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Understanding **3** key features of the

Bristle Blasting Process

1 Q: What is the Bristle Blasting Process?

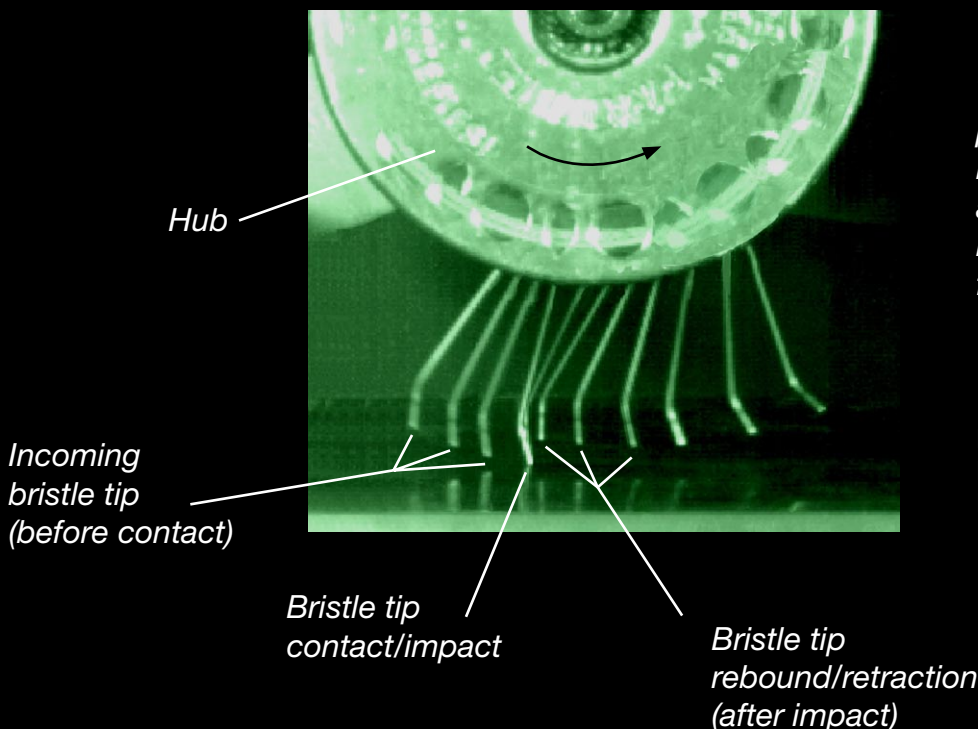
A: Bristle Blasting is a new process that uses a specially designed rotary bristle tool for achieving both corrosion removal and an anchor profile.

2 Q: How does the tool perform blasting operations?

A: The rotating bristles are DYNAMICALLY TUNED to the power tool, which results in impact and immediate retraction of bristle tips from the corroded surface (see high speed photography).

3 Q: How is this process similar to the abrasive grit blasting process?

A: The bristle tips are designed to strike the corroded surface with kinetic energy that is equivalent to grit blast media, thereby generating a texture and visual cleanliness that mimics the grit blasting process.



