

Preparing material surfaces by abrasive blasting

Overview

This standard identifies the competences you need to prepare a range of substrates to enable coating systems to be applied, in accordance with approved procedures. You will be required to carry out preparation on a variety of substrates using a variety of abrasive blasting equipment and abrasives. The process will also include the cleaning of the surface prior to the application of the marine coatings.

Your responsibilities will require you to comply with organisation policy and procedures for the preparation activities undertaken and to report any problems with these activities, or with the tools and equipment used, that you cannot personally resolve, or are outside your permitted authority, to the relevant people. You will be expected to work with a minimum of supervision, taking full responsibility for your own actions and for the quality and accuracy of the work that you carry out.

Your underpinning knowledge will provide a good understanding of your work and will provide an informed approach to applying preparation procedures to marine component/structural surfaces. You will understand the preparation procedures and relevant standards, their application and their limitations, 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 preparatory operations. You will be required to demonstrate safe working practices throughout and will understand the responsibility you owe to yourself and others in the workplace.

Preparing material surfaces by abrasive blasting

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. obtain and follow relevant instructions, standards and other specifications
3. identify the conditions of the surface to be prepared
4. select the appropriate tools and equipment and check that they are in a safe and usable condition
5. carry out the preparation activities using appropriate tools and techniques
6. check the prepared surface to ensure that it meets the required specification
7. deal promptly and effectively with problems within your control and report those that cannot be resolved
8. shut down and secure the preparation equipment to a safe condition on completion of the activities
9. reinstate the work area on completion of the activities in line with agreed organisational procedures
10. complete relevant documentation in line with organisational procedures

Preparing material surfaces by abrasive blasting

Knowledge and understanding

You need to know and understand:

1. the safe working practices and procedures to be observed when working with abrasive blasting surface preparation tools (such as general workshop and site safety, protecting other workers from the effects of the work, safety in enclosed/confined spaces, working at height, use of mobile elevated work platforms (MEWPs), atmospheric controls)
2. statutory requirements, risk assessment procedures and relevant requirements of HASAWA and COSHH (such as Approved Codes of Practice (ACOP), The Management of Health and Safety at Work Regulations, The Provision of and Use of Work Equipment Regulations, The Noise at Work Regulations, Control of Vibration at Work Regulations, The Confined Spaces Regulations, The Special Waste Regulations, The Pollution Prevention and Control Regulations, the Water Resources Act)
3. the environmental impact of the operations that you are carrying out and with the materials you are using and how the impact can be minimised
4. the health and safety requirements of the work area in which you are carrying out your surface preparation activities and the responsibility they place upon you
5. how to recognise and deal with emergencies and the procedures to be followed (such as methods of safely evacuating and closing down of compartments in the case of fire or other major incident, first aid, fire fighting and resuscitation of personnel)
6. the hazards associated with surface preparation using abrasive blasting (such as sparks, dust/debris, hearing damage, hand/arm vibration, working at heights) and how they can be minimised
7. the requirements for working in confined spaces, the importance of emergency procedures and safe systems of work (including permits to work, Required Air Quantities (RAQs) and local exhaust ventilation (LEV)) to maintain safe conditions; the provision of adequate and safe lighting and avoidance of sources of ignition
8. the personal protective equipment (PPE) to be worn during the surface preparation activity
9. how to obtain the required work procedures and instructions and how to interpret their requirements (to include the appropriate

Preparing material surfaces by abrasive blasting

- standards and specifications, use of paint manufacturers' data sheets to ascertain the surface cleanliness standards and profiles required)
10. how to carry out currency/issue checks of the specifications you are working with
 11. the reasons for carrying out surface preparation and the effects on the final finishing activities if preparations are not carried out correctly
 12. the various types of substrate that may require preparing and the types of tools and preparation methods that may be used on them
 13. why different types of substrate require different preparation techniques to be used
 14. the types of defects and contamination to be found on unpainted and painted surfaces and their causes
 15. types of equipment used, their setting up and operation, codes of practice, manufacturers' operating instructions, company procedures and instructions (including operation and techniques for use)
 16. the effects of lengths of air and blast hoses, selection of appropriate nozzle size, selection of nozzle configuration
 17. maintenance of hoses and joints/gaskets; inspection of nozzles for wear; inspection of safety devices
 18. the requirements for air pressure, volume of air flow and for cleanliness of air; use of a hypodermic needle gauge
 19. types of abrasive, their characteristics and application, the importance of abrasive profile and abrasive cleanliness, company procedures for checking levels of contamination in abrasives
 20. the limitations of abrasive blasting, the requirements for the removal of particular types of coatings and hazards associated with the removal of particular coatings
 21. the importance of maintaining a register of power tools and the need to check tools against certification
 22. basic quality control techniques and procedures, tolerances and quality standards, measurements, environmental conditions (such as dew point, relative humidity) and their effect on work output and

