Overview

This standard identifies the competences you need to install aircraft de-icing systems in accordance with approved procedures. It covers both fixed wing and rotary winged aircraft and includes equipment and components associated with warm air, fluid, electrical heating, flexible surface systems, ice detection units and other systems, as applicable to the aircraft type. You will be required to select the appropriate tools and equipment to use, based on the operations to be performed and components to be installed.

The de-icing components to be installed will include items such as flexible and rigid pipework, control valves, piccolo tubes, reservoirs and supply tanks, pumps, heating units, cylinders and actuating mechanisms, mechanical and electrical controls and safety devices. The installation activities will include making all necessary checks and adjustments to ensure that components are correctly positioned and aligned, have appropriate travel and/or working clearances, are tightened to the correct torque and that they function as per the specification.

Your responsibilities will require you to comply with organisational policy and procedures for the installation activities undertaken and to report any problems with these activities that you cannot personally resolve, or that are outside your permitted authority, to the relevant people. You will ensure that all tools, equipment and materials used in the installation are correctly accounted for on completion of the activities and that all necessary job/task documentation is completed accurately and legibly. You will be expected to work with a minimum of supervision, taking personal responsibility for your own actions and for the quality and accuracy of the work that you carry out.

Your underpinning knowledge will provide a good understanding of your work and will provide an informed approach to applying instructions and procedures. You will understand the de-icing system, and its application, and will know about the components, tools and equipment used and the installation requirements, in adequate depth to provide a sound basis for carrying out the activities to the required specification.

You will understand the safety precautions required when working on the aircraft de-icing system and with its associated tools and equipment. You will be required to demonstrate safe working practices throughout
and will understand the responsibility you owe to yourself and others in the workplace.
Performance criteria

You must be able to:

1. work safely at all times, complying with health and safety and other relevant regulations, directives and guidelines
2. follow all relevant drawings and specifications for the installation being carried out
3. use the correct tools and equipment for the installation operations and check that they are in a safe and usable condition
4. install, position and secure the de-icing equipment and components in accordance with the specification
5. ensure that all necessary connections to the equipment are complete
6. deal promptly and effectively with problems within your control and report those that cannot be solved
7. check that the installation is complete and that all components are free from damage
8. complete the relevant documentation, in accordance with organisational requirements
9. leave the aircraft and the work area in a safe and appropriate condition, free from foreign object debris on completion of the activities
Knowledge and understanding

You need to know and understand:

1. the specific safety practices and procedures that you need to observe when working with de-icing systems (including any specific legislation, regulations/codes of practice for the activities, equipment or materials)
2. the health and safety requirements of the work area where you are carrying out the activities and the responsibility these requirements place on you
3. the hazards associated with installing aircraft de-icing systems and with the tools and equipment used and how to minimise them and reduce any risks
4. the protective equipment that you need to use for both personal protection (PPE) and protection of the aircraft
5. how to extract and use information from engineering drawings and related specifications (to include symbols and conventions to appropriate BS, ISO or BSEN standards) in relation to work undertaken
6. how to interpret first and third angle drawings, imperial and metric systems of measurement, workpiece reference points and system of tolerancing
7. how to carry out currency/issue checks on the specifications you are working with
8. the components to be installed and their function within the particular de-icing system
9. the various mechanical fasteners that will be used and their method of installation (such as open and blind rivets, threaded fasteners, special securing devices)
10. the importance of using the specified fasteners for the particular installation and why you must not substitute others
11. why securing devices need to be locked and labelled and the different methods that are used
12. the torque loading requirements of the fasteners and what to do if these loadings are exceeded or not achieved
13. the quality control procedures to followed during the installation operations
14. procedures for ensuring that you have the correct tools, equipment, components and fasteners for the activities
15. the techniques used to position, align, adjust and secure the
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components to the aircraft without damage
16. methods of lifting, handling and supporting the components/equipment during the installation activities
17. how to make pipe bends using fittings and by hand bending, using approved forming equipment
18. elimination of stress on pipework/connections and the importance of supporting at suitable intervals
19. the use of seals, sealant, adhesives and anti-electrolysis barriers and the precautions to be taken
20. why electrical bonding is critical and why it must be both mechanically and electrically secure
21. the procedure for the safe disposal of waste materials
22. how to conduct any necessary checks to ensure the system integrity, functionality, accuracy and quality of the installation
23. how to recognise installation defects (such as leaks, poor seals, misalignment, ineffective fasteners, foreign object damage or contamination)
24. the importance of ensuring that the completed installation is free from dirt, swarf and foreign object damage, and of ensuring that any exposed components or pipe ends are correctly covered/protected
25. the tools and equipment used in the installation activities and their calibration/care and control procedures
26. why tool/equipment control is critical and what to do if a tool or piece of equipment is unaccounted for on completion of the activities
27. the problems that can occur with the installation operations and how these can be overcome
28. the recording documentation to be completed for the activities undertaken and where appropriate, the importance of marking and identifying specific pieces of work in relation to the documentation
29. the extent of your responsibility and to whom you should report if you have problems that you cannot resolve
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Scope/range related to performance criteria

1. Carry out all of the following during the installation activities:
   1. obtain and use the appropriate documentation (such as job instructions, installation drawings, planning and quality control documentation, aircraft standards and specifications)
   2. adhere to procedures or systems in place for risk assessment, COSHH, personal protective equipment and other relevant safety regulations and procedures to realise a safe system of work
   3. provide and maintain a safe working environment for the installation activities
   4. obtain the correct tools and equipment for the activity, and check that they are in a safe, tested and usable condition and within current calibration date
   5. follow safe practice/approved installation techniques and procedures at all times
   6. return all tools and equipment to the correct location on completion of the installation activities
   7. dispose of waste materials in accordance with approved procedures

2. Install two of the following aircraft de-icing systems:
   1. warm air
   2. electrical heating
   3. flexible surface
   4. fluid
   5. other specific system

3. Apply installation methods and techniques to include three from:
   1. positioning and aligning
   2. setting travel or working clearance
   3. torque setting and locking fasteners
   4. earth bonding

4. Install de-icing components which include five of the following:
   1. rigid pipework
   2. control valves
   3. heating elements
   4. ice detection units
   5. hoses
   6. pumps
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7. filters
8. safety devices
9. air supply tanks
10. seals
11. fluid reservoirs
12. control units
13. cylinders/actuating mechanisms
14. mechanical controls (plungers, springs, rollers)
15. piccolo tubes
16. electrical mechanisms (such as solenoids, indicators, motors, switches)
17. other specific components

5. Use three of the following types of securing device:
   1. threaded fasteners
   2. screws
   3. quick-release fasteners
   4. locking devices
   5. torque load bolts
   6. electrical connectors
   7. pipe couplings

6. Produce installations which comply with one of the following standards:
   1. Civil Aviation Authority (CAA)/European Aviation Safety Agency (EASA)
   2. Ministry of Defence (MoD)
   3. Military Aviation Authority (MAA)
   4. Aerospace Quality Management Standards (AS)
   5. customer standards and requirements
   6. Federal Aviation Authority (FAA)
   7. company standards and procedures
   8. BS, ISO or BSEN standards and procedures
   9. manufacturers standards and procedures

7. Complete the relevant paperwork, to include one from the following and pass it to the appropriate people:
   1. build records
   2. job cards
   3. log cards
4. aircraft flight log
5. other specific recording method
Behaviours

You will be able to apply the appropriate behaviours required in the workplace to meet the job profile and overall company objectives, such as:

- strong work ethic
- positive attitude
- team player
- dependability
- responsibility
- honesty
- integrity
- motivation
- commitment
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