



# Standard Guide for Metallic Abrasive Blasting to Descale the Interior of Pipe<sup>1</sup>

This standard is issued under the fixed designation F1330; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon ( $\epsilon$ ) indicates an editorial change since the last revision or reapproval.

## 1. Scope

1.1 This guide covers metallic abrasive blasting to descale the interior of carbon steel pipe.

1.2 This guide is recommended for use in conjunction with an abrasive reclamation system.

1.3 The values stated in SI units are to be regarded as standard. The values given in parentheses are mathematical conversions to inch-pound units that are provided for information only and are not considered standard.

1.4 *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety, health, and environmental practices and determine the applicability of regulatory limitations prior to use.*

1.5 *This international standard was developed in accordance with internationally recognized principles on standardization established in the Decision on Principles for the Development of International Standards, Guides and Recommendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.*

## 2. Referenced Documents

### 2.1 ASTM Standards:<sup>2</sup>

**D2200 Practice for Use of Pictorial Surface Preparation Standards and Guides for Painting Steel Surfaces**

**E18 Test Methods for Rockwell Hardness of Metallic Materials**

### 2.2 SAE Standards:<sup>3</sup>

**J444 Cast Shot and Grit Size Specifications for Peening Cleaning**

**J827 Cast Steel Shot**

### 2.3 Other Documents:

**SSPC SP10 Surface Preparation Specifications<sup>4</sup>**

**SFSA 20-66 Standard Specification for Cast Steel Abrasives<sup>5</sup>**

## 3. Significance and Use

3.1 The maximum length and minimum diameter of the pipe shall be determined by the capacity of the blast equipment used.

3.2 This guide is recommended for removing mill scale, rust scale, paints, zincs, and oxides.

## 4. General Requirements

4.1 Before blasting, pipe shall be dry and free of slag and weld spatter which would not be removed by abrasive blasting. Pipe shall also be free of loose dust and debris which might hamper the effectiveness of abrasive blasting.

4.2 Abrasive blasting shall be accomplished in a dry area with the ambient air condition such that condensation does not occur.

4.3 Shot and blasting equipment shall be stored at a temperature not less than  $-13\text{ }^{\circ}\text{C}$  ( $10\text{ }^{\circ}\text{F}$ ) above the dew point of the surrounding area.

4.3.1 Abrasive reclamation system shall include a filtration system capable of removing oxides, debris, dust, shot/grit fragments, and fines.

4.4 Compressed air system shall be equipped with moisture removal devices capable of reducing the dew point of the air at the nozzle to  $-18\text{ }^{\circ}\text{C}$  (approximately  $0\text{ }^{\circ}\text{F}$ ) or less.

4.5 Hoses shall have the maximum practical diameter and shall be as short as possible.

4.6 Nozzles shall have the maximum possible aperture as determined by the capacity of the blast equipment and as limited by the pipe diameter.

4.7 Internal pipe cleaning nozzle assemblies are commercially available and shall be used where required.

<sup>1</sup> This guide is under the jurisdiction of ASTM Committee F25 on Ships and Marine Technology and is the direct responsibility of Subcommittee F25.11 on Machinery and Piping Systems.

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<sup>2</sup> For referenced ASTM standards, visit the ASTM website, [www.astm.org](http://www.astm.org), or contact ASTM Customer Service at [service@astm.org](mailto:service@astm.org). For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

<sup>3</sup> Available from SAE International (SAE), 400 Commonwealth Dr., Warrendale, PA 15096, <http://www.sae.org>.

<sup>4</sup> Available from Society for Protective Coatings (SSPC), 800 Trumbull Dr., Pittsburgh, PA 15205, <http://www.sspc.org>.

<sup>5</sup> Available from Steel Founders' Society of America (SFSA), 780 McArdle Dr., Unit G, Crystal Lake, IL 60014, <http://www.sfsa.org>.

