

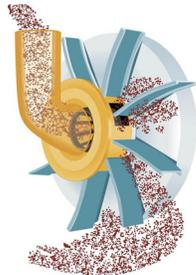
Blasting Steel Parts to Clean And Profile For Coating Adhesion Specifications

Question:

We are a machining manufacturer and have an upcoming hot rolled 3" x 2" steel pipe welded part. The print calls out an SSPC-SP5, 3 Mill profile, with adhesion testing. We're not familiar with these specifications but we need to know how to achieve them and automate the process. Can you help?

The SSPC and Mill profile specifications are standard for surface preparation for paint and coating adhesion. Many coating manufacturers have the specification recommendations in the preparation instructions for each product.

Wheel or air blasting the surface with various blast medias will clean and profile to achieve both specifications. One blast process will accomplish both at the same time. Blast equipment automation recommendations are hard to make without seeing the part or knowing the production rates. Media selection would also help determine what systems to recommend. Wheel or air automated blast systems could include, J-belt or basket tumble blast, in-line conveyors, rotary tables, or spinner hangers.



Wheel Blasting



Air Blasting

Common industrial recoverable blast medias that achieve the specifications are:

Wheel Blast Medias

Ceramic grit or shot
Steel or stainless grit
Steel or stainless cast or cut wire shot

Air Blast Medias

Aluminum oxides
Silicon carbide
Ceramic grit or shot
Steel or stainless grit
Steel or stainless cast or cut wire shot

Cleaning (SSPC specifications) is the removal of contaminants. Blasting with angular-shaped abrasives rather than round particles chip away and remove contaminants on the peaks and valleys of the surface profile. This will create a contaminant free surface very quickly.

Profiling (Mill profile) is the term used for surface roughness. Depth of surface profile is specified in micrometers (mills). The mill range for most pre-coat adhesion applications is between 1-to-4 mills. Larger blast medias create higher profiles and increase surface area, resulting in higher adhesion or anchor pattern capabilities.

SPECIFICATIONS:

Cleaning

SSPC (Society for Protective Coatings) www.sspc.org is a non-profit association concerned with surface preparation, coating selection, and coating applications. NACE (National Association of Corrosion Engineers) www.nace.org is a credited standards developer for practices and methods of surface preparation when corrosion is a factor.

The SSPC-SP5 and NACE 1 specification is a white metal blast. It is the complete removal of all visible oil, grease, dirt, dust, mill scale, rust, paint, oxides, corrosion, and other foreign matter.

Other specifications are SSPC-10 or NACE 2 near white metal blast; SSPC-SP6 or NACE 3 commercial blast; and SSPC-7 or NACE 4 Brush-off blast.

The ISO8501-1 and SSP-Vis 1-89 specification shows visual samples of the SSPC finishes. The visual samples are not intended to replace the specification but to visually assist.

Mill Profile

ASTM D2651-0 (2008) www.astm.org is the standard guide for mechanically preparing surfaces for adhesion bonding. Surface profile mill depths are accomplished by blasting various types and sizes of media.

Non-specifications, but estimated examples of what type and size medias will achieve different mill profiles are below.

2 Mill Profile

24-36 grit aluminum oxide
24-36 grit garnet
24-36 grit silicon carbide
G-40 steel grit
S-230 shot

3-4 Mill Profile

14-16 grit aluminum oxide
16 grit garnet
16-24 grit silicon carbide
G-25 steel grit
S-330 shot

Paint Adhesion

Common tests for coating adhesion are:

Cross Cut Pattern test - covered in specification ASTM D 3359-07

Pull Off test – covered in specification ASTM D4541-09E1

Scrape Adhesion test – covered in specification ASTM D2197-98