
Overview

This standard identifies the competences you need to assemble and disassemble experimental mechanical components to new models/experimental vehicles, in accordance with approved procedures. You will be required to assemble a range of mechanical sub-assembly units or components, specifically made or reworked for development to experimental vehicles, such as front suspension/brake sub-assembly, rear axle/brake sub-assembly, power unit sub-assembly, exhaust system sub-assembly, steering mechanism sub-assembly, cooling system sub-assembly, gearbox and transmission sub-assembly, complete internal body trim, complete external body trim and complete front and rear seat assemblies, by using a variety of assembly methods and techniques. You will also be expected to use a range of tools and specialist equipment associated with the assembly methods, and to check that the assembly has been completed to the level of accuracy and quality required by the specification.

Your responsibilities will require you to comply with organisational policy and procedures for the assembly activities undertaken, and to report any problems with the process that you cannot resolve, or that are outside your permitted authority, to the relevant people. 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 procedures appropriate to the assembly of mechanical sub-assembly units and components to the experimental vehicle. You will understand the assembly/disassembly methods and techniques used, and their application, and will know about the expected development process, 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 carrying out the assembly activities, especially those for jacking and supporting the vehicle and for safely isolating systems prior to dismantling. 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 the relevant instructions, assembly drawings and any other specifications
3. ensure that the specified components are available and that they are in a usable condition
4. use the appropriate methods and techniques to assemble and secure the components in their correct positions
5. check the finished assembly is complete and ready for tests to be carried out
6. dismantle the tested assembly and components to the agreed level using appropriate tools and techniques
7. deal promptly and effectively with problems within your control and report those that cannot be solved
8. ensure that work records are completed, stored securely and available to others as per organisational requirements
9. leave the work area in a safe condition on completion of the activities, as per organisational and legal requirements

Knowledge and understanding

You need to know and understand:

1. the specific safety precautions to be taken whilst carrying out the activities (including any specific legislation, regulations or codes of practice relating to the activities, equipment or materials)
2. the health and safety requirements of the work area and the activities, and the responsibility these requirements place on you
3. the hazards associated with the activities, and how to minimise them and reduce risks
4. the personal protective equipment and clothing (PPE) to be worn during the activities
5. the procedures for obtaining the various types of drawing, job instructions and specifications that are used during the assembly and dismantling of sub-assemblies and associated components to the vehicle, and how to interpret them correctly
6. how to identify the components to be used; component identification systems (such as codes and component orientation indicators)
7. the assembly and dismantling methods and procedures to be used, and the importance of adhering to them
8. how the sub-assemblies and associated components are to be aligned and positioned prior to securing, and the tools and equipment that are used (such as jigs and fixtures)
9. the various mechanical fasteners that will be used, and their method of installation and dismantling (such as the use of threaded fasteners, set and self-tap screws, welded fasteners)
10. the application of sealants and adhesives within the assembly activities, and the precautions that must be taken when working with them
11. the company coding procedure for component variants to meet customer requirements
12. the functions of the various sub-assemblies and associated components
13. the use of torque wrenches, and the importance of ensuring that fasteners are adjusted to required settings
14. the consumables, tools and equipment that are used for the assembly of sub-assemblies and associated components to the vehicle

15. the importance of using the specified fasteners for the assembly, and why you must not use substitutes
16. the importance of ensuring that the completed assembly is free from left-over items and foreign objects
17. the methods and equipment used to transport, lift and handle the sub-assemblies and components into position, and how to check that the equipment is within its current certification dates
18. preparations to be undertaken on the sub-assemblies, associated components and fixing points prior to fitting the sub-assemblies and associated components into the vehicle
19. how to deal with components or fastening devices that are incorrectly assembled, damaged or have other faults
20. the quality control procedures to be followed during the assembly operations
21. the types of tests which the assemblies will be subjected to
22. how to adjust and make minor alterations to sub-assembly alignment, where appropriate, to meet specifications
23. the procedure to check that the developed assembly units meet the specification and quality control requirements
24. how to recognise defects (such as incorrect assembly, ineffective fasteners, foreign object damage)
25. how to check that the tools and equipment to be used are correctly calibrated and are in a safe, tested and serviceable condition
26. the importance of ensuring that all tools are used correctly and within their permitted operating range
27. the problems that can occur with the development activities on experimental vehicles and how these can be overcome
28. the extent of your own responsibility and to whom you should report if you have problems that you cannot resolve
29. how to access, use and maintain information to comply with organisational requirements and legislation

