

Vapor Abrasive Blasting


ICRI 2016

Eric Rennerfeldt
Product Manager – Protective Coatings
and Surface Preparation Equipment

PROVEN QUALITY. LEADING TECHNOLOGY.


Agenda

- Blast methods that use water and abrasive media
- Vapor abrasive blasting
 - How and why it works
- Basic system components
- Applications
- Q&A



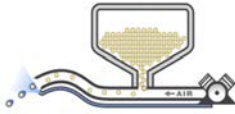
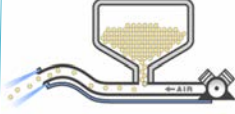
2016 Fall Convention | November 9-11 | Cleveland, Ohio

Blasting Methods using Water and Media




2016 Fall Convention | November 9-11 | Cleveland, Ohio

Abrasive Blasting Methods Using Water

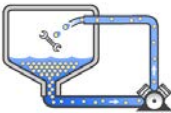
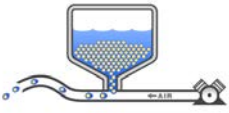



- WIN Nozzles
 - Water Injection Nozzles (WIN)
 - Jets of water dampen abrasive as it leaves the nozzle
 - Pros: Relatively inexpensive. Suppresses 50-85% of dust
 - Cons: High water consumption for maximum dust suppression
- Halo Nozzles
 - Halo (water ring) nozzles
 - A curtain of water surrounds the abrasive blast, dampening dust after impact




2016 Fall Convention | November 9-11 | Cleveland, Ohio

Abrasive Blasting Methods Using Water


- Cabinets and blast rooms
 - Water and media are mixed and sprayed inside an enclosure
 - Pros: Allows for media recycling, built-in containment.
 - Cons: Stationary. Blasting limited to objects that can fit in the enclosure.
- Modified sandblasters
 - Water and abrasive is stored in a pot under air pressure
 - Pros: Effective dust suppression.
 - Cons: Limited flow control. High abrasive and water consumption.




2016 Fall Convention | November 9-11 | Cleveland, Ohio

Problems with some Wet Technologies

- Each wet system... although reducing dust has had many drawbacks and potential problems
- Over time these drawbacks and problems from older wet blast technologies have lead to many myths about anything wet abrasive
 - Too wet, low production rate, etc.
- **This all changed with Vapor Abrasive blasting!**



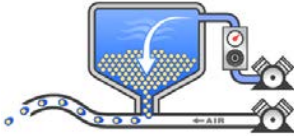
2016 Fall Convention | November 9-11 | Cleveland, Ohio



What is Vapor Abrasive Blasting?

PROVEN QUALITY. LEADING TECHNOLOGY.

Abrasive Blasting Methods Using Water


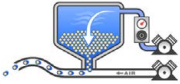


- Vapor Abrasive Blasting
 - Water and abrasive are combined in a pot under water pressure, then injected into the airflow
 - Pros: Up to 92% dust suppression. Affords fine control over the air pressure and water/abrasive mixture, allowing for blasting of a wider range of surfaces and reducing the amount of media and water expended

INTERNATIONAL CONCRETE REPAIR INSTITUTE | 2016 Fall Convention | November 9-11 | Cleveland, Ohio

A Closer Look at Vapor Abrasive Blasting


- Removes coatings, contaminants, corrosion and residues from hard surfaces
 - Similar to dry blasting, except that the blast media is moistened prior to impacting the surface
- Optimizes airflow and water usage
 - Only use about 1 to 2 pints (0.5 to 1.0 L) of water per minute when setup with high-performance blast media
 - Can utilize any blast media heavier than water, except steel shot

INTERNATIONAL CONCRETE REPAIR INSTITUTE | 2016 Fall Convention | November 9-11 | Cleveland, Ohio

Vapor Abrasive vs. Dry Blasting

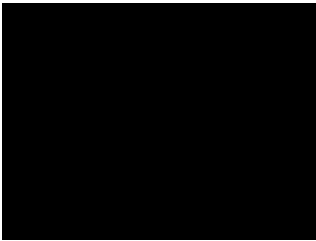
- The main advantage of vapor abrasive blasting over dry blasting is... less of this!
 - Up to 92% dust suppression – study conducted by the



INTERNATIONAL CONCRETE REPAIR INSTITUTE | 2016 Fall Convention | November 9-11 | Cleveland, Ohio

