

AEROSPACE ASSEMBLY TECHNICIAN

Levels 1 - 5

Learners on this pathway gain the skills needed for the assembly, troubleshooting and repair of aircraft structures and systems. Beginning with the history of aviation, the pathway instructs learners in the evolution of aircrafts and their design, materials, and regulations. The pathway employs five levels covering 27 areas of expertise through 159 courses. Learners will take 180 hours to complete this pathway.

Level 1 focuses on the main systems of the aircraft, including mechanical, electrical, hydraulic, pneumatic and body and interior components. Level 2 delivers lessons on the fastening of airplane components through drilling and fastening. Level 3 concentrates on the assembly of wing and skin systems, including sealing, electrical connections and general wiring. Level 4 involves lessons on the structure, application and repair of composite materials. Finally, Level 5 continues the focus on composite materials and their drilling, fastening and repair.

Among the objectives for this pathway, learners will be able to:

- describe the history of aviation, the development of construction techniques for aircraft and the component parts of aircraft
- demonstrate the proper techniques of drilling and fastening of aircraft components
- employ the proper techniques for wing and skin assembly, as well as electrical components
- describe the development of composite materials, the materials used in their construction and tools and techniques for assembly, care and repair of composite components
- employ proper techniques for drilling composite materials and for their damage assessment and repair

Total # of Modules: 159

Total Hours: 180



AEROSPACE ASSEMBLY TECHNICIAN

Level 1

Aircraft Familiarization

- 1.5 The History of Aviation
- 1.6 Primary Assemblies of an Aircraft
- 1.7 Principles of Flight
- 1.8 Airplane Control
- 1.9 Aircraft Configuration
- 1.10 Aircraft Materials
- 1.11 Aircraft Construction
- 1.12 Aircraft Corrosion
- 1.13 Aircraft Regulations

Aerospace Sealing and Safety

- 1.14 Introduction to Sealing
- 1.15 Chemical Safety
- 1.16 Preparing the Surface
- 1.17 Selecting the Right Sealant
- 1.18 Applying the Sealant

Aerospace Electrical Bond and Ground

- 1.19 Electricity and the Airplane

Aerospace Wire Bundle Basics

- 1.20 Wiring in Airplanes
- 1.21 Wire and Cable Basics
- 1.22 Wire, Cable, and Wire Bundle Markings
- 1.23 Circular Connectors and Contacts
- 1.24 Installing a Connector
- 1.25 MTC Connectors
- 1.26 Tying Wire Bundles

Aerospace Systems

- 1.27 Flight Control Systems
- 1.28 Mechanical Systems
- 1.29 Landing Gear Systems
- 1.30 Aerospace Hydraulic Systems
- 1.31 Aerospace Pneumatic Systems
- 1.32 Electrical Systems
- 1.33 Propulsion Systems
- 1.34 Fuel Systems
- 1.35 Avionics Systems
- 1.36 Anti-Icing and De-Icing Systems
- 1.37 Environmental Systems
- 1.38 Window and Door Systems
- 1.39 Commercial Aircraft Structures

Level 2

Basic Drilling and Riveting

- 2.1 Marking Fastener Locations for Drilling Project
- 2.2 Setting Up the Drill Motor
- 2.3 Drilling Pilot Holes and Enlarging Holes
- 2.4 Deburring
- 2.5 Driving Protruding Head Rivets

Installing Advanced Fasteners Project

- 2.6 Assembly Preparation for Advanced Fasteners Project
- 2.7 Installing Nut Plates
- 2.8 Compression Riveting
- 2.9 Installing Bolts
- 2.10 Securing Bolts with Lockwire

Countersinking and Riveting Project

- 2.11 Marking Fastener Locations for Countersinking and Flush Riveting Project
- 2.12 Setting Up the Assembly and Drill
- 2.13 Drilling, Enlarging, and Deburring Holes
- 2.14 Setting the Countersink Tool (project)
- 2.15 Countersinking (project)
- 2.16 Flush Riveting

90 Degree Drilling Project

- 2.17 Assembly Preparation for 90 Degree Drilling Project
- 2.18 Installing 5/16 Inch HI-Loks
- 2.19 Installing 3/16 Inch HI-Loks
- 2.20 Installing Protruding Head Rivets
- 2.21 Removing Rivets in the 90 Degree Drilling Project
- 2.22 Removing 5/16 Inch HI-Loks

Drilling Titanium Project

- 2.23 Drilling Titanium
- 2.24 Marking Hole Locations for Drilling Titanium
- 2.25 Drilling Pilot Holes in Titanium
- 2.26 Drilling and Enlarging Holes in Row JD2
- 2.27 Enlarging Row JD7
- 2.28 Enlarging Rows JD4, JD5, and JD6
- 2.29 Enlarging Rows JD1 and JD3
- 2.30 Enlarging Row JD8
- 2.31 Chamfering
- 2.32 Edge Breaking and Deburring

