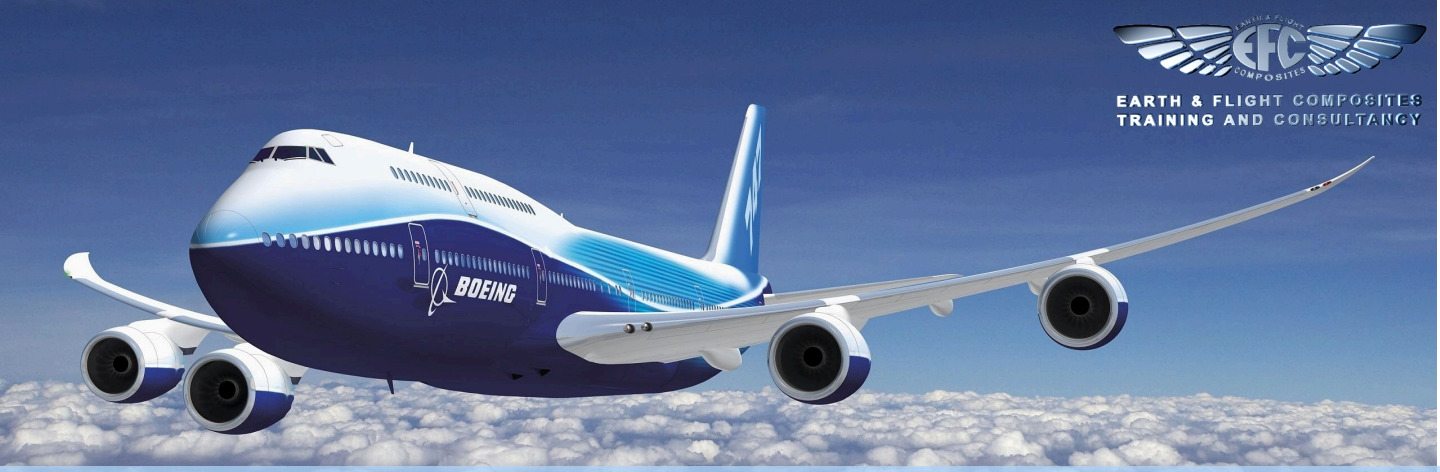


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# TECH-120 Advanced Aircraft Radome Composite Repair

## Introduction

**If you are looking to upgrade your career prospects in 2020 and learn more about Aviation Composites Radome Repair, this is your chance!**

**Enrol in this course. Aircraft Composite Radome repair is the Future for you!**

This curriculum made to meet the formal training requirement for technicians/specialists who already have several years of Aircraft Structural repair experience and who intend to extend their skills or specialize in Advanced Radome Repair.

Persons who complete this Radome repair training program can perform repairs to Aircraft Radomes in compliance with the manufacturers' repair documentation or other acceptable repair data.

Watch our composite video in the repair of aircraft radome step-cut repair.

**Course ID:** **EFC-TECH-120-Advanced Aircraft Radome Composite Repair**
**Course duration: 5 DAYS (40 hours) training course.**
**Course schedule: See "Course Schedule."**
**Onsite courses: On request, we can run this course onsite at your facility any time! If needed, we can ship a radome.**

**Watch our EFC YouTube film showing parts of the Radome Repair Hands-on practical.**

**Visit EFC's Facebook page also, for the latest composite training information and Like us!**

Enrol for our Radome composite repair course**.**

Abbreviations used:
· SAE: Society of Automotive Engineering
· SAE- CACRC: Commercial Aircraft Composite Repair Committee
· SAE- AIR: Aerospace Information Report
· SAE- ARP: Aerospace Recommended Practices
· FAA: Federal Aviation Administration
· EASA: Europian Union Aviation Safety Authority
· EFC: Earth & Flight Composite training recourses