Vapor Abrasive Blasting Video

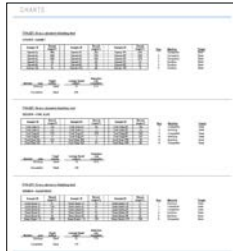
- Atlanta Shoot



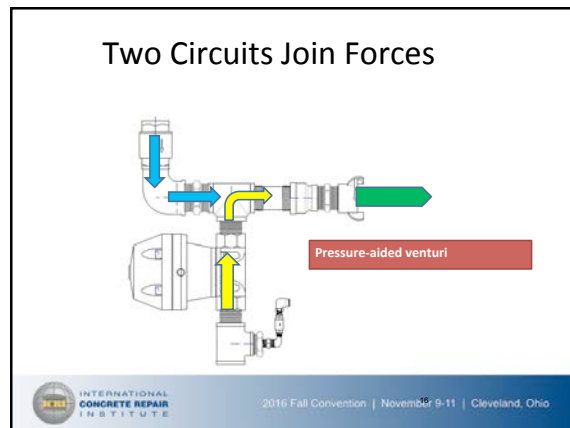
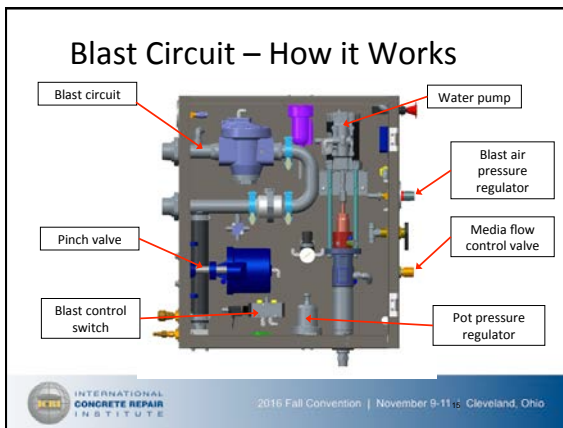
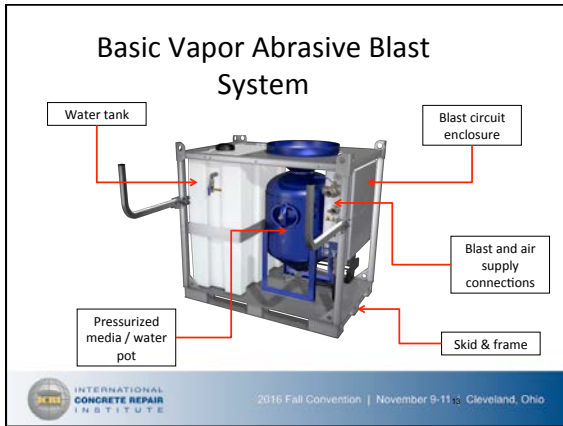
INTERNATIONAL CONCRETE REPAIR INSTITUTE | 2016 Fall Convention | November 9-11 | Cleveland, Ohio

Dust Suppression Report

- Third-party testing with Applied Environmental Sciences – May 19-21, 2014.
- Comparison study of airborne particulate concentrations produced by vapor abrasive blasting vs. dry abrasive blasting
- 3 media types: Garnet, coal slag, crushed glass
- 3 sets of samples dried and weighed to measure particulate mass reduction on each run
 - Up to 92% dust reduction on steel
 - Report available upon request



INTERNATIONAL CONCRETE REPAIR INSTITUTE | 2016 Fall Convention | November 9-11 | Cleveland, Ohio



Media Choices

- Vapor abrasive blasting works with any media that is heavier than water
 - Garnet
 - Crushed glass
 - Glass beads
 - Coal slag
 - Copper slag
 - Walnut shells
 - Soda (non-destructive)
- **Wetness** of the blast is a function of media size and shape (water space between the media in the pot)



