

Dressing engines for motorsport vehicles

Overview

This standard identifies the competences you need to carry out assembly operations to dress engines for motorsport vehicles, in accordance with approved procedures. You will be required to obtain all the required tools and equipment for the assembly/dressing operations, and to check that they are in a safe and usable condition. In carrying out the assembly operations, you will be required to follow laid-down procedures and specific assembly techniques, in order to assemble the various components onto the engine. The assembly activities will also include making all necessary checks and adjustments, to ensure that components are correctly orientated, positioned and aligned, that moving parts have the correct working clearances, that all fasteners are tightened to the correct torque, and that the assembled parts function as per 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 assembly activities, materials or equipment that you cannot personally resolve, or that are outside your permitted authority, to the relevant people. You will be expected to ensure that all tools, equipment and materials used in the assembly are correctly accounted for on completion of the activities, and to complete all necessary job/task documentation 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 the appropriate assembly dressing techniques and procedures to engines for motorsport vehicles. You will understand the motorsport engine being dressed, and its application, and will know about the equipment, relevant components and fastening devices, 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. You will be required to demonstrate safe working practices throughout, and will understand the responsibility you owe to yourself and others in the workplace.

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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. assemble the components in their correct positions using appropriate methods and techniques
5. secure the components using the specified connectors and securing devices
6. check the completed assembly to ensure that all operations have been completed and the finished assembly meets the required specification
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

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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 specific safety precautions to be taken whilst carrying out the dressing of motorsport engines (including any specific legislation,
6. the various types of drawing and specification that are used during the engine dressing and assembly activities
7. how to identify the components to be used; component identification systems (codes and component orientation indicators)
8. preparations and inspections to be undertaken on the components prior to fitting them onto the engine
9. the engine dressing/assembly methods and procedures to be used, and the importance of adhering to the procedures
10. how the components are to be aligned and positioned prior to securing, and the tools and equipment that are used (including jigs and fixtures)
11. the various mechanical fasteners that will be used, and their method of installation (threaded fasteners, special securing devices)
12. the importance of using the specified fasteners for the assembly, and why you must not use substitutes
13. how to complete basic fitting practices, meeting regulatory and organisational requirements (torque tightening, wire locking, fitting wire thread inserts, fitting O-ring seals, fitting lock nuts and tab washers)
14. how to deal with components or fastening devices that are incorrectly assembled, damaged or having other faults
15. the application of sealants and adhesives within the dressing/assembly activities, and the precautions that must be taken when working with them
16. the quality control procedures to be followed during the dressing/assembly operations
17. how to conduct any necessary checks to ensure the accuracy and quality of the dressed engines

18. how to detect assembly defects, and what to do to rectify them (such as ineffective fasteners, foreign object damage)
19. how to move large components and assemblies, the methods and equipment used to transport, handle and lift the components into position, and how to check that the equipment is within its current certification dates
20. how to check that the tools and equipment to be used are correctly calibrated and are in a safe, tested and serviceable condition
21. the importance of ensuring that all tools are used correctly and within their permitted operating range
22. the importance of ensuring that the completed engine is free from dirt, swarf and foreign objects
23. the importance of ensuring that all tools, equipment and components are accounted for and returned to their correct location on completion of the engine dressing/assembly activities
24. the problems that can occur with the engine dressing activities and how they can be avoided
25. the importance of informing appropriate people of non-conformances
26. the extent of your own responsibility and to whom you should report if you have problems that you cannot resolve
27. 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 engine dressing activities:

1. obtain and use the appropriate documentation (such as job instructions, engine assembly drawings, specifications, quality control documentation and other related documentation)
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
3. provide and maintain safe access and working arrangements for the engine dressing area
4. check that all tools and measuring instruments to be used are in a safe and usable condition and are within current calibration dates
5. ensure that the required components are available and have the correct part numbers
6. use safe and approved assembly techniques and procedures at all times
7. ensure that the engine is maintained free from damage and foreign objects
8. return all tools and equipment to the correct location on completion of the activities
9. dispose of waste items in a safe and environmentally acceptable manner
10. leave the engine and work area in a safe and appropriate condition and ready for testing

2. Dress engines for one of the following types of motorsport vehicle:

1. single seater
2. kart
3. rallying
4. historic
5. sports car
6. other specific approved competition vehicle

3. Use five of the following assembly methods and techniques:

1. assembly of components by pressure
2. applying sealant/adhesives
3. aligning components
4. drilling and riveting
5. setting working clearances
6. earth bonding of components

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7. torque setting of fasteners
 8. securing components using mechanical fasteners and threaded devices
 9. making connections to electrical components and harnesses
 10. applying bolt locking methods (split pins, wire locking, lock nuts, stiff nuts)
4. Dress the engine, by fitting ten of the following:
1. engine mountings
 2. sensors (such as temperature, pressure, fire)
 3. fuel pipes
 4. manifolds
 5. oil pipes
 6. pumps (such as fuel, coolant, oil)
 7. electronic control units
 8. air pipes
 9. coolers (such as air, oil, fuel)
 10. electrical harnesses/looms
 11. brackets
 12. filters (such as fuel, oil, air)
 13. primary exhaust systems
 14. sump pans
 15. valves (such as solenoid, bleed, pressure)
 16. turbo chargers/super chargers
 17. heat exchangers (such as oil, water)
 18. air intake systems (such as air boxes and plenums)
 19. charging/starting components
 20. clutch assemblies
5. Carry out all the required checks for accuracy, using the correct inspection testing equipment, to include:
1. freedom from damage or foreign objects
dimensions
 2. operating/working clearance
 3. alignment
 4. torque loadings
 5. completeness
 6. positional accuracy
 7. orientation
 8. freedom of movement
6. Check dressed engine assemblies for motorsport vehicles comply with one of the following:
1. race associations
 2. legislation, current industry standards, codes of practice and

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- procedures
- 3. vehicle manufacturer's specification
- 4. customer standards and requirements
- 5. team/company standards and procedures
- 6. specific vehicle requirements

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