

SURFACE PREPARATION BY GRITBLASTING

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Grit blasting is the most commonly used method of preparing surfaces for metal spraying. It removes rust, mill scale and other surface contaminants and produces a suitably roughened surface by projecting a highly concentrated stream of relatively small abrasive particles at high velocity against the surface to be cleaned. It has also been shown to be effective in reducing the loss of fatigue strength.

Equipment

Suction or Syphon Blasting

Here the particles of abrasive are projected by suction or by a venturi type nozzle into an air blast. It is mainly employed in the preparation of small components in hand cabinets.

High Pressure Blasting

The particles of abrasive are directly fed from a pressurised container into a high pressure air stream. This is the most widely used form of blasting, either in hand cabinets, blast rooms or in portable form, on site work.

Centrifugal Blasting

Involves the abrasive being centrifugally propelled from rapidly rotating impellers. It is much more specialised equipment and is highly efficient for low cost blasting of large volume repetitive production.

Types of Abrasives

Chilled Iron Grit

This is by far the most widely used abrasive for metal spraying. It is an excellent general purpose abrasive, due to (a) its relatively high density, which gives high particle energies, (b) its slow rate of breakdown and (c) the retention of sharp cutting edges on the particles.

Crushed Slag's - Expendable Abrasive

An alternative to chilled iron grit when reclamation is not possible, as is the case on many site jobs. While quite effective for "once only" use, they are not suitable for reclamation and re-use, due to their rapid breakdown to dust.

Ceramic Grits - Aluminium Oxide and Silicon Carbides

Used where the base material has a hardness greater than 360HV which cannot be effectively blasted by chilled iron grit. They can be used at lower than normal blasting pressures and are effective when "Syphon Blasting". They are therefore well suited to the preparation of thin metal surfaces which may distort if blasted with chilled iron at conventional pressures. Non-metallic grits must not be used to prepare surfaces for coatings which are to be fused.

Grit blasting standards for metal spraying should not be confused with blast cleaning as used to prepare surfaces for painting.

Of the various standards of surface finish "SA 3" are comparable in surface cleanness with grit blasting quality for metal spraying.

The blast profile, defined as "height from trough to adjacent peak", should not exceed 0.004"-0.005" (100 - 125 μ) experience has shown that chilled iron grit Grade G24 provides a surface of appropriate amplitude. Comparable surface amplitudes are similarly achieved with expendable non-metallic abrasives of around N° 16 mesh.

Blasting Techniques

- i) Blasting pressures must not be excessive. If pressures are too high, grit breakdown will be rapid, grit may be embedded in the surface and mechanical distortion of the component may occur. Particular care is required with most non-ferrous alloys, plastics and fragile or highly stressed parts.
- ii) Grit must be inspected regularly. Blunt particles, fines and contaminants are deleterious and should be removed.
- iii) Blasting air must be free of water, oil and other contaminants. Accordingly, suitable after coolers, moisture traps, filters etc. should be fitted to the air lines.

- iv) Excessive blasting should be avoided. It is expensive and can be detrimental to the metal spraying process.
- v) Blasting debris must be removed from the surface before spraying. Vacuum cleaning or brushing is preferable; blowing with compressed air may not remove debris but move it from one place to another.
- vi) Grit blasted surfaces must not be contaminated before spraying. If handling is unavoidable, clean cotton gloves should be used.
- vii) Spraying must commence as soon as possible after surfaces have been blasted, certainly before any visible deterioration occurs. In temperate climates, deterioration (and impairment of adhesion) may occur in less than four hours. In hot, humid conditions, deterioration will be more rapid.

Precautions Relating to Gritblasting

- i) Except in open site work, where special precautions must be taken to protect personnel; blasting should always be done in a blast room or cabinet.
- ii) Never start up a blasting unit until the hose is firmly held pointing in a safe direction.
- iii) The blast hose should be of an approved anti-static type and must be inspected regularly for wear and security of fittings.
- iv) Always wear full protective clothing; for example, helmet, hood, gloves, aprons and leggings, to ensure protection from flying abrasive.
- v) The provision of an inspection window in a blast room is advised.

NOTE

Under The Blasting (Castings and other Articles) Special Regulations 1949 Part II, it is forbidden to use sand, or other substance containing free silica in any blasting apparatus.

REFERENCE INFORMATION :-

5.2.1 Preparation for Spraying

5.2.4 Bond Coating