.

VALIDATION MODE

Editing a training certificate.

TRAINEES EVALUATION

In the form of multiple choice questions.

BIBLIOGRAPHY

The programs are conducted according to the standards of principals and TESTIA France defined in our document T TRA NOA 34 A21.

Level : **1**

Duration : **5 days**

1st day

Welcome
Presentation of COFREND and COSAC
Presentation of the certification under CER COSAC PR-001V01

Generalities
Principle
Field of applications
Complementary methods
Defectology

Basic principles
The UT echo
Analyzing the sound path
Device
- Transmission circuit
- Reception circuit

Control
- Retection
- Characterisation

Signal exploitation method
- A-scan
- B-scan
- C-scan

Calibration phase
- In distance
- In amplitude

Checks
- Distance calibration
- Resolution
- Dead zone
- Linearity
- Probe index
- Angle of refraction

Practical work
Bloc A type presentation
Distance calibration
- Longitudinal wave

2nd day

Basic principles (following)
Kinds of acoustics probes
Ultrasonic waves physical
Ultrasonic waves propagation
- Mechanical vibrations in the material (elastic characteristic)
- Longitudinal waves
- Transverse waves
- Surface waves
- Lamb waves

Acoustics waves speeds

Interfaces phenomenons
Cases of waves normals
Cases of waves obliques
Criticals angles
Angulars relationships

Practical work
Bloc V2 type presentation
Distance calibration
- Obliques waves

TESTIA
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General training
ULTRASONIC TESTING

FGUT1

3rd day

Physical principles
Beams shape
Acoustic power in the beam
• Near field
• Far field
Energy attenuation
• Absorption
• Diffusion
• Spread-related

Equipments
Ultrasonic device
• Production
• Receiver
The transducer
Piezoelectricity
Transducer characteristics
• Acoustic
• Geometrical
Differents kinds of tranducer
• Contact Transducer
• Contact Transducer with protection
• Angle Transducer
• Delay transducer
• Transducer with separated emission/reception
• Immersion Transducer
• Phased-array transducer

Practical work
Control by contact on steel and aluminium blocs
Sizing of the defect
• -6dB and -20dB
• Comparing method

4th day

Differents kinds of controls
Reflection testing
• Principle
• Advantages and drawbacks
• Application
Immersion testing
• Principle
• Advantages and drawbacks
• Application
Transmission testing
• Principle
• Advantages and drawbacks
• Application
Dual transmission testing
• Principle
• Advantages and drawbacks
• Application
TOFD Testing
• Principle
• Advantages and drawbacks
• Application
Phased Array testing
• Principle
• Advantages and drawbacks
• Application

Practical work
Control by contact on steel and aluminium blocs
Sizing of the defect
• -6dB and -20dB
• Comparing method

5th day

Focusing
Principle
Advantages and drawbacks
Focusing characteristics
• Optic focal
• Dimension of the focal spot
• Focusing, defocusing

Knowledge evaluation
Questionnary

Pratice
Periodics checks
Immersion control
Discuss and conclusion

DATES

Toulouse
January 11th to 15th..... week 2
January 29th to feb. 04th ..... week 9
May 09th to 13th..... week 19
August 22th to 26th ..... week 34
October 10th to 14th ..... week 41

cofrend

COSAC

The dates may be modified, cancelled or added.

Consult the entire calendar

Consult the tariffs

TO COMPLETE THIS TRAINING

(click on the desired training course for access)

Materials initiation

Field works

UT immersion

UT Phased Array

Ultis

TESTIA
AN AIRBUS GROUP COMPANY

Specific training

ULTRASONIC TESTING

SPUT1

PEOPLE CONCERNED

Every people certified level 1 EN 4179 wishing renew his certification.
Every people beginning in the method and wishing taking the exam level 1 under norm EN 4179.

PREREQUISITE

Every people taking the first certification in the method must have taken the general training (FG2) or equal.
It is also recommended to have attended a training Materials initiation.
The visual acuity test must meet the requirements of CER COSAC PR-001V01 (Table V - § 7.1.1).

AIMS

To prepare for Level I aerospace certification according to EN 4179.
To acquire basis knowledge of materials and defectology.
To be able to prepare the parts and run a control in the technic(s) chosen(s) following an instruction procedure.
To be able to interpret and classify indication according to the criteria of acceptance extract of the customer references.
To be able to fill a report.

EDUCATIONAL RESOURCES AND GUIDANCE

Theorical training given in classroom with book and multimedia and in laboratory for the field works.
Each student has a workstation equipped for practical work.
Permanent presence of an experienced trainer.

VALIDATION MODE

Editing a training certificate.

TRAINEES EVALUATION

In the form of multiple choice questions, open question and continuous monitoring during the practical work.

BIBLIOGRAPHY

The programs are conducted according to the standards of principals and TESTIA France defined in our document T TRA NOA 34 A21.

Level : **1**

Duration : **5 days**

1st day

Welcome
Presentation of COFREND and COSAC
Presentation of the certification under CER COSAC PR-001V01
Fly safety awarness

Basic principles
Detection conditions
- Defect orientation
- Acoustic coupling
- Kind of defect
- Wave length

Choice of the transducer
Acoustic beam
- Fresnel area
- Fraunhofer area

Focusing
- Principle
- Advantages and limits
- Dimension of the focal spot

Intrinsic attenuation

Practical work
Control by contact on aluminium blocs
Sizing of the defect
- Comparing method

Reports editing

2nd day

Basic principles (following)
Device
- Transmission circuit
- Reception circuit

Defects sizing
- -6dB method
- -20dB method
- Comparing method

Control techniques
- Reflection testing
- Transmission testing
- Immersion testing
- Dual transmission testing
- Resonance
- Particular case

Reference parts
- Metallic
- Monolithic composite

Interpretation
Material health defects
C-scan mapping
Indications on composites in A-scan mode

Practical work
Control by contact on a selfstiff composite panel
Sizing of the defect
- -6dB and -20dB

Control by immersion on a selfstiff composite panel
Report editing

Specific training
ULTRASONIC TESTING

3rd day

Aeronautical applications
Forming
- Part qualification
- Research unit requirements
- Control technique
- Discontinuities analysing
- Conformity criterias

Sticking
- Plate metallic/composite
- Plate composite/composite
- Plate composite/metallic

Immersion composite
- Part qualification
- Research unit requirements
- Control technique
- Discontinuities analysing
- Conformity criterias

Composite water jet
- Part qualification
- Research unit requirements
- Control technique
- Discontinuities analysing
- Conformity criterias

Practical work
Control by contact on fastenings lines
Sizing of the defect
- -6dB

Report editing

4th day

Aeronautical applications (following)
Thickness measurement
- Part qualification
- Research unit requirements
- Control technique
- Discontinuities analysing
- Conformity criterias

Maintenance
- Part qualification
- Research unit requirements
- Control technique
- Discontinuities analysing
- Conformity criterias

Equipments
Devices
Periodical checks

The reference documents
Presentation of documents
Their structure
Discuss and analysis

Practical work
Thickness measurement on metallic and composite
Report editing

5th day

Defectology
Choice of metallic materials
Defects
- Casting
- Forging
- Transformation
- Heat treatments
- Surface treatments
- Welding
- Composite materials
- Maintenance

Knowledge evaluation
Questionnary

Pratice
Many differents parts controls by contact or immersion
Report editing
Discuss and conclusion

DATES

Toulouse
January 25th to 29th ..... week 4
February 14th to 18th ..... week 11
June 06th to 10th..... week 23
September 05th to 09th ..... week 36
October 24th to 29th ..... week 43

cofrend

COSAC

The dates may be modified, cancelled or added.

Consult the entire calendar

Consult the tariffs

TO COMPLETE THIS TRAINING

(click on the desired training course for access)

Materials initiation

Field works

UT immersion

UT Phased Array

Ultis

TESTIA
AN AIRBUS GROUP COMPANY

General training
ULTRASONIC TESTING

FGUT2

PEOPLE CONCERNED

Every people with experience in the method and who want taking the certification level 2, under norms EN 4179.
Anyone wishing to know the fundamentals of the method.

PREREQUISITE

Level advised: Bac +2 (or equivalent) or operator certified level 1 in the method.

AIMS

Prepare for specific training in the aerospace sector (SP2) in the method.
Knowing the areas of application of all methods and their limitations.
Assimilate the essential theoretical knowledge to master the method.
Control verification, calibration and use of equipment.
Able to analyze, interpret and classify indication according to acceptance criteria.

EDUCATIONAL RESOURCES AND GUIDANCE

Theoretical taught in the classroom with book and multimedia and in laboratory for practical work.
Each student has a workstation equipped for practical work.
Permanent presence of an experienced trainer.

VALIDATION MODE

Editing a training certificate.

TRAINEES EVALUATION

In the form of multiple choice questions.

BIBLIOGRAPHY

The programs are conducted according to the standards of principals and TESTIA France defined in our document T TRA NOA 34 A21.

Level : **2**

Duration : **5 days**

1st day

Welcome
Presentation of COFREND and COSAC
Presentation of the certification under CER COSAC PR-001V01

Generalities
Principle
Field of applications
Complementary methods
Defectology

Basic principles
The UT echo
Analyzing the sound path
Device
- Transmission circuit
- Reception circuit

Control
- Retection
- Characterisation

Signal exploitation method
- A-scan
- B-scan
- C-scan

Calibration phase
- In distance
- In amplitude

Checks
- Distance calibration
- Resolution
- Dead zone
- Linearity
- Probe index
- Angle of refraction

Practical work
Bloc A type presentation
Distance calibration
- Longitudinal waves

2nd day

Basic principles (following)
Kinds of waves
Ultrasonic waves physical
Ultrasonic waves propagation
- Mechanical vibrations in the material (elastic characteristic)
- Longitudinal waves
- Transverse waves
- Surface waves
- Lamb waves

Acoustics waves speeds

Interfaces phenomenons
Cases of waves normals
Cases of waves obliques
Simple and double phenomenons
Criticals angles
Angulars relationships

Practical work
Bloc V2 type presentation
Distance calibration
- Obliques waves

TESTIA
AN AIRBUS GROUP COMPANY

General training
ULTRASONIC TESTING

FGUT2

3rd day

Physical principles
Beams shape
Acoustic power in the beam
• Near field
• Far field
Energy attenuation
• Absorption
• Diffusion
• Spread-related

Equipments
Ultrasonic device
• Production
• Receiver
The transducer
Piezoelectricity
Transducer characteristics
• Acoustic
• Geometrical
Differents kinds of tranducer
• Contact Transducer
• Contact Transducer with protection
• Angle Transducer
• Delay transducer
• Transducer with separated emission/reception
• Immersion Transducer
• Phased-array transducer

Practical work
Control by contact on steel and aluminium blocs
Sizing of the defect
• -6dB and -20dB
• Comparing method

4th day

Differents kinds of controls
Reflection testing
• Principle
• Advantages and drawbacks
• Application
Immersion testing
• Principle
• Advantages and drawbacks
• Application
Transmission testing
• Principle
• Advantages and drawbacks
• Application
Dual transmission testing
• Principle
• Advantages and drawbacks
• Application
TOFD Testing
• Principle
• Advantages and drawbacks
• Application
Phased Array testing
• Principle
• Advantages and drawbacks
• Application

Practical work
Control by contact on steel and aluminium blocs
Sizing of the defect
• -6dB and -20dB
• Comparing method

5th day

Focusing
Principle
Advantages and drawbacks
Focusing characteristics
• Optic focal
• Dimension of the focal spot
• Focusing and defocusing

Knowledge evaluation
Questionnary

Pratice
Periodics checks
Immersion control
Discuss and conclusion

DATES

Toulouse
January 18th to 22th ..... week 3
February 07th to 11th ..... week 10
May 23th to 27th..... week 21
August 29th to sept. 02nd. ..... week 35
October 17th to 21th..... week 42

cofrend

COSAC

The dates may be modified, cancelled or added.

Consult the entire calendar

Consult the tariffs

TO COMPLETE THIS TRAINING

(click on the desired training course for access)

Materials initiation

Field works

UT immersion

UT Phased Array

Ultis

TESTIA
AN AIRBUS GROUP COMPANY

Specific training
ULTRASONIC TESTING

SPUT2

PEOPLE CONCERNED

Every people certified level 2 EN 4179 wishing renew his certification.
Every people certified level 1 EN 4179 wishing take the exam level 2.
Every people experienced in the method and wishing take the exam level 2 under norm EN 4179.

PREREQUISITE

Every people taking the first certification in the method must have taken the general training (FG2) or equal.
It is also recommended to have attended a training Materials initiation.
The visual acuity test must meet the requirements of CER COSAC PR-001V01 (Table V - § 7.1.1).

AIMS

Preparing for Level II aerospace certification according to EN 4179.
Acquire in-depth knowledge of materials and defectology knowledge.
Be able to prepare the parts and run a control in the technique(s) chosen(s) following a procedure.
Be able to interpret and classify indication according to the criteria of acceptance extract of the customer references.
Be able to implement or execute a procedure raised doubt.
Know the standards and other applicable documents in the method.
Write an instruction procedure according to a customer reference.

EDUCATIONAL RESOURCES AND GUIDANCE

Theoretical taught in the classroom with book and multimedia and in laboratory for practical work.
Each student has a workstation equipped for practical work.
Permanent presence of an experienced trainer.

VALIDATION MODE

Editing a training certificate.

TRAINEES EVALUATION

In the form of multiple choice questions, open questions and continuous monitoring during the practical work.

BIBLIOGRAPHY

The programs are conducted according to the standards of principals and TESTIA France defined in our document T TRA NOA 34 A21.

Level : **2**

Duration : **5 days**

1st day

Welcome
Presentation of COFREND and COSAC
Presentation of the certification under CER COSAC PR-001V01
Fly safety awarness

Needs and requirements
Standards and autoritys presentation
- In production
- In maintenance

Basic principles
Detection conditions
- Defect orientation
- Acoustic coupling
- Kind of defect
- Wave length

Choice of the transducer
Acoustic beam
- Fresnel area
- Fraunhofer area

Focusing
- Principle
- Advantages and limits
- Dimension of the focal spot

Intrinsic attenuation

Practical work
Control by contact on aluminium blocs
Sizing of the defect
- Comparing method

Instruction procedure editing

2nd day

Basic principles (following)
Device
- Transmission circuit
- Reception circuit
- Display screen

Defects sizing
- -6dB method
- -20dB method
- Comparing method

Control techniques
- Reflection testing
- Transmission testing
- Immersion testing
- Dual transmission testing
- Resonance
- Particular case

Reference parts
- Metallic
- Monolithic composite

Interpretation
Material health defects
C-scan mapping
Indications on composites in A-scan mode

Practical work
Control by contact on a selfstiff composite panel
Sizing of the defect
- -6dB and -20dB

Control by immersion on a selfstiff composite panel

TESTIA
AN AIRBUS GROUP COMPANY

Specific training
ULTRASONIC TESTING

SPUT2

3rd day

Aeronautical applications
Forming
- Part qualification
- Research unit requirements
- Control technique
- Discontinuities analysing
- Conformity criterias

Sticking
- Plate metallic/composite
- Plate composite/composite
- Plate composite/metallic

Immersion composite
- Part qualification
- Research unit requirements
- Control technique
- Discontinuities analysing
- Conformity criterias

Composite water jet
- Part qualification
- Research unit requirements
- Control technique
- Discontinuities analysing
- Conformity criterias

Practical work
Control by contact on fastenings lines
Sizing of the defect
- -6dB

Instruction procedure editing

4th day

Aeronautical applications (following)
Thickness measurement
- Part qualification
- Research unit requirements
- Control technique
- Discontinuities analysing
- Conformity criterias

Maintenance
- Part qualification
- Research unit requirements
- Control technique
- Discontinuities analysing
- Conformity criterias

Equipments
Devices
Periodical checks

The technical Instruction Sheet
Its structure
Applicable norms

The reference documents
Presentation of documents
Their structure
Discuss and analysis

Practical work
Thickness measurement on metallic and composite

5th day

Defectology
Choice of metallic materials
Defects
- Casting
- Forging
- Transformation
- Heat treatments
- Surface treatments
- Welding
- Composite materials
- Maintenance

Knowledge evaluation
Questionnary

Pratice
Many differents parts controls by contact or immersion
Discuss and conclusion

DATES

Toulouse

February 01st to 05th	week 5
February 08th to 12th	week 6
March 21th to 25th	week 12
April 04th to 08th	week 14
June 13th to 17th	week 24
June 20th to 24th	week 25
September 12th to 16th	week 37
September 19th to 23th	week 38
November 14th to 18th	week 46
November 21th to 25th	week 47

The dates may be modified, cancelled or added.

Consult the entire calendar

Consult the tariffs

TO COMPLETE THIS TRAINING

(click on the desired training course for access)

Materials initiation

Field works

UT immersion

UT Phased Array

Ultis

cofrend

COSAC

TESTIA
AN AIRBUS GROUP COMPANY

General training
ULTRASONIC TESTING

FGUT3

PEOPLE CONCERNED

Every people certified level 2 EN 4179 wishing take the exam level 3.
Every people with experience in appliance with the CER COSAC PR-001V01 (Table IV - § 6.2.2) and wishing take the exam level 3 under norm EN 4179.

PREREQUISITE

Level adviced: Bachelor, engineer or agent certified level 2.

AIMS

To prepare at specific training of aerospace sector (SP3) in the method.
To prepare at the certification level 3 of aerospace sector under norm EN 4179.
To reinforce the achievement and deepen theorical knowledge of the method.
To acquire the necessary competence to skill an implementation of non-destructive testing laboratory.
To master the norm and other applicable documents in the method.

EDUCATIONAL RESOURCES AND GUIDANCE

Theorical training given in classroom with book and multimedia.
Projection of videos and visit of installations.
Permanent presence of an experienced trainer certified level 3 under norm EN 4179.

VALIDATION MODE

Editing a training certificate.

TRAINEES EVALUATION

In the form of multiple choice questions.

BIBLIOGRAPHY

The programs are conducted according to the standards of principals and TESTIA France defined in our document T TRA NOA 34 A21.

Level : **3**

Duration : **5 days**

1st day

Welcome
Presentation of the certification under CER COSAC PR-001V01

Level 3 functions
Roles
Responsibilities
Production management (cost and lead times)
Investment
Quality system
Human aspect (personnel management, instructions, health and safety)
What to do to ensure the maintaining of test performance (personnel, equipment and procedures)

2nd day

Theory
Principles
- The form of mechanical vibration
- The various waves
- Propagation

The form of an acoustic beam
- The near field
- The far field

Numerical applications
Transducer characteristics
- Piezo-electricity
- Frequency
- Diameter
- Damping
- Generator adjustments
- Transmission
- Reception

Interface phenomena
- Acoustic impedance
- The Snell-Descartes law

Attenuation phenomena
- Absorption
- Diffusion
- The effect of surface state
- Thickness
- Focusing
- The charactéristics of the focal spot
- Formulas
- Numerical applications

The various technologies
- Reflection
- Transmission
- Resonance

General training
ULTRASONIC TESTING

3rd day

Equipment
Presentation of the various equipment
- Contact
- Local immersion
- Total immersion
- Water jet
- Phased array
- Air C-scan
- Laser ultrasounds
- Multiplexing

The choice of equipment, materials and tools
Analysis of impact
- On detection
- On lead times
- On costs

Supervised work
The various actual cases
Definition of the installation specifications

4th day

Standardisation
The sue of reference bases and main order givers (detection techniques, periodic verifications, acceptance criteria)

Supervised work
The use of reference bases
Data extraction (detection techniques, periodic verifications, acceptance criteria)

5th day

Removal of doubt
Actions to be performed by a level 1
Actions to be performed by a level 2
- Modifications of test parameters
- Change of equipment
- Change of technique

Actions to be performed by a level 3
- The complementarity of methods
- The technical report

Knowledge assessment
Questionnary
Correction

Supervised work
Development of a standard procedure
Discuss and conclusion

DATES

Toulouse
February 08th to 12th..... week 6

cofrend

COSAC

The dates may be modified, cancelled or added.

Consult the entire calendar

Consult the tariffs

TO COMPLETE THIS TRAINING

(click on the desired training course for access)

Material in-depth study

UT immersion

UT Phased Array

Ultis

TESTIA
AN AIRBUS GROUP COMPANY

Specific training (process)
ULTRASONIC TESTING

SPUT3

PEOPLE CONCERNED

Every people certified level 2 EN 4179 wishing take the exam level 3.
Every people with experience in appliance with the CER COSAC PR-001V01 (Table IV - § 6.2.2) and wishing take the exam level 3 under norm EN 4179.

PREREQUISITE

Every people taking the first certification in the method must have take the general training (FG3) or equal.
Deepen knowledge of materials, manufacturing process and defectology or had a training in Material in-depth study.
The visual acuity test must meet the requirements of CER COSAC PR-001V01 (Table V - § 7.1.1).

AIMS

To prepare at the certification level 3 of aerospace sector under norm EN 4179.
To reinforce the achievement and deepen theorical knowledge of the method.
To acquire the necessary competence to skill an implementation of non-destructive testing laboratory.
To master the norm and other applicable documents in the method.
To be able to realize a case study.
To be able to set the NDT inspection in a manufacturing process.
To choose human and technical resource necessary to the realization of the control.
To define an operational mode.
To gain insight the action to improve in case of doubt result.

EDUCATIONAL RESOURCES AND GUIDANCE

Theorical training given in classroom with book and multimedia.
Permanent presence of an experienced trainer certified level 3 under norm EN 4179.

VALIDATION MODE

Editing a training certificate.

TRAINEES EVALUATION

Under continuous control during field works

BIBLIOGRAPHY

The programs are conducted according to the standards of principals and TESTIA France defined in our document T TRA NOA 34 A21.

Level : **3**

Duration : **5 days**

1st day

Welcome
Presentation of COFREND and COSAC
Presentation of the certification under CER COSAC PR-001V01
- Description of the different subject
- Analysis of the contents of the writing procedure

Study of global positioning of NDT controls in a manufacturing process
Exercise on a common subject
Writing of the procedure

2nd day

Writing of the procedure on a aeronautical subject
- Correction ans Technical Discuss on the different industrial choices

3rd day

Writing of the procedure on a aeronautical subject
- Correction ans Technical Discuss on the different industrial choices

4th day

Writing of the procedure on a aeronautical subject
- Correction ans Technical Discuss on the different industrial choices

5th day

Writing of the procedure on a aeronautical subject
- Correction ans Technical Discuss on the different industrial choices

DATES

Toulouse
March 07th to 11th ..... week 10
October 03rd to 07th ..... week 40

The dates may be modified, cancelled or added.

Consult the entire calendar

Consult the tariffs

TO COMPLETE THIS TRAINING

(click on the desired training course for access)

Material in-depth study

UT immersion

UT Phased Array

Ultis

cofrend

COSAC

TESTIA
AN AIRBUS GROUP COMPANY

Training courses

MAGNETIC PARTICLE TESTING

General training level 1	General training level 2	General training level 3
Specific training level 1	Specific training level 2	Specific training level 3

The time allowed to practical works is most important for training level 1.
It is advised to the trainees to have a calculator, paper, pencils and rule.

TESTIA
AN AIRBUS GROUP COMPANY

General training

MAGNETIC PARTICLE TESTING

FGMT1

PEOPLE CONCERNED

Every people beginning in the method and wishing taking the certification level 1 under norms EN 4179.

PREREQUISITE

Level adviced: leaving certificate.

AIMS

To prepare at specific training of aerospace sector (SP1) in the method.
To know the field of application of the method and the limits.
To assimilate the theorical knowledge necessary to a control.
To be able to verify, to set and use the equipment with an operational mode.
To be able to interpret and classify indication.

EDUCATIONAL RESOURCES AND GUIDANCE

Theorical training given in classroom with book and multimedia and in laboratory for the field works.
Each student has a workstation equipped for practical work.
Permanent presence of an experienced trainer.

VALIDATION MODE

Editing a training certificate.

TRAINEES EVALUATION

In the form of multiple choice questions.

