

Setting up motorsport vehicles

Overview

This standard identifies the competences you need to set up a motorsport vehicle prior to a competition, in a recognised sequence and to a high standard. This will involve preparing a flat area prior to setting up the vehicle, and following a recognised procedure to check and adjust camber, castor, toe-in, ride heights, bump steer, corner weights using hand tools, specialist tools and test equipment, in accordance with approved procedures. It covers motorsport vehicles such as single seater, rally cars, sports cars, karts, historic vehicles and other specific approved competition vehicles.

In carrying out the activities, you will be required to use a range of set up techniques, tools and equipment. You must be able to use recognised methods for checking and adjusting chassis dynamic and aerodynamic components, against the set-up documentation required for the vehicle, and within the team's or regulation guidelines. You will be expected to produce evidence of following the team's procedures for setting up motorsport vehicles prior to a competition. You must be able to understand and use the correct tools and equipment for the vehicle being set up.

Your responsibilities will require you to comply with organisational policy and procedures for the set up activities undertaken, and to report any problems with these activities, or with the tools and equipment used that you cannot personally resolve, to the relevant people. You must ensure that all tools, equipment and materials used in the set up activities are removed from the vehicle and work area on completion of the activities, and that all necessary job/task documentation is completed accurately and legibly.

You will be expected to work as a member of a team, 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. Where team working is involved, you must demonstrate a significant personal contribution during the team activities, in order to satisfy the requirements of the standard and competence in all the areas required by the standard must be demonstrated.

You must be able to show that you can competently clean the work area that you are responsible for, including tidying up bays or garages to a standard that will reflect the professional image of the team. You must show that you can maintain the tools and equipment needed for the set up activities, and return them to their recognised storage area ready for further use.

Your underpinning knowledge will provide a good understanding of your work, and will provide an informed approach to applying the appropriate set up procedures prior to, during or following a motorsport event or competition. You will know how the equipment functions, the common problems that can occur, the purpose of the individual components and associated defects, in adequate depth to provide a sound

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basis for carrying out the set up activities and for ensuring that the equipment functions to the required standard.

You will understand the safety precautions required when carrying out motorsport vehicle set up activities, especially those for lifting and supporting vehicles. You will be required to demonstrate safe working practices throughout, and will understand your responsibility for taking the necessary safeguards to protect 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, set up sheets and any other specifications
3. plan the setting up activities before you start them
4. obtain and prepare tools and ancillary equipment for the set up work to be carried out
5. carry out the setting up activities, using approved tools, methods and techniques
6. take suitable precautions to prevent damage to components and surrounding systems
7. report any instances where the setting up activities cannot be fully met or where there are identified issues outside the planned activities
8. discuss the findings of the set up with the relevant person before deciding on any modifications needed
9. use the evidence you have gained during the setting up activities to improve future reliability and performance of the motorsport vehicle
10. check that all operations have been completed to specification
11. ensure that work records are completed, stored securely and available to others as per organisational requirements
12. 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 procedures for obtaining the various types of set up sheets, job instructions and specifications that are used during the setting up of motorsport vehicles, and how to interpret them correctly
6. the tools and equipment to be used for the setting up of the motorsport vehicles and how to identify the different types of set up equipment to be used
7. the operational function of the set up equipment to be used
8. how to check that the equipment is within its calibration parameters, and that tools are in a safe, tested and serviceable condition
9. the set up methods and techniques to be used to meet the team's requirements, and the importance of adhering to these procedures
10. how the set up adjustments are to be made and why they must adhered to when setting up a motorsport vehicle for a competition
11. the various mechanical fasteners that will be used and their method of installation (readed fasteners, quick release fasteners, aerodynamic fasteners)
12. the importance of using the specified fasteners for the set up and why you must not use substitutes
13. the use of torque wrenches and the importance of ensuring that fasteners are adjusted to the required settings
14. dealing with components or fastening devices that are incorrectly adjusted, damaged or have other faults
15. the application of sealants and adhesives within the set up activities, and the precautions to be taken when working with them
16. the quality control procedures to be followed during the set up activities
17. the various tests and checks to be carried out on completion of the set up activities
18. how to recognise set up problems (inability to set to correct specification)
19. the importance of ensuring that the completed motorsport vehicle is free from foreign objects, dirt or other contamination
20. the importance of ensuring that all tools are used correctly, checked

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- and stored after use
- 21. problems with the setting up activities and the importance of informing appropriate people of non-conformances
- 22. the extent of your own responsibility and to whom you should report if you have problems that you cannot resolve
- 23. 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 set up activities:
 1. obtain and use the appropriate documentation (such as job instructions, company and/or manufacturer's specification, set up information and 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. ensure that appropriate environmental conditions can be met
 4. ensure that the work area is suitably prepared for the set up to take place
 5. position and secure the vehicle, using the correct equipment
 6. provide safe access and working arrangements for the set up area
 7. ensure that correct personal protective equipment is worn for the task being undertaken
 8. ensure that any required specific set up equipment is available
 9. dispose of waste items in a safe and environmentally acceptable manner
 10. leave the work area in a safe and appropriate condition and free from foreign object debris
2. Set up one of the following types of motorsport vehicle:
 1. single seater
 2. sports cars
 3. historic vehicles
 4. rallying
 5. karts
 6. other specific approved competition vehicles
3. Use appropriate methods and techniques to set up a motorsport vehicle, to include all of the following:
 1. selecting and preparing an appropriate flat area for setting up the vehicle
 2. determining the appropriate amount of ballast required for the vehicle (where appropriate)
 3. using the correct equipment for jacking the vehicle when making adjustments
 4. setting, aligning and adjusting motorsport vehicle components
 5. making mechanical connections
 6. tightening fastenings to the required torque

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7. removing all bodywork, fairings, covers and hatches, and storing them correctly
 8. ensuring that the motorsport vehicle is supported on the appropriate stands/supports prior to being worked on
 9. obtaining all the required tools and equipment for carrying out a motorsport vehicle set up, and checking that they are in a safe, tested and usable condition
 10. ensuring that the set up activity is carried out in the correct sequence
4. Use six of the following during the set up activities:
1. pressure gauges
 2. angle gauges
 3. ride height measuring tools
 4. toe-in equipment
 5. camber gauges
 6. levelling devices
 7. corner weight scales
 8. data calibration devices
 9. Ackerman plates
 10. castor gauges
 11. bump steer gauges
5. Make eight of the following motorsport vehicle set up adjustments:
1. measure and adjust ride heights
 2. wing settings
 3. measure and adjust bump steer
 4. change road springs
 5. check and adjust cambers
 6. adjust drive chain tension
 7. check and adjust castor
 8. change sprocket ratio
 9. check and adjust damper packer clearances
 10. check operation/calibration of data sensors
 11. check and adjust toe-in
 12. check and adjust damper settings
 13. check and adjust corner weights
 14. check and adjust track or wheelbase
 15. calculate total vehicle weight
 16. check and adjust anti-dive or squat
 17. other specific set up adjustment
6. Carry out regulation checks to the motorsport vehicle, to include four of the following:
1. overall track width
 2. operation of lighting systems

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3. wheelbase
 4. bumper overhangs
 5. front wing dimensions
 6. ground clearance
 7. rear wing dimensions
 8. minimum weight
 9. other specific regulation check
7. Check the set up of the motorsport vehicles complies with one of the following:
1. race associations
 2. vehicle manufacturer's specification
 3. team/company standards and procedures
 4. specific vehicle requirements

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