The Society for Protective Coatings

SURFACE PREPARATION BY WET ABRASIVE BLAST CLEANING

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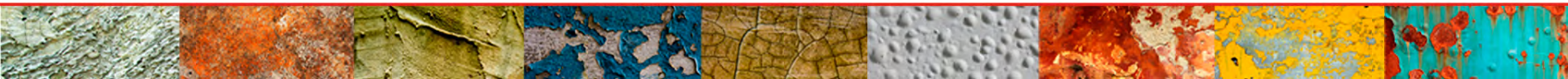
www.sspc.org



Webinar Objective

Overview of Web Abrasive Blasting Including:

- Industry Standards
- Procedures
- Equipment
- Materials, and
- Safety

Existing and Developing Standards

Current Standards:

- SSPC-SP 6/NACE No. 3 Commercial Blast Cleaning
- SSPC-SP 14/NACE No. 8 Industrial Blast Cleaning
  - Last Updated On January 1, 2007
  - Referenced As “Other methods of surface preparation”
  - Broadly address the use of Wet Abrasive Blasting and use of rust inhibitors

Existing and Developing Standards

- SSPC-TR 2/NACE 6G198 JOINT TECHNICAL REPORT - Wet Abrasive Blast Cleaning
  - Last Updated on November 1, 2004
  - Addresses
    - Description & Use
    - Procedures For Use
    - Types of Wet Blasting Systems
    - Selection of Abrasives
    - Rust Inhibitors & Compatibility with Coating
    - Operation of Equipment
    - Safety
- **http://www.sspc.org**

Existing and Developing Standards

- SSPC-VIS 5/NACE VIS 9
  - Guide and Reference Photographs for Steel Surfaces Prepared by Wet Abrasive Blast Cleaning
- ISO 8504-2:2000
  - Preparation of steel substrates before application of paints and related products – Surface preparation methods – Part 2: Abrasive blast cleaning
- ISO 8501: Corrosion Protection of Steel Structures by Painting
  - ISO 8501-1:2007 – Rust grades and preparation of uncoated steel substrates and steel substrates after overall removal of previous coatings
  - ISO 8501-4:2006 – Initial surface conditions, preparation grades and flash rust grades in connection with high pressure water jetting

New Wet Abrasive Blasting Standards

- SSPC/NACE 2016 WAB Standard Publications:
  - SSPC-SP 5 (WAB)/NACE WAB-1
    - White Metal Wet Abrasive Blast Cleaning
  - SSPC-SP 10 (WAB)/NACE WAB-2
    - Near-White Metal Wet Abrasive Blast Cleaning
  - SSPC-SP 7 (WAB)/NACE WAB-4
    - Brush-Off Wet Abrasive Blast Cleaning
  - SSPC-SP 6 (WAB)/NACE WAB-3
    - Commercial Wet Abrasive Blast Cleaning
  - SSPC-SP 14 (WAB)/NACE WAB-8
    - Industrial Wet Abrasive Blast Cleaning

PROCEDURES

Prior To Wet Abrasive Blasting, Contractor Must Consider

- Planning
- Training
- Staging

SSPC Standards Focus On:

- Pre-Blasting Surface Preparation
- Blasting Operation
- Post Blasting Operation

PROCEDURES

Planning:

- Equipment
- Supplies
- Personnel
- Training Requirements

Planning Makes Or Breaks The Contractor

PROCEDURES

Training

- Abrasive Blasting Program (C7)
  - Surface Preparation
  - Nozzle Blasting System Components
  - Abrasive Characteristics, Types, and Specifications
  - Wheel Blast Equipment Types, Set up, Operation, Maintenance