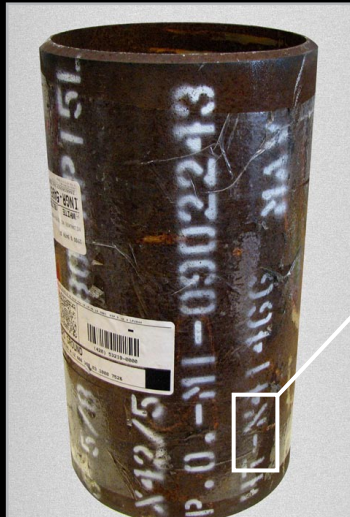
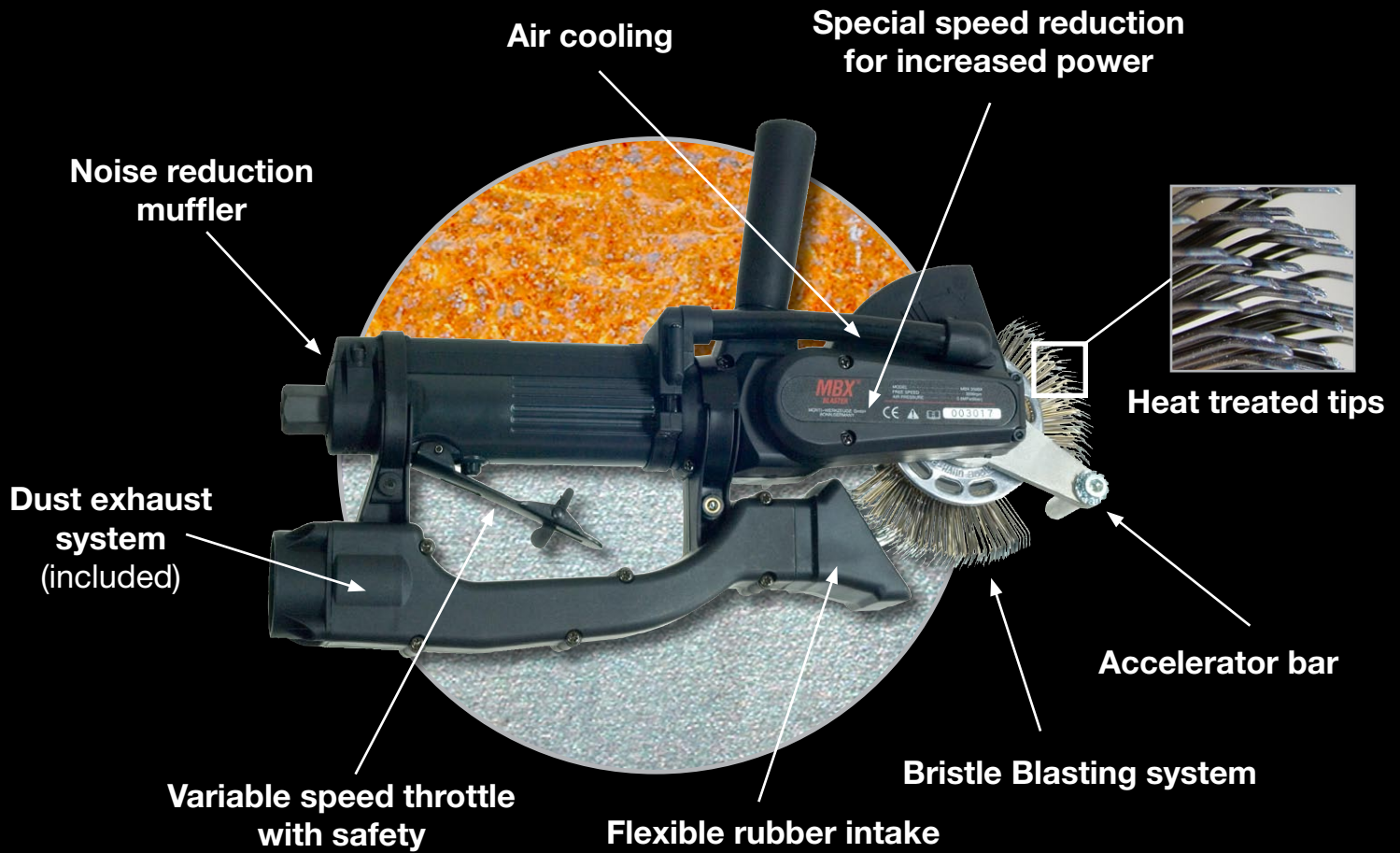
Time-exposed high-speed photography of single bristle illustrating the approach, impact, and retraction of bristle tip from steel surface.

Frame rate: 30,000 frames/sec
Hub speed: 2,500 rpm
Impact duration: 0.0003 sec

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API 5L piping



- bristle blast
- near-white/white metal
- 11.8 ft²/hr (1.1 m²/hr)
- 3.3 mils (83 R_z)

**Demonstrated performance
in corrosion removal**



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MBX[®] Bristle Blaster PERFORMANCE

Corrosion, Mill Scale, and Coating Removal ...

Restores surface to Near White/
White Metal visual standard

Surface Texture/ Anchor Profile ...

Roughness capability from
1.6 - 4.7 mils (40-120 microns)
(on API 5L steel 2.6 - 3.3 mils (65 - 83 Rz))
– also on weld seams

Environmentally-friendly ...

“Green” surface treatment, does not
use/produce hazardous materials

Improved Integrity of Treated Surfaces ...

Generates compressive residual stress along
treated surface for crack growth resistance,
improved fatigue life, and improved corrosion
resistance

Minimal Heat Generation ...

Surfaces free of thermal damage/heat
marking

Simple/Economical ...

Eliminates the need for complex
and costly abrasive blast equipment

Versatile ...

Lightweight & handheld - pneumatic
or electric - ideal for spot repairs and
recommended for areas prohibitive to
traditional metal cleaning processes



conventional
Grit Blasting



newly developed
Bristle Blasting



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ANNOUNCEMENT/
PRESS RELEASE

New Corrosion Removal Process, Technology.

MBX®- Surface Technologies, MONTI-Werkzeuge GmbH, Bonn, Germany
September 4, 2007.