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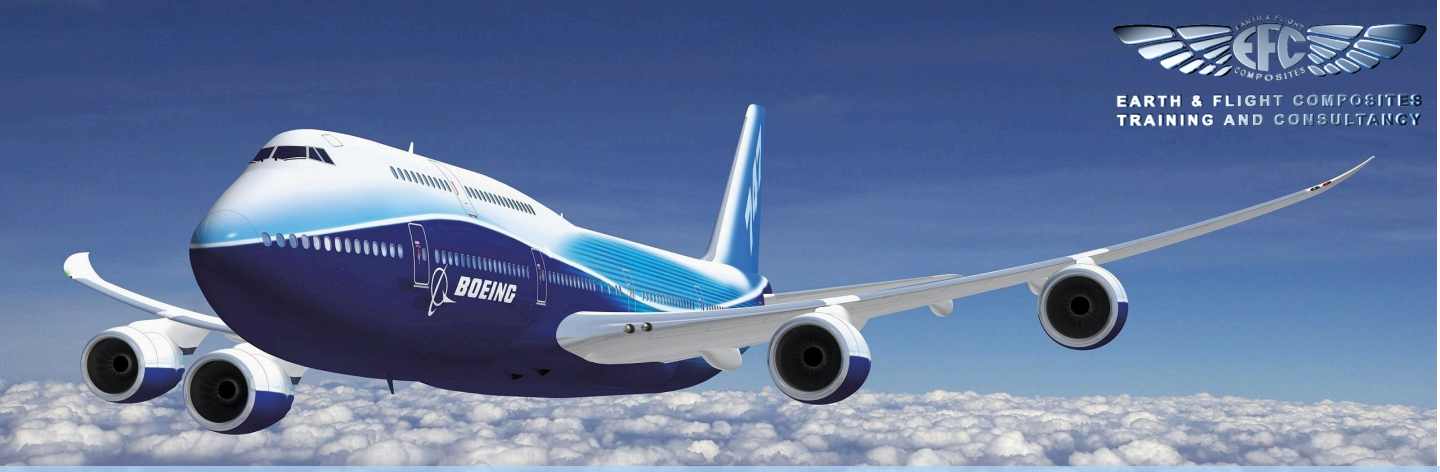


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# TECH-120 Advanced Aircraft Radome Composite Repair

## Introduction

This course complies with the guidelines of:

**1- SAE Publications:**

| | |
|---|---|
| AIR4844 | Composites and Metal Bonding Glossary |
| AIR5719 | Teaching Points for an Awareness Class on "Critical Issues in Composite Maintenance and Repair" |
| AIR/ARPs | Produced by repair technique task group |

**2- FAA and EASA Certifications:**

| | |
|---|---|
| Title 14 | Code of Federal Regulations, Part 147 |
| EASA AMC 20-29 | Composite Aircraft Structure |
| FAA AC 20-107B | Composite Aircraft Structure |
| FAA AC 65-33 | Development of Training/Qualification Programs for Composite Maintenance Technicians |
| FAA AC 43-214 | Repairs and Alterations to Composite and Bonded Aircraft Structure |

**To Aircraft Maintenance Repair & Overhaul (MRO stations and composite repair technicians in the maintenance of Aircraft Radomes:**

For an MRO composite repair station, an Aircraft radome is more than just a cover for your aircraft's radar unit. It's an integral part of your avionics system and some aerodynamics of the aeroplane.
The Radome is one of the essential parts of the aeroplane. It must be able to withstand the wind-, rain- and hail- forces of routine flight while providing a window through which the radar sends a signal.

That is why all radomes are repaired following approved OEM repair specifications by very skilled and well trained Composite Repair Technicians.
To repair damaged radomes by OEM specifications, you need to be skilled with many years of repair experience before you can do the job accordingly.

This is where we come in to provide you or your technicians with the best skill training and knowledge available!

Composite Shop Managers and Shop leads need to understand that Advanced Radome Repair requires far more added skills from an actual Composite Repair Technician than the default basics.

In our training centres in Amsterdam and Leipzig Germany, we train you as an individual or as a company Composite Repair Technician in Advanced Radome Repair.

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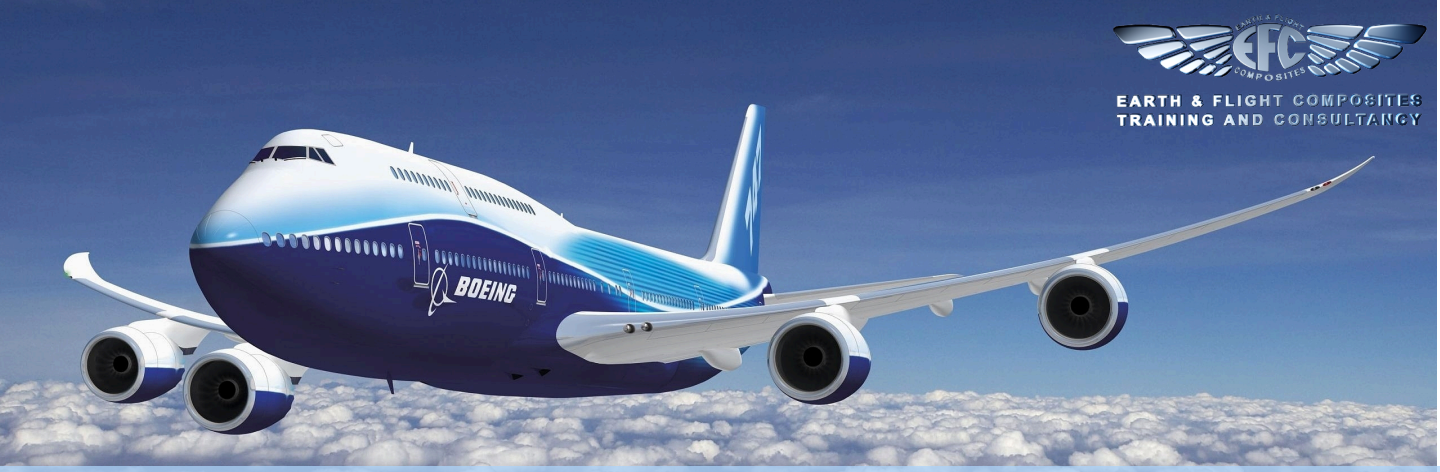