PROCEDURES

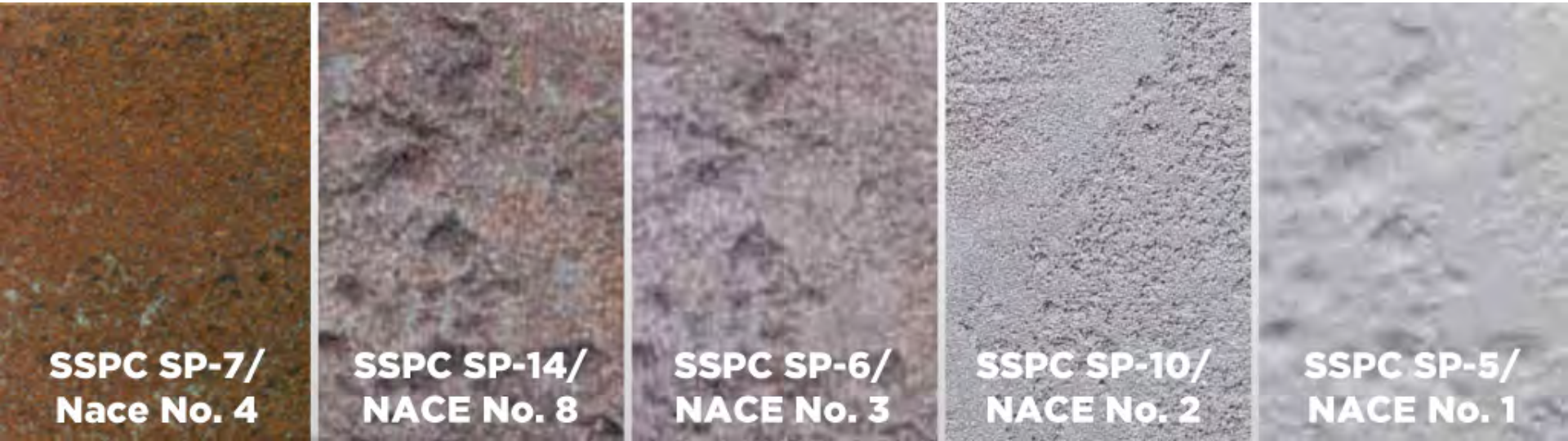
Staging

- First Step Of A Successful Job
  - Equipment
  - Supplies
  - Personnel
  - Support

PROCEDURES

Order of Surface Prep Quality:

1.	White Metal:	SSPC-SP5	SSPC-SP5 (WAB)
2.	Near White Metal:	SSPC-SP10	SSPC-SP10 (WAB)
3.	Commercial:	SSPC-SP6	SSPC-SP6 (WAB)
4.	Industrial:	SSPC-SP14	SSPC-SP14 (WAB)
5.	Brush-Off:	SSPC-SP7	SSPC-SP7 (WAB)



PROCEDURES

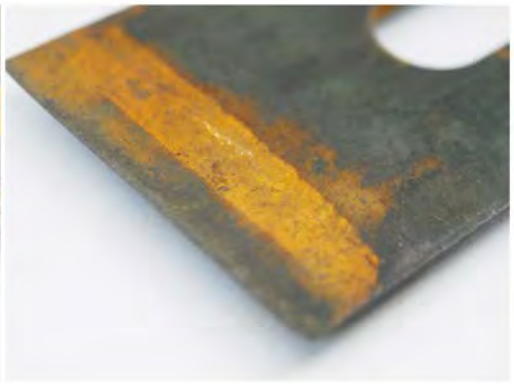
Overview of Surface Prep Quality

Standard	Name	Free of Oil, Grease, Dirt , Dust, **Loose** Mill Scale, Rust & Coating Residues	Traces of Tightly Adherent Mill Scale, Rust, & Coating Residue	Shadows, Streaks & Discolorations Caused by Stains Of Rust, Mill Scale & Previously Applied Coating	Flash Rust
SSPC-SP5	White	100%	Not Acceptable	Not Acceptable	Procurement Doc.
SSPC-SP10	Near White	100%	Not Acceptable	5%	Procurement Doc.
SSPC-SP6	Commerical	100%	Not Acceptable	33%	Procurement Doc.
SSPC-SP14	Industrial	100%	10%	Acceptable	Procurement Doc.
SSPC-SP7	Brush-Off	100%	No Limit	No Limit	Procurement Doc.

PROCEDURES

Flash Rust Definitions:

- No Flash Rust
- Light (L) Flash Rusted Surface
- Moderate (M) Flash Rusted Surface
- Heavy (H) Flash Rusted Surface



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PROCEDURES

SSPC Flash Rust Definitions:

Flash Rust	Visual Surface	Surface Adherence (Wiping Cloth Test)
No	None	N/A
Light	Small Quantities With Surface Visual	Not Easily Removed
Moderate	Layer That Obscures	Light Marks
Heavy	Layer That Hides	Significant Marks

- SSPC-VIS 5/NACE VIS 9,
  - Guide and Reference Photographs for Steel Surfaces Prepared by Wet Abrasive Blast Cleaning

