SEMMME3136

Making strip spring components using shearing machines

Overview

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This standard identifies the competences you need for cutting and shaping materials used in the manufacture of strip springs, using guillotines or section cropping machines, in accordance with approved procedures. You will be required to select the appropriate equipment and machine settings to use, for the material, thickness and the accuracy to be achieved. Items to be cut and shaped may include ferrous and non-ferrous materials, and will include parallel cuts, square cuts, and cuts that are at an angle. These cuts will be achieved by working to marking out, and by setting the machine's backstop when multiple cutting is required.

Your responsibilities will require you to comply with organisational policy and procedures for the spring making activities undertaken, and to report any problems with the tools and equipment, materials or activities that you cannot personally 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 metal shearing procedures to strip springs. You will understand the shearing processes, the equipment and its application, and will know about the materials and shearing techniques, in adequate depth to provide a sound basis for carrying out the activities, correcting faults and for producing the spring components to the required specification.

You will understand the safety precautions required when working with the shearing machines, and with their associated tools and 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:

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1. work safely at all times, complying with health and safety and other relevant regulations, directives and guidelines
2. confirm that the machine is set up and ready for the machining activities to be carried out
3. manipulate the machine tool controls safely and correctly in line with operational procedures
4. produce components to the required quality and within the specified dimensional accuracy
5. carry out quality sampling checks at suitable intervals
6. deal promptly and effectively with problems within your control and report those that cannot be solved
7. shut down the equipment to a safe condition on conclusion of the machining activities

Knowledge and understanding

You need to know and understand:

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1. how to work safely at all times, complying with health and safety and other relevant regulations, directives and guidelines
2. the importance of wearing the appropriate protective clothing (PPE) and equipment and of keeping the work area clean and tidy
3. the handling precautions and correct methods of moving or lifting sheet or plate materials, and the equipment to be used for this
4. the hazards associated with working on shearing machines and how to minimise them and reduce any risks
5. checks to be carried out to ensure that the shearing machine is in a safe and fit condition to use
6. the safety mechanisms on the machine, and the procedure for checking that they function correctly
7. how to start and stop the machine in normal and emergency situations
8. the importance of ensuring that the machine is isolated from the power supply before setting up the various operating mechanisms
9. how to check that the shearing machine blades are in a safe and serviceable condition, and their care and maintenance procedures
10. how to obtain the necessary drawings, specifications and job instructions
11. how to extract and use information from engineering drawings and related specifications (to include symbols and conventions to appropriate standards) in relation to work undertaken
12. how to interpret first and third angle drawings, imperial and metric systems of measurement, workpiece reference points and system of tolerancing
13. terminology used in shearing machines and shearing operations in relation to the activities undertaken and types of springs produced
14. how to interpret marking out conventions
15. the various shearing machine cutting methods and techniques
16. material handling and preparation methods
17. the method of setting and adjusting shearing blades for the material thickness
18. tool and equipment care and control procedures, and how to recognise when the cutting blades require changing
19. the importance of using tools or equipment only for the purpose intended; the care that is required when using the tools or

equipment; the proper way of preserving tools or equipment between operations

20. the safety mechanisms and devices that are on the machine, and why they must always be used
21. the problems that can occur when shearing materials, and how these can be avoided
22. inspection techniques that can be applied to check that shape and dimensional accuracy are to specification and within acceptable limits
23. the importance of completing all relevant documentation on conclusion of the spring making activities
24. the extent of your own authority and to whom you should report if you have problems that you cannot resolve

Scope/range related to performance criteria

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1. Carry out all of the following in preparation for the spring making activities:
    1. obtain and interpret correctly the documentation for the type of spring being made
    2. adhere to procedures or systems in place for risk assessment, personal protective equipment and other relevant safety regulations
    3. check that the machine and cutting blades are in a safe and usable condition
    4. set the cutting blades for the thickness of material being cut (where applicable)
    5. set up back stops where multiple components are required
    6. carry out the setting-up activities, following good practice/approved procedures
    7. ensure that correctly adjusted machine guards/safety devices are in place, and that they operate correctly
    8. leave the machine and work area in a safe and clean condition on completion of the setting-up activities
2. Cut strip spring components from two appropriate materials from the following:
    1. mild steel
    2. alloy steel
    3. nickel based alloys
    4. carbon steel
    5. copper based alloy
    6. titanium and other special material
    7. stainless steel
    8. other specific material
3. Cut materials for strip spring components, using one of the following types of shearing machine:
    1. guillotine
    2. cropping machine
4. Cut materials using both of the following techniques:
    1. to marking out
    2. using machine backstop for multiple cutting
5. Perform operations that produce straight and accurate cuts, which include two of the following:

1. parallel cuts
2. square cuts
3. cuts at an angle

6. Produce strip spring components which meet all of the following quality and accuracy standards:
    1. dimensional accuracy is within the tolerances specified on the drawing/specification
    2. cut components are free from excessive distortion
    3. cut edges are neat and free from false tool cuts and shearing slivers and burrs

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