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TRAINING AND CONSULTANCY

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# TECH-120 Advanced Aircraft Radome Composite Repair

## Introduction

Our skilled instructor(s) are professional experts in advanced composite repair and specialized in all types of radome repair. In this course, we will offer you a range of tips and tricks in Radome repair methods and techniques.

EFC instructors perform repairs on a monthly base in-between class planning in assist of HEICO a Part 145 Certified Composite/Radome Repair station based in Leipzig Germany.

*Welcome to EFC Worldwide Composite Training Services*
*We provide Worldwide Composite Training Services.*
*Let us know when and where and we can perform any training onsite at your company facility!*

We provide training services to support you or your company. Bespoke course tailored to your company needs and we also have a whole a range of SAE-CARC standard courses designed to give you as participants the best knowledge and skills that you or your company is looking for. Please contact us to see if we EFC can help you to get you or your company the front row in the best performance.

**To Aircraft Maintenance Repair & Overhaul MRO stations Composite shops their managers and composite repair technicians in the maintenance of Aircraft Radomes:**

For an MRO Composite repair station, an Aircraft radome is more than just a cover for your aircraft's radar unit. It's an integral part of your avionics system and some aerodynamics of the aeroplane.
A radome is one **of the essential parts of the aeroplane.** It must be able to withstand the wind, rain and hail- forces of routine flight while providing a window through which the radar sents a signal.
That's why all radomes are repaired following approved OEM repair specifications by **very skilled and well trained Composite Repair Technicians with over more than five years**. in repair.
To repair damages on Aircraft Radomes by OEM specifications, you need to be skilled with many years of repair experience before you can do the job accordingly.
**There is where we come in and provide you as a composite technician with the best skill training and all the knowledge there is!**

C**omposite Shop Managers and Shop leads need to understand** that Advanced Radome Repair requires far more added skills from an actual Composite Repair Technician than he already has.
In our training centres in Amsterdam and at HEICO Aircraft Maintenance in Leipzig Germany, or onsite we train you as an individual or as a company in Advanced Radome Repair.

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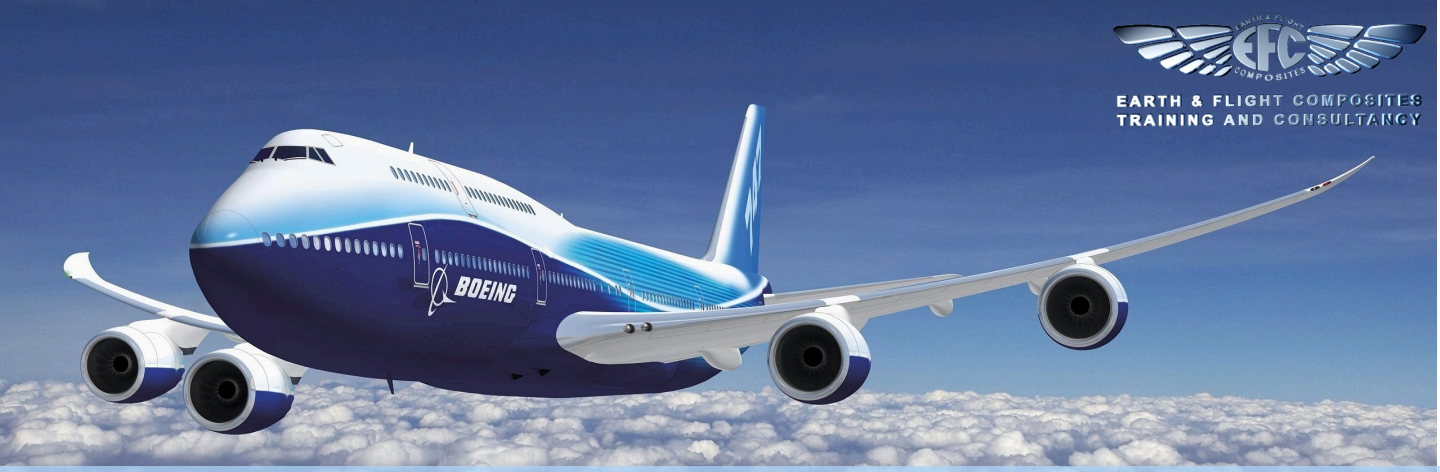


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# TECH-120 Advanced Aircraft Radome Composite Repair