Recently Developed *Bristle Blasting* Process Simultaneously Removes Corrosion and Generates Anchor Profile*

Process Description and Principles of Operation

The **bristle blasting** process is a new innovation that both **removes corrosion** and generates an **anchor profile** by using a specially designed rotary bristle tool. This tool consists of **hardened wire bristle tips** that are bent forward and dynamically tuned to a hand-held power tool which operates at approximately 2,500 rpm. The mechanical principles upon which the bristle blasting tool is based are summarized as follows: Bristle tips are designed to strike the corroded surface with **kinetic energy** that is equivalent to standard processes that use grit blast media. Immediately after the bristle tips strike the corroded steel surface, they retract (i.e., “rebound”) from the surface, which results in both **corrosion removal** and a **micro-indentation** that exposes fresh surface. Consequently, surfaces that have been treated by the bristle blasting tool have a **texture** and **visual cleanliness** that mimics those obtained by traditional grit blasting processes.

Tool Performance and Life

Recently completed tests carried out at Marquette University, Milwaukee, Wisconsin, USA, have indicated that the bristle blasting tool can perform on a par with traditional grit blasting processes. That is, corroded/pitted steel surfaces have been restored to a **near-white** or **white metal** appearance after treatment. In addition, an anchor profile that ranges from **2.6 - 3.3 mils (65 µm to 83 µm (R_z))** is routinely obtained on standard API 5L steel, which is commonly used for petroleum piping applications. This same testing program has also shown that corroded surfaces can be thoroughly treated at a **rate of 11.8 ft²/hr. (1.1 m²/hr.)**, which is well within the life of a single bristle blasting belt. Finally, the bristle blasting process simultaneously generates a **compressive residual stress** along the treated surface which, in turn, can increase the ability of steel **to resist cracking, fatigue, and stress corrosion**.

Process Advantages/Benefits

Chief advantages of the bristle blasting process lie in its **simplicity** and in its **economical advantages**. The tool itself is driven by a light-weight hand-held power tool that can utilize either a standard electric power source or compressed air. Safety precautions taken by the operator are the same as those which apply to ordinary hand-held power tools, namely, work gloves, suitable work-clothing and appropriate face/eye protection should be worn. The tool has excellent mobility, and eliminates the need for complex equipment, work-suits, breathing apparatus, and grit-recovery systems that are commonly required for ordinary abrasive blasting processes. In addition, the bristle blasting process is **eco-friendly**, and does not use or generate hazardous waste, thereby providing a “**green**” approach to corrosion removal and surface preparation of steel components.

Common Applications

Although the bristle blasting process is ideally suited for **spot-repair** applications, it can also be readily applied to larger surface areas where the use of other metal cleaning processes may be prohibitive or impractical. The process provides an efficient means for the **removal of corrosion, mill scale, defunct protective coatings**, and for **post-weld cleaning operations**. These applications frequently arise in a wide range of fabricating and infrastructure-support operations, such as **onshore/offshore well drilling installations, bridge refurbishment**, the **fabrication and repair** of **naval/marine vessels**, and **industrial maintenance applications**.

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MBX® Bristle Blaster Pneumatic



Technical details:

Free speed: 3,500 rpm \pm 5 %
 Required air pressure: 6.2 bar (90 PSI) > Bristle Blaster Belt 23 mm
 5.2 bar (75 PSI) > Bristle Blaster Belt 11 mm
 Average air consumption: 17.5 CFM (0.5 m³/min) \pm 10 %
 Required interior air hose size: 3/8" (9.5 mm)
 Weight: 2.6 lb. (1.2 kg)

MBX® Bristle Blaster Electric



Technical details:

Free speed: 3,200 rpm
 Voltage rating AC (3200): 240 V \pm 10 %
 Voltage rating AC (3200A): 120 V \pm 10 %
 Amperes (3200): 2 A \pm 15 %
 Amperes (3200A): 4 A \pm 15 %
 Weight: 4.8 lb. (2.2 kg)

MBX® Bristle Blaster Belts 11 mm (.43 inch) width



0.7 mm (.03 inch) spring steel angled, ground and heat treated tips
 OD: 115 mm (4.53 inch)

MBX® Adaptor System 11 mm (.43 inch)width



Made of high quality die cast aluminium, with safety elements

MBX® Bristle Blaster Set Pneumatic



MBX® Bristle Blaster Belts 23 mm (.90 inch) width



0.7 mm (.03 inch) spring steel angled, ground and heat treated tips
 OD: 115 mm (4.53 inch)

MBX® Adaptor System 23 mm (.90 inch) width



Made of high quality die cast aluminium, with safety elements

MBX® Bristle Blaster Set Electric



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