Scope/range related to performance criteria

1.

Carry out all of the following during the assembly, dismantling and re-assembly activities:

- 1.1 obtain and use the appropriate documentation (such as job instructions, drawings, specifications, planning and quality control documentation)
- 1.2 adhere to procedures or systems in place for risk assessment, hazardous substances, personal protective equipment and other relevant safety regulations and procedures to realise a safe system of work
- 1.3 use safe and approved techniques to dismantle and re-assemble sub-assemblies and components to the vehicles
- 1.4 check that all tools and measuring equipment to be used are within current calibration/certification dates
- 1.5 ensure that sub-assemblies and components used are free from damage, foreign objects, dirt or other contamination before assembling them
- 1.6 return all tools and equipment to the correct location on completion of the fitting activities
- 1.7 leave the work area and machine in a safe and appropriate condition on completion of the activities

2.

Assemble three of the following sub-assembly units and/or associated components, to an experimental vehicle:

- 2.1 front suspension/brake sub-assembly unit
- 2.2 cooling system sub-assembly
- 2.3 rear axle/brake sub-assembly unit
- 2.4 gearbox and transmission sub-assembly
- 2.5 power unit sub-assembly
- 2.6 complete internal body trim
- 2.7 exhaust system sub-assembly
- 2.8 complete external body trim
- 2.9 steering mechanism sub-assembly
- 2.10 complete front and rear seat assemblies

3.

Use a variety of assembly and disassembly methods and techniques, to include four of the following:

- 3.1 bolts
- 3.2 staples
- 3.3 sealants
- 3.4 clip/push fasteners
- 3.5 drive/interference fits
- 3.6 rivets
- 3.7 adhesives

- 3.8 weld nuts/bolts
- 3.9 set/self-tap screws

4.

Assemble and disassemble components using three of the following devices:

- 4.1 jigs
- 4.2 spring compression devices
- 4.3 torque drivers
- 4.4 alignment devices
- 4.5 fixtures
- 4.6 power drivers
- 4.7 sub-assemblies cradles
- 4.8 lifting devices

5.

Assemble the sub-assembly unit into the experimental vehicle using/modifying, as appropriate, four of the following components:

- 5.1 locators
- 5.2 pipes/hoses and connectors
- 5.3 spring/snap clips
- 5.4 control wires and rods
- 5.5 strengtheners
- 5.6 cables and connectors
- 5.7 positional brackets
- 5.8 foam/padding
- 5.9 terminals
- 5.10 mounting brackets
- 5.11 special connectors
- 5.12 adhesive/tape

6.

Carry out one of the following test activities:

- 6.1 pass to physical testing department
- 6.2 hot/cold test
- 6.3 destructive test
- 6.4 new vehicle/component performance check
- 6.5 life expectancy test
- 6.6 environmental test

7.

Disassemble units from the experimental vehicle, to carry out one the following checks on the completion of development test:

- 7.1 breakages
- 7.2 contamination
- 7.3 wear
- 7.4 seizures
- 7.5 loose connections
- 7.6 distortion

- 7.7 visual indicators
- 7.8 leaks
- 7.9 securing devices

8.

Check that mechanical equipment assembled or to, or dismantled from experimental vehicles complies with one of the following:

- 8.1 current standards, codes of practice and legislation
- 8.2 customer standards and requirements
- 8.3 company standards and procedures
- 8.4 specific system development/experimental requirements

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