## Introduction

Our skilled instructor(s) are professional experts in advanced composite repair and specialized in all types of radome repair. In this course, we will offer you a range of repair methods, techniques, which we instructors perform on a monthly base in-between class planning in assist of a  Part 145 organization in HEICO Germany. Certified Composite/Radome Repair company based  in the
We can train technicians in the repair of all type radomes such as surface erosion problems, extensive impact damage, full re-ring jobs/rebuilds, moisture ingress repair, and other repairs.
**For the technician, motivate your manager to contact us for enrolment on this unique course. Your repair skills are what you or your company needs in the repair of advanced Radomes.**
Training in the Fabrication of Radome Tooling for Repair is what we also are best in and a must-have for Composite repair technicians!

See also our EFC TECH-170 Tooling course (click on to see this course)
THE TECH-170 is a tooling course for advance tooling fabrication.
See also our EFC TECH-171 Advanced Tooling course (click on to see this course)
The TECH- is a tooling course for advance tooling fabrication

## Course duration

5 DAYS (40 hours) training course

## Advised pre-requisites

**If you are looking to upgrade your career prospects in 2020 and learn more about Aviation Advanced Composites Radome Repair, this your chance!**
Preferably our EFC TECH-001 Stage I, TECH-010 Stage II and TECH-020 Stage III, Composite courses.
Or equivalent **advanced** repair knowledge and Hands-On skills in the field.
**Enrol in this course. Aircraft Composite repair is the Future for you!**

## Participants

Personnel Technical Departments, preferably having previous experience of Aircraft Composite repair by the use of the Structural Repair Manual per OEM. The participants must also have a basic knowledge of aircraft structures.
(Please contact us for equivalence & test criteria at info@efcomposites.comst criteria at info@efcomposites.com

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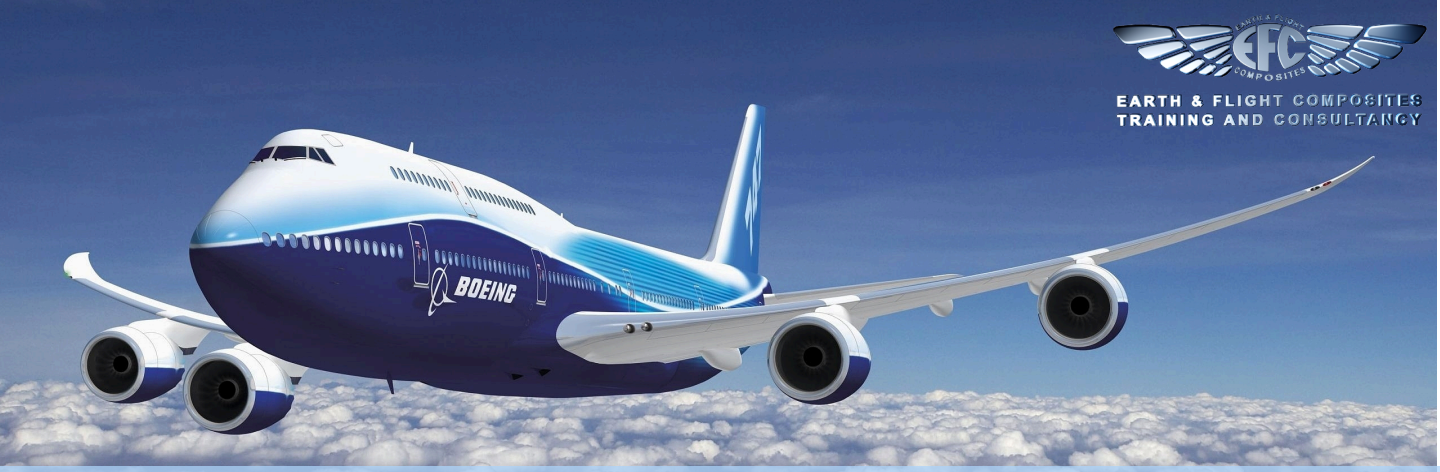


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# TECH-120 Advanced Aircraft Radome Composite Repair

## To MRO stations

As an MRO composite repair station, your Aircraft radome is more than just a cover for your aircraft's radar unit. It's an integral part of your avionics system.
An aircraft  Radome is one of the most critical parts of the aeroplane. It must be able to withstand the wind-, rain- and hail-forces of routine flight while providing a window through which the radar signal is sent. That's why all radomes are repaired following approved OEM repair specifications by very skilled Composite Repair Technicians.
To repair your damaged Radome(s) by OEM specifications, you need skilled and well trained Composite Repair Technician(s) that can do the job accordingly. Advanced Radome Repair requires far more added skills from a Composite Repair Technician than he already has.
In our training centre in Amsterdam, we train you as an individual or as a company Composite Repair Technician in Advanced Radome Repair.  Our skilled instructor s is a professional expert in advanced composites and specialized in all types of radome repair. In this course, we will offer you a range of repair methods, techniques, which the instructor performs on a monthly base in Part 145 Certified Radome Repair company based in the Netherlands and abroad.

