
Overview

This standard identifies the competences you need to carry out the removal and refitting of motorsport steering systems and other components, such as racks, rack tubes, pinions, toe links, Ackermann plates, columns, pumps, transfer boxes, data sensors and 'lived' components, in accordance with approved procedures.

It covers a range of motorsport vehicles such as single seater, rallying, sports cars, karts, historic and other specific approved competition vehicles. The removal and refitting methods and techniques will include dismantling the equipment to sub-assembly and component level, protecting exposed components, checking components for serviceability, making mechanical and electrical connections, releasing stored pressure, setting, aligning and adjusting refitted components, tightening fasteners to the required torque, and replenishing oils, greases and fluids.

On completion of the removal and refitting activities, you will be required to carry out a range of final checks, tests and adjustments, such as checking for hydraulic fluid leaks, starting and running the engine to ensure that the system meets the required specification.

Your responsibilities will require you to comply with organisational policy and procedures for the removal and refitting 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 must ensure that all tools, equipment and materials used 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 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.

Your underpinning knowledge will provide a good understanding of your work, and will provide an informed approach to applying the appropriate removal and refitting techniques and procedures to motorsport steering systems and components. You will understand the removal and refitting methods and procedures, and their application. 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 basis for carrying out the removal and refitting activities, correcting faults and ensuring that the equipment is replaced to the required standard. You will also have sufficient knowledge of these components to ensure that they are fit for

purpose and meet the specifications, thus providing a sound basis for carrying out the refitting activities.

You will understand the safety precautions required when working on motorsport vehicles, especially those for isolating the equipment. 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.

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, vehicle manuals and publications to carry out the required work
3. remove and refit the components in their correct positions using appropriate methods and techniques
4. take suitable precautions to prevent damage to components and surrounding structure
5. ensure that the removed components are clean and free from dirt, oil and debris, and that they are in a usable condition, prior to being refitted and tested
6. replace and secure the components, using the specified connectors and securing devices
7. check all operations have been completed and that the finished assembly meets the required specification
8. label and store components that require repair or overhaul
9. deal promptly and effectively with problems within your control and report those that cannot be solved
10. ensure that work records are completed, stored securely and available to others as per organisational requirements
11. 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 manual/drawing, job instructions and specifications that are used during the removal and refitting of steering systems to motorsport vehicles, and how to interpret them correctly
6. how to identify different types of motorsport steering systems and components
7. the removal and refitting methods and techniques to be used, and the importance of adhering to these
8. how the components are to be aligned and positioned prior to securing, and the tools and equipment that are used (including jigs and fixtures)
9. the various mechanical fasteners and other components that are used (threaded fasteners and studs, hose fittings, 't' and bulkhead fittings, and other specialised fasteners)
10. the application of greases, sealants and fluids within the removal and refitting activities, and the precautions that must be taken when working with them
11. the company 'lifing' procedure for components, to meet the team's requirements
12. the use of torque wrenches, and the importance of ensuring that fasteners are adjusted to the required settings
13. how to charge the steering system with fluid and carry out the bleeding activities (to include the use of bleeding equipment or procedures)
14. how to set and adjust operating pressures for power assisted steering systems, and the equipment used for these activities
15. the tools and equipment used for removing and refitting steering systems to a motorsport vehicle
16. the importance of using the specified fasteners for the removal and refitting activities, and why you must not use substitutes
17. dealing with components or fastening devices that are incorrectly fitted damaged or have other faults
18. the quality control procedures to be followed during the removal and