BIBLIOGRAPHY

The programs are conducted according to the standards of principals and TESTIA France defined in our document T TRA NOA 34 A21.

Level : **1**

Duration : **4 days**

1st day

Welcome
Presentation of COFREND and COSAC
Presentation of the certification under CER COSAC PR-001V01

Generalities
Principle
Field of applications
Method Complementarity
Defectology

Health and safety
Security instruction
Risk with products
Risk for healthy

Practical work
Time evaluation of preheat of an arc projector
Presentation of the fixed bench
Direction determination and repartition of field function magnetization mode
Using the formula H =I/π.D then drawing of the corrective factors

2nd day

Knowledge of magnetism
Principle of magnetic field
- Magnetic moment
- Definition

Interaction with the material
- Magnetization
- Magnetic susceptibility
- Classification of the materials
- Magnetic permeability
- Magnetic induction

Interactions with ferromagnetic
- First magnetization curve
- Ferromagnetic mechanism
- Hysteresis loop

Knowledge of electricity
- Electric current
- Characteristic values
- Choice of the current
- Comparison between direct current and alternative
- Distribution of the current in the part

Practical work
Presentation of the mobile bench
Direction determination and repartition of field function magnetization mode
Using the formula H = I/π.D then drawing of the corrective factors

TESTIA
AN AIRBUS GROUP COMPANY

General training

MAGNETIC PARTICLE TESTING

FGMT1

3rd day

Equipments
The magnets
- Definition
- Properties

The electromagnets
- Principle
- Applications

The mobile generators of current
- Principle
- Tools
- Direct current in the part
- Direct current in an auxiliary conductor
- Direct current in a solenoid

The fixed benchs
- Transversal magnetization
- Circular magnetisation
- Longitudinal magnetization
  - Between poles
  - In a solenoid
- Oscillating field
- Induced current
- Verifications of the installation
- Automatized Installations
- Demagnetization
  - Principle
  - Technical of demagnetization
- Equipments of measure
  - Tangential field measurer
  - Remanent field measurer

Products indicators
Principle
The different revealing
- Dry powder
- Aqueous revealing

Colored magnetic liquors
Fluorescent magnetic liquors
Choice of liquors

Practical work
Electromagnets
- Presentation
- Direction determination and repartition of field function magnetization mode
- Control of weld

Permanent magnets
- Presentation
- Direction determination and repartition of field function magnetization mode
- Control of test specimen of resistance

4th day

Operating mode
Preparation
- Different sort of preparations

The different magnetizations
- Continuous or simultaneous magnetization
- Remanent magnetization

Interpretation
- Under white light
- Under UVA

Different lighting source
- Human eye
- Contrast
- Light
- Electromagnetic spectrum
- Photometric units

Demagnetization
Reconditioning

Defectology
Defect definition
Harmfulness
Detection
Classification of the indications
Magnetic pictures
Detection Parameters
- Orientation
- The material and his magnetic permeability
- Dimension of the discontinuities
- Depth of the discontinuities

Knowledge evaluation
Questionnary

Practical work
Magnetic mapping on a part
Control of maintenance part
Control of manufacturing part
Discuss and conclusion

DATES

Toulouse

January 11th to 14th..... week 2
January 29th to feb. 03rd..... week 9
May 09th to 12th..... week 19
August 22th to 25th ..... week 34
October 10th to 13th ..... week 41

cofrend

COSAC

The dates may be modified, cancelled or added.

Consult the entire calendar

Consult the tariffs

TO COMPLETE THIS TRAINING

(click on the desired training course for access)

Materials initiation

Field works

TESTIA
AN AIRBUS GROUP COMPANY

Specific training

MAGNETIC PARTICLE TESTING

SPMT1

PEOPLE CONCERNED

Every people certified level 1 EN 4179 wishing renew his certification.
Every people beginning in the method and wishing taking the exam level 1 under norm EN 4179.

PREREQUISITE

Every people taking the first certification in the method must have taken the general training (FG2) or equal.
It is also recommended to have attended a training Materials initiation.
The visual acuity test must meet the requirements of CER COSAC PR-001V01 (Table V - § 7.1.1).

AIMS

To prepare for Level I aerospace certification according to EN 4179.
To acquire basis knowledge of materials and defectology.
To be able to prepare the parts and run a control in the technic(s) chosen(s) following an instruction procedure.
To be able to interpret and classify indication according to the criteria of acceptance extract of the customer references.
To be able to fill a report.

EDUCATIONAL RESOURCES AND GUIDANCE

Theorical training given in classroom with book and multimedia and in laboratory for the field works.
Each student has a workstation equipped for practical work.
Permanent presence of an experienced trainer.

VALIDATION MODE

Editing a training certificate.

TRAINEES EVALUATION

In the form of multiple choice questions, open question and continuous monitoring during the practical work.

BIBLIOGRAPHY

The programs are conducted according to the standards of principals and TESTIA France defined in our document
T TRA NOA 34 A21.

Level : **1**

Duration : **4 days**

1st day

Welcome
Presentation of COFREND and COSAC
Presentation of the certification under
CER COSAC PR-001V01
Fly safety awarness

Basic principles
Principle
Nature of the alloy
Tangential magnetic field
- Tangential field value
- Choice of the current
- Repartition of the field in the part

Discontinuities
- Dimensions
- Depth
- Orientation

Magnetic picture and revealing
- Continuous magnetization
- Remanent magnetization

Detection sensitivity

Interpretation
Lighting conditions
Human factor
The measure

Practical work
Verifications of the installations
Preparation of aeronautical parts
Control of parts
Under operating mode
Report editing

2nd day

Equipments
Fixed benches
- Type of magnetization
- Transversal
- Longitudinal
- Power
- Description of the installation
- Dimensionnal capacity
- Example of installation
- Handling

Mobil benches
- Type of magnetization
- Longitudinal
- Power
- Description of the installation
- Dimensionnal capacity
- Example of installation
- Handling

Equipments of demagnetization
Type of measure
- Tangential and remanent flux analyzer
  - Principle of the measure
  - Different probe and their using
- Radiometer and luxmeter
  - Principle of use

Products
- The liquors certified

Periodical checks
- Study of the different verifications function of the materials and requirements of aeronautical manufacturer

Practical work
Verifications of the installations
Preparation of aeronautical parts
Control of parts
Under operating mode
Report editing

Specific training

MAGNETIC PARTICLE TESTING

3rd day

Aeronautical applications

The step of preparations
- Magnetic remanent field
- Surface condition and cleanliness
- The different step
- Parts with surface treatment
- The masks

Foundry
- Definition of the part: panel asweekly
- Requirement of design office
- Method of control
- Exploitation and characterization of discontinuities
- Acceptance criteria

Forging
- Definition of the part: shaft
- Requirement of design office
- Method of control
- Exploitation and characterization of discontinuities
- Acceptance criteria

Welding
- Definition of the part: nut
- Requirement of design office
- Method of control
- Exploitation and characterization of discontinuities
- Acceptance criteria

Heat treatment and surface treatment
- Definition of the part: gear
- Requirement of design office
- Method of control
- Exploitation and characterization of discontinuities
- Acceptance criteria

Maintenance
- Definition of the part: bolt trailing edge and gear landing axis
- Requirement of design office
- Method of control
- Exploitation and characterization of discontinuities
- Acceptance criteria

The reference documents

Presentation of documents
Their structure
Discuss and analysis

Practical work

Verifications of the installations
Preparation of aeronautical parts
Control of parts
Report editing

4th day

Defectology

Choice of metallic materials
Defects
- Casting
- Forging
- Transformation
- Heat treatments
- Surface treatments
- Welding
- Maintenance

Knowledge evaluation

Questionnary

Pratice

Verifications of the installations
Preparation of aeronautical parts
Control of parts
Report editing
Discuss and conclusion

DATES

Toulouse

January 25th to 28th ..... week 4
February 14th to 17th ..... week 11
June 06th to 09th ..... week 23
September 05th to 08th..... week 36
October 24th to 27th ..... week 43

cofrend

COSAC

The dates may be modified, cancelled or added.

Consult the entire calendar

Consult the tariffs

TO COMPLETE THIS TRAINING

(click on the desired training course for access)

Materials initiation

Field works

TESTIA
AN AIRBUS GROUP COMPANY

General training

MAGNETIC PARTICLE TESTING

FGMT2

PEOPLE CONCERNED

Every people with experience in the method and who want taking the certification level 2, under norms EN 4179.
Anyone wishing to know the fundamentals of the method.

PREREQUISITE

Level advised: Bac +2 (or equivalent) or operator certified level 1 in the method.

AIMS

Prepare for specific training in the aerospace sector (SP2) in the method.
Knowing the areas of application of all methods and their limitations.
Assimilate the essential theoretical knowledge to master the method.
Control verification, calibration and use of equipment.
Able to analyze, interpret and classify indication according to acceptance criteria.

EDUCATIONAL RESOURCES AND GUIDANCE

Theoretical taught in the classroom with book and multimedia and in laboratory for practical work.
Each student has a workstation equipped for practical work.
Permanent presence of an experienced trainer.

VALIDATION MODE

Editing a training certificate.

TRAINEES EVALUATION

In the form of multiple choice questions.

BIBLIOGRAPHY

The programs are conducted according to the standards of principals and TESTIA France defined in our document T TRA NOA 34 A21.

Level : **2**

Duration : **4 days**

1st day

Welcome
Presentation of COFREND and COSAC
Presentation of the certification under CER COSAC PR-001V01

Generalities
Principle
Field of applications
Method Complementarity
Defectology

Health and safety
Security instruction
Risk with products
Risk for healthy

Practical work
Time evaluation of preheat of an arc projector
Presentation of the fixed bench
Direction determination and repartition of field function magnetization mode
Using the formula H =I/π.D then drawing of the corrective factors

2nd day

Knowledge of magnetism
Principle of magnetic field
Interaction with the material
- Magnetic susceptibility
- Classification of the materials
- Magnetic permeability
- Magnetic induction
- Interactions with ferromagnetic
  - First magnetization curve
  - Ferromagnetic mechanism
  - Hysteresis loop

Knowledge of electricity
Electric current
- Principle
- Characteristic values
- Choice of the current
  - Comparison between direct current and alternative
- Regulation mode

Practical work
Presentation of the mobile bench
Direction determination and repartition of field function magnetization mode
Using the formula H = I/π.D then drawing of the corrective factors

TESTIA
AN AIRBUS GROUP COMPANY

General training

MAGNETIC PARTICLE TESTING

FGMT2

3rd day

Equipments
The magnets
- Definition
- Properties

The electromagnets
- Principle
- Applications
- Advantage and disadvantage

The mobile generators of current
- Principle
- Tools
- Direct current in the part
- Direct current in an auxiliary conductor
- Current in a solenoid

The fixed benches
- Transversal magnetization
- Circular magnetization
- Longitudinal magnetization
  - Between poles
  - In a solenoid
- Oscillating field
- Induced current
- Verifications of the installation
- Automatized installations

Demagnetization
- Principle
- Technical of demagnetization
- Limits

Equipments of measure
- Principle of the measure (hall effect)
- Tangential field measurer
- Remanent field measurer

Products indicators
Principle
The different revealing
- Dry powder
- Aqueous revealing

Colored magnetic liquors
Fluorescent magnetic liquors
Verifications
Choice of liquors

Practical work
Electromagnets
- Presentation
- Direction determination and repartition of field function magnetization mode
- Control of weld

Permanent magnets
- Presentation
- Direction determination and repartition of field function magnetization mode
- Control of test specimen of resistance

4th day

Operating mode
Preparation
- Different sort of preparations

The different magnetizations
- Continuous or simultaneous magnetization
- Remanent magnetization

Interpretation
- Under white light
- Under UVA

Different lighting source
- Human eye
- Contrast
- Light
- Electromagnetic spectrum
- Photometric units

Demagnetization
Reconditioning
Defectology
Magnetic pictures

Knowledge evaluation
Questionnary

Practical work
Magnetic mapping on a part
Control of maintenance part
Control of manufacturing part
Control of forging part
Discuss and conclusion

DATES

Toulouse
January 18th to 21th ..... week 3
February 07th to 10th..... week 10
May 23th to 26th ..... week 21
August 29th to 01st..... week 35
October 17th to 20th ..... week 42

The dates may be modified, cancelled or added.

Consult the entire calendar

Consult the tariffs

TO COMPLETE THIS TRAINING

(click on the desired training course for access)

Materials initiation

Field works

cofrend

COSAC

TESTIA
AN AIRBUS GROUP COMPANY

Specific training

MAGNETIC PARTICLE TESTING

SPMT2

PEOPLE CONCERNED

Every people certified level 2 EN 4179 wishing renew his certification.
Every people certified level 1 EN 4179 wishing take the exam level 2.
Every people experienced in the method and wishing take the exam level 2 under norm EN 4179.

PREREQUISITE

Every people taking the first certification in the method must have taken the general training (FG2) or equal.
It is also recommended to have attended a training Materials initiation.
The visual acuity test must meet the requirements of CER COSAC PR-001V01 (Table V - § 7.1.1).

AIMS

Preparing for Level II aerospace certification according to EN 4179.
Acquire in-depth knowledge of materials and defectology knowledge.
Be able to prepare the parts and run a control in the technique(s) chosen(s) following a procedure.
Be able to interpret and classify indication according to the criteria of acceptance extract of the customer references.
Be able to implement or execute a procedure raised doubt.
Know the standards and other applicable documents in the method.
Write an instruction procedure according to a customer reference.

EDUCATIONAL RESOURCES AND GUIDANCE

Theoretical taught in the classroom with book and multimedia and in laboratory for practical work.
Each student has a workstation equipped for practical work.
Permanent presence of an experienced trainer.

VALIDATION MODE

Editing a training certificate.

TRAINEES EVALUATION

In the form of multiple choice questions, open questions and continuous monitoring during the practical work.

BIBLIOGRAPHY

The programs are conducted according to the standards of principals and TESTIA France defined in our document T TRA NOA 34 A21.

Level : **2**

Duration : **4 days**

1st day

Welcome
Presentation of COFREND and COSAC
Presentation of the certification under CER COSAC PR-001V01
Fly safety awarness

Requirements
Presentation of authorities and norms
- In manufacturing
- In maintenance

Basic principles
Principle
Nature of the alloy
Tangential magnetic field
- Tangential field value
- Choice of the current
- Repartition of the field in the part

Discontinuities
- Dimensions
- Depth
- Orientation

Magnetic picture and revealing
- Continuous magnetization
- Remanent magnetization

Detection sensitivity

Interpretation
Lighting conditions
Human factor
The measure
Whipping

Practical work
Control of parts on mobile and/or fixed benches
Instruction procedure editing

2nd day

Equipments
Fixed benches
- Type of magnetization
- Transversal
- Longitudinal
- Power
- Description of the installation
- Dimensionnal capacity
- Example of installation
- Handling

Mobil benches
- Type of magnetization
- Longitudinal
- Power
- Description of the installation
- Dimensionnal capacity
- Example of installation
- Handling

Equipments of demagnetization
Type of measure
- Tangential and remanent flux analyzer
  - Principle of the measure
  - Different probe and their using
- Radiometer and luxmeter
  - Principle of use

Products
- The liquors certified

Periodical checks
- Study of the different verifications function of the materials and requirements of aeronautical manufacturer

Practical work
Control of parts on mobile and/or fixed benches

MAGNETIC PARTICLE TESTING

3rd day

Aeronautical applications

The step of preparations
- Magnetic remanent field
- Surface condition and cleanliness
- The different step
- Parts with surface treatment
- The masks

Foundry
- Definition of the part: panel asweekly
- Requirement of design office
- Method of control
- Exploitation and characterization of discontinuities
- Acceptance criteria

Forging
- Definition of the part: shaft
- Requirement of design office
- Method of control
- Exploitation and characterization of discontinuities
- Acceptance criteria

Welding
- Definition of the part: nut
- Requirement of design office
- Method of control
- Exploitation and characterization of discontinuities
- Acceptance criteria

Heat treatment and surface treatment
- Definition of the part: gear
- Requirement of design office
- Method of control
- Exploitation and characterization of discontinuities
- Acceptance criteria

Maintenance
- Definition of the part: bolt trailing edge and gear landing axis
- Requirement of design office
- Method of control
- Exploitation and characterization of discontinuities
- Acceptance criteria

The technical Instruction Sheet

Its structure
Applicable norms

The reference documents

Presentation of documents
Their structure
Discuss and analysis

Practical work

Control of parts on mobile and/or fixed benches
Instruction procedure editing

4th day

Defectology

Choice of metallic materials
Defects
- Casting
- Forging
- Transformation
- Heat treatments
- Surface treatments
- Welding
- Maintenance

Knowledge evaluation

Questionnary

Pratice

Control of parts on mobile and/or fixed benche
Discuss and conclusion

DATES

Toulouse

February 01st to 04th	week 5
February 08th to 11th	week 6
March 21th to 24th	week 12
April 04th to 07th	week 14
June 13th to 16th	week 24
June 20th to 23th	week 25
September 12th to 15th	week 37
September 19th to 22th	week 38
November 14th to 17th	week 46
November 21th to 24th	week 47

The dates may be modified, cancelled or added.

Consult the entire calendar

Consult the tariffs

TO COMPLETE THIS TRAINING

(click on the desired training course for access)

Materials initiation

Field works

cofrend

COSAC

TESTIA
AN AIRBUS GROUP COMPANY

General training

MAGNETIC PARTICLE TESTING

FGMT3

PEOPLE CONCERNED

Every people certified level 2 EN 4179 wishing take the exam level 3.
Every people with experience in appliance with the CER COSAC PR-001V01 (Table IV - § 6.2.2) and wishing take the exam level 3 under norm EN 4179.

PREREQUISITE

Level adviced: Bachelor, engineer or agent certified level 2.

AIMS

To prepare at specific training of aerospace sector (SP3) in the method.
To prepare at the certification level 3 of aerospace sector under norm EN 4179.
To reinforce the achievement and deepen theorical knowledge of the method.
To acquire the necessary competence to skill an implementation of non-destructive testing laboratory.
To master the norm and other applicable documents in the method.

EDUCATIONAL RESOURCES AND GUIDANCE

Theorical training given in classroom with book and multimedia.
Projection of videos and visit of installations.
Permanent presence of an experienced trainer certified level 3 under norm EN 4179.

VALIDATION MODE

Editing a training certificate.

TRAINEES EVALUATION

In the form of multiple choice questions.

BIBLIOGRAPHY

The programs are conducted according to the standards of principals and TESTIA France defined in our document T TRA NOA 34 A21.

Level : **3**

Duration : **5 days**

1st day

Welcome
Presentation of the certification under CER COSAC PR-001V01

Level 3 functions
Roles
Responsibilities
Production management (cost and lead times)
Investment
Quality system
Human aspect (personnel management, instructions, health and safety)
What to do to ensure the maintaining of test performance (personnel, equipment and procedures)

2nd day

Theory
Physical principles
- Magnetic properties of alloys
- Tangential magnetic field
- Values of the tangential field
- Choice of currents
- Distribution of the field in the part
- Relation between the peak values and the values read on ammeters
- Recommended types of power supply according to orientation and types of defect sought
- The magnetic image and developers
- Detection sensitivity
- Preparation of parts

The various part preparation procedures before a magnetic particle Inspection
Demagnetisation
The various principles of demagnetisation
Demagnetisation according to the various methods
Demagnetisation verification
The feasibility of a magnetic particle inspection on parts with surface coatings

MAGNETIC PARTICLE TESTING

3rd day

Equipment
Presentation of the various equipment
- In production
- In maintenance

The choice of equipment, materials and tools
- The magnetisation system
- UV lamps
- The magnetic carrier
- Field measurement device
- Radiometer and luxmeter
- Control parts
- The demagnetiser
- Handling

Analysis of impact
- On detection
- On lead times
- On costs

Examples of low, medium and high capacity installations

Supervised work
The various actual cases
Definition of the installation specifications

4th day

Standardisation
The sue of reference bases and main order givers (detection techniques, periodic verifications, acceptance criteria)

Supervised work
The use of reference bases
Data extraction (detection techniques, periodic verifications, acceptance criteria)

5th day

Removal of doubt
Actions to be performed by a level 1
Actions to be performed by a level 2
- Modifications of test parameters
- Change of equipment
- Change of technique

Actions to be performed by a level 3
- The complementarity of methods
- The technical report

Knowledge assessment
Questionnary
Correction

Supervised work
Development of a standard procedure
Discuss and conclusion

DATES

Toulouse
February 22th to 26th ..... week 8

cofrend

COSAC

The dates may be modified, cancelled or added.

Consult the entire calendar

Consult the tariffs

TO COMPLETE THIS TRAINING

(click on the desired training course for access)

Material in-depth study

TESTIA
AN AIRBUS GROUP COMPANY

Specific training (process)

MAGNETIC PARTICLE TESTING

SPMT3

PEOPLE CONCERNED

Every people certified level 2 EN 4179 wishing take the exam level 3.
Every people with experience in appliance with the CER COSAC PR-001V01 (Table IV - § 6.2.2) and wishing take the exam level 3 under norm EN 4179.

PREREQUISITE

Every people taking the first certification in the method must have take the general training (FG3) or equal.
Deepen knowledge of materials, manufacturing process and defectology or had a training in Materials Advanced.
The visual acuity test must meet the requirements of CER COSAC PR-001V01 (Table V - § 7.1.1).

AIMS

To prepare at the certification level 3 of aerospace sector under norm EN 4179.
To reinforce the achievement and deepen theorical knowledge of the method.
To acquire the necessary competence to skill an implementation of non-destructive testing laboratory.
To master the norm and other applicable documents in the method.
To be able to realize a case study.
To be able to set the NDT inspection in a manufacturing process.
To choose human and technical resource necessary to the realization of the control.
To define an operational mode.
To gain insight the action to improve in case of doubt result.

EDUCATIONAL RESOURCES AND GUIDANCE

Theorical training given in classroom with book and multimedia.
Permanent presence of an experienced trainer certified level 3 under norm EN 4179.

VALIDATION MODE

Editing a training certificate.

TRAINEES EVALUATION

Under continuous control during field works

BIBLIOGRAPHY

The programs are conducted according to the standards of principals and TESTIA France defined in our document T TRA NOA 34 A21.

Level : **3**

Duration : **5 days**

1st day

Welcome
Presentation of COFREND and COSAC
Presentation of the certification under CER COSAC PR-001V01
- Description of the different subject
- Analysis of the contents of the writing procedure

Study of global positioning of NDT controls in a manufacturing process
Exercise on a common subject
Writing of the procedure

2nd day

Writing of the procedure on a aeronautical subject
- Correction ans Technical Discuss on the different industrial choices

3rd day

Writing of the procedure on a aeronautical subject
- Correction ans Technical Discuss on the different industrial choices

4th day

Writing of the procedure on a aeronautical subject
- Correction ans Technical Discuss on the different industrial choices

5th day

Writing of the procedure on a aeronautical subject
- Correction ans Technical Discuss on the different industrial choices

DATES

Toulouse
March 04th to 08th ..... week 14
October 10th to 14th ..... week 41

The dates may be modified, cancelled or added.

Consult the entire calendar

Consult the tariffs

TO COMPLETE THIS TRAINING

(click on the desired training course for access)

Material in-depth study

cofrend

COSAC

TESTIA
AN AIRBUS GROUP COMPANY

Training courses
INFRARED TESTING

General training level 1	General training level 2	General training level 3
Specific training level 1	Specific training level 2	Specific training level 3

The time allowed to practical works is most important for training level 1.
It is advised to the trainees to have a calculator, paper, pencils and rule.

TESTIA
AN AIRBUS GROUP COMPANY

General training
INFRARED TESTING

FGIRT1

PEOPLE CONCERNED

Every people beginning in the method and wishing taking the certification level 1 under norms EN 4179.

PREREQUISITE

Level adviced: leaving certificate.

AIMS

To prepare at specific training of aerospace sector (SP1) in the method.
To know the field of application of the method and the limits.
To assimilate the theorical knowledge necessary to a control.
To be able to verify, to set and use the equipment with an operational mode.
To be able to interpret and classify indication.