## Objectives

At the end of this course, the participant:

- Can work independently with minimum supervision in the repair of standard size damages
- Must be attentive to details and takes great care in reair of radomes
- Knows how to apply damage assessment  and damage mapping
- Knows how to apply a Tap hammer test and interpret the sound to detect the total damaged area
- Knows how to use a stethoscope along with a tap hammer to have a more detailed damage area overview in a noisy area
- Can work according to Safety regulations and recognize hazardous situations & materials
- Can work with the OEM repair and maintenance manuals for Advanced Aircraft radome parts
- knows how to make a splash composite tool in support of the radome skin repair
- Knows material properties and is familiar with "Handling & Storage" of frozen repair materials and out-time registration
- Knows about the different type of core materials and placement
- Knows how to remove core materials with the use of the vacuum Felt/vacuum  tooling technique
- Can apply fundamental radome skin support (both sides) using the Felt /vacuum technique
- Knows how to repair hail and lightning strike damages
- Can apply dry cycles according to the OEM manual to remove water ingress
- Can apply debulks

(see next page for more)

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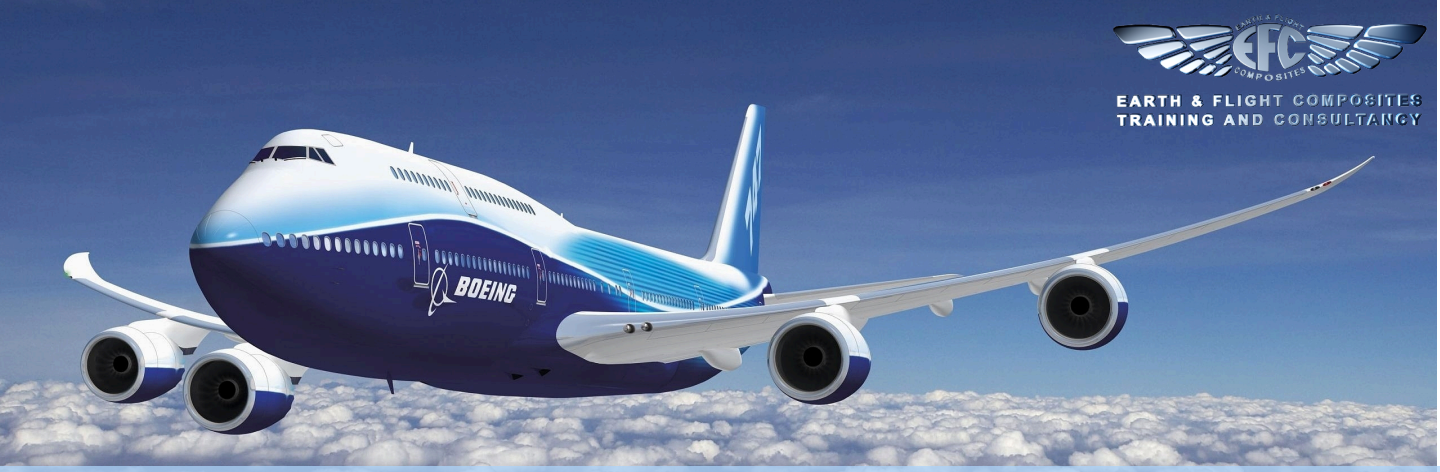


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# TECH-120 Advanced Aircraft Radome Composite Repair

## Objectives

At the end of this course, the participant:

- Can install a flexible core into the dome nose
- Can perform a damage assessment plan and work as planned
- Knows how to 23use a resin sweep according to the OEM-SRM
- Can find repair step to be taken in the Aircraft type related OEM-SRM-CMM manuals for Radomes
- Must be able to understand criteria as written in the SAE- ARPs "Aerospace Recommended Practices". and SAE AIR 4844 "Composites and Metal Bonded Glossary."

## Course content

*(Level 1-2)*

We discuss the following topics:

- Health and Safety (MSDS)
- Handling & Storage of materials
- Post Repair Inspection and Repair sequence Techniques
- Dry cycles removing moisture and water ingress
- Use of a moisture meter Type: (M50, JRTechnolegy, UK)
- Use of Felt support technique for repair
- Radome Standard Repair Materials and Repair Techniques
- OEM repair manuals like SRM, CMM., OHM, IPC
- Radome ply lay-up processes and ply lay-up drawings
- Core splicing chamfered crush splice
- Total dome replacement
- Sanding techniques
- Vacuum techniques  for Felt support material
- Sandwich structures
- Quick Support Tooling & Felt Technique for Repair
- Use of Re-Usable vacuum bags