PROCEDURES

Procedures Before Wet Abrasive Blast Cleaning

- Remove Visible Oil, Grease, & Contaminants
- Surface Imperfections
- Surface Inspection

Not Included In the Standard

- Staging Complete
- PPE & Training Complete

PROCEDURES

Procedures Following Wet Abrasive Blast Cleaning

- Removal of Visible Deposits or Oil, Grease & Other Contaminants
- Meet Surface Conditions Defined By Project Specifications
- Amount of Flash Rust Restricted By Project Specifications
- Removal of Abrasive Adherent To The Surface Prior To Coating Operations
- Removal of Dust & Loose Residues
- Drying Of Surface Prior To Coating Operation or Further Surface Rusting
- Final Inspection of Surface Imperfections

Non-mandatory Flash Rust Testing

- Tape Pull Test
- Wipe Test

PROCEDURES

Tape Pull Test:

Flash Rust	10th Try Tape Appearance	Appearance Of Test Area
None	No Discoloration	No Rust
Light	No Rust On Tape	No Change In Surface Appearance
Moderate	Slight Rust On Tape	Significant Change To Test Area
Heavy	Significant Rust On Tape	Significant Change To Test Area

PROCEDURES

Wipe Test

Flash Rust	Visual Surface	Surface Adherence (Wiping Cloth Test)
No	None	NA
Light	Small Quantities With Surface Visual	Not Easily Removed
Moderate	Layer That Obscures	Light Marks
Heavy	Layer That Hides	Significant Marks

Equipment

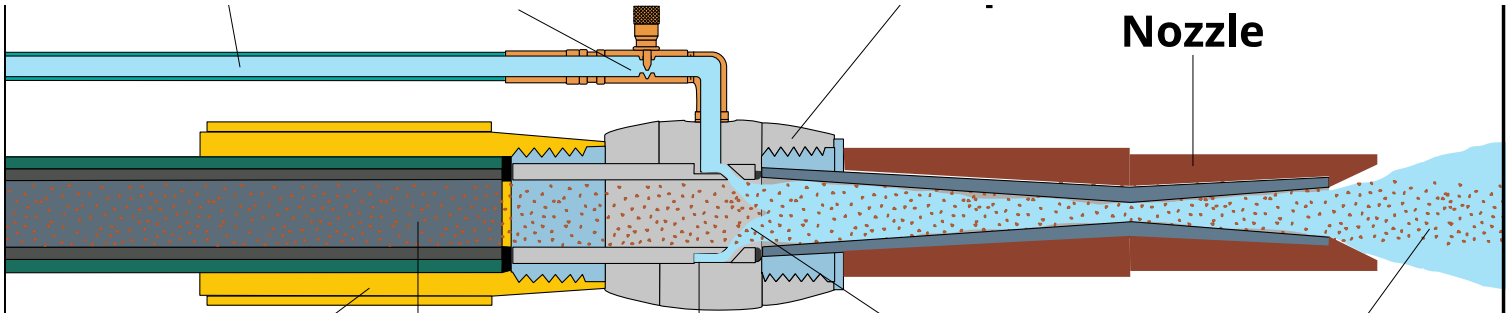
Types of Wet Blasting Systems

- Joint Technical Report SSPC-TR 2/NACE 6G198
  - Radial Water Injectors
  - Coaxial Water Injectors
  - Slurry Blasters
  - Water Blast With Abrasive Injection

Equipment

Radial Water Injectors (Water Rings)

1. High Pressure Water is injected at an angle toward the center of the blast stream as the air/abrasive stream enters the blast nozzle:



Equipment

Radial Water Injectors / Coaxial Water Injector

High Pressure Water is injected at an angle toward the center of the blast stream as the air/abrasive stream enters the blast nozzle:

Equipment

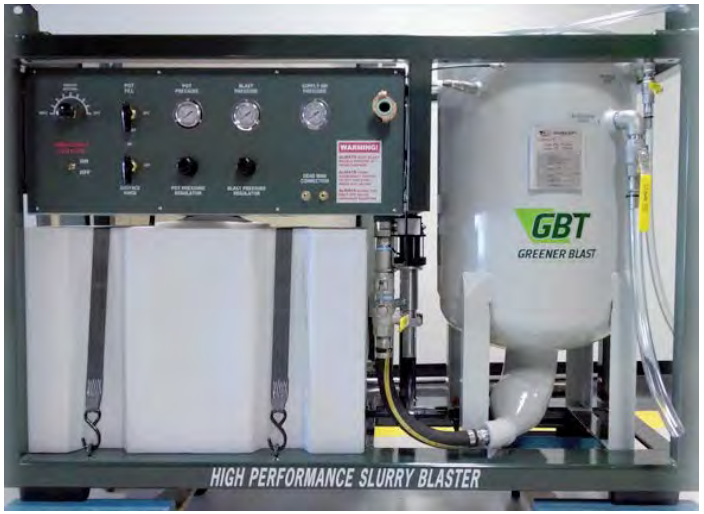
Radial Water Injectors (Water Rings)

