Jotun Surface Preparation Code and Standard for Bristle Blast Cleaning and Profiling Process

Definition

Surface Preparation via ***Bristle Blasting***, heretofore defined as **B**ristle **I**mpact **Po**wer **T**ool Cleaning (**BIPoT**)

Application

Removal of corrosion/rust and simultaneous formation of anchor profile for subsequent application of paints and coatings.

General Information

Bristle impact power tool cleaning (BIPoT) involves the use of a unique rotary wire-bristle power tool system that operates at approximately 2,500 rpm. The appearance of surfaces prepared by this power tool is similar to both the visual cleanliness and texture that is characteristic of G-16 grit blasting processes. The power tool system is lightweight, and can utilize either a pneumatic (tare wt. 2.6 lb.) or standard electric (tare wt. 4.0 lb.) power source.

Standard practice for implementing BIPoT has been reviewed in NACE literature, where details can be found that define both the proper use of the tool and the expected outcome. Typically, corroded steel surfaces can be cleaned to Sa.2½, with a profile ranging from 50 microns (2.0 mills) to 85 Microns (3.4 mills) over 1 (one) hour of continuous tool operation. Replacement of the wire-bristle belt/tool is advised after one hour of service, or as required by document specifications for profile requirements.

Performance Standard

As defined in this document, the performance of BIPoT is designated by **muA**, **muB**, **muC**, and **muD**, where the approximate equivalence to American, Swedish, and Japanese Standards are shown as follows:

Surface Preparation Standards Comparison				
	System			
Description	**American**	**Swedish**	**Japanese**	**mu(A,B,C,D)**
White Metal Blast	SSPC-SP-5	Sa. 3	Sd3: and Sh3:	**muA**
Commercial Blast	SSPC-SP-6	Sa 2	Sd1: and Sh1:	**muC**

Brush off Blast	SSPC-SP-7	Sa. 1		**muD**
Near White Metal Blast	SSPC-SP-10	Sa. 2½	Sd2: and Sh3:	**muB**

The approximate surface cleanliness description for **muA, muB, muC, and muD** designations is compared with ISO 8501, SSPC, and NACE as shown below:

HOW TO SPECIFY BIPoT CLEANING				
ISO 8501	***SSPC***	***NACE***	**mu(A,B,C,D)**	***Detailed description***
Sa 3	SP 5, White Metal Blast Cleaning	1	**muA**	Removal of all visible rust, mill scale, paint, and foreign matter by blast cleaning
Sa 2	SP 6, Commercial Blast cleaning	3	**muC**	Blast Cleaning until at least 65% of surface is free of all visible residue
Sa 1	SP 7, Brush-off Blast cleaning	4	**muD**	Blast Cleaning of all except tightly adhered residues of mill scale, rust, and coating
Sa 2 ½	SP 10, Near-White Blast Cleaning	2	**muB**	Blast cleaning until at least 95% of surface is free from all visible rust, mill scale, foreign matter

Technique for BIPoT

All manual surface treatment processes require dexterity, visual acuity, and a basic understanding of key parameters that affect the performance of surface finishing equipment. Training and experience are, therefore, important factors that enable users to develop skills that are needed for a successful outcome. The skill-sets that are essential for successful application of the bristle blasting process are quite similar to those needed for other surface treatment processes, and have been reviewed elsewhere.

It is widely acknowledged that the surface cleaning rate and profile generating performance of all surface preparation processes is largely dependent upon both the initial degree of corrosion and the mechanical properties of the substrate. The rate of surface cleaning for BIPoT process is much slower than grit blasting methods, and is approximated in the table below:

APPROXIMATE CLEANING RATE OF BIPoT CLEANING PROCESS				
ISO 8501	***SSPC***	***NACE***	**mu(A,B,C,D)**	**mu cleaning rate (sq. meters per hour)**
Sa 3	SP 5, White Metal Blast Cleaning	1	**muA**	1 m^2/hr.
Sa 2	SP 6, Commercial Blast cleaning	3	**muC**	1 ½ m^2/hr.
Sa 1	SP 7, Brush-off Blast cleaning	4	**muD**	2 m^2/hr.
Sa 2 ½	SP 10, Near-White Blast Cleaning	2	**muB**	1 ¼ m^2/hr.

Before cleaning takes place, deposits of oil, grease, and salt must be removed. When the pneumatic version of the power tool is chosen, clean, dry compressed air, free of oil, must be used. Oil separators, moisture separators, traps and other equipment may be necessary to achieve this requirement.

Although this grit-free process does not generate dust, any debris remaining on the cleaned surface must be removed. Blowing with compressed air that meets previously cited requirements is acceptable.

Previously coated or corroded surfaces having nominal mechanical properties can readily be cleaned to Sa 2 ½. However, cleaning heavily corroded, deeply pitted surfaces, or corroded steel having a base metal comprised of high tensile strength is more difficult, and Sa 2 ½ may not be practically achievable.

Due to the slower rate of surface cleaning, this method is ideally suited for spot or localized repair applications. However, this method is also suitable for larger operations that may prohibit the use of traditional grit blasting processes.

When used for cleaning areas where patchy corrosion has occurred, the area treated should extend slightly beyond the boundary of corrosion, and should be blended or feathered into an area where the protective coating is intact. It is recommended that, whenever possible, the patches to be treated should be defined by “chalking in” the boundaries.

References

1. Stango, R. J., and Khullar, P., 2008, Introduction to the Bristle Blasting Process for Simultaneous Corrosion Removal/Anchor Profile, ACA Journal of Corrosion and Materials 33 (5), 26-31.
2. Wilds, N., 2009, Bristle Blasting as a Method for Surface Preparation, International Paint, Inc., NACE Corrosion Conference, Atlanta, GA, Paper no. 09004.
3. Stango, R.J., Fournelle, R. A., Martinez, J. A., and Khullar, P., 2010,Surface Preparation of Ship Construction Steel Via Bristle Blasting Process, NACE Corrosion Conference, San Antonio, TX., 2009, Paper no. 13892.
4. Stango, R.J., 2010, Bristle-blast Surface Preparation Process for Reduced Environmental Contamination and Improved Health/Safety Management, 18th International Oil and Gas Industry and Conference, OSEA, Singapore, November 30-December 3, 2010.