EDUCATIONAL RESOURCES AND GUIDANCE

Theorical training given in classroom with book and multimedia and in laboratory for the field works.
Each student has a workstation equipped for practical work.
Permanent presence of an experienced trainer.

VALIDATION MODE

Editing a training certificate.

TRAINEES EVALUATION

In the form of multiple choice questions.

BIBLIOGRAPHY

The programs are conducted according to the standards of principals and TESTIA France defined in our document T TRA NOA 34 A21.

1st day

Welcome
Presentation of COFREND and COSAC
Presentation of the certification under CER COSAC PR-001V01

Generalities
Principle
Field of applications
Method Complementarity
Defectology

Theory
Defects searched
Thermodynamics

Practical work
Presentation facilities

2nd day

Theory (following)
Electromagnetic radiation
Radiometry
The characteristics of the thermal radiation
The atmospheric attenuation
The spectral emission

Practical work
The surface: influence of emissivity
Plate components to evaluate the emissivity
Plate with different emissivities

Level : **1**

Duration : **5 days**

General training

INFRARED TESTING

3rd day

Theory (following)
Measuring infrared radiation
The measuring infrared radiation system
The optical instrumentation
The detectors
Cooling of the detectors
The formation of thermal images

Practical work
The heat transfer
• Time
• Distance
• Heating mode
Application to various materials

4th day

Theory (following)
Thermal scanning cameras
Thermal cameras detector array
The characterization of infrared systems
Choosing the spectral bands
The calibration

Practical work
Identification and characterization
of defects
Rubber sheet/rubber
Composite parts
Parts with cork

5th day

Theory (following)
The thermal excitation
The NDT techniques
The control modes
Quantification of defects
Advanced technics: thermography phase
The pulse
The image processing

Knowledge evaluation
Questionnary

Practical work
Identification and characterization
of defects On part aluminum/rubber
Discuss and conclusion

DATES

Toulouse
April 11th to 15th..... week 15

cofrend

COSAC

The dates may be modified, cancelled or added.

Consult the entire calendar

Consult the tariffs

TO COMPLETE THIS TRAINING

(click on the desired training course for access)

Materials initiation

Field works

TESTIA
AN AIRBUS GROUP COMPANY

Specific training

INFRARED TESTING

SPIRT1

PEOPLE CONCERNED

Every people certified level 1 EN 4179 wishing renew his certification.
Every people beginning in the method and wishing taking the exam level 1 under norm EN 4179.

PREREQUISITE

Every people taking the first certification in the method must have taken the general training (FG2) or equal.
It is also recommended to have attended a training Materials initiation.
The visual acuity test must meet the requirements of CER COSAC PR-001V01 (Table V - § 7.1.1).

AIMS

To prepare for Level I aerospace certification according to EN 4179.
To acquire basis knowledge of materials and defectology.
To be able to prepare the parts and run a control in the technic(s) chosen(s) following an instruction procedure.
To be able to interpret and classify indication according to the criteria of acceptance extract of the customer references.
To be able to fill a report.

EDUCATIONAL RESOURCES AND GUIDANCE

Theorical training given in classroom with book and multimedia and in laboratory for the field works.
Each student has a workstation equipped for practical work.
Permanent presence of an experienced trainer.

VALIDATION MODE

Editing a training certificate.

TRAINEES EVALUATION

In the form of multiple choice questions, open question and continuous monitoring during the practical work.

BIBLIOGRAPHY

The programs are conducted according to the standards of principals and TESTIA France defined in our document T TRA NOA 34 A21.

Level : **1**

Duration : **5 days**

1st day

Welcome
Presentation COFREND and COSAC
Presentation of the certification under CER COSAC PR-001V01
Fly safety awarness

Basic principles
Applications of thermography in aeronautics
Recalls of thermodynamic
The thermal radiation
The principle of infrared thermography
The atmospheric transmission
The characteristics of the thermal radiation

Practical work
Inspection of aircraft connecting rods coiled carbon
Report editing

2nd day

Theory (following)
Measuring infrared radiation
Thermal imaging cameras
The thermal excitation
The thermal excitation pulse
The NDT techniques
Control mode

Practical work
Example of pulse thermography
Inspection of parts Nomex honeycomb/skin RTCs
Report editing

Specific training

INFRARED TESTING

3rd day

Theory (following)
Example of Lockin thermography
The different types of control
Static Control
Dynamic Control
Defects detected
Quantification of defects
The image processing
The comparison with other NDT techniques thermography

Practical work
Inspection of parts with honeycomb aluminum/aluminum skin with a rubber coating
Report editing

4th day

Theory (following)
Application of static control in aviation and space production
Application of dynamic control in aviation and space production
Application for maintenance aerospace
Application of imaging in aircraft maintenance

The reference documents
Presentation of documents
Their structure
Discuss and analysis

Practical work
Presentation facilities
The surface: influence of emissivity
Parts with component to assess the emissivities
Parts with different emissivities
Report editing

5th day

Defectology
Choice of metallic materials
Defects
- Casting
- Forging
- Transformation
- Heat treatments
- Surface treatments
- Welding
- Composite materials
- Maintenance

Knowledge evaluation
Questionnary

Practical work
Control of parts
Report editing
Discuss and conclusion

DATES

Toulouse
May 23th to 27th..... week 21

cofrend

COSAC

The dates may be modified, cancelled or added.

Consult the entire calendar

Consult the tariffs

TO COMPLETE THIS TRAINING

(click on the desired training course for access)

Materials initiation

Field works

TESTIA
AN AIRBUS GROUP COMPANY

General training
INFRARED TESTING

FGIRT2

PEOPLE CONCERNED

Every people with experience in the method and who want taking the certification level 2, under norms EN 4179.
Anyone wishing to know the fundamentals of the method.

PREREQUISITE

Level advised: Bac +2 (or equivalent) or operator certified level 1 in the method.

AIMS

Prepare for specific training in the aerospace sector (SP2) in the method.
Knowing the areas of application of all methods and their limitations.
Assimilate the essential theoretical knowledge to master the method.
Control verification, calibration and use of equipment.
Able to analyze, interpret and classify indication according to acceptance criteria.

EDUCATIONAL RESOURCES AND GUIDANCE

Theoretical taught in the classroom with book and multimedia and in laboratory for practical work.
Each student has a workstation equipped for practical work.
Permanent presence of an experienced trainer.

VALIDATION MODE

Editing a training certificate.

TRAINEES EVALUATION

In the form of multiple choice questions.

BIBLIOGRAPHY

The programs are conducted according to the standards of principals and TESTIA France defined in our document T TRA NOA 34 A21.

Level : **2**

Duration : **5 days**

1st day

Welcome
Presentation of COFREND and COSAC
Presentation of the certification under CER COSAC PR-001V01

Generalities
Principle
Field of applications
Method Complementarity
Defectology

Theory
Defects searched
Thermodynamics

Practical work
Presentation facilities

2nd day

Theory (following)
Electromagnetic radiation
Radiometry
The characteristics of the thermal radiation
The atmospheric attenuation
The spectral emission

Practical work
The surface: influence of emissivity
Plate components to evaluate the emissivity
Plate with different emissivities

General training
INFRARED TESTING

3rd day

Theory (following)
Measuring infrared radiation
The measuring infrared radiation system
The optical instrumentation
The detectors
Cooling of the detectors
The formation of thermal images

Practical work
The heat transfer
• Time
• Distance
• Heating mode
Application to various materials

4th day

Theory (following)
Thermal scanning cameras
Thermal cameras detector array
The characterization of infrared systems
Choosing the spectral bands
The calibration

Practical work
Identification and characterization
of defects
Rubber sheet/rubber
Composite parts
Parts with cork

5th day

Theory (following)
The thermal excitation
The NDT techniques
The control modes
Quantification of defects
Advanced technics: thermography phase
The pulse
The image processing

Knowledge evaluation
Questionnary

Practical work
Identification and characterization
of defects On part aluminum/rubber
Discuss and conclusion

DATES

Toulouse
April 11th to 15th..... week 15

cofrend

COSAC

The dates may be modified, cancelled or added.

Consult the entire calendar

Consult the tariffs

TO COMPLETE THIS TRAINING

(click on the desired training course for access)

Materials initiation

Field works

TESTIA
AN AIRBUS GROUP COMPANY

Specific training

INFRARED TESTING

SPIRT2

PEOPLE CONCERNED

Every people certified level 2 EN 4179 wishing renew his certification.
Every people certified level 1 EN 4179 wishing take the exam level 2.
Every people experienced in the method and wishing take the exam level 2 under norm EN 4179.

PREREQUISITE

Every people taking the first certification in the method must have taken the general training (FG2) or equal.
It is also recommended to have attended a training Materials initiation.
The visual acuity test must meet the requirements of CER COSAC PR-001V01 (Table V - § 7.1.1).

AIMS

Preparing for Level II aerospace certification according to EN 4179.
Acquire in-depth knowledge of materials and defectology knowledge.
Be able to prepare the parts and run a control in the technique(s) chosen(s) following a procedure.
Be able to interpret and classify indication according to the criteria of acceptance extract of the customer references.
Be able to implement or execute a procedure raised doubt.
Know the standards and other applicable documents in the method.
Write an instruction procedure according to a customer reference.

EDUCATIONAL RESOURCES AND GUIDANCE

Theoretical taught in the classroom with book and multimedia and in laboratory for practical work.
Each student has a workstation equipped for practical work.
Permanent presence of an experienced trainer.

VALIDATION MODE

Editing a training certificate.

TRAINEES EVALUATION

In the form of multiple choice questions, open questions and continuous monitoring during the practical work.

BIBLIOGRAPHY

The programs are conducted according to the standards of principals and TESTIA France defined in our document T TRA NOA 34 A21.

Level : **2**

Duration : **5 days**

1st day

Welcome
Presentation COFREND and COSAC
Presentation of the certification under CER COSAC PR-001V01
Fly safety awarness

Basic principles
Applications of thermography in aeronautics
Recalls of thermodynamic
The thermal radiation
The principle of infrared thermography
The atmospheric transmission
The characteristics of the thermal radiation

Practical work
Inspection of aircraft connecting rods coiled carbon
Instruction procedure editing

2nd day

Theory (following)
Measuring infrared radiation
Thermal imaging cameras
The thermal excitation
The thermal excitation pulse
The NDT techniques
Control mode

Practical work
Example of pulse thermography
Inspection of parts Nomex honeycomb/skin RTCs

Specific training
INFRARED TESTING

3rd day

Theory (following)
Example of Lockin thermography
The different types of control
Static Control
Dynamic Control
Defects detected
Quantification of defects
The image processing
The comparison with other NDT techniques thermography

Practical work
Inspection of parts with honeycomb aluminum/aluminum skin with a rubber coating
Instruction procedure editing

4th day

Theory (following)
Application of static control in aviation and space production
Application of dynamic control in aviation and space production
Application for maintenance aerospace
Application of imaging in aircraft maintenance

The technical Instruction Sheet
Its structure
Applicable norms

The reference documents
Presentation of documents
Their structure
Discuss and analysis

Practical work
Presentation facilities
The surface: influence of emissivity
Parts with component to assess the emissivities
Parts with different emissivities

5th day

Defectology
Choice of metallic materials
Defects
- Casting
- Forging
- Transformation
- Heat treatments
- Surface treatments
- Welding
- Composite materials
- Maintenance

Knowledge evaluation
Questionnary

Practical work
Control of parts
Discuss and conclusion

DATES

Toulouse
May 23th to 27th..... week 21

cofrend

COSAC

The dates may be modified, cancelled or added.

Consult the entire calendar

Consult the tariffs

TO COMPLETE THIS TRAINING

(click on the desired training course for access)

Materials initiation

Field works

TESTIA
AN AIRBUS GROUP COMPANY

General training

INFRARED TESTING

FGIRT3

PEOPLE CONCERNED

Every people certified level 2 EN 4179 wishing take the exam level 3.
Every people with experience in appliance with the CER COSAC PR-001V01 (Table IV - § 6.2.2) and wishing take the exam level 3 under norm EN 4179.

PREREQUISITE

Level adviced: Bachelor, engineer or agent certified level 2.

AIMS

To prepare at specific training of aerospace sector (SP3) in the method.
To prepare at the certification level 3 of aerospace sector under norm EN 4179.
To reinforce the achievement and deepen theorical knowledge of the method.
To acquire the necessary competence to skill an implementation of non-destructive testing laboratory.
To master the norm and other applicable documents in the method.

EDUCATIONAL RESOURCES AND GUIDANCE

Theorical training given in classroom with book and multimedia.
Projection of videos and visit of installations.
Permanent presence of an experienced trainer certified level 3 under norm EN 4179.

VALIDATION MODE

Editing a training certificate.

TRAINEES EVALUATION

In the form of multiple choice questions.

BIBLIOGRAPHY

The programs are conducted according to the standards of principals and TESTIA France defined in our document T TRA NOA 34 A21.

Level : **3**

Duration : **5 days**

1st day

Welcome
Presentation of the certification under CER COSAC PR-001V01

Level 3 functions
Roles
Responsibilities
Production management (cost and lead times)
Investment
Quality system
Human aspect (personnel management, instructions, health and safety)
What to do to ensure the maintaining of test performance (personnel, equipment and procedures)

2nd day

Theory
Principle of Infrared thermographie
- The infrared radiation
- The radiometry
  - Spectral luminance
  - Planck's law and to Stephan-Boltzmann
  - The photometric units
- The caractheristic of the infrared picture (the radiation balance, the atmospheric attenuation and spectral emissivity)

The caracterisation of infrared systems
- The technical specification
- The space of the picture
- The spectral band

The infrared detectors
- Thermal and quantum
- The cooled and non-cooled cameras
- The FPA cameras and mechanical scanning
- The calibration

The thermography active and passive
The technics in thermography
- The transmission and reflection

The thermal excitation
- Pulsed, step and lock-in

The technics of post-processing picture
- The substraction and filtering
- The technic of phase and TSR

The practical side
- The defects position
- The defects dimensioning
- The depth of the defects
- The instruction procedure

General training

INFRARED TESTING

3rd day

Equipment
Presentation of the different equipments
- The static bench test
- The dynamic bench test

The choice of the equipments
- The cameras
- The heating system
- The material
- The tools

The choice of the test configuration
- The plane parts
- The revolution parts

Analysis of impact
- On detection
- On lead times
- On costs

Supervised work
The various actual cases
Definition of the installation specifications

4th day

Standardisation
The sue of reference bases and main order givers (detection techniques, periodic verifications, acceptance criteria)

Supervised work
The use of reference bases
Data extraction (detection techniques, periodic verifications, acceptance criteria)

5th day

Removal of doubt
Actions to be performed by a level 1
Actions to be performed by a level 2
- Modifications of test parameters
- Change of equipment
- Change of technique

Actions to be performed by a level 3
- The complementarity of methods
- The technical report

Knowledge assessment
Questionnaires
Correction

Supervised work
Development of a standard procedure
Discussion and conclusion

DATES

Consult us.

cofrend

COSAC

The dates may be modified, cancelled or added.

Consult the entire calendar

Consult the tariffs

TO COMPLETE THIS TRAINING

(click on the desired training course for access)

Material in-depth study

TESTIA
AN AIRBUS GROUP COMPANY

Specific training (process)
INFRARED TESTING

SPIRT3

PEOPLE CONCERNED

Every people certified level 2 EN 4179 wishing take the exam level 3.
Every people with experience in appliance with the CER COSAC PR-001V01 (Table IV - § 6.2.2) and wishing take the exam level 3 under norm EN 4179.

PREREQUISITE

Every people taking the first certification in the method must have take the general training (FG3) or equal.
Deepen knowledge of materials, manufacturing process and defectology or had a training in Material in-depth study.
The visual acuity test must meet the requirements of CER COSAC PR-001V01 (Table V - § 7.1.1).

AIMS

To prepare at the certification level 3 of aerospace sector under norm EN 4179.
To reinforce the achievement and deepen theorical knowledge of the method.
To acquire the necessary competence to skill an implementation of non-destructive testing laboratory.
To master the norm and other applicable documents in the method.
To be able to realize a case study.
To be able to set the NDT inspection in a manufacturing process.
To choose human and technical resource necessary to the realization of the control.
To define an operational mode.
To gain insight the action to improve in case of doubt result.

EDUCATIONAL RESOURCES AND GUIDANCE

Theorical training given in classroom with book and multimedia.
Permanent presence of an experienced trainer certified level 3 under norm EN 4179.

VALIDATION MODE

Editing a training certificate.

TRAINEES EVALUATION

Under continuous control during field works

BIBLIOGRAPHY

The programs are conducted according to the standards of principals and TESTIA France defined in our document T TRA NOA 34 A21.

Level : **3**

Duration : **5 days**

1st day

Welcome
Presentation of COFREND and COSAC
Presentation of the certification under CER COSAC PR-001V01
- Description of the different subject
- Analysis of the contents of the writing procedure

Study of global positioning of NDT controls in a manufacturing process
Exercise on a common subject
Writing of the procedure

2nd day

Writing of the procedure on a aeronautical subject
- Correction ans Technical Discuss on the different industrial choices

3rd day

Writing of the procedure on a aeronautical subject
- Correction ans Technical Discuss on the different industrial choices

4th day

Writing of the procedure on a aeronautical subject
- Correction ans Technical Discuss on the different industrial choices

5th day

Writing of the procedure on a aeronautical subject
- Correction ans Technical Discuss on the different industrial choices

DATES

Toulouse
September 12th to 16th..... week 37

The dates may be modified, cancelled or added.

Consult the entire calendar

Consult the tariffs

TO COMPLETE THIS TRAINING

(click on the desired training course for access)

Material in-depth study

cofrend

COSAC

TESTIA
AN AIRBUS GROUP COMPANY

Training courses

LIQUID PENETRANT TESTING

General training level 1	General training level 2	General training level 3
Specific training level 1	Specific training level 2	Specific training level 3

The time allowed to practical works is most important for training level 1.
It is advised to the trainees to have a calculator, paper, pencils and rule.

TESTIA
AN AIRBUS GROUP COMPANY

General training

LIQUID PENETRANT TESTING

FGPT1

PEOPLE CONCERNED

Every people beginning in the method and wishing taking the certification level 1 under norms EN 4179.

PREREQUISITE

Level adviced: leaving certificate.

AIMS

To prepare at specific training of aerospace sector (SP1) in the method.
To know the field of application of the method and the limits.
To assimilate the theorical knowledge necessary to a control.
To be able to verify, to set and use the equipment with an operational mode.
To be able to interpret and classify indication.

EDUCATIONAL RESOURCES AND GUIDANCE

Theorical training given in classroom with book and multimedia and in laboratory for the field works.
Each student has a workstation equipped for practical work.
Permanent presence of an experienced trainer.

VALIDATION MODE

Editing a training certificate.

TRAINEES EVALUATION

In the form of multiple choice questions.

BIBLIOGRAPHY

The programs are conducted according to the standards of principals and TESTIA France defined in our document T TRA NOA 34 A21.

Level : **1**

Duration : **4 days**

1st day

Welcome
Presentation of COFREND and COSAC
Presentation of the certification under CER COSAC PR-001V01

Generalities
Principle
Field of applications
Method Complementarity
Defectology

Health and safety
Health and safety
Risk with products
Risk for healthy
Risk for environment
Fire safety

Product used
Characteristic of penetrant products
- Free Surface
- Surface tension
- Wetting
- Capillarity
- Viscosity
- Emulsion

Practical work
Using of a pre-emulsifier penetrant and post-emulsifier on Tesco reference sample
Excessive rinsing of a pre-emulsifier on Tesco reference sample
Water-rinsing and Solvent-rinsing on Tesco reference sample

2nd day

Product used (following)
Different sort of penetrants
- Way of elimination
- Sensitivity level

Différent sort of developer

Implementation
Preliminary cleaning
- Bating
- Degreasing
- Mechanical action

Penetrant application
- Paintbrush
- Spray
- Immersion
- Classical Spraying
- Electrostatic spraying

Impregnation time
Removal of penetrant excess
- Pre-emulsifier
- Post-emulsifier
- Solvant

Rinsing
- Precaution
- Means

Application of developer
- Dry developer
- Acqueous developer
- Non-acqueous developer

Practical work
Influence of thixotropic penetrant, of spray penetrant or in pencil on Runcheck samples
Using of mixed penetrant and colored penetrant on Runcheck samples
Using of dry developer or non-acqueous developer on Tesco samples

General training

LIQUID PENETRANT TESTING

3rd day

Light condition
Human eye
• Properties
• Contrast
The light
• Properties
• Electromagnetique spectre
Photometric unit
• Energetic lux
• Energetic lightning
• Illuminance
Observation
• Under day-light
• Under UV light

Checks
Control stage
• Preparation
• Penetrant
• Rinsing
• Developer
• Inspection
• Reference samples

Practical work
Using of pre-emulsifier and post-emulsifier penetrant on aluminium part
Using of different times of emulsification with post-emulsifier on Tesco samples
Influence of fluorescent penetrant and colored penetrant on Omega

4th day

Interpretation
Indications of penetrant
• Defect definition
• Noise signal
Classification of indications

Special technics
Thixotropic
Hot penetrant testing
Cold penetrant testing
Non-oil support

Knowledge evaluation
Questionnary

Practical work
Using of a dry or non-acqueous developer with colored penetrant on Runcheck samples
Control on weld (SOFRANEL case)
Discuss and conclusion

DATES

Toulouse
January 11th to 14th..... week 2
January 29th to feb. 03rd..... week 9
May 09th to 12th..... week 19
August 22th to 25th ..... week 34
October 10th to 13th ..... week 41

cofrend

COSAC

The dates may be modified, cancelled or added.

Consult the entire calendar

Consult the tariffs

TO COMPLETE THIS TRAINING

(click on the desired training course for access)

Materials initiation

Field works

TESTIA
AN AIRBUS GROUP COMPANY

Specific training

LIQUID PENETRANT TESTING

SPPT1

PEOPLE CONCERNED

Every people certified level 1 EN 4179 wishing renew his certification.
Every people beginning in the method and wishing taking the exam level 1 under norm EN 4179.

PREREQUISITE

Every people taking the first certification in the method must have taken the general training (FG2) or equal.
It is also recommended to have attended a training Materials initiation.
The visual acuity test must meet the requirements of CER COSAC PR-001V01 (Table V - § 7.1.1).

AIMS

To prepare for Level I aerospace certification according to EN 4179.
To acquire basis knowledge of materials and defectology.
To be able to prepare the parts and run a control in the technic(s) chosen(s) following an instruction procedure.
To be able to interpret and classify indication according to the criteria of acceptance extract of the customer references.
To be able to fill a report.

EDUCATIONAL RESOURCES AND GUIDANCE

Theorical training given in classroom with book and multimedia and in laboratory for the field works.
Each student has a workstation equipped for practical work.
Permanent presence of an experienced trainer.

VALIDATION MODE

Editing a training certificate.

TRAINEES EVALUATION

In the form of multiple choice questions, open question and continuous monitoring during the practical work.

BIBLIOGRAPHY

The programs are conducted according to the standards of principals and TESTIA France defined in our document
T TRA NOA 34 A21.