(See next page for more)

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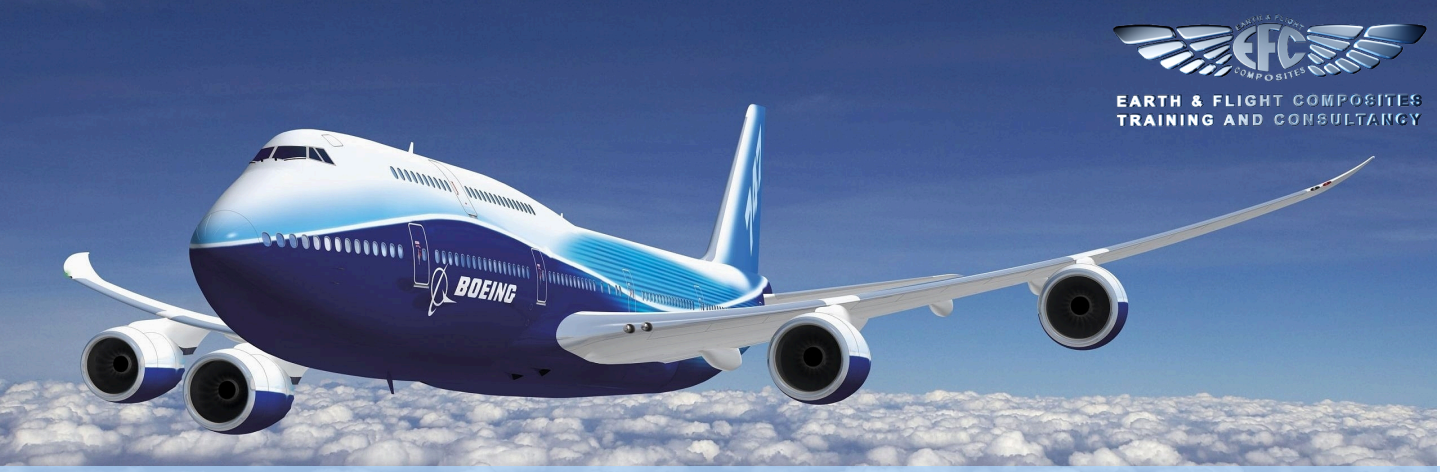


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# TECH-120 Advanced Aircraft Radome Composite Repair

## Course content

*(Level 1-2)*

We discuss the following topics:

- Lightning strike impact
- removal and zone tagging of fasteners and parts removed
- Hail impact and rain erosion effect
- Dry cycle applications
- NDI Inspection check, equipment, and transmission checks, moisture meter, Tap hammer, use of Stethoscope
- Hot bonding equipment from GMI Aero Paris, oven, hotbox & autoclave cure, and pressure processes
- LDS assembly, insert placement sealing of LDS and inserts
- Resin sweep
- Radome Fasteners re-installation of fasteners and bonded inserts
- Installation of frames and LDS with fasteners
- Oven & autoclave cures

## Workshop exercises

- OEM radome repair manual reading and compare between OEM types
- Cleaning and handling
- Repair damage inspection, photography, and record-keeping
- Damage mapping working with a grid
- Tap testing techniques with tap hammer & equipment and limitations
  Use of Steel tap hammer, Alu tap hammer rod and Boeing SRM tap hammer
- Moister measurement with JR moisture meter and water removal
- Resin injection repair method
- Repair of different radome damage type set-ups and their specific repair methods
- Actual use of Felt support techniques by vacuum
- Wet lay-up repair techniques on radomes
- Step repair cutting techniques in quarts glass and Aramid
- Quick Support Tooling usage, caul plate, and Felt support tooling technique
- Use of hot bonding equipment, heat blankets, and placement and insulation during cures
- Resin sweep
- Post Repair inspection and record-keeping