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- refitting activities
19. the various tests, checks and adjustments to be carried out on completion of steering removal and refitting activities
 20. how to recognise defects (incorrect removal and refitting, ineffective fasteners, component damage, fluid leaks)
 21. the importance of ensuring that the completed assembly is free from foreign objects, dirt or other contamination
 22. the preparations to be undertaken on the components and fixing points, prior to fitting the components to the vehicle (including ensuring that exposed component openings and hose fittings are free from dirt and foreign bodies)
 23. the importance of ensuring that power assisted steering fluid is of the correct type and is set to the correct level, prior to use of the vehicle
 24. how to check that the tools and equipment to be used are correctly calibrated, and are in a safe and serviceable condition
 25. the importance of ensuring that all tools are used correctly, checked and stored after use
 26. the problems with the removal and refitting operations, and the importance of informing appropriate people of non-conformances
 27. the recording documentation to be completed for the activities undertaken
 28. the procedure for the safe disposal of waste materials, scrap components, oils and fluids
 29. the extent of your own responsibility and to whom you should report if you have problems that you cannot resolve
 30. 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 removal and refitting of the motorsport vehicle steering system:
 1. plan the removal and refitting activities prior to beginning the work
 2. obtain and use the appropriate documentation (such as job instructions, assembly drawings, manuals, quality control documentation)
 3. 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
 4. provide safe access and working arrangements for the working area, and ensure that any appropriate environmental conditions can be met
 5. ensure that the work area is suitably prepared for the removal and refitting activities to take place
 6. obtain approval to carry out the removal and refitting activities
 7. position and secure the vehicle, using the correct equipment
 8. ensure that any required consumables are available
 9. leave the vehicle and work area in a safe condition and free from spillages and foreign object debris
 10. return all tools and equipment to the correct location on completion of the activities
2. Remove and refit steering system components on one of the following types of motorsport vehicle:
 1. single seater
 2. sports car
 3. historic vehicle
 4. rallying
 5. kart
 6. other specific approved competition vehicle
3. Use appropriate methods and techniques to remove and refit motorsport steering systems, to include twelve of the following:
 1. removing covers, cowlings and bodywork
 2. replacing damaged/defective components
 3. making an initial judgment of the condition of the steering (such as damage, missing components)
 4. marking and labelling components to aid reassembly
 5. setting, aligning and adjusting replaced components

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6. dismantling the steering system to an appropriate level
 7. disconnecting pipework
 8. making mechanical connections, and tightening fastenings to the required torque
 9. disconnecting electrical connections (where appropriate)
 10. re-assembling steering systems
 11. making electrical connections (where appropriate)
 12. protecting exposed components, looms and pipework
 13. replenishing oils, greases or fluids, and bleeding fluid systems (where appropriate)
 14. checking components for serviceability
 15. replacing all 'lifer' items (such as racks, pinions, seals, gaskets)
4. Use five of the following during the removal and refitting activities:
1. jigs
 2. specialist tools
 3. alignment devices
 4. fixtures
 5. torque wrenches
 6. fluid filling devices
 7. hand tools
 8. measuring equipment
 9. bleeding devices
5. Remove and refit eight of the following motorsport steering system components:
1. racks
 2. toe links
 3. pumps
 4. universal joints
 5. rack tubes
 6. Ackermann plates
 7. transfer boxes
 8. quick release couplings
 9. pinions
 10. columns
 11. data sensors
 12. steering boxes
 13. track rod ends
 14. flexible hoses and unions
 15. steering wheels
 16. other specific steering components
6. Carry out final checks and adjustments on the steering system, to include eight of the following:

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1. ensuring that all steering components are free from foreign objects, dirt or other contamination
 2. ensuring that the steering assembly is complete and complies with specification
 3. checking that all mechanical fixings are secure and have been 'torqued' to specification and, where appropriate, that bolt securing devices are fitted
 4. checking that power steering fluid is of the correct specification and set to desired level in the reservoir
 5. pressure checking the steering system for potential fluid leaks
 6. checking electrical looms for correct routeing and security for prevention of wear and chafing
 7. checking hoses and pipework for correct routeing and security for prevention of wear and chafing
 8. adjusting the steering wheel to the desired position
 9. adjusting the steering column to desired position
 10. checking from lock to lock to ensure that there are no high spots
 11. checking for spherical bearing movement in toe links
 12. carrying out other specific tests
7. Check removal and refit of motorsport steering system components 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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Removing and refitting steering systems on motorsport vehicles



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