Preparing material surfaces by abrasive blasting

on its quality

23. the various types of tests that are carried out on the prepared surfaces to check their compliance with the specification
24. how to safely dispose of waste materials, including the environmental impact of the materials you are using and the minimisation of this impact
25. the extent of your own responsibility and whom you should report to if you have problems that you cannot resolve

Preparing material surfaces by abrasive blasting

Scope/range related to performance criteria

1. Carry out all of the following during the abrasive blasting activities:

- 1.1 use appropriate personal protective equipment (PPE) during the preparation activities, ensuring that it is in good condition and used correctly
- 1.2 confirm that all necessary husbandry and containment arrangements are in place and are adequate
- 1.3 confirm that appropriate emergency arrangements are in place for any confined space or other hazardous work
- 1.4 ensure that safe working distance procedures are set up, where appropriate
- 1.5 ensure that tools and equipment are correctly prepared for the operations being performed
- 1.6 apply safe and appropriate working practices and procedures at all times

2. Carry out preparation activities on marine components, to include both of the following:

- 2.1 unpainted surfaces
- 2.2 painted surfaces

3. Visually inspect surfaces, and identify surface preparation requirements for all of the following conditions:

- 3.1 surface corrosion with millscale (ferrous)
- 3.2 surface corrosion
- 3.3 surface corrosion with pitting
- 3.4 paint coating defects (such as flaking/detachment, blistering, cracking/crocodiling, chalking, bubbling, cissing, wrinkling)
- 3.5 removal of old coating systems

4. Remove paint and corrosion products from ferrous and non-ferrous surfaces, using:

- 4.1 dry abrasive blasting

plus one from the following:

- 4.2 moisture-injection abrasive blasting
- 4.3 slurry blasting
- 4.4 compressed air wet abrasive blasting
- 4.5 pressurised liquid blast cleaning

plus one more from the following:

- 4.6 vacuum recovery blasting
- 4.7 wheeled deck blasting machine
- 4.8 low pressure wet abrasive blasting
- 4.9 low pressure soluble abrasive blasting

5. Carry out all of the following for composite or compliant polymer surfaces:

- 5.1 identify defects and preparation requirements for painted surfaces
- 5.2 identify defects and preparation requirements for unpainted surfaces
- 5.3 prepare the surface for painting using low pressure wet/dry blasting

6. Remove paint and corrosion products from marine structures and prepare surfaces incorporating five of the following features:

Preparing material surfaces by abrasive blasting

- 6.1 corners (outside corners, obscured corners and edges)
- 6.2 curved surfaces
- 6.3 slender components
- 6.4 round components
- 6.5 individual components (such as plates, deck fittings)
- 6.6 vertical flat surfaces
- 6.7 horizontal flat surfaces
- 6.8 overhead surfaces
- 6.9 inclined surfaces

- 7. Carry out the preparation activities in four of the following situations:
 - 7.1 confined spaces (such as tanks, voids, double bottoms)
 - 7.2 internal spaces
 - 7.3 weatherwork
 - 7.4 weather decks
 - 7.5 outer bottoms
 - 7.6 at height

- 8. Prepare marine surfaces/coatings by abrasive blasting in one of the following environments:
 - 8.1 ashore
 - 8.2 afloat

- 9. Identify requirements and clean the prepared surface, using all of the following:
 - 9.1 fresh water
 - 9.2 fresh water with detergent
 - 9.3 brush
 - 9.4 vacuum cleaner

- 10. Check that the prepared surfaces met the specified standards, to include the use of three of the following methods:
 - 10.1 visual examination
 - 10.2 salt testing kit
 - 10.3 surface profile gauge
 - 10.4 press tape
 - 10.5 swabs
 - 10.6 surface profile comparators

- 11. Carry out marine component surface preparations, in accordance with one or more of the following standards:
 - 11.1 BS or ISO standards and procedures
 - 11.2 customer (contractual) standards and requirements
 - 11.3 company standards and procedures
 - 11.4 paint/covering manufacturer's recommendations
 - 11.5 recognised compliance agency/body's standards

- 12. Reinstate the work area on completion of the preparation activities, to include carrying out all of the following:
 - 12.1 safely disposing of arisings and waste materials
 - 12.2 cleaning and returning all tools and excess materials
 - 12.3 removing protection and exclusion arrangements (if no longer required)
 - 12.4 completing all required records

Preparing material surfaces by abrasive blasting

Behaviours

Behaviours:

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

Preparing material surfaces by abrasive blasting

| | |
|--------------------------|--|
| Developed by | Enginuity |
| Version Number | 3 |
| Date Approved | 29 Apr 2014 |
| Indicative Review Date | 30 Mar 2017 |
| Validity | Current |
| Status | Original |
| Originating Organisation | Semta |
| Original URN | SEMME3185 |
| Relevant Occupations | Marine Engineering Trades |
| Suite | Marine Engineering Suite 3 |
| Keywords | Engineering; marine; prepare; surfaces; blasting; dry abrasive; slurry; moisture injected; compressed air abrasive; pressurised liquid |