

Overview

This standard identifies the competencies you need to undertake the joining of engineering materials using adhesive bonding processes, in accordance with approved procedures. You will be required to work to instructions, using appropriate or specified bonding agents for the materials to be joined, that meet the specified conditions and subsequent operating conditions to be demanded of the joint. Particular attention will be needed in the preparation of the materials and the application of the bonding agent, as well as the means of securing the joint until the setting or curing process has been completed, so that the finished component meets the level of accuracy required. The adhesive bonding agents used will include impact adhesives, cold curing adhesives, rubber mastic, solvent adhesives, epoxy resins and thermally cured adhesives. The joint will be of two or more materials and may include metallic and/or non-metallic materials and joints of dissimilar materials.

Your responsibilities will require you to comply with organisational policies and procedures, and/or those of the bonding agent manufacturers. You will be expected to report any problems with the bonding agents, materials or bonding activities that you cannot resolve yourself, or are outside your permitted authority, to the relevant people. You will be expected to work to instructions, 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 be sufficient to provide a good understanding of your work, and will provide an informed approach to the adhesive bonding activities carried out. You will have an understanding of the basic characteristics of the materials to be joined, the bonding agents used and the procedures that go with them, in adequate depth to provide a sound basis for carrying out the activities safely and correctly and for achieving a sound and cohesive joint that is fit for purpose.

You will understand the precautions required when working with the various bonding agents, and the safeguards necessary for undertaking the process. You will be required to demonstrate safe working practices throughout, and will understand the responsibilities 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 bonding procedure specification and job instructions
3. check that the materials to be bonded and bonding agents comply with the specification
4. correctly prepare the parent materials and bonding agents in line with the bonding specification
5. carry out the bonding operations using the specified processes and techniques to position and bond the materials in their correct locations
6. ensure that any equipment used to maintain surface contact during the bonding activities is set up and used correctly
7. achieve bonds of the required quality and within the specified dimensional accuracy
8. deal promptly and effectively with problems within your control and report those that cannot be solved

Knowledge and understanding

You need to know and understand:

1. the specific safety precautions to be taken when bonding engineering materials using adhesives in a fabrication environment (general workshop and site safety, appropriate personal protective equipment (PPE), accident procedure; statutory regulations, risk assessment procedures and COSHH regulations)
2. the personal protective clothing and equipment to be worn when carrying out bonding as part of the fabrication activities (such as gloves, eye protection, safety helmets, respiratory protection)
3. the importance of good workshop practice and housekeeping, ventilation and fume control equipment, first aid procedures and actions, hazardous substances and relevant sections of COSHH
4. the correct methods of moving or lifting sheet or plate materials
5. the hazards associated with bonding fabricated components, and how they can be minimised
6. how to obtain the necessary drawings and joining specifications
7. how to use and extract information from engineering drawings and related specifications (to include symbols and conventions to appropriate British, European or relevant International standards in relation to work undertaken)
8. the material preparations that are required, and the equipment and consumables that are used
9. the importance of working to organisational and bonding agent manufacturers' instructions whilst carrying out the bonding activities
10. the methods and techniques used for bonding the materials (such as gluing, impact, chemical and thermal reaction techniques)
11. the basic characteristics of the adhesives that are to be used
12. the application of, and precautions to be taken when using, adhesives and solvents
13. maintenance and care of tools and equipment
14. methods of degreasing components and producing a keying surface
15. type and suitability of adhesives; setting or curing requirements and time, strength, appearance and shelf life
16. common causes of defects associated with the bonding processes, and how to avoid them
17. the effects of the environment on the bonding process (such as temperature,

humidity, cleanliness)

18. how to identify, select, use, and clean, the appropriate bonding agent holding vessels, brushes, stirrers and spatulas, scrapers, knives, clamps and weights

19. the importance of cleaning up after use, to ensure everything can be used again and to minimise the need for replacement of equipment

20. reasons for checking that components are assembled in the correct sequence, are positioned dimensionally accurately and to the correct orientation, in accordance with the specifications, prior to bonding

21. how to check that completed joints are firm, sound and fit for purpose

22. procedures for cleaning off surplus adhesive and tidying up the appearance of joints

23. the problems that can occur with the bonding operations, and how these can be avoided

24. the extent of your own authority and whom you should report to if you have problems that you cannot resolve

25. reporting lines and procedures, line supervision and technical experts

Scope/range related to performance criteria

1.

Carry out all of the following during the adhesive bonding process:

- 1.1 correctly prepare the materials for bonding
- 1.2 select the right constituents and bonding methods
- 1.3 check the surfaces to be bonded mate properly to make a sound joint possible
- 1.4 ensure the joint is rigidly secure during the curing period
- 1.5 remove surplus material and clean up at the appropriate time

2.

Carry out adhesive bonding activities using two of the following types of material:

- 2.1 metallic
- 2.2 non-metallic
- 2.3 combinations of materials

3.

Use two of the following types of adhesives:

- 3.1 impact adhesives
- 3.2 rubber mastic
- 3.3 epoxy resins
- 3.4 cold curing adhesives
- 3.5 solvent adhesives
- 3.6 thermally cured adhesives

4.

Produce bonded joints in three of the following types of component:

- 4.1 flat and flanged joints on flat surfaces
- 4.2 circular trunking
- 4.3 flat and flanged joints on curved surfaces
- 4.4 access flanges, panels and cover plates
- 4.5 vertical components
- 4.6 tanks and tank covers
- 4.7 horizontal components
- 4.8 pipework
- 4.9 rectangular trunking
- 4.10 other specific components

5.

Use a range of bonding equipment and devices, to include four of the following:

- 5.1 mixing vessels
- 5.2 jigs
- 5.3 presses
- 5.4 spatulas, brushes, knives
- 5.5 formers

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- 5.6 weights
- 5.7 spray equipment
- 5.8 clamps
- 5.9 temporary fixtures (clips, wiring)
- 5.10 other specific equipment

6.

Use a range of preparation and cleaning agents, to include two of the following:

- 6.1 detergents
- 6.2 solvents
- 6.3 petroleum products
- 6.4 acids

7.

Produce bonded joints which comply with all of the following quality and accuracy standards:

- 7.1 components are dimensionally accurate and of the correct orientation
- 7.2 joints meet the required application standard
- 7.3 completed joints are clean and free from surplus adhesive
- 7.4 the completed joint has the required appearance

Behaviours

Additional Information

You will be able to apply the appropriate behaviours required in the workplace to meet the job profile and overall company objectives, such as:

- strong work ethic
- positive attitude
- team player
- dependability
- responsibility
- honesty
- integrity
- motivation
- commitment

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