2016 Fall Convention | November 9-11 | Cleveland, Ohio

Abrasive Media Overview

Media	Description	Mesh sizes	Hardness	Density	Shape	Cost	Profile
	Garnet is a gemstone with excellent naturally abrasive properties. The hardest abrasive in fast cutting, low dust producing and low compressing, excellent for removing tough coatings, paint, rust and mill scale from steel. Garnet also permits precise feathering control. A good general purpose preparation abrasive.	30-100	7-7.5 MOHS	3.4-3.9 SG		\$\$\$	
	More than 100% recycled glass, crushed glass creates a sharp profile and is useful in removing a variety of coatings. It produces a sharper cleaner finish than slag and mineral sands. Crushed glass is the abrasive of choice for preparing concrete.	30-400	5.5-7 MOHS	2.5 SG		\$	
	Mineral sands, like olivine and staurolite, are fast cutting, low dust abrasives that contain less than 5% silica per volume. Good for removal of rust, paint, weathered coatings and mill scale.	20-120	6.5-7.5 MOHS	3.3-3.6 SG		\$\$	
	Coal slag is the product of coal burning power plants, considered a "green" abrasive because it is ideal candidate for disposal of the waste. It is a relatively cheap, fast cutting abrasive with low free silica, but is considered a dirty abrasive and not widely used as wet abrasive blasting because the high amount of fines. Fine particles tend to get on the surface. Typical applications include the removal of rust, paint, weathered coatings and scale from steel and concrete.	10-80	6-7.5 MOHS	2.7 SG		\$	
	Copper slag is used for general cleaning, painting and corrosion. Blasting of sensitive metal surfaces, removing automotive paint, improving paint and removing fungus and calcium deposits from the painting. Used for, aluminum steel, aluminum pipe/welds and turbine blades.	30-320	5.5-6 MOHS	2.5 SG		\$\$\$	
	Flint is a soft, light abrasive that leaves no etched pattern, good for stripping paint and rust from sensitive surfaces, deburring and debanding aluminum, brass, plastic and fiberglass. Considered a non-hazardous abrasive for removal, stripping, and less than hand stripping.	10-80	3-4 MOHS	1.9 SG		\$\$\$	
	Walnut shells and other organic materials don't cause etched patterns, making them useful for cleaning old, green, oil, carbon, scale, burns and paint without changing the underlying substrate. Useful for stripping old bond, paint, epoxy, resin and dried epoxies, also use for etching, sandblasting and jewelry and restoring antique surfaces.	6-100	3-4 MOHS	1.2-1.35 SG		\$\$\$	



2016 Fall Convention | November 9-11 | Cleveland, Ohio

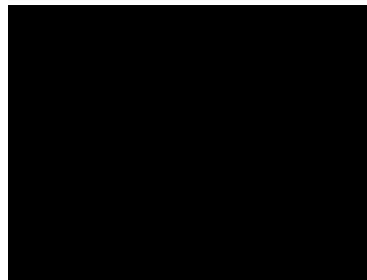
Brick Restoration

- Blast pressure: 60 psi
- #7 nozzle
- 375 cfm compressor for 2 machines



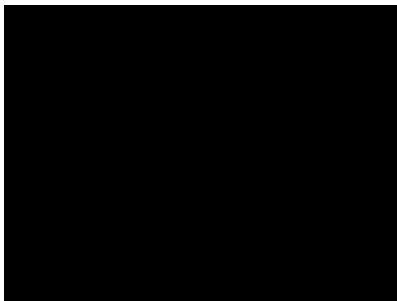
2016 Fall Convention | November 9-11 | Cleveland, Ohio

Brick Restoration



2016 Fall Convention | November 9-11 | Cleveland, Ohio

Line Removal



2016 Fall Convention | November 9-11 | Cleveland, Ohio

Concrete Applications

- Parking ramps – rebar and flooring repair
- Removal of and efflorescence from water treatment plants
- Removal of adhesives from overlay of carpets
- Removal of form marks to achieve an architectural blast
- Removal of rubber marks from curbing
- Removal of mold, lichens and biological growth



2016 Fall Convention | November 9-11 | Cleveland, Ohio

Vapor Abrasive vs. Dry Blasting

- Common advantages
 - From less dust
 - Allows for wide range of operating environments
 - Potentially less setup and cleanup costs
 - Less containment
 - From water vapor
 - Cleaner, more consistent surface
 - Fewer embedded particles or clinging dust
 - Media savings (water increases blast momentum)
 - Disposal costs from less water, dust and media savings



2016 Fall Convention | November 9-11th | Cleveland, Ohio

More Educational Resources



Thank You

PROVEN QUALITY. LEADING TECHNOLOGY.