Level 3

Wing Structure Project

- 3.1 Tools for Wing Structure Project
- 3.2 Preparing the Assembly for the Wing Structure Project
- 3.3 Countersinking and Fillet Relief
- 3.4 Installing Fasteners

Fuselage Skin Assembly Project

- 3.5 Preparing the Assembly for the Fuselage Skin Assembly
- 3.6 Drilling the Skin Panels
- 3.7 Preparing the Doubler
- 3.8 Countersinking
- 3.9 Assembly Finish and Fastener Installation
- 3.10 Removing Rivets in the Fuselage Skin Assembly

Sealant Applicant Processes Mechanical Project

- 3.11 Sealing Basics
- 3.12 Fay and Prepack Sealing
- 3.13 Fillet and Injection Sealing
- 3.14 Cap Sealing

Aerospace Electrical Bond and Ground Project

- 3.15 Electrical Bond and Ground Introduction
- 3.16 Pre-installed Ground Studs
- 3.17 Electrical Fay Surface Bonds
- 3.18 Direct Ground Stud
- 3.19 Fillet Sealing a Ground Stud
- 3.20 Fay Sealing a Direct Ground Stud

Aerospace Wire Bundle Installation Project

- 3.21 Clearance and Separation
- 3.22 Minimum Bend Radius
- 3.23 Clamping Wire Bundles - Part One
- 3.24 Tying Wire Bundles for the Wire Bundle Installation Project
- 3.25 Project Installation Plan
- 3.26 Project and Drawing Review
- 3.27 Pre-routing Wire Bundles
- 3.28 Clamping Wire Bundles - Part Two
- 3.29 Torque and Inspection

Level 4

Introduction to Composites

- 4.1 Background and History of Composites
- 4.2 Composite Industries and Products
- 4.3 Advantages and Disadvantages of Composites
- 4.4 Safety and Hazards of Composites

Composite Manufacturing Facilities

- 4.5 Facility Layout
- 4.6 Non-controlled Contamination Areas
- 4.7 Lay-up Area
- 4.8 Curing Area

Materials Used in Composites Manufacturing

- 4.9 Fiber Based Composites
- 4.10 Fibers, Tapes and Fabrics
- 4.11 Glass and Carbon Fibers
- 4.12 Matrix Types and Properties
- 4.13 Curing Process
- 4.14 Honeycomb Core Materials
- 4.15 Material Compatibility
- 4.16 Galvanic Reactivity
- 4.17 Core Potting Compounds

Composite Material Storage

- 4.18 Fiber Material Storage
- 4.19 Controlled Contamination Areas

Tools Used in Composite Manufacturing

- 4.20 Local Exhaust Ventilation
- 4.21 Forming Tools
- 4.22 Coefficient of Thermal Expansion
- 4.23 Forming Tool Inspection
- 4.24 Forming Tool Cleaning
- 4.25 Forming Tool Storage
- 4.26 Rollers and Sweeps
- 4.27 Overhead Laser System

Composite Material Kitting

- 4.28 Kitting with a Sheeter
- 4.29 Kitting by Hand
- 4.30 Kitting with Automated Machines

Level 4

Composite Part Layup and Bagging

- 4.31 Ply Balancing
- 4.32 Material Splicing
- 4.33 Wrinkles and Gaps
- 4.34 Pockets and Voids
- 4.35 Radius Filler Fabrication by Hand
- 4.36 Advanced Bagging
- 4.37 Bagging and Lay-up Equipment
- 4.38 Preparation for the Lay-up Process
- 4.39 Cure Cycle Controllers - Temperature Controls
- 4.40 Thermocouple Science

Inspecting Composite Parts

- 4.41 Introduction to Inspection of Composites
- 4.42 Visual Inspection for Composites
- 4.43 Ultrasonic Inspection for Composites
- 4.44 Tap Inspection for Composites

Inspecting Part Damage and Repair

- 4.45 Composite Repairs
- 4.46 Aircraft Damage
- 4.47 Damage Assessment
- 4.48 Repair Tools and Materials

Level 5

Composite Layup Projects

- 5.1 Unidirectional 4 Ply Lay-up
- 5.2 Carbon 8 Ply Lay-up with Core
- 5.3 Fiberglass 6 Ply Wet Lay-up

Drilling Composites Project

- 5.4 Drilling Composite Material
- 5.5 Marking Hole Locations
- 5.6 Drilling Pilot Holes in Titanium
- 5.7 Drilling Row JD3
- 5.8 Drilling Row JD7
- 5.9 Enlarging Holes in Rows JD1 and JD5
- 5.10 Enlarging Holes in Rows JD2 and JD6
- 5.11 Enlarging Holes in Row JD4

Composite Part Damage and Repair Project

- 5.12 Surface Damage Assessment
- 5.13 Surface Damage Repair
- 5.14 Disbonding Damage Assessment
- 5.15 Disbonding Damage Repair