- Low-Pressure Water Ring

Equipment

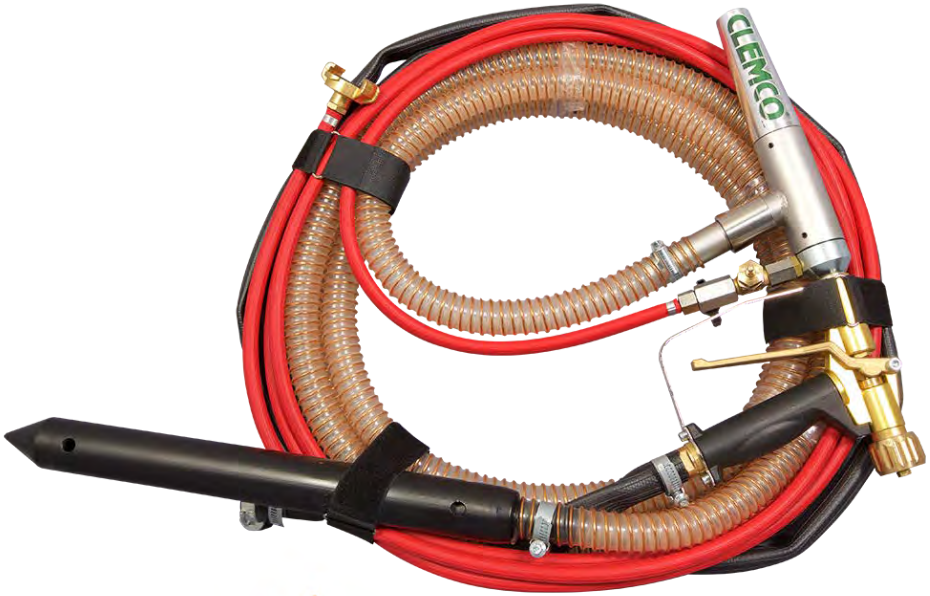
Slurry Blasters:

- Water & Abrasive Mixed In The Blast Machine



Equipment

Water Blast With Abrasive Injection:



Materials

Abrasives:

- Sand
- Slags
- Coal
- Crushed Glass
- Garnet

Materials

Rust Inhibitors For Wet Abrasive Blasting:

- Flash Rust
  - The purity of the water
  - The amount of oxygen dissolved in the water
  - The pH of the water, or a more exact way of saying this: The amount of ionic species left on the surface
  - The temperature, and
  - The drying time.