Level : **1**

Duration : **4 days**

1st day

Welcome
Presentation of COFREND and COSAC
Presentation of the certification under CER COSAC PR-001V01
Fly safety awarness

Basic principles
Principle
- Preparation
- Application of penetrant
- Removal of the excess
- Drying
- Application of developer
- Interpretation

Parameters influencing the detection sensitivity
- Preparation
- Choice of the penetrant
- Removal of the excess
- Interpretation

Practical work
Control of parts
Report editing

2nd day

Interpretation
Light conditions
Human factor
The measure

Equipments
Preliminary operations
- Handling
- Preparation
- Treatment of effluents

Installation of penetrant testing
- Application of penetrant
- Removal of excess of penetrant
- Drying
- Developing
- Interpretation
- Automatisation

Periodical checks
- Study of the different check functiun of materials manufacturer requirements and exigence in aerospace

Practical work
Control of parts
Report editing

LIQUID PENETRANT TESTING

3rd day

Aeronautical application

Step of preparation
- Requirement of NDT foreman
- Technic of preparation

Foundry
- Definition of the part: blade compressor
- Requirement of design office
- Control technic
- Exploitation and characterisation of discontinuities
- Acceptance criteria

Forging
- Definition of the part: engine support and HP disk
- Requirement of design office
- Control technic
- Exploitation and characterisation of discontinuities
- Acceptance criteria

Welding
- Definition of the part: fuel pipe
- Requirement of design office
- Control technic
- Exploitation and characterisation of discontinuities
- Acceptance criteria

Manufacturing
- Definition of the part: shaft jack
- Requirement of design office
- Control technic
- Exploitation and characterisation of discontinuities
- Acceptance criteria

Maintenance
- Definition of the part: wings begininng and motor blade
- Requirement of design office
- Control technic
- Exploitation and characterisation of discontinuities
- Acceptance criteria

The reference documents

Presentation of documents
Their structure
Discuss and analysis

Practical work

Control of parts
Report editing

4th day

Defectology

Choice of metallic materials

Defects
- Casting
- Forging
- Transformation
- Heat treatments
- Surface treatments
- Welding
- Composite materials
- Maintenance

Knowledge evaluation

Questionnary

Pratice

Control of parts
Report editing
Discuss and conclusion

DATES

Toulouse

January 25th to 28th ..... week 4
February 14th to 17th ..... week 11
June 06th to 09th ..... week 23
September 05th to 08th..... week 36
October 24th to 27th ..... week 43

cofrend

COSAC

The dates may be modified, cancelled or added.

Consult the entire calendar

Consult the tariffs

TO COMPLETE THIS TRAINING

(click on the desired training course for access)

Materials initiation

Field works

TESTIA
AN AIRBUS GROUP COMPANY

General training

LIQUID PENETRANT TESTING

FGPT2

PEOPLE CONCERNED

Every people with experience in the method and who want taking the certification level 2, under norms EN 4179.
Anyone wishing to know the fundamentals of the method.

PREREQUISITE

Level advised: Bac +2 (or equivalent) or operator certified level 1 in the method.

AIMS

Prepare for specific training in the aerospace sector (SP2) in the method.
Knowing the areas of application of all methods and their limitations.
Assimilate the essential theoretical knowledge to master the method.
Control verification, calibration and use of equipment.
Able to analyze, interpret and classify indication according to acceptance criteria.

EDUCATIONAL RESOURCES AND GUIDANCE

Theoretical taught in the classroom with book and multimedia and in laboratory for practical work.
Each student has a workstation equipped for practical work.
Permanent presence of an experienced trainer.

VALIDATION MODE

Editing a training certificate.

TRAINEES EVALUATION

In the form of multiple choice questions.

BIBLIOGRAPHY

The programs are conducted according to the standards of principals and TESTIA France defined in our document T TRA NOA 34 A21.

Level : **2**

Duration : **4 days**

1st day

Welcome
Presentation of COFREND and COSAC
Presentation of the certification under CER COSAC PR-001V01

Generalities
Principle
Field of applications
Method Complementarity
Defectology

Health and safety
Safety directive
Risk with products
Risk for health
Risk for environment
Fire safety

Products used
Properties of penetrant products
- Free surface
- Surface tension
- Interface liquid/liquid
- Wettability
- Capillarity
- Viscosity
- Miscibility
- Emulsion
- Surfactant factors

Practical work
Using of a pre-emulsifier and post-emulsifier penetrant on Tesco sample
Excessive rinsing of a pre-emulsifier on Tesco sample
Water-rinsing and Solvent-rinsing on Tesco sample

2nd day

Products used (following)
Different sort of penetrant
- Way of eliminating
- Level of sensitivity

Different sort of developer
Choice of the product

Implementation
Preliminary rinsing
- Bating
- Degreasing
- Mechanical action

Application of the penetrant
- Paintbrush
- Spray
- Immersion
- Classical spraying
- Electrostatic spraying

Impregnation time
Removal of penetrant excess
- Pre-emulsifier
- Post-emulsifier
- Solvant

Rinsing
- Precaution
- Means

Application of developer
- Dry developer
- Acqueous developer
- Non-acqueous developer

Practical work
Influence of thixotropic penetrant, of spray penetrant or in pencil on Runcheck samples
Using of mixed penetrant and colored penetrant on Runcheck samples
Using of a dry developer or non-acqueous developer on Tesco samples

General training

LIQUID PENETRANT TESTING

3rd day

Light condition
Human eye
• Properties
• Contrast
The light
• Properties
• Electromagnetic spectre
Photometric unit
• Energetic Lux
• Energetic lightning
• Illuminance
Observation
• Under day-light
• Under UV light

Verifications
Control stage
• Preparation
• Penetrant
• Rinsing
• Developer
• Inspection
• Reference samples

Practical work
Using of pre-emulsifier and post-emulsifier penetrant on aluminium part
Using of different times of emulsification with post-emulsifier on Tesco samples
Influence of fluorescent penetrant and colored penetrant on Omega

4th day

Interpretation
Indications of penetrant
• Defect definition
• Noise signal
Classification of indications

Special technics
Thixotropic
Hot penetrant testing
Cold penetrant testing
Non-oil support

Knowledge evaluation
Questionnary

Practical work
Using of a dry or non-acqueous developer with colored penetrant on Runcheck samples
Control on weld (SOFRANEL case)
Discuss and conclusion

DATES

Toulouse
January 18th to 21th ..... week 3
February 07th to 10th..... week 10
May 23th to 26th ..... week 21
August 29th to 01st..... week 35
October 17th to 20th ..... week 42

cofrend

COSAC

The dates may be modified, cancelled or added.

Consult the entire calendar

Consult the tariffs

TO COMPLETE THIS TRAINING

(click on the desired training course for access)

Materials initiation

Field works

TESTIA
AN AIRBUS GROUP COMPANY

Specific training

LIQUID PENETRANT TESTING

SPPT2

PEOPLE CONCERNED

Every people certified level 2 EN 4179 wishing renew his certification.
Every people certified level 1 EN 4179 wishing take the exam level 2.
Every people experienced in the method and wishing take the exam level 2 under norm EN 4179.

PREREQUISITE

Every people taking the first certification in the method must have taken the general training (FG2) or equal.
It is also recommended to have attended a training Materials initiation.
The visual acuity test must meet the requirements of CER COSAC PR-001V01 (Table V - § 7.1.1).

AIMS

Preparing for Level II aerospace certification according to EN 4179.
Acquire in-depth knowledge of materials and defectology knowledge.
Be able to prepare the parts and run a control in the technique(s) chosen(s) following a procedure.
Be able to interpret and classify indication according to the criteria of acceptance extract of the customer references.
Be able to implement or execute a procedure raised doubt.
Know the standards and other applicable documents in the method.
Write an instruction procedure according to a customer reference.

EDUCATIONAL RESOURCES AND GUIDANCE

Theoretical taught in the classroom with book and multimedia and in laboratory for practical work.
Each student has a workstation equipped for practical work.
Permanent presence of an experienced trainer.

VALIDATION MODE

Editing a training certificate.

TRAINEES EVALUATION

In the form of multiple choice questions, open questions and continuous monitoring during the practical work.

BIBLIOGRAPHY

The programs are conducted according to the standards of principals and TESTIA France defined in our document T TRA NOA 34 A21.

Level : **2**

Duration : **4 days**

1st day

Welcome
Presentation of COFREND and COSAC
Presentation of the certification under CER COSAC PR-001V01
Fly safety awarness

Requirements
Presentation of authorities and norms
- In manufacturing
- In maintenance

Basic principles
Principle
- Preparation
- Penetrant application
- Removal of the excess
- Drying
- Developer application
- Interpretation

Parameters influencing the detection sensitivity
- Preparation
- Choice of the penetrant
- Removal of the excess
- Interpretation

Practical work
Control of parts
Instruction procedure editing

2nd day

Interpretation
Light conditions
Human factor
The measure
Whipping

Equipments
Preliminary operations
- Handling
- Preparation
- Treatment of effluents

Installation of penetrant testing
- Application of penetrant
- Removal of excess of penetrant
- Drying
- Developing
- Interpretation
- Automatisation

Periodical checks
- Study of the different check functiun of materials manufacturer requirements and exigence in aerospace

Practical work
Control of parts

LIQUID PENETRANT TESTING

3rd day

Aeronautical application

Step of preparation
- Requirement of NDT foreman
- Technic of preparation

Foundry
- Definition of the part: blade compressor
- Requirement of design office
- Control technic
- Exploitation and characterisation of discontinuities
- Acceptance criteria

Forging
- Definition of the part: engine support and HP disk
- Requirement of design office
- Control technic
- Exploitation and characterisation of discontinuities
- Acceptance criteria

Welding
- Definition of the part: fuel pipe
- Requirement of design office
- Control technic
- Exploitation and characterisation of discontinuities
- Acceptance criteria

Manufacturing
- Definition of the part: shaft jack
- Requirement of design office
- Control technic
- Exploitation and characterisation of discontinuities
- Acceptance criteria

Maintenance
- Definition of the part: wings begininng and motor blade
- Requirement of design office
- Control technic
- Exploitation and characterisation of discontinuities
- Acceptance criteria

The technical Instruction Sheet

Its structure
Applicable norms

The reference documents

Presentation of documents
Their structure
Discuss and analysis

Practical work

Control of parts
Instruction procedure editing

4th day

Defectology

Choice of metallic materials

Defects
- Casting
- Forging
- Transformation
- Heat treatments
- Surface treatments
- Welding
- Composite materials
- Maintenance

Knowledge evaluation

Questionnary

Pratice

Control of parts
Discuss and conclusion

DATES

Toulouse

February 01st to 04th ..... week 5
February 08th to 11th ..... week 6
March 21th to 24th ..... week 12
April 04th to 07th ..... week 14
June 13th to 16th ..... week 24
June 20th to 23th ..... week 25
September 12th to 15th ..... week 37
September 19th to 22th ..... week 38
November 14th to 17th ..... week 46
November 21th to 24th ..... week 47

The dates may be modified, cancelled or added.

Consult the entire calendar

Consult the tariffs

TO COMPLETE THIS TRAINING

(click on the desired training course for access)

Materials initiation

Field works

cofrend

COSAC

TESTIA
AN AIRBUS GROUP COMPANY

General training

LIQUID PENETRANT TESTING

FGPT3

PEOPLE CONCERNED

Every people certified level 2 EN 4179 wishing take the exam level 3.
Every people with experience in appliance with the CER COSAC PR-001V01 (Table IV - § 6.2.2) and wishing take the exam level 3 under norm EN 4179.

PREREQUISITE

Level adviced: Bachelor, engineer or agent certified level 2.

AIMS

To prepare at specific training of aerospace sector (SP3) in the method.
To prepare at the certification level 3 of aerospace sector under norm EN 4179.
To reinforce the achievement and deepen theorical knowledge of the method.
To acquire the necessary competence to skill an implementation of non-destructive testing laboratory.
To master the norm and other applicable documents in the method.

EDUCATIONAL RESOURCES AND GUIDANCE

Theorical training given in classroom with book and multimedia.
Projection of videos and visit of installations.
Permanent presence of an experienced trainer certified level 3 under norm EN 4179.

VALIDATION MODE

Editing a training certificate.

TRAINEES EVALUATION

In the form of multiple choice questions.

BIBLIOGRAPHY

The programs are conducted according to the standards of principals and TESTIA France defined in our document T TRA NOA 34 A21.

Level : **3**

Duration : **5 days**

1st day

Welcome
Presentation of the certification under CER COSAC PR-001V01

Level 3 functions
Roles
Responsibilities
Production management (cost and lead times)
Investment
Quality system
Human aspect (personnel management, instructions, health and safety)
What to do to ensure the maintaining of test performance (personnel, equipment and procedures)

2nd day

Theory
The principle
- Physico-chemical phenomena
- Luminous phenomena

Products used for an inspection
- Surface preparation
- Penetrants
- Emulsifiers
- Developers

Carrying out the inspection
- Surface preparation
- Penetrant application
- Elimination of excess penetrant
- Drying
- Applying the developer
- Interpretation
- Reconditioning

Interpretation
- Types of discontinuity detectable
- Analysis of the features
- Classification of the features

Ranges of types
Health and safety
The treatment of effluents

General training

LIQUID PENETRANT TESTING

3rd day

Equipment
Presentation of the various equipment
- In production
- In maintenance

The choice of equipment, materials and tools
Analysis of impact
- On detection
- On lead times
- On costs

Examples of low, medium and high capacity installations

Supervised work
The various actual cases
Definition of the installation specifications

4th day

Standardisation
The sue of reference bases and main order givers (detection techniques, periodic verifications, acceptance criteria)

Supervised work
The use of reference bases
Data extraction (detection techniques, periodic verifications, acceptance criteria)

5th day

Removal of doubt
Actions to be performed by a level 1
Actions to be performed by a level 2
- Modifications of test parameters
- Change of equipment
- Change of technique

Actions to be performed by a level 3
- The complementarity of methods
- The technical report

Knowledge assessment
Questionnary
Correction

Supervised work
Development of a standard procedure
Discuss and conclusion

DATES

Toulouse
February 15th to 19th ..... week 7

cofrend

COSAC

The dates may be modified, cancelled or added.

Consult the entire calendar

Consult the tariffs

TO COMPLETE THIS TRAINING

(click on the desired training course for access)

Material in-depth study

TESTIA
AN AIRBUS GROUP COMPANY

Specific training (process)

LIQUID PENETRANT TESTING

SPPT3

PEOPLE CONCERNED

Every people certified level 2 EN 4179 wishing take the exam level 3.
Every people with experience in appliance with the CER COSAC PR-001V01 (Table IV - § 6.2.2) and wishing take the exam level 3 under norm EN 4179.

PREREQUISITE

Every people taking the first certification in the method must have take the general training (FG3) or equal.
Deepen knowledge of materials, manufacturing process and defectology or had a training in Material in-depth study.
The visual acuity test must meet the requirements of CER COSAC PR-001V01 (Table V - § 7.1.1).

AIMS

To prepare at the certification level 3 of aerospace sector under norm EN 4179.
To reinforce the achievement and deepen theorical knowledge of the method.
To acquire the necessary competence to skill an implementation of non-destructive testing laboratory.
To master the norm and other applicable documents in the method.
To be able to realize a case study.
To be able to set the NDT inspection in a manufacturing process.
To choose human and technical resource necessary to the realization of the control.
To define an operational mode.
To gain insight the action to improve in case of doubt result.

EDUCATIONAL RESOURCES AND GUIDANCE

Theorical training given in classroom with book and multimedia.
Permanent presence of an experienced trainer certified level 3 under norm EN 4179.

VALIDATION MODE

Editing a training certificate.

TRAINEES EVALUATION

Under continuous control during field works

BIBLIOGRAPHY

The programs are conducted according to the standards of principals and TESTIA France defined in our document T TRA NOA 34 A21.

Level : **3**

Duration : **5 days**

1st day

Welcome
Presentation of COFREND and COSAC
Presentation of the certification under CER COSAC PR-001V01
- Description of the different subject
- Analysis of the contents of the writing procedure

Study of global positioning of NDT controls in a manufacturing process
Exercise on a common subject
Writing of the procedure

2nd day

Writing of the procedure on a aeronautical subject
- Correction ans Technical Discuss on the different industrial choices

3rd day

Writing of the procedure on a aeronautical subject
- Correction ans Technical Discuss on the different industrial choices

4th day

Writing of the procedure on a aeronautical subject
- Correction ans Technical Discuss on the different industrial choices

5th day

Writing of the procedure on a aeronautical subject
- Correction ans Technical Discuss on the different industrial choices

DATES

Toulouse
March 21th to 25th..... week 12
September 19th to 23th..... week 38

The dates may be modified, cancelled or added.

Consult the entire calendar

Consult the tariffs

TO COMPLETE THIS TRAINING

(click on the desired training course for access)

Material in-depth study

cofrend

COSAC

TESTIA
AN AIRBUS GROUP COMPANY

Training courses

SHEAROGRAPHY TESTING

General training level 1	General training level 2	General training level 3
Specific training level 1	Specific training level 2	Specific training level 3

The time allowed to practical works is most important for training level 1.
It is advised to the trainees to have a calculator, paper, pencils and rule.

TESTIA
AN AIRBUS GROUP COMPANY

General training

SHEAROGRAPHY TESTING

FGST1

PEOPLE CONCERNED

Every people beginning in the method and wishing taking the certification level 1 under norms EN 4179.

PREREQUISITE

Level adviced: leaving certificate.

AIMS

To prepare at specific training of aerospace sector (SP1) in the method.
To know the field of application of the method and the limits.
To assimilate the theorical knowledge necessary to a control.
To be able to verify, to set and use the equipment with an operational mode.
To be able to interpret and classify indication.

EDUCATIONAL RESOURCES AND GUIDANCE

Theorical training given in classroom with book and multimedia and in laboratory for the field works.
Each student has a workstation equipped for practical work.
Permanent presence of an experienced trainer.

VALIDATION MODE

Editing a training certificate.

TRAINEES EVALUATION

In the form of multiple choice questions.

BIBLIOGRAPHY

The programs are conducted according to the standards of principals and TESTIA France defined in our document T TRA NOA 34 A21.

Level : **1**

Duration : **5 days**

1st day

Welcome
Presentation of COFREND and COSAC
Presentation of the certification under CER COSAC PR-001V01

General
The principle
Fields of application
• The complementarity of methods
Defect analysis

The fundamentals
Light
• Wave nature
• Interference
• Measuring tool
• Polarisation
• Coherence
• Reflection
Speckle pattern
Interference
• Interferogram correlation
• Shearography

Optical components
Lasers
Lenses
Beam splitter
Pin hole
Types of optical asweekly

2nd day

Shearography
Interferometry fringes
Measurement characteristics

The various systems
The Hung system
• The principle
• The optical asweekly
• Advantages and drawbacks
The Michelson system
• The principle
• The optical asweekly
• Advantages and drawbacks
The Mach-Zehnder system
• The principle
• The optical asweekly
• Advantages and drawbacks

Practical work
Presentation of the installations
• LTI
• Ettemeyer
The various loadings
• Thermal stress
• Vibratory stress
• Mechanical stress
• Compressive stress

SHEAROGRAPHY TESTING

3rd day

Holographic interferometry
The principle
Advantages and drawbacks
The various optical asweeklies
TV holography
ESPI

Loadings
Introduction
Thermal stress
Pneumatic stress
Vibrational loading
Static charge loading
Examples of asweeklies

Practical work
Familiarisation with shearograms obtained by various stresses
The effect of image shift on detection quality
The effect of coating type on the image intensity leve

4th day

Defect characterisation
The shear direction
The relative depth of defects

Lasers
The principle
Radiation transition: absorption
Radiation transition: emission
The essential components
The classification of lasers by their medium
Laser wavelengths
Safety
• Laser safety instructions
The beam
• Absorption
• Reflection
• Focusing
Classification of lasers by their power

Practical work
Presentation of the installations
• SC 4000

5th day

Industrial applications
Tests of comparison with other NDT methods
Shearography tests
TV holography tests

Knowledge evaluation
Questionnary

Practical work
Control of parts
Discuss and conclusion

DATES

Consult us.

cofrend

COSAC

The dates may be modified, cancelled or added.

Consult the entire calendar

Consult the tariffs

TO COMPLETE THIS TRAINING

(click on the desired training course for access)

Materials initiation

Field works

TESTIA
AN AIRBUS GROUP COMPANY

Specific training

SHEAROGRAPHY TESTING

SPST1

PEOPLE CONCERNED

Every people certified level 1 EN 4179 wishing renew his certification.
Every people beginning in the method and wishing taking the exam level 1 under norm EN 4179.

PREREQUISITE

Every people taking the first certification in the method must have taken the general training (FG2) or equal.
It is also recommended to have attended a training Materials initiation.
The visual acuity test must meet the requirements of CER COSAC PR-001V01 (Table V - § 7.1.1).

AIMS

To prepare for Level I aerospace certification according to EN 4179.
To acquire basis knowledge of materials and defectology.
To be able to prepare the parts and run a control in the technic(s) chosen(s) following an instruction procedure.
To be able to interpret and classify indication according to the criteria of acceptance extract of the customer references.
To be able to fill a report.

EDUCATIONAL RESOURCES AND GUIDANCE

Theorical training given in classroom with book and multimedia and in laboratory for the field works.
Each student has a workstation equipped for practical work.
Permanent presence of an experienced trainer.

VALIDATION MODE

Editing a training certificate.

TRAINEES EVALUATION

In the form of multiple choice questions, open question and continuous monitoring during the practical work.

BIBLIOGRAPHY

The programs are conducted according to the standards of principals and TESTIA France defined in our document
T TRA NOA 34 A21.

Level : **1**

Duration : **5 days**

1st day

Welcome
Presentation of COFREND and COSAC
Presentation of the certification under CER COSAC PR-001V01
Fly safety awarness

The fundamentals
Light
- Wave nature
- Interference
- Coherence
- Reflection

Speckle pattern
Interference
- Interferogram correlation
- Speckle interferometry

Optical components
- Lasers
- Lenses
- Beam splitters
- The spatial filter
- The various types of asweekly

Practical work
Inspection on a MIRA bottle
Stress by pressure increase
Inspection with LTI system
Inspection with Ettemeyer system
Report editing

2nd day

The fundamentals (continued)
Interferometry fringes
Measurement characteristics
Shearography
- The principle
- Optical systems
- Applications to NDT

Holographic interferometry
- Advantages and drawbacks
- The various optical asweeklies
  - Holographic interferometry
  - TV holography or ESPI
- Applications

Loading systems
- Introduction
- Thermal loading
- Pneumatic loading
- Vibrational loading
- Static charge loading

Practical work
Inspection of an ATR rudder
Stress in a vacuum chamber
Inspection with LTI system
Inspection with Ettemeyer system
Inspection of an elevon
Report editing

SHEAROGRAPHY TESTING

3rd day

The fundamentals (continued)
Defect characterisation
- The shear direction
- The relative depth of defects

Lasers
- The principle
- The essential components
- Laser wavelengths

Safety
- Laser safety instructions
- Absorption
- Reflection
- Focusing the beam
- Classification of lasers
- Miscellaneous

Tests of comparison with other NDT methods
- Corrosion detection
- Test piece containing water
- Impacted composite test piece
- Aluminium/aluminium test piece
- Aircraft applications

Shearography tests
TV holography tests

Practical work
Thermal stress
Inspection with LTI system
Inspection with Ettemeyer system
Report editing

4th Jour

Defectology
Choice of metallic materials
Defects
- Casting
- Forging
- Transformation
- Heat treatments
- Surface treatments
- Welding
- Composite materials
- Maintenance

The reference documents
Presentation of documents
Their structure
Discuss and analysis

Practical work
Inspection of an A320 radome
Thermal stress
Inspection with LTI system
Inspection with Ettemeyer system
Report editing

5th day

Practical applications
Quantitative measurements
Practical application
Examples of inspection

Knowledge evaluation
Questionnary

Pratice
Inspection of an ATR stiffener
Vibrational loading
Inspection with LTI system
Inspection with Ettemeyer system
Report editing
Discuss and conclusion

DATES

Consult us.

cofrend

COSAC

The dates may be modified, cancelled or added.

Consult the entire calendar

Consult the tariffs

TO COMPLETE THIS TRAINING

(click on the desired training course for access)

Materials initiation

Field works

TESTIA
AN AIRBUS GROUP COMPANY

General training

SHEAROGRAPHY TESTING

FGST2

PEOPLE CONCERNED

Every people with experience in the method and who want taking the certification level 2, under norms EN 4179.
Anyone wishing to know the fundamentals of the method.

PREREQUISITE

Level advised: Bac +2 (or equivalent) or operator certified level 1 in the method.

AIMS

Prepare for specific training in the aerospace sector (SP2) in the method.
Knowing the areas of application of all methods and their limitations.
Assimilate the essential theoretical knowledge to master the method.
Control verification, calibration and use of equipment.
Able to analyze, interpret and classify indication according to acceptance criteria.