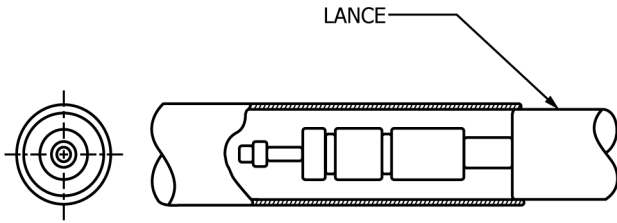


FIG. 1 For 20 mm to 50 mm (Approximately 3/4 in. to 2 in.) Inside Diameter Pipe

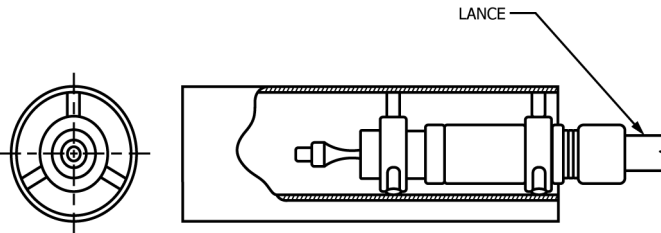


FIG. 2 For 50 mm to 125 mm (Approximately 2 in. to 5 in.) Inside Diameter Pipe

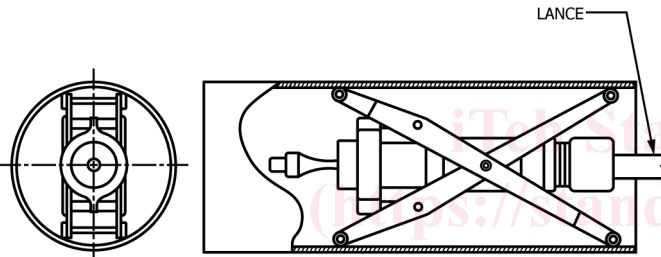


FIG. 3 For 125 mm to 305 mm (Approximately 5 in. to 12 in.) Inside Diameter Pipe

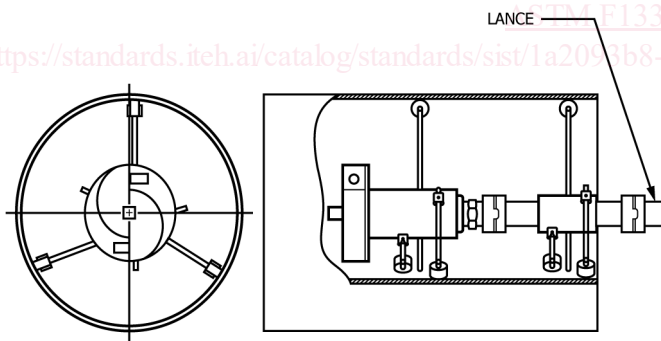


FIG. 4 For 305 mm to 915 mm (12 in. to 36 in.) Inside Diameter Pipe

4.7.1 Internal pipe cleaning nozzle assemblies shall include a carriage which is capable of centering the nozzle concentrically in the pipe being blasted and a nozzle which is capable of producing a consistent 360° blast pattern.

4.7.2 Diagrams of some commercially available internal pipe cleaning assemblies are provided in Figs. 1-4.

4.7.3 If a lance is required, it shall be at least as long as the pipe being blasted.

4.8 Blasting shall be accomplished using an abrasive mixture of cast steel shot and grit, or with iron shot or grit.

4.8.1 Iron or grit may be used if desired.

4.8.2 Cast steel shot and grit mixtures shall be sized in accordance with SAE J444.

4.8.3 Reclaimed shot and grit shall be of the same quality as the original material.

4.9 Cast steel shot shall be manufactured in accordance with SAE J827 and tempered to a hardness of 40–50 Rockwell C in accordance with Test Methods E18 (see Table 1).

4.10 Cast steel grit shall be manufactured in accordance with SFSA 20-66 and tempered to a hardness of 55–65 Rockwell C in accordance with Test Methods E18 (see Table 2).

4.11 Shot and grit size shall be determined by the following criteria:

4.11.1 Smaller shot and grit produces more impacts per inch and is therefore more effective for removing paints and corrosion products.

4.11.2 Larger shot and grit produces more kinetic energy per impact and is therefore more efficient for removing heavier deposits such as mill scale.

4.12 If surface type and profile is specified, abrasive shall be selected using the following criteria:

4.12.1 Shot produces a wavy rounded surface profile which increases coating area coverage.

4.12.2 Grit produces a sharp angular profile which forms a better anchor pattern for most coatings.

4.12.3 Table 3 lists some typical maximum profiles produced by some commercial abrasive media.<sup>4</sup>

4.13 Blasting shall be accomplished with a minimum of 620 kPa (90 psi) dry air pressure at the nozzle.

TABLE 1 Steel Shot and Grit Specifications<sup>A,B</sup>

Property	Shot	Grit
Size:		
New abrasive as manufactured	All material is screened to meet or exceed SAE J444 and SFSA 20-66.	
Chemistry:		
Carbon	0.85 % to 1.20 %	
Manganese	0.60 % to 1.00 %	
Silicon	0.50 % to 1.00 %	
Sulfur	<0.05 %	
Phosphorus	<0.05 %	
Microstructure:		
	Uniformly tempered martensite, with fine, well-distributed carbides, if any. Carbide networks, transformation products, decarburized surfaces, inclusions, and quench cracks are undesirable.	
Hardness:		
Commonly used structural steel <sup>C</sup>	40 RC to 50 RC	40 RC to 50 RC <sup>D</sup> 40 RC to 60 RC

<sup>A</sup> Courtesy of Steel Structures Painting Council.

<sup>B</sup> It is extremely important that contractual documents which specify abrasive to be used clearly designate the abrasive by size and by hardness.

<sup>C</sup> Both cast steel shot and grit of hardnesses in the range from 30 to 66 Rockwell C may be purchased. However, the abrasives of less than 40 RC and greater than 60 RC are generally used for applications other than surface preparation of structural steel.

<sup>D</sup> Abrasive manufacturers identify steel grit by designations which include two or more prefix letters, followed by the number size. Prefix letters are different for each of the abrasive suppliers for any given hardness range.