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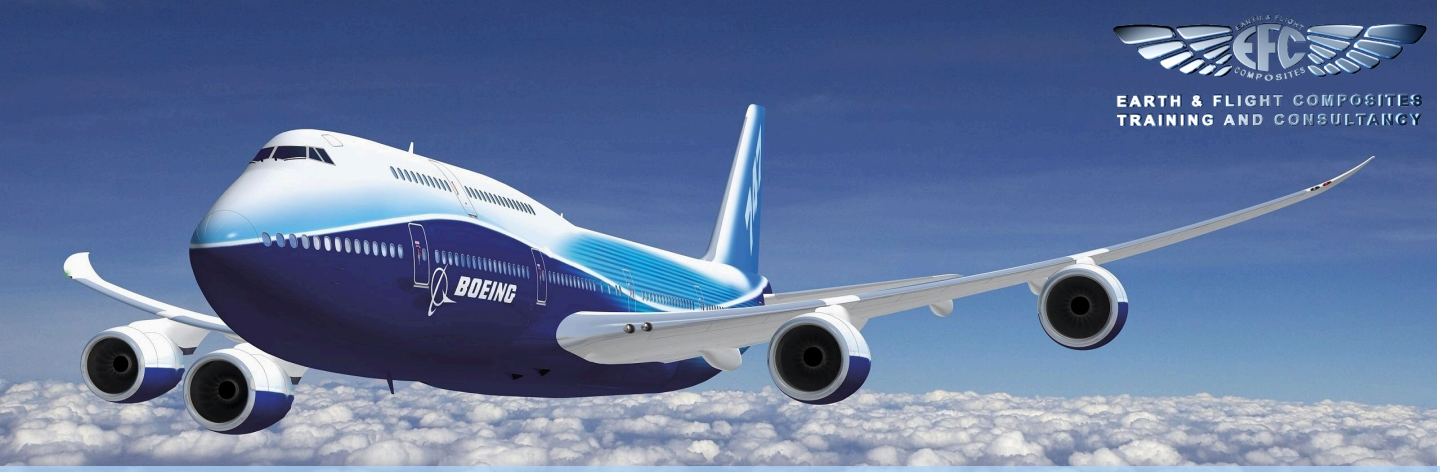


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# TECH-120 Advanced Aircraft Radome Composite Repair

## Examinations ((Ref: SAE-AIR4938 original par. numbering) )

- EFC as Training Providers will be required to monitor the student/participant's performance throughout the program.
- Students will be administered a practical certification assessment following laboratory classes. It is recommended to use a checklist to evaluate the practical certification assessment.
- The written certification examination and practical certification assessment will cover the principles of the applicable curriculum and consist of:
- The written Examination for certification shall contain approx. Eight (8) multiple-choice questions per course day with a maximum of fifty (50)* per exam.
- * The number depends on the use of three or four alternative answers per question
- The Examination shall contain questions from each of the Topics listed in the outline for each Part.
- The Examination will be a closed book.
- Successful completion is 75% correct answers
- Reexamination: If the student fails the written Examination, they may request to retake a written examination.
- The written Examination must not contain more than 20% of the questions that were on the failed Examination.

**Practical certification assessment:**
The student must demonstrate to the approved training provider that they can perform the necessary tasks required to complete the applicable repairs.

- All grades will be recorded in the participant individual training records and kept on paper at EFC for unlimited time (compliant with Reference EASA Commission Regulation (EU) No 1321/2014) and the GDPR rules
- A certificate of accomplishment is handed out for each participant
- Assessment activities are built into our courses, to give feedback on the achievement and personal potential and kept a record in their logbook.
- The outcome of the participant's Examination, assessment document and logbook per student will be digitally sent to you or your company responsible manager or HR department.

## Certification

Part 1 certification shall consist of documentation of successful completion of:

- A repair training program, the required exams, and assessments based on the curriculum of this AIR and conducted by a training provider following the guidance outlined in this AIR.
- OR successful completion of the required exams and assessments based on the curriculum of this AIR without completion of a training program. Attempting the exam and evaluation without training is not recommended for personnel without composite repair experience.

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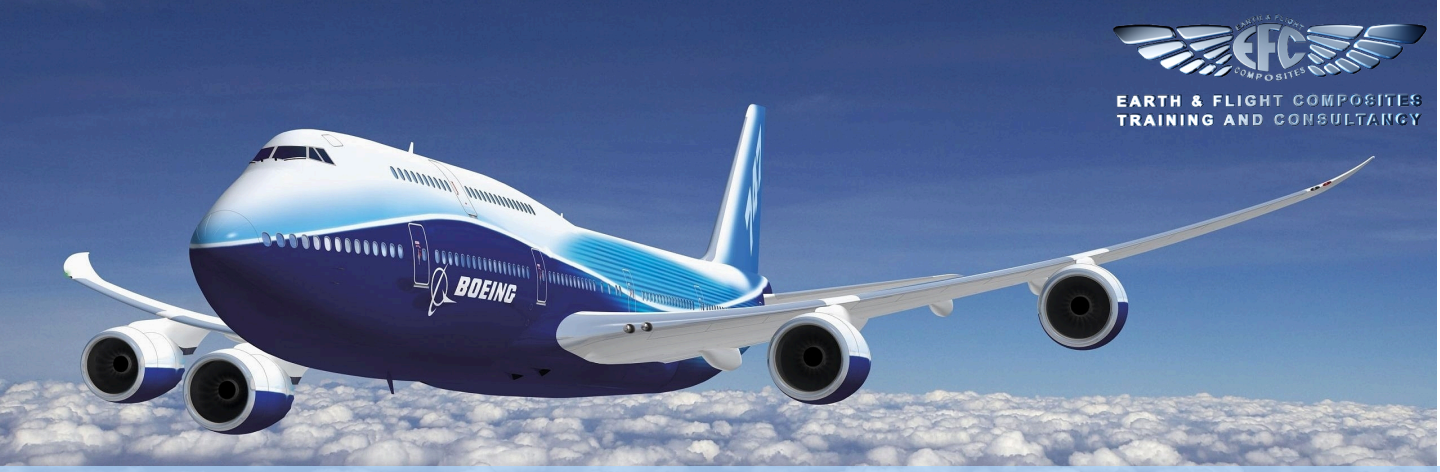