EDUCATIONAL RESOURCES AND GUIDANCE

Theoretical taught in the classroom with book and multimedia and in laboratory for practical work.
Each student has a workstation equipped for practical work.
Permanent presence of an experienced trainer.

VALIDATION MODE

Editing a training certificate.

TRAINEES EVALUATION

In the form of multiple choice questions.

BIBLIOGRAPHY

The programs are conducted according to the standards of principals and TESTIA France defined in our document T TRA NOA 34 A21.

Level : **2**

Duration : **5 days**

1st day

Welcome
Presentation of COFREND and COSAC
Presentation of the certification under CER COSAC PR-001V01

General
The principle
Fields of application
• The complementarity of methods
Defect analysis

The fundamentals
Light
• Wave nature
• Interference
• Measuring tool
• Polarisation
• Coherence
• Reflection
Speckle pattern
Interference
• Interferogram correlation
• Shearography

Optical components
Lasers
Lenses
Beam splitter
Pin hole
Types of optical asweekly

2nd day

Shearography
Interferometry fringes
Measurement characteristics

The various systems
The Hung system
• The principle
• The optical asweekly
• Advantages and drawbacks
The Michelson system
• The principle
• The optical asweekly
• Advantages and drawbacks
The Mach-Zehnder system
• The principle
• The optical asweekly
• Advantages and drawbacks

Practical work
Presentation of the installations
• LTI
• Ettemeyer
The various loadings
• Thermal stress
• Vibratory stress
• Mechanical stress
• Compressive stress

General training

SHEAROGRAPHY TESTING

3rd day

Holographic interferometry
The principle
Advantages and drawbacks
The various optical asweeklies
TV holography
ESPI

Loadings
Introduction
Thermal stress
Pneumatic stress
Vibrational loading
Static charge loading
Examples of asweeklies

Practical work
Familiarisation with shearograms obtained by various stresses
The effect of image shift on detection quality
The effect of coating type on the image intensity leve

4th day

Defect characterisation
The shear direction
The relative depth of defects

Lasers
The principle
Radiation transition: absorption
Radiation transition: emission
The essential components
The classification of lasers by their medium
Laser wavelengths
Safety
• Laser safety instructions
The beam
• Absorption
• Reflection
• Focusing
Classification of lasers by their power

Practical work
Presentation of the installations
• SC 4000

5th day

Industrial applications
Tests of comparison with other NDT methods
Shearography tests
TV holography tests

Knowledge evaluation
Questionnary

Practical work
Control of parts
Discuss and conclusion

DATES

Consult us.

cofrend

COSAC

The dates may be modified, cancelled or added.

Consult the entire calendar

Consult the tariffs

TO COMPLETE THIS TRAINING

(click on the desired training course for access)

Materials initiation

Field works

Specific training

SHEAROGRAPHY TESTING

PEOPLE CONCERNED

Every people certified level 2 EN 4179 wishing renew his certification.
Every people certified level 1 EN 4179 wishing take the exam level 2.
Every people experienced in the method and wishing take the exam level 2 under norm EN 4179.

PREREQUISITE

Every people taking the first certification in the method must have taken the general training (FG2) or equal.
It is also recommended to have attended a training Materials initiation.
The visual acuity test must meet the requirements of CER COSAC PR-001V01 (Table V - § 7.1.1).

AIMS

Preparing for Level II aerospace certification according to EN 4179.
Acquire in-depth knowledge of materials and defectology knowledge.
Be able to prepare the parts and run a control in the technique(s) chosen(s) following a procedure.
Be able to interpret and classify indication according to the criteria of acceptance extract of the customer references.
Be able to implement or execute a procedure raised doubt.
Know the standards and other applicable documents in the method.
Write an instruction procedure according to a customer reference.

EDUCATIONAL RESOURCES AND GUIDANCE

Theoretical taught in the classroom with book and multimedia and in laboratory for practical work.
Each student has a workstation equipped for practical work.
Permanent presence of an experienced trainer.

VALIDATION MODE

Editing a training certificate.

TRAINEES EVALUATION

In the form of multiple choice questions, open questions and continuous monitoring during the practical work.

BIBLIOGRAPHY

The programs are conducted according to the standards of principals and TESTIA France defined in our document T TRA NOA 34 A21.

Level : **2**

Duration : **5 days**

1st day

Welcome
Presentation of COFREND and COSAC
Presentation of the certification under CER COSAC PR-001V01
Fly safety awarness

The fundamentals
Light
- Wave nature
- Interference
- Coherence
- Reflection

Speckle pattern
Interference
- Interferogram correlation
- Speckle interferometry

Optical components
- Lasers
- Lenses
- Beam splitters
- The spatial filter
- The various types of asweekly

Practical work
Inspection on a MIRA bottle
Stress by pressure increase
Inspection with LTI system
Inspection with Ettemeyer system
Instruction procedure editing

2nd day

The fundamentals (continued)
Interferometry fringes
Measurement characteristics
Shearography
- The principle
- Optical systems
- Applications to NDT

Holographic interferometry
- Advantages and drawbacks
- The various optical asweeklies
  - Holographic interferometry
  - TV holography or ESPI
- Applications

Loading systems
- Introduction
- Thermal loading
- Pneumatic loading
- Vibrational loading
- Static charge loading

Practical work
Inspection of an ATR rudder
Stress in a vacuum chamber
Inspection with LTI system
Inspection with Ettemeyer system
Inspection of an elevon

Specific training

SHEAROGRAPHY TESTING

3rd day

The fundamentals (continued)
Defect characterisation
- The shear direction
- The relative depth of defects

Lasers
- The principle
- The essential components
- Laser wavelengths

Safety
- Laser safety instructions
- Absorption
- Reflection
- Focusing the beam
- Classification of lasers
- Miscellaneous

Tests of comparison with other NDT methods
- Corrosion detection
- Test piece containing water
- Impacted composite test piece
- Aluminium/aluminium test piece
- Aircraft applications

Shearography tests
TV holography tests

Practical work
Thermal stress
Inspection with LTI system
Inspection with Ettemeyer system

4th Jour

Defectology
Choice of metallic materials
Defects
- Casting
- Forging
- Transformation
- Heat treatments
- Surface treatments
- Welding
- Composite materials
- Maintenance

The technical Instruction Sheet
Its structure
Applicable norms

The reference documents
Presentation of documents
Their structure
Discuss and analysis

Practical work
Inspection of an A320 radome
Thermal stress
Inspection with LTI system
Inspection with Ettemeyer system
Instruction procedure editing

5th day

Practical applications
Quantitative measurements
Practical application
Examples of inspection

Knowledge evaluation
Questionnary

Pratice
Inspection of an ATR stiffener
Vibrational loading
Inspection with LTI system
Inspection with Ettemeyer system
Discuss and conclusion

DATES

Consult us.

cofrend

COSAC

The dates may be modified, cancelled or added.

Consult the entire calendar

Consult the tariffs

TO COMPLETE THIS TRAINING

(click on the desired training course for access)

Materials initiation

Field works

TESTIA
AN AIRBUS GROUP COMPANY

General training

SHEAROGRAPHY TESTING

FGST3

PEOPLE CONCERNED

Every people certified level 2 EN 4179 wishing take the exam level 3.
Every people with experience in appliance with the CER COSAC PR-001V01 (Table IV - § 6.2.2) and wishing take the exam level 3 under norm EN 4179.

PREREQUISITE

Level adviced: Bachelor, engineer or agent certified level 2.

AIMS

To prepare at specific training of aerospace sector (SP3) in the method.
To prepare at the certification level 3 of aerospace sector under norm EN 4179.
To reinforce the achievement and deepen theorical knowledge of the method.
To acquire the necessary competence to skill an implementation of non-destructive testing laboratory.
To master the norm and other applicable documents in the method.

EDUCATIONAL RESOURCES AND GUIDANCE

Theorical training given in classroom with book and multimedia.
Projection of videos and visit of installations.
Permanent presence of an experienced trainer certified level 3 under norm EN 4179.

VALIDATION MODE

Editing a training certificate.

TRAINEES EVALUATION

In the form of multiple choice questions.

BIBLIOGRAPHY

The programs are conducted according to the standards of principals and TESTIA France defined in our document T TRA NOA 34 A21.

Level : **3**

Duration : **5 days**

1st day

Welcome
Presentation of the certification under CER COSAC PR-001V01

Level 3 functions
Roles
Responsibilities
Production management (cost and lead times)
Investment
Quality system
Human aspect (personnel management, instructions, health and safety)
What to do to ensure the maintaining of test performance (personnel, equipment and procedures)

2nd day

Theory
Physical principles
- Light
- Speckle pattern
- Speckle interferometry
- Holographic interferometry
- Speckle interferometry
- ESPI/TV holography

Shearography
- Lasers
  - Physical principles
  - Properties of lasers
  - Laser safety

Industrial shearography systems
- Interferometers
  - The Hung system
  - The Michelson system
- Mechanical loading
  - Vacuum stressing
  - Heat
  - Vibration

Practical aspects
- The shear direction
- Locating defects
- Dimensioning defects
- Defect depth
- Completing the report
- Working instructions

General training

SHEAROGRAPHY TESTING

3rd day

Equipment
Presentation of the various equipment
- Vacuum stressing equipment
- Thermal equipment

Presentation of the various industrial installations
- Tyre inspection (retreads)
- The inspection of structures in CFRP
- The inspection of aircraft air inlets
- The inspection of satellite structures

The choice of equipment, materials and tools
The choice of mechanical stress
Analysis of impact
- On detection
- On lead times
- On costs

Supervised work
The various actual cases
Definition of the installation specifications

4th day

Standardisation
The sue of reference bases and main order givers (detection techniques, periodic verifications, acceptance criteria)

Supervised work
The use of reference bases
Data extraction (detection techniques, periodic verifications, acceptance criteria)

5th day

Removal of doubt
Actions to be performed by a level 1
Actions to be performed by a level 2
- Modifications of test parameters
- Change of equipment
- Change of technique

Actions to be performed by a level 3
- The complementarity of methods
- The technical report

Knowledge assessment
Questionnary
Correction

Supervised work
Development of a standard procedure
Discuss and conclusion

DATES

Consult us.

cofrend

COSAC

The dates may be modified, cancelled or added.

Consult the entire calendar

Consult the tariffs

TO COMPLETE THIS TRAINING

(click on the desired training course for access)

Material in-depth study

TESTIA
AN AIRBUS GROUP COMPANY

Specific training (process)

SHEAROGRAPHY TESTING

SPST3

PEOPLE CONCERNED

Every people certified level 2 EN 4179 wishing take the exam level 3.
Every people with experience in appliance with the CER COSAC PR-001V01 (Table IV - § 6.2.2) and wishing take the exam level 3 under norm EN 4179.

PREREQUISITE

Every people taking the first certification in the method must have take the general training (FG3) or equal.
Deepen knowledge of materials, manufacturing process and defectology or had a training in Material in-depth study.
The visual acuity test must meet the requirements of CER COSAC PR-001V01 (Table V - § 7.1.1).

AIMS

To prepare at the certification level 3 of aerospace sector under norm EN 4179.
To reinforce the achievement and deepen theorical knowledge of the method.
To acquire the necessary competence to skill an implementation of non-destructive testing laboratory.
To master the norm and other applicable documents in the method.
To be able to realize a case study.
To be able to set the NDT inspection in a manufacturing process.
To choose human and technical resource necessary to the realization of the control.
To define an operational mode.
To gain insight the action to improve in case of doubt result.

EDUCATIONAL RESOURCES AND GUIDANCE

Theorical training given in classroom with book and multimedia.
Permanent presence of an experienced trainer certified level 3 under norm EN 4179.

VALIDATION MODE

Editing a training certificate.

TRAINEES EVALUATION

Under continuous control during field works

BIBLIOGRAPHY

The programs are conducted according to the standards of principals and TESTIA France defined in our document T TRA NOA 34 A21.

Level : **3**

Duration : **5 days**

1st day

Welcome
Presentation of COFREND and COSAC
Presentation of the certification under CER COSAC PR-001V01
- Description of the different subject
- Analysis of the contents of the writing procedure

Study of global positioning of NDT controls in a manufacturing process
Exercise on a common subject
Writing of the procedure

2nd day

Writing of the procedure on a aeronautical subject
- Correction ans Technical Discuss on the different industrial choices

3rd day

Writing of the procedure on a aeronautical subject
- Correction ans Technical Discuss on the different industrial choices

4th day

Writing of the procedure on a aeronautical subject
- Correction ans Technical Discuss on the different industrial choices

5th day

Writing of the procedure on a aeronautical subject
- Correction ans Technical Discuss on the different industrial choices

DATES

Consult us.

The dates may be modified, cancelled or added.

Consult the entire calendar

Consult the tariffs

TO COMPLETE THIS TRAINING

(click on the desired training course for access)

Material in-depth study

cofrend

COSAC

TESTIA
AN AIRBUS GROUP COMPANY

Training courses

EDDY CURRENTS TESTING

General training level 1	General training level 2	General training level 3
Specific training level 1	Specific training level 2	Specific training level 3

The time allowed to practical works is most important for training level 1.
It is advised to the trainees to have a calculator, paper, pencils and rule.

TESTIA
AN AIRBUS GROUP COMPANY

General training

EDDY CURRENTS TESTING

FGET1

PEOPLE CONCERNED

Every people beginning in the method and wishing taking the certification level 1 under norms EN 4179.

PREREQUISITE

Level adviced: leaving certificate.

AIMS

To prepare at specific training of aerospace sector (SP1) in the method.
To know the field of application of the method and the limits.
To assimilate the theorical knowledge necessary to a control.
To be able to verify, to set and use the equipment with an operational mode.
To be able to interpret and classify indication.

EDUCATIONAL RESOURCES AND GUIDANCE

Theorical training given in classroom with book and multimedia and in laboratory for the field works.
Each student has a workstation equipped for practical work.
Permanent presence of an experienced trainer.

VALIDATION MODE

Editing a training certificate.

TRAINEES EVALUATION

In the form of multiple choice questions.

BIBLIOGRAPHY

The programs are conducted according to the standards of principals and TESTIA France defined in our document T TRA NOA 34 A21.

Level : **1**

Duration : **5 days**

1st day

Welcome
Presentation of COFREND and COSAC
Presentation of the certification under CER COSAC PR-001V01

Generalities
Principle
Field of applications
Method Complementarity
Defectology

Material properties
Electrical properties
Magnetical properties
Electrical conductives materials
Magnetic susceptibility
Relative permeability influence
Real cases of Relative permeability influence
Ferromagnetics demagnetization

Practical work
Conductivity influence
Frequency influence
Influence of an open to the surface defect

2nd day

Knowledge of electricity
Electrical current
Electrical current intensity
Alternative currents
Alternative currents representation
Fresnel représentation
Phase between two alternavive currents
Electrical impedance Ohm law
Resistance R case
Inductance L case
Capacity C case
Real coil case

Knowledge of electromagnétism
Definition
Magnetic field direction
Generated field by a coil crossedby an electrical current
Generated induction by a coil crossedby an electrical current
Electromagnetism induction phenomenes

Practical work
Internal defect influence
Lift off influence
Curvature radius influence

TESTIA
AN AIRBUS GROUP COMPANY

General training

EDDY CURRENTS TESTING

FGET1

3rd day

Eddy currents origin
Primary and secondary circuit
Flat part case
- Eddy currents distribution
- Eddy currents penetration depth
- Phase variation

Cylindrical bar case
- Eddy currents distribution
- Eddy currents density variation
- Phase variation
- Eddy currents penetration depth

Similarity law
Definition

Normative impedance plan
Definition
Contact with an electrical conductive part

Practical work
Coating thickness measurements
Thickness influence
Absolute probe
Differential probe

4th day

Different factors which have influence on the impedance plan
Influence
- Frequency
- Conductivity
- Permeability
- Lift off
- Thickness
- A non conductive coating on an amagnetic part
- An amagnetic coating on an amagnetic part
- An amagnetic coating on a ferromagnetic part
- An open to the surface defect
- An internal defect

Kinds of probes
According to their use
- Encircling coils
- Internal sensors
- Punctual probes
- Boring probes

According to their design
- Combined transmit receive probes
- Separate transmit receive probes
- Focus probes
- Shielded probes

According to their working methods
- Absolute mode
- Comparaison method (differential mode)

Practical work
Defects influences for a rototest inspection
Searching open on surface defects
Searching pipings connections cracks

5th day

Equipments
Transmitter and receiver
Generator
Balancing
Summing integrator
Filtering
Differents kinds of filters
Amplification
Représentation in Y/t
Linear time base
Représentation in X/Y
Mono frequency signal
Water fall
Bi-frequency signal
C-scan

Knowledge evaluation
Questionnary

Pratice
Filters influence
Tubes control
Discuss and conclusion

DATES

Toulouse
January 11th to 15th..... week 2
January 29th to feb. 04th ..... week 9
May 09th to 13th..... week 19
August 22th to 26th ..... week 34
October 10th to 14th ..... week 41

cofrend

COSAC

The dates may be modified, cancelled or added.

Consult the entire calendar

Consult the tariffs

TO COMPLETE THIS TRAINING

(click on the desired training course for access)

Materials initiation

Field works

ET Phased Array

TESTIA
AN AIRBUS GROUP COMPANY

Specific training

EDDY CURRENTS TESTING

SPET1

PEOPLE CONCERNED

Every people certified level 1 EN 4179 wishing renew his certification.
Every people beginning in the method and wishing taking the exam level 1 under norm EN 4179.

PREREQUISITE

Every people taking the first certification in the method must have taken the general training (FG2) or equal.
It is also recommended to have attended a training Materials initiation.
The visual acuity test must meet the requirements of CER COSAC PR-001V01 (Table V - § 7.1.1).

AIMS

To prepare for Level I aerospace certification according to EN 4179.
To acquire basis knowledge of materials and defectology.
To be able to prepare the parts and run a control in the technic(s) chosen(s) following an instruction procedure.
To be able to interpret and classify indication according to the criteria of acceptance extract of the customer references.
To be able to fill a report.

EDUCATIONAL RESOURCES AND GUIDANCE

Theorical training given in classroom with book and multimedia and in laboratory for the field works.
Each student has a workstation equipped for practical work.
Permanent presence of an experienced trainer.

VALIDATION MODE

Editing a training certificate.

TRAINEES EVALUATION

In the form of multiple choice questions, open question and continuous monitoring during the practical work.

BIBLIOGRAPHY

The programs are conducted according to the standards of principals and TESTIA France defined in our document
T TRA NOA 34 A21.

Level : **1**

Duration : **5 days**

1st day

Welcome
Presentation of COFREND and COSAC
Presentation of the certification under
CER COSAC PR-001V01
Fly safety awarness

Basic principles
Eddy currents density
The conventional penetration depth
Phase variation
Normalized impedance plan construction

Practical work
Control and measurement
- Conductivity control on a rib foot
- Conductivity control (for sorting materials)

Control and searching defects by HF
- Chromed bar control
- Fitting control (structure)
- Fitting control (angular gear)

Report editing

2nd day

High frequency control
On surface defects
Control frequency
Filters
- High pass filter
- Low pass filter

Preamplifier
Gain
Phase
Used probes
Focusing
Combined transmit receive probes
Absolute mode
Differential method
Comparaison method
Crack influence on a impedance plan
Operational mode
Signal analyse
Defect sizing

Practical work
Control and searching defects by HF
- Fitting control
- Titanium blade
- Angle gear control
- Main landing gear swan fitting control
- Fitting control
- Steel rivet setter control

Report editing

Specific training

EDDY CURRENTS TESTING

3rd day

Low frequency control
Control frequency
Phase analyse
Filters
Preamplifier
Used probes
Internal defect influence
on the impedance plan
Part thickness influence
on the impedance plan
Rivet line control
Multifrequency control

Bores control
Used equipements
Filling coefficient
Control frequency
Filters
Signal analyse
Operational mode
Defect sizing
Defect direction

Practical work
Control and searching defects
by low frequency
- Layer stack control (corrosion)
- Layer stack control (cracks)
- Rivet line control

Report editing

4th day

Measurement
Coating thickness measurement
Conductivity measurement

Materials and products
Electrical conductive materials
- Magnetic materials
- Ferromagnetic materials
- Magnetic saturation curve
- Magnetic relative permeability

The reference documents
Presentation of documents
Their structure
Discuss and analysis

Practical work
Control and searching defects
by rotational probes
- Riveted layers stacks control
- Bore hole compressor blade control
- Countersinks control
- Fitting control

Report editing

5th day

Defectology
Choice of metallic materials
Defects
- Casting
- Forging
- Transformation
- Heat treatments
- Surface treatments
- Welding
- Maintenance

Knowledge evaluation
Questionnary

Pratice
Control and searching defects
by multifrequency
- Layer stack multifrequency
  control (cracks)
- Layer stack multifrequency
  control
  (corrosion, cracks)

Report editing
Discuss and conclusion

DATES

Toulouse
January 25th to 29th ..... week 4
February 14th to 18th ..... week 11
June 06th to 10th..... week 23
September 05th to 09th ..... week 36
October 24th to 29th ..... week 43

cofrend

COSAC

The dates may be modified,
cancelled or added.

Consult the entire calendar

Consult the tariffs

TO COMPLETE THIS TRAINING

(click on the desired training course for access)

Materials initiation

Field works

ET Phased Array

TESTIA
AN AIRBUS GROUP COMPANY

General training

EDDY CURRENTS TESTING

FGET2

PEOPLE CONCERNED

Every people with experience in the method and who want taking the certification level 2, under norms EN 4179.
Anyone wishing to know the fundamentals of the method.

PREREQUISITE

Level advised: Bac +2 (or equivalent) or operator certified level 1 in the method.

AIMS

Prepare for specific training in the aerospace sector (SP2) in the method.
Knowing the areas of application of all methods and their limitations.
Assimilate the essential theoretical knowledge to master the method.
Control verification, calibration and use of equipment.
Able to analyze, interpret and classify indication according to acceptance criteria.

EDUCATIONAL RESOURCES AND GUIDANCE

Theoretical taught in the classroom with book and multimedia and in laboratory for practical work.
Each student has a workstation equipped for practical work.
Permanent presence of an experienced trainer.

VALIDATION MODE

Editing a training certificate.

TRAINEES EVALUATION

In the form of multiple choice questions.

BIBLIOGRAPHY

The programs are conducted according to the standards of principals and TESTIA France defined in our document T TRA NOA 34 A21.

Level : **2**

Duration : **5 days**

1st day

Welcome
Presentation of COFREND and COSAC
Presentation of the certification under CER COSAC PR-001V01

Generalities
Principle
Field of applications
Method Complementarity
Defectology

Material properties
Electrical properties
Magnetical properties
Electrical conductives materials
• Magnetic materials
• Ferromagnetic materials
• Magnetic saturation curve
Magnetic susceptibility
Relative permeability influence
Real cases of Relative permeability influence
Ferromagnetics demagnetization
• Curie point
• Hysteresis cycle

Practical work
Conductivity influence
Frequency influence
Influence of an open to the surface defect

2nd day

Knowledge of electricity
Electrical current
Electrical current intensity
Alternative currents
Alternative currents representation
Fresnel représentation
Phase between two alternavive currents
Electrical impedance Ohm law
Resistance R case
Inductance L case
Capacity C case
Real coil case

Knowledge of electromagnétism
Definition
Magnetic field direction
Generated field by a coil crossedby an electrical current
Generated induction by a coil crossedby an electrical current
Electromagnetism induction phenomenes

Practical work
Internal defect influence
Lift off influence
Curvature radius influence

General training

EDDY CURRENTS TESTING

3rd day

Eddy currents origin
Primary and secondary circuit
Flat part case
- Eddy currents distribution
- Eddy currents penetration depth
- Phase variation

Cylindrical bar case
- Eddy currents distribution
- Eddy currents density variation
- Phase variation
- Eddy currents penetration depth

Similarity law
Definition

Normative impedance plan
Definition
Contact with an electrical conductive part

Practical work
Coating thickness measurements
Thickness influence
Absolute probe
Differential probe

4th day

Different factors which have influence on the impedance plan
Influence
- Frequency
- Conductivity
- Permeability
- Lift off
- Thickness
- A non conductive coating on an amagnetic part
- An amagnetic coating on an amagnetic part
- An amagnetic coating on a ferromagnetic part
- An open to the surface defect
- An internal defect

Kinds of probes
According to their use
- Encircling coils
- Internal sensors
- Punctual probes
- Boring probes

According to their design
- Combined transmit receive probes
- Separate transmit receive probes
- Focus probes
- Shielded probes

According to their working methods
- Absolute mode
- Comparaison method (differential mode)

Practical work
Defects influences for a rototest inspection
Searching open on surface defects
Searching pipings connections cracks

5th day

Equipments
Transmitter and receiver
Generator
Balancing
Summing integrator
Filtering
Differents kinds of filters
Amplification
Représentation in Y/t
Linear time base
Représentation in X/Y
Mono frequency signal
Water fall
Bi-frequency signal
C-scan

Knowledge evaluation
Questionnary

Pratice
Filters influence
Tubes control
Discuss and conclusion

DATES

Toulouse
January 18th to 22th ..... week 3
February 07th to 11th ..... week 10
May 23th to 27th..... week 21
August 29th to sept. 02nd. ..... week 35
October 17th to 21th..... week 42

cofrend

COSAC

The dates may be modified, cancelled or added.

