SEMAUT3013

Assembling and fitting wiring looms to vehicles

Overview

This standard identifies the competences needed to assemble various wiring looms and fit them to the vehicle, in accordance with approved procedures. You will be required to assemble a range of different types and ratings of wires/cables, plugs, sockets and multi-connectors, 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 manufacture and 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 produce.

Your underpinning knowledge will provide a good understanding of your work, and will provide an informed approach to applying procedures appropriate to the construction and assembly of wiring looms, and to their fitting to the vehicle. You will understand the construction and assembly methods and techniques used, and their application, and will know about the tooling and ancillary equipment, loom components and consumables, 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 and fitting 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.

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 wires and 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 resolved
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 legislation, regulations or codes of practice relating to the activities, equipment or materials)
2. the health and safety requirements of the work area and activities
3. the hazards associated with the activities how to minimise them and reduce any 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 construction, assembly and fitting of wiring looms, and how to interpret them correctly
6. how to identify the components to be used; component identification systems (codes and component orientation indicators)
7. the assembly methods and procedures to be used, and the importance of adhering to these procedures
8. how the components are to be aligned and positioned prior to securing, and the tools and equipment that are used
9. the various joining, fastening and connecting devices that will be used, and their method of construction, assembly and installation
10. the functions of the various wiring looms
11. the use of torque wrenches and the importance of ensuring fasteners are adjusted to the required settings
12. the types and rating of wires/cables and fuses, and their functions and application
13. the principles, conventions and wiring regulations associated with electrical measurement and assembly
14. the consumables, tools and equipment that are used for constructing and fitting wiring looms to vehicles
15. the importance of using the specified fasteners for the assembly and why you must not use substitutes
16. how to deal with components or fastening devices that are incorrectly assembled, damaged or have other faults

17. the quality control procedures to be followed during the assembly operations
18. how to conduct any necessary checks to ensure the accuracy and quality of the assembly produced
19. how to recognise defects (incorrect assembly, ineffective fasteners, component damage)
20. the importance of ensuring that the completed assembly is free from left-over items and foreign objects
21. 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
22. the preparations to be undertaken on the components and fixing points, prior to fitting the looms into the vehicle
23. how to check that the tools and equipment to be used are correctly calibrated and are in a safe, tested and serviceable condition
24. the importance of ensuring that all tools are used correctly and within their permitted operating range
25. problems with the assembly and fitting operations, and 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 assembly activities:

1.1 obtain and use the appropriate documentation (such as job instructions, assembly drawings, 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 check that all cables, extension leads or air supply hoses are in a safe, tested and serviceable condition
1.4 check that all tools and 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
1.6 use safe and approved assembly techniques and procedures at all times
1.7 return all tools and equipment to the correct location on completion of the assembly activities
1.8 leave the work area in a safe and appropriate condition on completion of the activities

2.

Assemble wiring looms and fit to the vehicle, to include all of the following:

2.1 commerical and passenger carrying vehicles
2.2 commerical vehicles
2.3 special/custom-built vehicles

3.

Select appropriate types and ratings of wire/cables to meet the loom specification, including four of the following:

3.1 3/4 strand
3.2 special insulated
3.3 multi-strand
3.4 screened
3.5 multiplex (as applicable)

4.

Terminate wires/cables using five of the following components:

4.1 multi-contact connectors
4.2 soldered connectors
4.3 plugs/sockets
4.4 cable protection
4.5 screened connectors
4.6 crimped connecters
4.7 terminal blocks
4.8 other specific terminations

5.

Assemble the loom, to including four of the following:

- 5.1 cable stripping/termination
- 5.2 soldering
- 5.3 crimping
- 5.4 cable grouping/routing
- 5.5 conduit assembly
- 5.6 screw fittings
- 5.7 other specific technique

6.

Assemble and test looms, using four of the following:

- 6.1 jigs
- 6.2 fixtures
- 6.3 cutting devices
- 6.4 wire/cable stripping devices
- 6.5 measuring devices
- 6.6 testing device/meters
- 6.7 soldering equipment
- 6.8 computer-aided fault diagnostic devices

7.

Make five of the following types of connections during the installation:

- 7.1 clip/push fit
- 7.2 multi-contact connectors
- 7.3 plugs/sockets
- 7.4 cable ties
- 7.5 p-clip
- 7.6 screw fasteners
- 7.7 other specific connections

8.

Check that assemblies comply with all of the following quality and accuracy standards:

- 8.1 cables are correctly routed and free from kinks
- 8.2 pins in multi-connectors are secure
- 8.3 loom is correctly terminated and securely mounted
- 8.4 all components are installed correctly and to specifications

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