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# TECH-120 Advanced Aircraft Radome Composite Repair

## Certification

EFC SAE-AIR 4938C Part 2, Part 3, and Part 4 certification shall consist of successful completion of a repair training program, the required exams, and assessments based on the curriculum of this AIR and conducted by a training provider following the guidance outlined in this AIR.

**CURRENCY AND RECURRENT TRAINING RECOMMENDATIONS**

Currency: Personnel should demonstrate **continued competence every three years** by performing a repair or by completing a practical assessment under the direct supervision of an examiner authorized and designated by the organization or by having participated in or performed at least six repairs applicable to the specific certification (i.e. Part 1, Part 2, et al.) in the three years.

Please contact us for our currency or recurrent training program EFC TECH-0

**Recurrent Training:** A training program should include provisions for recurrent training to continually update persons on technology, materials, and other changes regarding composite and metal-bond maintenance and repair. The organization and the individual should maintain records of recurrent training.

## Records

The certifying agency or their designee shall maintain certification records for as long as certification is in effect and a minimum of 5 years after the certificate has expired. Such records shall be available for audit by authorized personnel. The training agency shall maintain training records for a minimum of 5 years. Such records shall be available for audit by authorized personnel.

EFC as an approved training provider complies with the European AVG/GDPR rules as effective on May, 25th, 2018 concerning the Storage of training records private information of participants who attended our courses. Students and participant sign their first day Administration form for approval of Storage of their training records

## CURRENCY AND RECURRENT TRAINING RECOMMENDATIONS

Currency: Personnel should demonstrate continued competence every three years by performing a repair or by completing a practical assessment under the direct supervision of an examiner authorized and designated by the organization or by having participated in or performed at least six repairs applicable to the specific certification (i.e. Part 1, Part 2, et al.) in the three years.

Please contact us for our currency or recurrent training program **EFC TECH-022 and TECH-023**

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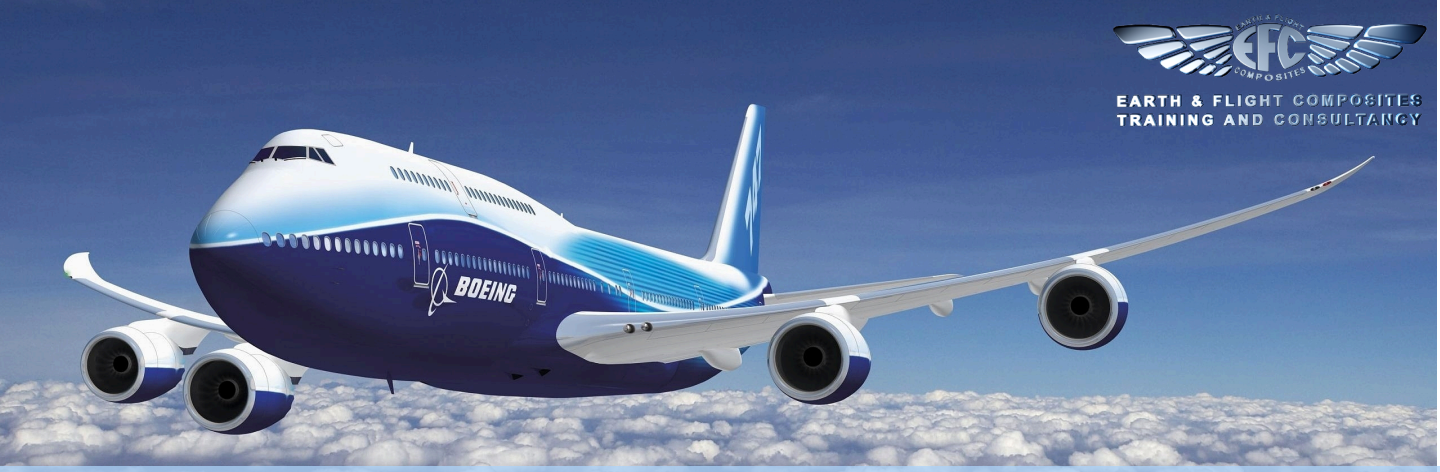


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# TECH-120 Advanced Aircraft Radome Composite Repair

*For information & requirements, contact us at e-mail at* info@efcomposites.com

Bert Groenewoud
EFC Founder/Owner

Info@efcomposites.com
Sept. 10, 2020