Consult the entire calendar

Consult the tariffs

TO COMPLETE THIS TRAINING

(click on the desired training course for access)

Materials initiation

Field works

ET Phased Array

TESTIA
AN AIRBUS GROUP COMPANY

Specific training

EDDY CURRENTS TESTING

SPET2

PEOPLE CONCERNED

Every people certified level 2 EN 4179 wishing renew his certification.
Every people certified level 1 EN 4179 wishing take the exam level 2.
Every people experienced in the method and wishing take the exam level 2 under norm EN 4179.

PREREQUISITE

Every people taking the first certification in the method must have taken the general training (FG2) or equal.
It is also recommended to have attended a training Materials initiation.
The visual acuity test must meet the requirements of CER COSAC PR-001V01 (Table V - § 7.1.1).

AIMS

Preparing for Level II aerospace certification according to EN 4179.
Acquire in-depth knowledge of materials and defectology knowledge.
Be able to prepare the parts and run a control in the technique(s) chosen(s) following a procedure.
Be able to interpret and classify indication according to the criteria of acceptance extract of the customer references.
Be able to implement or execute a procedure raised doubt.
Know the standards and other applicable documents in the method.
Write an instruction procedure according to a customer reference.

EDUCATIONAL RESOURCES AND GUIDANCE

Theoretical taught in the classroom with book and multimedia and in laboratory for practical work.
Each student has a workstation equipped for practical work.
Permanent presence of an experienced trainer.

VALIDATION MODE

Editing a training certificate.

TRAINEES EVALUATION

In the form of multiple choice questions, open questions and continuous monitoring during the practical work.

BIBLIOGRAPHY

The programs are conducted according to the standards of principals and TESTIA France defined in our document T TRA NOA 34 A21.

Level : **2**

Duration : **5 days**

1st day

Welcome
Presentation of COFREND and COSAC
Presentation of the certification under CER COSAC PR-001V01
Fly safety awarness

Requirements
Presentation of authorities and norms
- In manufacturing
- In maintenance

Basic principles
Calculations of Eddy currents density
Calculations of the conventional penetration depth
Phase variation
Normalized impedance plan construction

Practical work
Control and measurement
- Conductivity control on a rib foot
- Conductivity control (for sorting materials)

Control and searching defects by HF
- Chromed bar control
- Fitting control (structure)
- Fitting control (angular gear)

Instruction procedure editing

2nd day

High frequency control
On surface defects
Control frequency
Calculation of the frequency
Filters
- High pass filter
- Low pass filter
- Choice of the filters

Preamplifier
Gain
Phase
Used probes
Focusing
Combined transmit receive probes
Absolute mode
Differential method
Comparaison method
Crack influence on an impedance plan
Operational mode
Signal analyse
Defect sizing

Practical work
Control and searching defects by HF
- Fitting control
- Titanium blade
- Angle gear control
- Main landing gear swan fitting control

Specific training

EDDY CURRENTS TESTING

3rd day

Low frequency control
Control frequency
Calculation of the frequency
Phase analyse
Filters
Preamplifier
Used probes
• Bases
• Separate transmit receive probes
• Measurement mode
Internal defect influence
on the impedance plan
Part thickness influence
on the impedance plan
Rivet line control
Multifrequency control

Bores control
Used equipments
Filling coefficient
Control frequency
Filters
Signal analyse
Operational mode
Defect sizing
Defect direction

Practical work
Control and searching defects
by low frequency
• Layer stack control (corrosion)
• Layer stack control (cracks)
• Rvet line control
Instruction procedure editing

4th day

Measurement
Coating thickness measurement
Conductivity measurement

Materials and products
Electrical conductive materials
• Magnetic materials
• Ferromagnetic materials
• Magnetic saturation curve
• Magnetic relative permeability

The technical Instruction Sheet
Its structure
Applicable norms

The reference documents
Presentation of documents
Their structure
Discuss and analysis

Practical work
Control and searching defects
by rotational probes
• Riveted layers stacks control
• Bore hole compressor blade control
• Countersinks control
• Fitting control

5th day

Defectology
Choice of metallic materials
Defects
• Casting
• Forging
• Transformation
• Heat treatments
• Surface treatments
• Welding
• Maintenance

Knowledge evaluation
Questionnary

Pratice
Control and searching defects
by multifrequency
• Layer stack multifrequency
control (cracks)
• Layer stack multifrequency
control
(corrosion, cracks)
Discuss and conclusion

DATES

Toulouse

February 01st to 05th	week 5
February 08th to 12th	week 6
March 21th to 25th	week 12
April 04th to 08th	week 14
June 13th to 17th	week 24
June 20th to 24th	week 25
September 12th to 16th	week 37
September 19th to 23th	week 38
November 14th to 18th	week 46
November 21th to 25th	week 47

The dates may be modified, cancelled or added.

Consult the entire calendar

Consult the tariffs

TO COMPLETE THIS TRAINING

(click on the desired training course for access)

Materials initiation

Field works

ET Phased Array

cofrend

COSAC

TESTIA
AN AIRBUS GROUP COMPANY

General training

EDDY CURRENTS TESTING

FGET3

PEOPLE CONCERNED

Every people certified level 2 EN 4179 wishing take the exam level 3.
Every people with experience in appliance with the CER COSAC PR-001V01 (Table IV - § 6.2.2) and wishing take the exam level 3 under norm EN 4179.

PREREQUISITE

Level adviced: Bachelor, engineer or agent certified level 2.

AIMS

To prepare at specific training of aerospace sector (SP3) in the method.
To prepare at the certification level 3 of aerospace sector under norm EN 4179.
To reinforce the achievement and deepen theorical knowledge of the method.
To acquire the necessary competence to skill an implementation of non-destructive testing laboratory.
To master the norm and other applicable documents in the method.

EDUCATIONAL RESOURCES AND GUIDANCE

Theorical training given in classroom with book and multimedia.
Projection of videos and visit of installations.
Permanent presence of an experienced trainer certified level 3 under norm EN 4179.

VALIDATION MODE

Editing a training certificate.

TRAINEES EVALUATION

In the form of multiple choice questions.

BIBLIOGRAPHY

The programs are conducted according to the standards of principals and TESTIA France defined in our document T TRA NOA 34 A21.

Level : **3**

Duration : **5 days**

1st day

Welcome
Presentation of the certification under CER COSAC PR-001V01

Level 3 functions
Roles
Responsibilities
Production management (cost and lead times)
Investment
Quality system
Human aspect (personnel management, instructions, health and safety)
What to do to ensure the maintaining of test performance (personnel, equipment and procedures)

2nd day

Theory
Application of physical principles
- Signal perturbation by a defect
- Impedance and inductance of a coil
- The air gap effect
- The eddy current penetration depth
- The magnetic field created by the probes
- The electrical conductivity of materials
- The characteristic frequency of a product
- Ferromagnetism
- Quality control
  - Measurements of defect features
- Upstream inspection of week-products
- Quality control: thermal and surface treatment, measurement of electrical conductivity
  - Thermal treatment used
  - Metallurgical properties
  - Corrosion resistance under tension
  - Inspection temperature
  - Material sorting
- Thickness measurements
  - Metallic coatings
  - Paints and varnishes
  - Layers of anodic oxidation
- Quality control of finished parts
  - Rotating components and bearings
  - Asweekly inspection
- Inspection in maintenance
  - Fissures in service
  - Corrosion and wear
  - Overheating of cell components

General training

EDDY CURRENTS TESTING

3rd day

Equipment
Presentation of the various equipment
- Fixed installations for specific use (production control)
- Multi-purpose mobile inspection apparatus
  - High frequency generators
  - Low frequency generators
- Dedicated measuring devices
  - Measuring coating thickness
  - Measuring electrical conductivity
- The inspection method
  - Manual or automatic
  - Single frequency or multi-frequency
- Choice of sensors
- The type
- The function
- The working method
- The working frequency
- Choice of standard
- Universal gauges (conductivity, coating thickness, HF)
- Bore gauges
- Specific gauges (LF)

The choice of equipment, materials and tools
Analysis of impact
- On detection
- On lead times
- On costs

Supervised work
The various actual cases
Definition of the installation specifications

4th day

Standardisation
The sue of reference bases and main order givers (detection techniques, periodic verifications, acceptance criteria)

Supervised work
The use of reference bases
Data extraction (detection techniques, periodic verifications, acceptance criteria)

5th day

Removal of doubt
Actions to be performed by a level 1
Actions to be performed by a level 2
- Modifications of test parameters
- Change of equipment
- Change of technique

Actions to be performed by a level 3
- The complementarity of methods
- The technical report

Knowledge assessment
Questionnary
Correction

Supervised work
Development of a standard procedure
Discuss and conclusion

DATES

Toulouse
February 01st to 05th ..... week 5

cofrend

COSAC

The dates may be modified, cancelled or added.

Consult the entire calendar

Consult the tariffs

TO COMPLETE THIS TRAINING

(click on the desired training course for access)

Material in-depth study

ET Phased Array

TESTIA
AN AIRBUS GROUP COMPANY

Specific training (process)

EDDY CURRENTS TESTING

SPET3

PEOPLE CONCERNED

Every people certified level 2 EN 4179 wishing take the exam level 3.
Every people with experience in appliance with the CER COSAC PR-001V01 (Table IV - § 6.2.2) and wishing take the exam level 3 under norm EN 4179.

PREREQUISITE

Every people taking the first certification in the method must have take the general training (FG3) or equal.
Deepen knowledge of materials, manufacturing process and defectology or had a training in Materials adva3nced.
The visual acuity test must meet the requirements of CER COSAC PR-001V01 (Table V - § 7.1.1).

AIMS

To prepare at the certification level 3 of aerospace sector under norm EN 4179.
To reinforce the achievement and deepen theorical knowledge of the method.
To acquire the necessary competence to skill an implementation of non-destructive testing laboratory.
To master the norm and other applicable documents in the method.
To be able to realize a case study.
To be able to set the NDT inspection in a manufacturing process.
To choose human and technical resource necessary to the realization of the control.
To define an operational mode.
To gain insight the action to improve in case of doubt result.

EDUCATIONAL RESOURCES AND GUIDANCE

Theorical training given in classroom with book and multimedia.
Permanent presence of an experienced trainer certified level 3 under norm EN 4179.

VALIDATION MODE

Editing a training certificate.

TRAINEES EVALUATION

Under continuous control during field works

BIBLIOGRAPHY

The programs are conducted according to the standards of principals and TESTIA France defined in our document T TRA NOA 34 A21.

Level : **3**

Duration : **5 days**

1st day

Welcome
Presentation of COFREND and COSAC
Presentation of the certification under CER COSAC PR-001V01
- Description of the different subject
- Analysis of the contents of the writing procedure

Study of global positioning of NDT controls in a manufacturing process
Exercise on a common subject
Writing of the procedure

2nd day

Writing of the procedure on a aeronautical subject
- Correction ans Technical Discuss on the different industrial choices

3rd day

Writing of the procedure on a aeronautical subject
- Correction ans Technical Discuss on the different industrial choices

4th day

Writing of the procedure on a aeronautical subject
- Correction ans Technical Discuss on the different industrial choices

5th day

Writing of the procedure on a aeronautical subject
- Correction ans Technical Discuss on the different industrial choices

DATES

Toulouse
March 14th to 18th..... week 11
September 05th to 09th ..... week 36

The dates may be modified, cancelled or added.

Consult the entire calendar

Consult the tariffs

TO COMPLETE THIS TRAINING

(click on the desired training course for access)

Material in-depth study

ET Phased Array

cofrend

COSAC

TESTIA
AN AIRBUS GROUP COMPANY

Training courses

RADIOLOGY TESTING

General training level 1	General training level 2	General training level 3
Specific training level 1	Specific training level 2	Specific training level 3

The time allowed to practical works is most important for training level 1.
It is advised to the trainees to have a calculator, paper, pencils and rule.

TESTIA
AN AIRBUS GROUP COMPANY

General training
RADIOLOGY TESTING

FGRT1

PEOPLE CONCERNED

Every people beginning in the method and wishing taking the certification level 1 under norms EN 4179.

PREREQUISITE

Level adviced: leaving certificate.

AIMS

To prepare at specific training of aerospace sector (SP1) in the method.
To know the field of application of the method and the limits.
To assimilate the theorical knowledge necessary to a control.
To be able to verify, to set and use the equipment with an operational mode.
To be able to interpret and classify indication.

EDUCATIONAL RESOURCES AND GUIDANCE

Theorical training given in classroom with book and multimedia and in laboratory for the field works.
Each student has a workstation equipped for practical work.
Permanent presence of an experienced trainer.

VALIDATION MODE

Editing a training certificate.

TRAINEES EVALUATION

In the form of multiple choice questions.

BIBLIOGRAPHY

The programs are conducted according to the standards of principals and TESTIA France defined in our document T TRA NOA 34 A21.

Level : **1**

Duration : **5 days**

1st day

Welcome
Presentation of COFREND and COSAC
Presentation of the certification under CER COSAC PR-001V01

Generalities
Principle
Field of applications
Method Complementarity
Defectology

Basic principles
Electromagnetics waves
- Matter
- L'arrangement électronique
- Atom symbols
- Radiation
- Electromagnetic spectrum

X-rays
- The tube
- Characteristic radiation
- Bremsstrahlung radiation
- Radiation spectrum
- Beam characteristic

Gamma-rays generation
- Natural radiation
- Gamma disintegration
- Radiation penetration into the material
- Sealed sources

Units
- Energy
- Activity
- Exposure
- Dose H absorbed
- Equivalent dose H absorbed

Practical work
Shot parameters calculation
Sharts use
Reciprocity law

2nd day

Basic principles (following)
Rays interaction with the material
- Photons absorption
- Compton diffusion
- Creation of pair
- Distribution phenomena
- Half-value layer
- Tenth-value layer

Principle of latent image formation

Equipment
X-ray technology
- X-ray tube
- Various tubes
- Thermal focal and effective focal spot
- Cooling
- High-voltage power supply
- Other beams and rays
- kV impact
- mA impact
- Console control
- The powers

Gamma ray technology
- GAM 80 equipment
- Camera conditioning
- Guide tube
- Techanical remote control

X with gamma comparing
Density testing
- Densitometer and negatoscope

Practical work
Films sensibility
Latitude of pose

TESTIA
AN AIRBUS GROUP COMPANY

General training

RADIOLOGY TESTING

FGRT1

3rd day

Detectors
Radiographic image creation
• Physical property and emulsion structure
• Latent image formation principle
  - Film exposition
• Emulsions processing after irradiation
  - Developer
  - Stop bath
  - Fixer
  - Washing and drying
Emulsion features
• Grain size
• Opacity
• Optical density
Curve characteristic
• Sensitometry
• Base fog
• Impact on detectability
• Graininess
Exposure latitude
Resolution
Contrasts
• Subject contrast
• Image contrast
Processing procedure impact
Radiograph preservation
Digital radiography
• General
• Photostimulables screens
• Scanner

Practical work
Subject and image contrasts
Plan flaw orientation

4th day

Radioscopy
Principle
Radiography/radioscopy comparing
Digital image important notions
• Resolution
• Dynamic
Detectors
• Televised radioscopy
• Digital radioscopy
• Direct digitizing
• Linear detector
Image quality control

Image quality
Flaws detection
Radiographic quality check
• Different kind of IQI
• Positioning
• Results interpretation
Image definition
• Principle
• Scattered radiation
• Screens
• Cassette

Practical work
Differents parameters impact
on a flaw type crack
Welds controls
Different kind of shots
on circulars welds around

5th day

Test techniques
Operating techniques
• Double film
• Multi film
• Flat welds
• Plan
• Connection welds
• Circular welds
• Simple
• Panoramic
• Double wall/simple picture
• Double wall/ double picture
• Ellipsis
Specials techniques
• Van de Graaf accelerator
• Tomography
• Neutronography
• Betatron
• Parallax positioning

Radiation protection
Risk prevention
Biological effects
• Medical effects
• Lonizing radiation
• Professional diseases
• Devices
• Detection equipment
Reglementation
• CAMARI
• Limits and the zoning

Knowledge evaluation
Questionnary

Pratice
Control of parts
Discuss and conclusion

DATES

Toulouse
January 11th to 15th..... week 2
January 29th to feb. 04th ..... week 9
May 09th to 13th..... week 19
August 22th to 26th ..... week 34
October 10th to 14th ..... week 41

cofrend

COSAC

The dates may be modified, cancelled or added.

Consult the entire calendar

Consult the tariffs

TO COMPLETE THIS TRAINING

(click on the desired training course for access)

Materials initiation

Field works

C.A.M.A.R.I. X-ray opt.

Digital radiology

TESTIA
AN AIRBUS GROUP COMPANY

Specific training

RADIOLOGY TESTING

SPRT1

PEOPLE CONCERNED

Every people certified level 1 EN 4179 wishing renew his certification.
Every people beginning in the method and wishing taking the exam level 1 under norm EN 4179.

PREREQUISITE

Every people taking the first certification in the method must have taken the general training (FG2) or equal.
It is also recommended to have attended a training Materials initiation.
The visual acuity test must meet the requirements of CER COSAC PR-001V01 (Table V - § 7.1.1).

AIMS

To prepare for Level I aerospace certification according to EN 4179.
To acquire basis knowledge of materials and defectology.
To be able to prepare the parts and run a control in the technic(s) chosen(s) following an instruction procedure.
To be able to interpret and classify indication according to the criteria of acceptance extract of the customer references.
To be able to fill a report.

EDUCATIONAL RESOURCES AND GUIDANCE

Theorical training given in classroom with book and multimedia and in laboratory for the field works.
Each student has a workstation equipped for practical work.
Permanent presence of an experienced trainer.

VALIDATION MODE

Editing a training certificate.

TRAINEES EVALUATION

In the form of multiple choice questions, open question and continuous monitoring during the practical work.

BIBLIOGRAPHY

The programs are conducted according to the standards of principals and TESTIA France defined in our document
T TRA NOA 34 A21.

Level : **1**

Duration : **5 days**

1st day

Welcome
Presentation of COFREND and COSAC
Presentation of the certification under
CER COSAC PR-001V01
Fly safety awarness

Basic principles
Principle
Parameters impact on the detection
Characteristics curves use
Digital radiography
Radioscopy
- Picture intensifier
- CCD camera
- Flat panel
- Linear detector

Picture quality
- Film
- Digital
- Quality picture control (IQI)

Practical work
Operating mode application and part control in radiography and/or radioscopy
Report editing

2nd day

Radiation protection
Unity
Hazards
Human effects
Doses limits
Protection means
Measuring devices

Interpretation
Characterization and assessment

Equipment
X-ray station
- Power
- Using time
- Geometrical quality
- Beamwidth
- Handling

Detector
- Film
- Digital
  - Digital radiography
  - Photo-stimulable screen composition
  - Radioscopy
  - Picture intensifier
  - CCD camera
  - Flat panel
  - Linear detector

Special technic
- Tomography
- Neutronography

Practical work
Operating mode application and part control in radiography and/or radioscopy
Report editing

Specific training

RADIOLOGY TESTING

3rd day

Equipment (following)
Periodic checks
- X-ray station
- Automatic development
- Interpretation booth
- Various materials

Aeronautic applications
Foundry
- Part definition: intermediate housing arm
- Design department demands
- Control technic
- Effects exploitation and characterization
- Acceptance criterias

Welding
- Part definition: engine pipe
- Design department demands
- Control technics
- Defects exploitation and characterization
- Acceptance criterias

Practical work
Operating mode application and part control in radiography and/or radioscopy
Report editing

4th day

Aeronautic applications (following)
Composite
- Part definition: monolithic, sandwich structure, filament, winding structure
- Design department demands
- Control technic
- Defects exploitation and characterization
- Acceptance criterias

Maintenance
- Part definition: leading edge
- Design department demands
- Control technic
- Defects exploitation and characterization
- Acceptance criterias

The reference documents
Presentation of documents
Their structure
Discuss and analysis

Practical work
Operating mode application and part control in radiography and/or radioscopy
Report editing

5th day

Defectology
Choice of metallic materials
Defects
- Casting
- Forging
- Transformation
- Heat treatments
- Surface treatments
- Welding
- Composite materials
- Maintenance

Knowledge evaluation
Questionnary

Pratice
Operating mode application and part control in radiography and/or radioscopy
Report editing
Discuss and conclusion

DATES

Toulouse
February 01st to 05th ..... week 5
March 21th to 25th..... week 12
June 06th to 10th..... week 23
September 05th to 09th ..... week 36
November 14th to 18th ..... week 46

cofrend

COSAC

The dates may be modified, cancelled or added.

Consult the entire calendar

Consult the tariffs

TO COMPLETE THIS TRAINING

(click on the desired training course for access)

Materials initiation

Field works

C.A.M.A.R.I. X-ray opt.

Digital radiology

TESTIA
AN AIRBUS GROUP COMPANY

General training
RADIOLOGY TESTING

FGRT2

PEOPLE CONCERNED

Every people with experience in the method and who want taking the certification level 2, under norms EN 4179.
Anyone wishing to know the fundamentals of the method.

PREREQUISITE

Level advised: Bac +2 (or equivalent) or operator certified level 1 in the method.

AIMS

Prepare for specific training in the aerospace sector (SP2) in the method.
Knowing the areas of application of all methods and their limitations.
Assimilate the essential theoretical knowledge to master the method.
Control verification, calibration and use of equipment.
Able to analyze, interpret and classify indication according to acceptance criteria.

EDUCATIONAL RESOURCES AND GUIDANCE

Theoretical taught in the classroom with book and multimedia and in laboratory for practical work.
Each student has a workstation equipped for practical work.
Permanent presence of an experienced trainer.

VALIDATION MODE

Editing a training certificate.

TRAINEES EVALUATION

In the form of multiple choice questions.

BIBLIOGRAPHY

The programs are conducted according to the standards of principals and TESTIA France defined in our document T TRA NOA 34 A21.