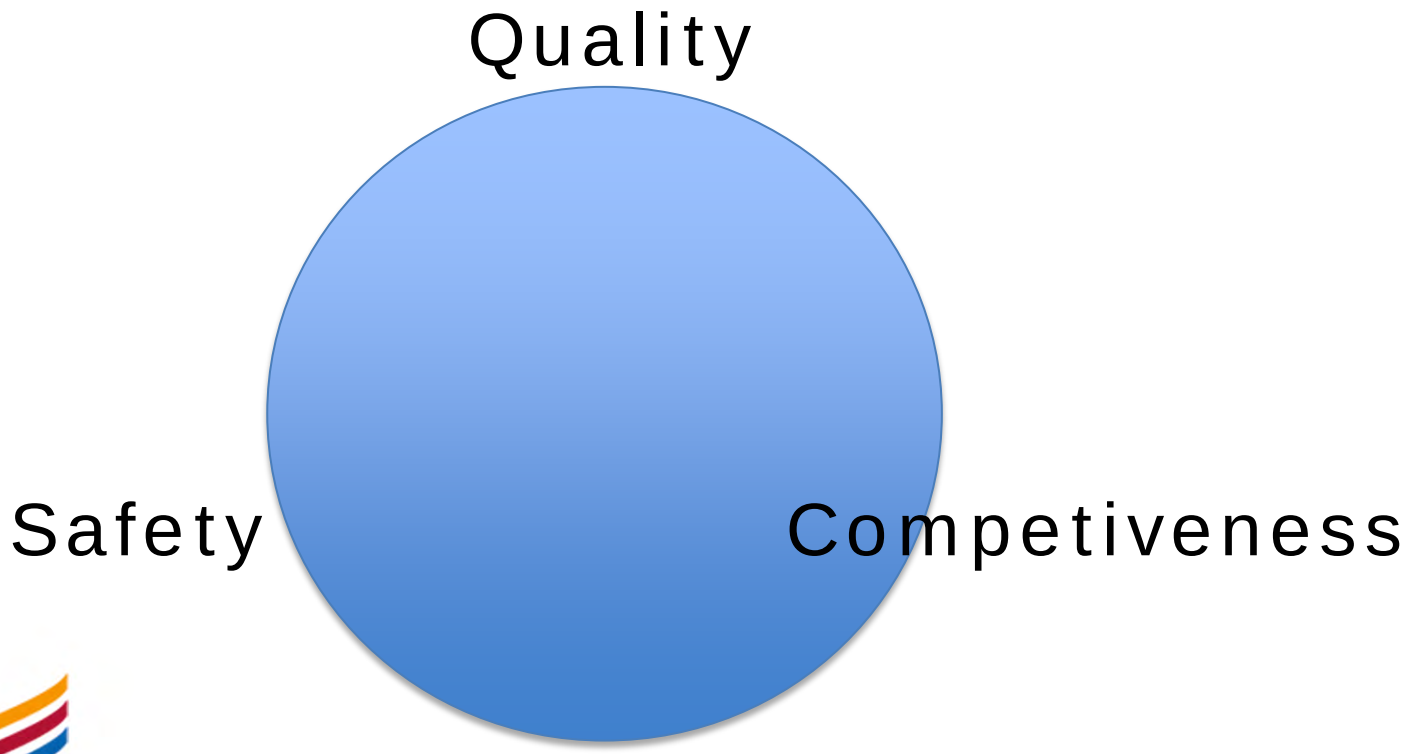
Materials

Types of Rust Inhibitors
For Wet Abrasive Blasting:

- Barrier Film Inhibitor
- Removes Reactants That Form On The Surface

SAFETY

Three Pillars Of a Successful Contracting Business



SAFETY

Construction Standard Vs. General Industry

- **1926.32(g)**"Construction work." For purposes of this section, "Construction work" means work for construction, alteration, and/or repair, including painting and decorating

SAFETY

Construction Standard: CFR 29: 1926

- https://www.osha.gov/
  - https://www.osha.gov/dcsp/compliance_assistance/sampleprograms.html
- Subpart E:
  - Personal Protective and Life Saving Equipment
    - 1926.103: Respiratory protection.

SAFETY

Proper Head, Eye, Foot, Hand & Body Protection:

- 29CFR 1926, Subpart E
  - Head Protection: Z89
  - Eye Protection: Z87
  - Foot Protection: Z41.1
- Hand & Body Protection
  - 29CFR 1926.28

OSHA

SAFETY

Respiratory Protection:

- OSHA's Response To Clemco's Letter Dated April 7, 2015

http://www.clemcoindustries.com/images/pdfs/OSHA_Reply_SARs_Wet_Vapor_Blasting

In order to be excluded from the standard described above [1910.94(a)(5)(ii)(c)], where NIOSH-approved respiratory protection is required, the employer must demonstrate compliance with each of the following criteria:

1) The exposure will not exceed the PELs. The exposure data must be:
   a. Personal sample(s) analyzed utilizing accepted methodologies;
   b. Collected outside of the abrasive-blasting unit's shroud in operator's breathing zone (Note: The sampling cassette should be positioned as close as possible to the employee's nose and mouth, i.e., in a hemisphere forward of the shoulders within a radius of 6 to 9 inches);
   c. Representative of the work environment without taking credit for respiratory protection;
   d. Representative of the abrasive blasting procedure with sufficient exposure data; and,
   e. Documented.
2) The abrasive blasting operator is working in an exhaust-ventilated enclosure where the operator is separated from the nozzle and blast.
3) The employer will comply with the requirements of the OSHA Respiratory Protection standard, 1910.134.

END - Questions