Level : **2**

Duration : **5 days**

1st day

Welcome
Presentation of COFREND and COSAC
Presentation of the certification under CER COSAC PR-001V01

Generalities
Principle
Field of applications
Method Complementarity
Defectology

Basic principles
Electromagnetics waves
- Matter
- The electronic arrangement
- Atom symbols
- Radiation
- Electromagnetic spectrum

X-rays
- The tube
- Characteristic radiation
- Bremsstrahlung radiation
- Radiation spectrum
- Beam characteristic

Gamma-rays generation
- Natural radiation
- Gamma disintegration
- Radiation penetration into the material
- Sealed sources

Units
- Energy
- Exposure
- Dose H absorbed
- Equivalent dose H absorbed

Practical work
Shot parameters calculation
Sharts use
Reciprocity law

2nd day

Basic pinciples (following)
Rays interaction with the material
- Electromagnetic diffusion
- Photoelectrical effect
- Auger effect
- Compton diffusion
- Creation of pair
- Distribution phenomena
- BEER law
- Half-value layer
- Tenth-value layer

Principle of latent image formation

Equipment
X-ray technology
- X-ray tube
- Various tubes
- Thermal focal and effective focal spot
- Cooling
- High-voltage power supply
- Other beams and rays
- kV and mA impact
- Radioprotection of X-ray tubes
- Console control
- Powers

Gamma ray technology
- GAM 80 equipment
- Camera conditioning
- Guide tube
- Techanical remote control
- Signalisation

X with gamma comparing
Density testing
- Densitometer and negatoscope

Practical work
Films sensibility
Latitude of pose

TESTIA
AN AIRBUS GROUP COMPANY

General training
RADIOLOGY TESTING

FGRT2

3rd day

Detectors
Radiographic image creation
• Physical property and emulsion structure
• Radiographic film section
• Photons absorption by the film
• Latent image formation principle
• Emulsions processing after irradiation
Emulsion features
• Grain size
• Opacity
• Optical density
Curve characteristic
• Principle
• Base fog
• Gradient
• Impact on detectability
• The variation of characteristic curve
• Graininess
Exposure latitude
• Definition
• Modifications of the exposure latitude
Sensivity
• Definition
• Classification of films
Resolution
Contrasts
• Subject and image contrast
Processing procedure impact
Radiograph preservation
Digital radiography
• General
• Photostimulables screens
• Scanner

Practical work
Subject and image contrast
Plan flaw orientation

4th day

Radioscopy
Principle
Radiography/radioscopy comparing
Digital image important notions
• Resolution
• Dynamic
Detectors
• Televised radioscopy
• Digital radioscopy
• Direct digitizing
• Linear detector
Image quality control

Image quality
Flaws detection
Radiographic quality check
• Different kind of IQI
• Positioning
• Results interpretation
Image definition
• Principle
• Scattered radiation
• Screens
• Filtration
• Cassette
• Parameters
• Distance
• Blurred
• Density

Practical work
Differents parameters impact
on a flaw type crack
Welds controls
Different kind of shots
on circulars welds around

5th day

Test techniques
Operating techniques
• Double film
• Multi film
• Flat welds
• Plan
• Connection welds
• Circular welds
• Simple
• Panoramic
• Double wall/simple picture
• Double wall/ double picture
• Ellipsis
Specials techniques

Radiation protection
Risk prevention
• Distance
• Screen
• Duration
Biological effects
• Medical effects
• Lonizing radiation
• Professional diseases
• Devices
• Detection equipment
Reglementation
• CAMARI
• Limits and the zoning

Knowledge evaluation
Questionnary

Pratice
Control of parts
Discuss and conclusion

DATES

Toulouse
January 18th to 22th ..... week 3
February 07th to 11th ..... week 10
May 23th to 27th..... week 21
August 29th to sept. 02nd. ..... week 35
October 17th to 21th..... week 42

cofrend

COSAC

The dates may be modified, cancelled or added.

Consult the entire calendar

Consult the tariffs

TO COMPLETE THIS TRAINING

(click on the desired training course for access)

Materials initiation

Field works

C.A.M.A.R.I. X-ray opt.

Digital radiology

TESTIA
AN AIRBUS GROUP COMPANY

Specific training

RADIOLOGY TESTING

SPRT2

PEOPLE CONCERNED

Every people certified level 2 EN 4179 wishing renew his certification.
Every people certified level 1 EN 4179 wishing take the exam level 2.
Every people experienced in the method and wishing take the exam level 2 under norm EN 4179.

PREREQUISITE

Every people taking the first certification in the method must have taken the general training (FG2) or equal.
It is also recommended to have attended a training Materials initiation.
The visual acuity test must meet the requirements of CER COSAC PR-001V01 (Table V - § 7.1.1).

AIMS

Preparing for Level II aerospace certification according to EN 4179.
Acquire in-depth knowledge of materials and defectology knowledge.
Be able to prepare the parts and run a control in the technique(s) chosen(s) following a procedure.
Be able to interpret and classify indication according to the criteria of acceptance extract of the customer references.
Be able to implement or execute a procedure raised doubt.
Know the standards and other applicable documents in the method.
Write an instruction procedure according to a customer reference.

EDUCATIONAL RESOURCES AND GUIDANCE

Theoretical taught in the classroom with book and multimedia and in laboratory for practical work.
Each student has a workstation equipped for practical work.
Permanent presence of an experienced trainer.

VALIDATION MODE

Editing a training certificate.

TRAINEES EVALUATION

In the form of multiple choice questions, open questions and continuous monitoring during the practical work.

BIBLIOGRAPHY

The programs are conducted according to the standards of principals and TESTIA France defined in our document T TRA NOA 34 A21.

Level : **2**

Duration : **5 days**

1st day

Welcome
Presentation of COFREND and COSAC
Presentation of the certification under CER COSAC PR-001V01
Fly safety awarness

Requirements
Authorities and standards presentation
- In production
- In maintenance

Basic principles
Principle
Parameters calculation
Parameters impact on the detection
Choice of the film
Characteristics curves use
Digital radiography
Radioscopy
- Picture intensifier
- CCD camera
- Flat panel
- Linear detector

Picture quality
- Film
- Digital
- Quality picture control

Practical work
Part control in radiography and/or radioscopy
Instruction procedure editing

2nd day

Radiation protection
Unity
Hazards
Human effects
Doses limits
Protection means
Measuring devices

Interpretation
Characterization and assessment
Doubt removal

Equipment
X-ray station
- Power
- Using time
- Geometrical quality
- Beamwidth
- Handling

Detector
- Film
- Digital
  - Digital radiography
  - Photo-stimulable screen composition
  - Characteristics
  - Radioscopy
  - Picture intensifier
  - CCD camera
  - Flat panel
  - Linear detector

Special technic
- Tomography
- Neutronography

Practical work
Part control in radiography and/or radioscopy

RADIOLOGY TESTING

3rd day

Equipment (following)
Periodic checks
- X-ray station
- Automatic development
- Interpretation booth
- Various materials

Aeronautic applications
Foundry
- Part definition: intermediate housing arm
- Design department demands
- Control technic
- Effects exploitation and characterization
- Acceptance criterias

Welding
- Part definition: engine pipe
- Design department demands
- Control technics
- Defects exploitation and characterization
- Acceptance criterias

Practical work
Part control in radiography
and/or radioscopy
Instruction procedure editing

4th day

Aeronautic applications (following)
Composite
- Part definition: monolithic, sandwich structure, filament, winding structure
- Design department demands
- Control technic
- Defects exploitation and characterization
- Acceptance criterias

Maintenance
- Part definition: leading edge
- Design department demands
- Control technic
- Defects exploitation and characterization
- Acceptance criterias

The technical Instruction Sheet
Its structure
Applicable norms

The reference documents
Presentation of documents
Their structure
Discuss and analysis

Practical work
Part control in radiography
and/or radioscopy

5th day

Defectology
Choice of metallic materials
Defects
- Casting
- Forging
- Transformation
- Heat treatments
- Surface treatments
- Welding
- Composite materials
- Maintenance

Knowledge evaluation
Questionnary

Pratice
Part control in radiography
and/or radioscopy
Discuss and conclusion

DATES

Toulouse

February 08th to 12th	week 6
April 04th to 08th	week 14
April 11th to 15th	week 15
June 13th to 17th	week 24
June 20th to 24th	week 25
September 12th to 16th	week 37
September 19th to 23th	week 38
November 21th to 25th	week 47
November 28th to dec. 02nd	week 48

The dates may be modified, cancelled or added.

Consult the entire calendar

Consult the tariffs

TO COMPLETE THIS TRAINING

(click on the desired training course for access)

Materials initiation

Field works

C.A.M.A.R.I. X-ray opt.

Digital radiology

cofrend

COSAC

TESTIA
AN AIRBUS GROUP COMPANY

General training
RADIOLOGY TESTING

FGRT3

PEOPLE CONCERNED

Every people certified level 2 EN 4179 wishing take the exam level 3.
Every people with experience in appliance with the CER COSAC PR-001V01 (Table IV - § 6.2.2) and wishing take the exam level 3 under norm EN 4179.

PREREQUISITE

Level adviced: Bachelor, engineer or agent certified level 2.

AIMS

To prepare at specific training of aerospace sector (SP3) in the method.
To prepare at the certification level 3 of aerospace sector under norm EN 4179.
To reinforce the achievement and deepen theorical knowledge of the method.
To acquire the necessary competence to skill an implementation of non-destructive testing laboratory.
To master the norm and other applicable documents in the method.

EDUCATIONAL RESOURCES AND GUIDANCE

Theorical training given in classroom with book and multimedia.
Projection of videos and visit of installations.
Permanent presence of an experienced trainer certified level 3 under norm EN 4179.

VALIDATION MODE

Editing a training certificate.

TRAINEES EVALUATION

In the form of multiple choice questions.

BIBLIOGRAPHY

The programs are conducted according to the standards of principals and TESTIA France defined in our document T TRA NOA 34 A21.

Level : **3**

Duration : **5 days**

1st day

Welcome
Presentation of the certification under CER COSAC PR-001V01

Level 3 functions
Roles
Responsibilities
Production management (cost and lead times)
Investment
Quality system
Human aspect (personnel management, instructions, health and safety)
What to do to ensure the maintaining of test performance (personnel, equipment and procedures)

2nd day

Theory
The interaction of ionising radiation with matter
- Wavelength
- Kv
- mA

The choice of Xray parameters
- Kv
- mA
- Time

Radioprotection
- The legislation
- The operator
- The X-ray firing cabin

Applications of X-rays at the different stages of production
- In foundries
- In forges
- In machining
- In welding

Radiographic films
- Types and classes
- Dimensions
- Filters and screens

Development
- Manual development
- Automatic development

Reading
- The choice of densitometer
- The choice of viewing box
- Specific reference standards

General training
RADIOLOGY TESTING

3rd day

Equipment
Presentation of the various equipment
Specific radiographic techniques
Digital radiography
Tomography
Directional tubes
• Panoramic tubes
• Microfocus tubes
The choice of equipment, materials and tools
Analysis of impact
• On detection
• On lead times
• On costs

Supervised work
The various actual cases
Definition of the installation specifications

4th day

Standardisation
The sue of reference bases and main order givers (detection techniques, periodic verifications, acceptance criteria)

Supervised work
The use of reference bases
Data extraction (detection techniques, periodic verifications, acceptance criteria)

5th day

Removal of doubt
Actions to be performed by a level 1
Actions to be performed by a level 2
• Modifications of test parameters
• Change of equipment
• Change of technique
Actions to be performed by a level 3
• The complementarity of methods
• The technical report

Knowledge assessment
Questionnary
Correction

Supervised work
Development of a standard procedure
Discuss and conclusion

DATES

Toulouse
March 01st to 04th..... week 9

cofrend

COSAC

The dates may be modified, cancelled or added.

Consult the entire calendar

Consult the tariffs

TO COMPLETE THIS TRAINING

(click on the desired training course for access)

Material in-depth study

C.A.M.A.R.I. X-ray opt.

Digital radiology

TESTIA
AN AIRBUS GROUP COMPANY

Specific training (process)
RADIOLOGY TESTING

SPRT3

PEOPLE CONCERNED

Every people certified level 2 EN 4179 wishing take the exam level 3.
Every people with experience in appliance with the CER COSAC PR-001V01 (Table IV - § 6.2.2) and wishing take the exam level 3 under norm EN 4179.

PREREQUISITE

Every people taking the first certification in the method must have take the general training (FG3) or equal.
Deepen knowledge of materials, manufacturing process and defectology or had a training in Material in-depth study.
The visual acuity test must meet the requirements of CER COSAC PR-001V01 (Table V - § 7.1.1).

AIMS

To prepare at the certification level 3 of aerospace sector under norm EN 4179.
To reinforce the achievement and deepen theorical knowledge of the method.
To acquire the necessary competence to skill an implementation of non-destructive testing laboratory.
To master the norm and other applicable documents in the method.
To be able to realize a case study.
To be able to set the NDT inspection in a manufacturing process.
To choose human and technical resource necessary to the realization of the control.
To define an operational mode.
To gain insight the action to improve in case of doubt result.

EDUCATIONAL RESOURCES AND GUIDANCE

Theorical training given in classroom with book and multimedia.
Permanent presence of an experienced trainer certified level 3 under norm EN 4179.

VALIDATION MODE

Editing a training certificate.

TRAINEES EVALUATION

Under continuous control during field works

BIBLIOGRAPHY

The programs are conducted according to the standards of principals and TESTIA France defined in our document T TRA NOA 34 A21.

Level : **3**

Duration : **5 days**

1st day

Welcome
Presentation of COFREND and COSAC
Presentation of the certification under CER COSAC PR-001V01
- Description of the different subject
- Analysis of the contents of the writing procedure

Study of global positioning of NDT controls in a manufacturing process
Exercise on a common subject
Writing of the procedure

2nd day

Writing of the procedure on a aeronautical subject
- Correction ans Technical Discuss on the different industrial choices

3rd day

Writing of the procedure on a aeronautical subject
- Correction ans Technical Discuss on the different industrial choices

4th day

Writing of the procedure on a aeronautical subject
- Correction ans Technical Discuss on the different industrial choices

5th day

Writing of the procedure on a aeronautical subject
- Correction ans Technical Discuss on the different industrial choices

DATES

Toulouse
April 11th to 15th..... week 15
October 17th to 21th..... week 42

The dates may be modified, cancelled or added.

Consult the entire calendar

Consult the tariffs

TO COMPLETE THIS TRAINING

(click on the desired training course for access)

Material in-depth study

C.A.M.A.R.I. X-ray opt.

Digital radiology

cofrend

COSAC

TESTIA
AN AIRBUS GROUP COMPANY

Training courses

LES FORMATIONS COMPLÉMENTAIRES

- NDT Initiation
- Composite Materials Testing
- Materials Initiation
- Material in-depth study
- CAMARI X-Ray opt.
- Digital radiology
- UT immersion
- UT Phased Array
- ULTIS
- ET Phased Array
- Field Works

Nous demandons aux stagiaires de se munir d'une calculatrice, de support papist, de crayons et d'un réglet.

Complementary training
NDT INITIATION

PEOPLE CONCERNED

Every people wishing an information on the different NDT method in aerospace sector.

PREREQUISITE

Level adviced: Leaving certificate.

AIMS

To bring a synthetic view on all the NDT method on the aerospace sector.
To know for each method, the performance, advantages and disadvantages.
To be able to choose the method in appliance with the sort of part.

EDUCATIONAL RESOURCES AND GUIDANCE

Theorical training given in classroom with book and multimedia and in laboratory for the field works.
Permanent presence of an experienced trainer.

VALIDATION MODE

Editing a training certificate.

TRAINEES EVALUATION

In the form of multiple choice questions.

BIBLIOGRAPHY

The programs are conducted according to the standards of principals and TESTIA France defined in our document T TRA NOA 34 A21.

Duration : **4 days**

1st day

Welcome
Presentation of COFREND and COSAC

Generalities
Non-destructive testing methods
- In production
- In maintenance

Visual inspection

Liquid penetrant testing
Principle
Procedures
Parameters to be fulfilled
Demonstrating

Magnetic particle testing
Principle
Magnetisation methods
Procedures
Parameters to be fulfilled
Demonstrating

2nd day

Radiology testing
Principle of radiography
Principle of radioscopy
Silver and digital image
X-ray production principles
Geometric unsharpness
Elliptic projection
Radiographic films
Optical density and image quality
Examples of applications
Visiting a radiology testing installation
Demonstrating
Examining radiographs

Ultrasonic testing
Principle
Propagation of ultrasounds at an interface
Ultrasonic probes
Ultrasonic beam
Signal representation (type A, B, C)
Ultrasonic testing methods
- Transmission method
- Double-transmission method
- Reflection method

NDT INITIATION

3rd day

Ultrasonic testing (following)
Examples of applications
- Inspecting metal week-products
- Inspecting composite materials
- Aeronautical maintenance inspections

Demonstrating

Eddy current testing
Principle
Probe technology
Instruments
Influence of different parameters
- Electrical conductivity
- Magnetic permeability
- Frequency
- Probe clearance

Examples of applications
- Inspecting metal week-products
- Aeronautical maintenance inspections

Demonstrating

4th day

Infrared testing
Principle
Examples of applications

Speckle interferometry testing
Principle
Examples of applications

Synthesis
Summary of methods
Selecting a test method
Principle of testing procedure development
Performance and limits of the
non-destructive testing methods
Pratical exercises
Discuss and conclusion

DATES

Toulouse
May 17th to 20th..... week 20
November 07th to 10th..... week 45

cofrend

COSAC

The dates may be modified, cancelled or added.

Consult the entire calendar

Consult the tariffs

Complementary training
COMPOSITE MATERIALS TESTING

PEOPLE CONCERNED

Every people wishing an information on NDT method applicable to composite materials in aerospace sector.

PREREQUISITE

Level adviced: Bachelor.

AIMS

To acquire basis knowledge of the defects who can be generate in composite materials.
To bring a synthetic view on all controls on composite materials.
To know for each method, the performance, advantages and disadvantages.
To be able to choose the method in appliance with the sort of part.

EDUCATIONAL RESOURCES AND GUIDANCE

Theorical training given in classroom with book and multimedia and in laboratory for the demonstration.
Permanent presence of an experienced trainer.

VALIDATION MODE

Editing a training certificate.

TRAINEES EVALUATION

Under open questions.

BIBLIOGRAPHY

The programs are conducted according to the standards of principals and TESTIA France defined in our document T TRA NOA 34 A21.

Applicable NTD methods
- Tap test
- Ultrasonic testing
- Radiography and Radioscopy
- Tomography
- Shearography
- Infrared testing
- New methods

Duration : **4 days**

1st day

Welcome

Composite materials
Introduction
Description of composite structures
- Monolithic
- Sandwich
- Coils
- Geometries

Defects
- Various types
- Causes
- Consequences

Manufacturing processes

The control method
Presentation
Advantage and disadvantage

Tap test
Various techniques
Applications to the various types
Searched defects
Application limits
Applications to various part conditions
- In production
- In maintenance

Calibration parts
Characteristics of equipment
Demonstrating

2nd day

Ultrasonic testing by reflection
Various techniques
Applications to monolithic structures
Searched defects
Application limits
Applications to various part conditions
- In production
- In maintenance

Calibration parts
Characteristics of equipment
Representation of data and defect sizing
Demonstrating

Ultrasonic testing by transmission
Various techniques
Applications to monolithic structures
Searched defects
Application limits
Applications to various part conditions
- In production
- In maintenance

Calibration parts
Characteristics of equipment
Representation of data and defect sizing
Demonstrating

COMPOSITE MATERIALS TESTING

3rd day

Analysing mappings
General
Aim

Presentation of the software
- Main advantages
- Acquiring data
- Various parameters

Radiology testing
Various techniques
Applications to monolithic structures
Searched defects
Application limits
Applications to various part conditions
- In production
- In maintenance

Calibration parts
Characteristics of equipment
Demonstrating

4th day

Shearography testing
Various techniques
Applications to monolithic structures
Searched defects
Application limits
Applications to various part conditions
- In production
- In maintenance

Calibration parts
Characteristics of equipment
Demonstrating

Infrared testing
Various techniques
Applications to monolithic structures
Searched defects
Application limits
Applications to various part conditions
- In production
- In maintenance

Calibration parts
Characteristics of equipment
Demonstrating
Discuss and conclusion

DATES

Toulouse
March 29th to april 01st ..... week 13
November 28th to dec. 01st..... week 48

cofrend

COSAC

The dates may be modified, cancelled or added.

Consult the entire calendar

Consult the tariffs

Complementary training

MATERIALS INITIATION

PEOPLE CONCERNED

Every people wishing acquire basis knowledge on materials science.
Every people wishing prepare the certification level 1 or 2.

PREREQUISITE

Level adviced: Leaving certificate.

AIMS

To acquire basic knowledge on materials science in aerospace sector.
To be able to identify the nature of the defects at a NDT inspection.
To train for the specific questions at the certification level 1 or 2.

EDUCATIONAL RESOURCES AND GUIDANCE

Theorical training given in classroom with book and multimedia and in laboratory for the field works.
Permanent presence of an experienced trainer.

VALIDATION MODE

Editing a training certificate.

TRAINEES EVALUATION

In the form of multiple choice questions.

BIBLIOGRAPHY

The programs are conducted according to the standards of principals and TESTIA France defined in our document T TRA NOA 34 A21.

Duration : **3 days**

1st day

Welcome

Metallic

Different alloys used in the aeronautical field
- Areas of use and reasons for selecting them
- Composition and designation

Notions on the physical properties of alloys in manufacturing
- Hardness, elasticity, plasticity
- Resilience, toughness, creep strength
- Resistance to simple and stressed corrosion
- Retractability quality

The elaboration

The elaboration of metallurgic half-products
- The casting
- Lamination, forging, die-forging and wire-drawing
- Notion of malleability and conductivity
- The origin and the causes of the defects

2nd day

Manufacturing

Different manufacturing processes
- Machining
- Forming
  - Different methods
  - Notions of cold working in forming operations
  - Advantages and disadvantages
- Origin and causes of defects
- Heat treatments

Asweekly

Different asweekly methods
- Mechanical
- Welding
  - Notions of weldability and alloy
  - Different processes and use choices
- Origin and causes of defects

MATERIALS INITIATION

3rd day

Maintenance

Behaviour of operating parts
- Fatigue: stress accumulation and vibrations
- Various projectiles
- Thermal and atmospheric conditions
- High temperature creep
- Simple and stressed corrosion

Composite materials

Characteristics of a composite material
Advantages and disadvantages
Different types of composite materials
Manufacturing principle
Origin and causes of defects
Discuss and conclusion

DATES

Toulouse

March 29th to 31th..... week 13
September 05th to 07th..... week 36

cofrend

COSAC

The dates may be modified, cancelled or added.

Consult the entire calendar

Consult the tariffs

TESTIA
AN AIRBUS GROUP COMPANY

Complementary training

MATERIALS IN-DEPTH STUDY

MAT PERF

PEOPLE CONCERNED

Every people wishing reinforce knowledge on materials science.
Every people wishing prepare the certification level 3.

PREREQUISITE

Level adviced: Bachelor.
It is recommended to had a training Materials initiation.

AIMS

To Reinforce basic knowledge on materials science in aerospace sector.
To be able to identify the nature of the defects at a NDT inspection.
To train for the specific questions at the certification level 3.

EDUCATIONAL RESOURCES AND GUIDANCE

Theorical training given in classroom with book and multimedia and in laboratory for the field works.
Permanent presence of an experienced trainer.

VALIDATION MODE

Editing a training certificate.

TRAINEES EVALUATION

In the form of multiple choice questions.

BIBLIOGRAPHY

The programs are conducted according to the standards of principals and TESTIA France defined in our document T TRA NOA 34 A21.

Duration : **5 days**

1st day

Welcome

Generalities
Aerodynes
- Introduction
- Metallurgy requirements

Materials
- Properties
- Characteristics

Metallurgy
Alloys
- Properties
- Characteristics
- Designation

2nd day

Casting
Different processes
- Die casting works
- Lost-wax casting

Casting production steps
Characteristic defects
Testing means

Manufacturing
Shaping processes
- Casting
  - Continuous casting
- Shaping
  - Forging
  - Die forging
  - Rolling
  - Superplastic forming

Characteristic defects
Testing means
Machining processes

Complementary training

MATERIALS IN-DEPTH STUDY

3rd day

Welding
Welding techniques
- TIG and MIG welding
- Coated metal arc welding
- Friction or diffusion welding
- Electron-beam welding
- Laser welding
- Plasma welding

Advantages and disadvantages
Alloys and welding
- Aluminum alloys
- Nickel alloys
- Titanium alloys
- Zirconium alloys
- Copper alloys

Characteristic defects
Testing means

4th day

Corrosion
Principle
Corrosion factors
Different types of corrosion

Surface treatments
Thermochemical treatments
Conversion treatments
Anodising treatments
Characteristic defects

Fatigue defect
General information about the metal material fatigue
General information about the linear elastic fracture mechanics (L.E.F.M.)
General information about damage tolerances

5th day

Composite materials
Properties
Characteristics
Reinforcing fibres
Dies
Manufacturing concept
Repair concept

Evolution
New materials
Characteristic defects
Testing means
Discuss and conclusion

DATES

Toulouse
April 18th to 22th ..... week 16
September 26th to 30th ..... week 39

cofrend

COSAC

The dates may be modified, cancelled or added.

Consult the entire calendar

Consult the tariffs

TESTIA AN AIRBUS GROUP COMPANY

Complementary training

C.A.M.A.R.I. X-RAY opt.

PEOPLE CONCERNED

Every people wishing prepare the exam CAMARI (decree 2007-1570 dated November 05th 2007).

PREREQUISITE

Level adviced: Leaving certificate.

AIMS

To prepare the exam CAMARI organized by the IRSN.
To acquire the theorical knowledge necessary to radioprotection.
To be able to use equipment with the respect of safety norms.

EDUCATIONAL RESOURCES AND GUIDANCE

Theorical training given in classroom with book and multimedia and in laboratory for the field works.
Permanent presence of an experienced trainer.

VALIDATION MODE

Editing a training certificate.

TRAINEES EVALUATION

In the form of multiple choice questions and case study.

BIBLIOGRAPHY

The programs are conducted according to the standards of principals and TESTIA France defined in our document T TRA NOA 34 A21.

Duration : **4 days**

1st day

Welcome
Presentation of CAMARI exam X-ray option
- As per order dated December 21st 2007 defining the industrial radiology equipment handling certificate training conditions

Generalities
Health and safety
- Role
- Approach
- History

Organisation of health and safety in France
Ionising radiation
Ionising radiation
Type and families
Energy of electromagnetic waves
Radiation units

X-rays
Production principle: fluorescence effect and bremsstrahlung effect
Quantity and quality of radiation
Gamma rays
Activity and radioactive decay
Presentation of GAM instrument
Interaction of radiation with matter
Attenuation of radiation
Different types of radiation beams

2nd day

Dose calculation
According to time, distance, screens
Studies and calculations (use of transmission and attenuation curves)

X-ray equipment
X-ray tube
Different tube types
X-ray emission block
Safety circuits

Radiation detectors
Passive dosimeters
Operational dosimeters
Ambient detectors with direct reading

Complementary training
C.A.M.A.R.I. X-RAY opt.

3rd day

Study of main application documents
Decree 2003 296 dated March 31st 2003
Order dated May 15th 2006
NFC 74100 standard

Case study
Handling of downgraded and "incident" situations
Risk analysis and prevention plan

4th day

Radiation hazards
Exposure sources for man
Biological effects of radiation

Health and safety implementation
Controlled and operational areas
Dosimetric follow-up
Implementation of projected dosimetry
Role of Health and safety Relevant Person

Training for exam
Questionnary
Case study
Discuss and conclusion

DATES

Toulouse
March 29th to april 01st ..... week 13

cofrend

COSAC

The dates may be modified, cancelled or added.

Consult the entire calendar

Consult the tariffs

Complementary training
DIGITAL RADIOLOGY

PEOPLE CONCERNED

Every people wishing discover all the digital technologies applied to the radiography.

PREREQUISITE

Level adviced : agent certified level 1 minimum in the method.

AIMS

To acquire basic knowledge on all sort of equipment existing today in the area of the digital radiography.
To be able to set and use the equipment of digital radiography.

EDUCATIONAL RESOURCES AND GUIDANCE

Theorical training given in classroom with book and multimedia and in laboratory for the field works.
Permanent presence of an experienced trainer.

VALIDATION MODE

Editing a training certificate.

TRAINEES EVALUATION

In the form of multiple choice questions.

BIBLIOGRAPHY

The programs are conducted according to the standards of principals and TESTIA France defined in our document T TRA NOA 34 A21.

Duration : **5 days**

1st day

Welcome

Revision: principle of radiography
The effect of kV
The effect of mA
Revision of geometrical blurring
The importance of intensifying screens

Introduction to digital radiology
General
Digitising silver films
Principle (CR and DR)
Comparison of digital systems

The digital image
General
Resolution
Spatial resolution
Contrast resolution
The contrast to noise ratio
The histogram
The histogram and its quantifying values
The principle of the window function
The effect of the window function

2nd day

Data acquisition
General
Noise
Photon noise
Thermal noise
The signal to noise ratio
The normalised signal to noise ratio
The pixel
The fill factor
Digitising the signal
Sampling
Quantifying
Dynamics
Coding
The analogue to digital converter
Fourier theory

Image processing
General observations on filters
The convolution filter
The high pass and low pass filter
The Laplace filter
The gradient filter

Practical work
Presentation of the various resources
• The CR50
• The X-Cube
Displaying the resolution, contrast, window function
Carrying out the FTM
Work on dynamics
Plotting the curve with step gauges of various materials

Complementary training
DIGITAL RADIOLOGY

3rd day

CR systems
Principle
The photostimulable screen
The latent image
Digitisers
Advantages and drawbacks

DR or DDA systems
Principle
The image intensifier
Scintillators coupled with a CCD camera
Flat panel screens
Digital detectors
Indirect conversion
Direct conversion
Advantages and drawbacks

Practical work
Highlighting the possibilities for processing computer images
Displaying the possibilities and the inspection limits in digital radiography
Actual applications of the radioscopy system on aircraft components (X-Cube apparatus)

4th day

Image formats
General
The DICOM format
The TIFF format
The DICONDE format

Choice of detector
The various characteristics
Spatial resolution
Sensitivity to contrast
The range of material thicknesses
The number of defective pixels
LAG
Measuring the FTM

Checking the performance of CR systems
Periodic checks
Basic spatial resolution
The normalised signal to noise ratio
Geometrical distortion
The Function of the laser beam
Laser beam shift
Dazzling
Sensitivity to contrast
Erasure

Practical work
Applying the training acquisitions
Analysing a qualification procedure for a digital radiography system
Using a CR Phantom
Actual applications of the radioscopy system on aircraft components (X-Cube apparatus)

5th day

Checking the performance of DDA systems
The Modulation Transfer Function
Periodic checks
The contrast to noise ratio
Sensitivity to contrast
Spatial resolution
Detection efficiency
Geometrical efficiency
Intrinsic efficiency
The Quantum Efficiency of Detection
Defective pixels
LAG
Burn-In

Practical work
Applying the training acquisitions
Explanations of checks of the DR radioscopy system
Actual applications of the radioscopy system on aircraft components (X-Cube apparatus)
Discussion and conclusion

DATES

Toulouse

January 25th to 29th ..... week 4
March 14th to 18th ..... week 11
May 30th to june 03rd ..... week 22
October 24th to 28th ..... week 43

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COSAC

The dates may be modified, cancelled or added.

Consult the entire calendar

Consult the tariffs

Complementary training
ULTRASONIC IMMERSION

PEOPLE CONCERNED

Every people wishing information on ultrasound in immersion.

PREREQUISITE

Level adviced: agent certified level 1 minimum in the method.

AIMS

To gain insight the technology of immersion system.
To be able to use and set immersion system.

EDUCATIONAL RESOURCES AND GUIDANCE

Theorical training given in classroom with book and multimedia and in laboratory for the field works.
Permanent presence of an experienced trainer.

VALIDATION MODE

Editing a training certificate.

TRAINEES EVALUATION

In the form of multiple choice questions.

BIBLIOGRAPHY

The programs are conducted according to the standards of principals and TESTIA France defined in our document T TRA NOA 34 A21.

Duration : **5 days**

1st day

Welcome

Reminding immersion testing
Principle
Advantages and disadvantages
Different types of testing
- Reflection
- Transmission
- Double transmission
- Phased array

Different mappings

Reminding theoretical knowledge
Interface influence
Reflection and transmission coefficients
Signal analysis in HF mode
Snell's law
Acoustic beam
Radiation patterns
Focusing principle

Practical work
Presentation of the installations
Inspecting an aluminum and composite part
- Setting of learning
- Setting of the acquisition
- Analysis of mapping

2nd day

Focusing
Principle
Optical focusing
Acoustic focusing
Focusing coefficients
Depth and dimensions of a focal zone
Transducers used in immersion testing

Digital applications
Focal zone calculations

Practical work
Inspecting an aluminum block with straight transducers
Analysing mappings
Inspecting an aluminum block with focused transducers
Using the TCG

ULTRASONIC IMMERSION

3rd day

Mapping
Data acquisition
- Spatial and temporal resolution
- Signal-to-noise ratio
- Dynamics
- Mechanics accuracy and quality
- Selection of the recorded information
- Processing and filtering during acquisition
- Processing and filtering after acquisition
- Type of data representation chosen

Image viewing
- Gray scale and false colours
- Zoom and scrolling
- Colour palette management
- Multi-images
- Image sequencing
- Image comparison
- "Copy/paste" type functions
- Image resetting, centring, and rotating
- Reference image look-up
- Pseudo-3D, perspective view
- Processing of data contained in the A scan

Post-acquisition processing

Practical work
Inspecting an aluminum and composite part
Parameter influence (transducer diameters, pitch, speed, and frequency)
Result analysis
Mapping processing

4th day

Mapping (following)
Image processing
- Convolution matrices
- Gray scale processing
- Binary processing
- Post-acquisition processing

General information about data handling
Data processing and ultrasonic testing

Supervised work
Inspecting a composite part
Gray and colours scale processing
Post-acquisition processing
Result analysis
Inspecting a metallic part
Gray and colours scale processing
Post-acquisition processing
Result analysis

Practical work
Control of different parts
Determining all parameters
Analysing mappings
Report editing
Instruction procedure editing

5th day

Supervised work
Specific case of checking realized in manufacturing
The analysis of the problematic
The setting of the different parameters

Practical work
Control of different parts
Determining all parameters
Choice of the transducer
Analysing mappings

Knowledge evaluation
Questionnary
Discuss and conclusion

DATES

Toulouse
May 30th to june 03rd ..... week 22

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COSAC

The dates may be modified, cancelled or added.

Consult the entire calendar

Consult the tariffs

TESTIA
AN AIRBUS GROUP COMPANY

Complementary training

ULTRASONIC PHASED ARRAY

UTPA

PEOPLE CONCERNED

Every people wishing information on ultrasound phased-array.

PREREQUISITE

Level adviced: agent certified level 1 minimum in the method.

AIMS

To gain insight the technology of phased-array systems.
To be able to use and set phased-array systems.

EDUCATIONAL RESOURCES AND GUIDANCE

Theorical training given in classroom with book and multimedia and in laboratory for the field works.
Permanent presence of an experienced trainer.

VALIDATION MODE

Editing a training certificate.

TRAINEES EVALUATION

In the form of multiple choice questions.

BIBLIOGRAPHY

The programs are conducted according to the standards of principals and TESTIA France defined in our document T TRA NOA 34 A21.

Duration : **5 days**

1st day

Welcome

Phased array technology
Principle
Phased array probes
- Different probe types
- Geometric characteristics
- Operating characteristics

Phased array electronics
- Architecture, beam
- Forming
  - Time limits
  - Summation

Supervised work
Presentation of the user interface of the phased-array ultrasonic equipment
Settings and implementation of focal laws for direct contact testing
- Focusing
- Beam steering

Linear and sector scanning

2nd day

Phased array technology (following)
Focal laws: beam forming
- Reminding the characteristics of the ultrasonic beams in single-element technology
- Focusing
  - Rules
  - Limitations
- Beam steering
  - Rules
  - Limitations
- In-depth dynamic focusing

Focal laws: electronic scanning
- Electronic linear scanning
- Electronic sector scanning

Practical work
Applying the inspection in manual mode on different application cases
- In direct contact
- With relay
- By week-immersion

Parameter setting
Result analysis

Complementary training
ULTRASONIC PHASED ARRAY

3rd day

Phased array technology (following)
Use of a relay (water column or rigid relay)
- Beam forming
- Electronic scanning

Inspection in mixed or separate transmit/receive mode
Data representation and acquisitions
- Free-scanning inspection or inspection with mechanical coding
- Data representation
  - A-scan
  - B-scan
  - C-scan
  - S-scan, corrected sector view
- Acquisition parameters
  - Setting of the A-scan window
  - Acquisition gates
  - TCG function
  - Acquisition step and increment
  - Dimensions of the acquisition area

Practical work
Applying the inspection in manual mode on different application cases
- In direct contact
- With relay
- By week-immersion

Parameter setting
Result analysis

4th day

Phased array technology (following)
Principles of equipment check before use
Presentation of applications in the aeronautical field and in other fields
- In maintenance
- In manufacturing

Advantages of phased array testing

Practical work
Applying the inspection in manual mode on different application cases
- In direct contact
- With relay
- By week-immersion

Parameter setting
Result analysis

5th day

Practical work
Applying the inspection in manual mode on different application cases
- In direct contact
- With relay
- By week-immersion

Parameter setting
Result analysis
Discuss and conclusion

List of the applications which will be discussed during field works

Fine composite materials
- Delamination testing after shock
- Porosity testing

Thick composite materials
- Delamination testing
- Use of gain correction based on distance
- Porosity testing

Metal materials
- Check for manufacturing defects such as blowhole.
- Crack testing on the bore lines
- Corrosion testing
- Weld inspection
- Metal materials and vertical defects
- Diffraction signal processing

DATES

Toulouse
April 25th to 29th ..... week 17
December 05th to 09th ..... week 49

The dates may be modified, cancelled or added.

Consult the entire calendar

Consult the tariffs

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COSAC

Complementary training
ULTIS

ALSO AVAILABLE IN E-LEARNING*

PEOPLE CONCERNED

Every people wishing realized advanced setting of C-Scan analysis.
Every people wishing realize analyze of C-Scan inspections by ultrasound of composites.

PREREQUISITE

Level adviced: agent certified level 2 in ultrasound.

AIMS

To be able to use basic function of Ultis software.
To be able to realize an analyze of A-Scan and C-Scan data with Ultis software.

EDUCATIONAL RESOURCES AND GUIDANCE

Theorical training given in classroom with book and multimedia and in laboratory for the field works.
Permanent presence of an experienced trainer.

VALIDATION MODE

Editing a training certificate.

TRAINEES EVALUATION

In the form of multiple choice questions.

BIBLIOGRAPHY

The programs are conducted according to the standards of principals and TESTIA France defined in our document T TRA NOA 34 A21.

Duration : **4 days**

**contact us for more information.*

1st day

Welcome

Presentation of the software
Main advantages
Acquiring C-scan data

Managing units
The time base
Amplitudes

Managing colour palettes
Loading a palette
Adjusting the limits
Unifying the palettes
Creating, modifying and saving palettes

Locating, selecting and measuring
Selections
Masks
Skins

Formatting C-scans
Preference
Association
History
Image zoom
Changing the origin
Duplication
Rotation and symmetry

2nd day

Formatting C-scans (continued)
Correcting the edge effect
NaN filter
Registration
Concatenation
Backlash
Synthesising
Applying a mathematical formula
CAO registration

Generating mappings from A-scans
Loading, saving A-scans
Filters
Port configuration
C-scan table
B/D scan table
Slicer tool

3rd day

Analysing the data
Amplitude distance graph
Histogram
Analysis table
Specific measurements
Drilling inspection
Compression after impact

Defect detection
Detection principle
Manual detection
Automatic detection
Customising a detection table
Displaying numbers and distances
Dimensioning at -6dB
Background echo filter

4th day

Defect detection
Creating detection and
grouping criteria

Automating tasks and creating reports
Launching automatic automation and report
Configuring automation
Saving image captures
Customising a report template

NDT KIT functionalities
A350 requirements
Loading UT AREVA data
Detecting contours
Using collaborative mode
AREVA 3D module

DATES

Toulouse
May 17th to 20th..... week 20
November 07th to 10th..... week 45

Also available in E-learning.

cofrend

COSAC

The dates may be modified, cancelled or added.

Consult the entire calendar

Consult the tariffs

TESTIA
AN AIRBUS GROUP COMPANY

Complementary training
EDDY CURRENTS ARRAY

PEOPLE CONCERNED

Every people wishing an information on the Eddy current Array.

PREREQUISITE

Level adviced: agent certified level 1 minimum in the method.

AIMS

To gain insight the Eddy current Array technology.
To be able to set and use system in Eddy current Array.

EDUCATIONAL RESOURCES AND GUIDANCE

Theorical training given in classroom with book and multimedia and in laboratory for the field works.
Permanent presence of an experienced trainer.

VALIDATION MODE

Editing a training certificate.

TRAINEES EVALUATION

In the form of multiple choice questions.

BIBLIOGRAPHY

The programs are conducted according to the standards of principals and TESTIA France defined in our document T TRA NOA 34 A21.

Duration : **3 days**

1st day

Welcome

Theory
Different ECA applications
Technical characteristics of OMNISCAN
- Dimensions
- Data storage in memory
- Input and output ports
- Input and output lines
- Power supply

Characteristics of the Eddy Current module
- General characteristics
- Multi-element
- Generators
- Receivers
- Internal multiplexer
- Data processing
- Advantages and disadvantages of ECA

ECA software architecture
Details of different menus
- ET Menu
  - Group
  - Frequency
  - Filter
  - Channel
- Scan Menu
  - Encoder
  - Synchro
  - Area
  - Display Menu

Supervised work
Supervised work for implementation of OMNISCAN on reference block

2nd day

ECA software architecture
Details of different menus
- Process Menu
  - Normalization
  - Axis
  - Mix
- Reading Menu
  - Result
  - Selection
  - Measure
- Tools Menu
  - Substraction
- Alarms

Supervised work
Supervised work for implementation of OMNISCAN on reference block

Practical work
Searching surface defects
Searching underlying defects

Complementary training
EDDY CURRENTS ARRAY

3rd day

Operating mode

Different ECA probes
Definition of a setting
for searching surface cracks
Definition of a setting
for searching corrosion
Definition of a setting
for searching rivet line cracks
Report editing

Practical work

Searching surface defects
Searching underlying defects
Discuss and conclusion

DATES

Toulouse

February 22th to 24th..... week 8
May 30th to june 03rd..... week 22

The dates may be modified, cancelled or added.

Consult the entire calendar

Consult the tariffs

Complementary training
FIELD WORKS

PEOPLE CONCERNED

Every people wishing complete the preparation to certification level 1 or 2 in the method.

PREREQUISITE

Level adviced : Leaving certificate.
To have had a specific training (SP) level 1 or 2 in the method.

AIMS

To train for the certification level 1 or 2 of the aerospace sector under norm EN 4179.
To reinforce the practical experience acquired during theorical training (FG/SP).

EDUCATIONAL RESOURCES AND GUIDANCE

Practical training given in laboratory.
Permanent presence of an experienced trainer.

VALIDATION MODE

Editing a training certificate.

TRAINEES EVALUATION

In the form of multiple choice questions.

BIBLIOGRAPHY

The programs are conducted according to the standards of principals and TESTIA France defined in our document T TRA NOA 34 A21.

Level : **1/2**

Duration : **1 day**

1st day

Welcome
Presentation of installations
Inspecting aeronautical castings
Report editing
Instruction procedure editing

DATES

Consult us.

The dates may be modified, cancelled or added.

Consult the entire calendar

Consult the tariffs

cofrend

COSAC

TESTIA
AN AIRBUS GROUP COMPANY

Applicable documents
OF NDT TRAINING

PRIMES	PT	MT	ET	UT	RT
TESTIA	**Level 1 :** T TRA TH 230 T TRA TH 233 T TRA TP 236 T TRA TP 237 **Level 2 :** T TRA TH 231 T TRA TH 234 T TRA TP 236 T TRA TP 238 **Level 3 :** T TRA TH 232 T TRA TH 235	**Level 1 :** T TRA TH 220 T TRA TH 223 T TRA TP 226 T TRA TP 227 **Level 2 :** T TRA TH 221 T TRA TH 224 T TRA TP 226 T TRA TP 228 **Level 3 :** T TRA TH 225	**Level 1 :** T TRA TH 200 T TRA TH 203 T TRA TP 206 T TRA TP 207 **Level 2 :** T TRA TH 201 T TRA TH 204 T TRA TP 206 T TRA TP 208 **Level 3 :** T TRA TH 205	**Level 1 :** T TRA TH 260 T TRA TH 263 T TRA TP 266 T TRA TP 267 **Level 2 :** T TRA TH 261 T TRA TH 264 T TRA TP 266 T TRA TP 268 **Level 3 :** T TRA TH 262 T TRA TH 265	**Level 1 :** T TRA TH 240 T TRA TH 243 T TRA TP 246 T TRA TP 247 **Level 2 :** T TRA TH 241 T TRA TH 244 T TRA TP 246 T TRA TP 248 **Level 3 :** T TRA TH 242 T TRA TH 245
ASTM	ASTM E 1417	ASTM 1444	NÉANT	AMS 2154 ASTM E 2491	ASTM E 1742
AIRBUS F	AITM 6-1001	AITM 6-2001	AITM 6-6002 AITM 6-6003 AITM 6-6004 AITM 6-6005 AITM 6-6006	AITM 6-4001 AITM 6-4002 AITM 6-4003 AITM 6-4004 AITM 6-4005 AITM 6-4006 AITM 6-4007 AITM 6-4016	AITM 6-7002 AITM 6-7007
AIRBUS UK	ABP6-5230 AITM 6-1001	AITM 6-2001	AITM 6-6002 AITM 6-6003 AITM 6-6004 AITM 6-6005 AITM 6-6006	AITM 6-4001 AITM 6-4002 AITM 6-4003 AITM 6-4004 AITM 6-4005 AITM 6-4006 AITM 6-4007 AITM 6-4016	AB6-5346 AITM 6-7002 AITM 6-7007
SNECMA	DMC 010	DMC 070	DMC 080	DMC 020	DMC 050

TESTIA
AN AIRBUS GROUP COMPANY

Applicable documents
OF NDT TRAINING

PRIMES	PT	MT	ET	UT	RT
AIRBUS HELICOPTERS	EI 070 09-023 EI 070-09-039	EI 070-09-011	NÉANT	EI 070-09-042 EI 070-09-043 EI 070-09-035	EI 070-09-033
DASSAULT	DGQT 1.0.1.0286 DGQT 1.0.1.0020	DGQT 0.8.3.0050 DGQT 1.0.1.0073	DGQT 1.0.0.40 DGQT 1.0.0.44	NÉANT	DGQT 0.8.34 DGQT 1.0.1.0034
BOEING	BAC 5423 BSS7039	BAC 5424 BSS 7040	NÉANT	NÉANT	BAC 5652 BSS 7041
BOMBARDIER	BAPS 176002	BAPS176004	NÉANT	NÉANT	NÉANT
GENERAL ELECTRIC	P3TF2 P3TF47	P3TF9 P3TF48	NÉANT	P3TF35 P3TF22 P3TF32	P3TF5 P3TF38 P3TF37
HISPANO SUIZA	BLRJ080401	BLRJ080301	NÉANT	NÉANT	BLRJ080101
HONEWELL	EMS52309	EMS52308	NÉANT	EMS 52321	EMS52348
MESSIER BUGATTI DOWTY	PCS-3200 IFC 40-931-01	PCS-3100 IFC 40-932-01	NÉANT	NÉANT	NÉANT
P et W CANADA	CFPM-MASTER PW 2492	NÉANT	NÉANT	NÉANT	CXRM-1
ROLLS ROYCE	RRP 58003	RRP 58004	NÉANT	RRP 58001 RRP 58002	RRP 58007 RRP 58009
SAFRAN	Pr-5000 In 5000	Pr-5300 In 5300	Pr-5400	Pr-5100 Pr-5120 Pr-5125	Pr-5200 Pr-5250
TURBOMECA	CCT 00418	CCT 00616	CCT 00???	CCT 00573 CCT 00670	CCT 00624

TESTIA France

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PRÉC.