



Standard Specification for Automated Controlled Shot Peening of Metallic Articles Prior to Nickel, Autocatalytic Nickel, or Chromium Plating, or as Final Finish¹

This standard is issued under the fixed designation B 851; 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 (ε) indicates an editorial change since the last revision or reapproval.

1. Scope

1.1 This specification covers the requirements for automated, controlled shot peening of metallic articles prior to electrolytic or autocatalytic deposition of nickel or chromium, or as a final finish, using shot made of cast steel, conditioned cut wire, or ceramic media. The process is applicable to those materials on which test work has shown it to be beneficial within given intensity ranges. It is not suitable for brittle materials. Hand peening and rotary flap peening are excluded specifically.

1.2 Shot peening induces residual compressive stresses in the surface and near-surface layers of metallic articles, controlling or limiting the reduction in fatigue properties that occurs from nickel or chromium plating of the article, or the fatigue properties of unplated articles.

1.3 *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 and health practices and determine the applicability of regulatory limitations prior to use.*

2. Referenced Documents

2.1 ASTM Standards:²

- B 183 Practice for Preparation of Low-Carbon Steel for Electroplating
- B 242 Guide for Preparation of High-Carbon Steel For Electroplating
- B 320 Practice for Preparation of Iron Castings for Electroplating
- B 322 Practice for Cleaning Metals Prior to Electroplating
- B 607 Specification for Autocatalytic Nickel Boron Coatings for Engineering Use
- B 650 Specification for Electrodeposited Engineering Chromium Coatings on Ferrous Substrates

- B 656 Guide for Autocatalytic (Electroless) Nickel-Phosphorus Deposition on Metals for Engineering Use³
- B 689 Specification for Electroplated Engineering Nickel Coatings
- B 733 Specification for Autocatalytic (Electroless) Nickel-Phosphorus Coatings on Metal
- E 11 Specification for Wire Cloth and Sieves for Testing Purposes
- E 165 Test Method for Liquid Penetrant Examination
- E 709 Guide for Magnetic Particle Examination
- 2.2 *Federal Standards:*⁴
 - QQ-N-290 Nickel Plating (Electrodeposited)
 - QQ-C-320 Chromium Plating (Electrodeposited)
- 2.3 *Military Standards:*⁴
 - MIL-S-851 Steel Grit, Shot, and Cut Wire Shot, and Iron Grit and Shot Blast Cleaning and Peening
 - MIL-S-13165 Shot Peening of Metal Parts
 - MIL-C-26074 Coating, Electroless Nickel
 - MIL-STD-45662 Calibration System Requirements
- 2.4 *SAE Standards:*⁵
 - SAE J441 Cut Steel Wire Shot
 - SAE J442 Test Strip, Holder and Gage for Shot Peening
 - SEA J827 Cast Steel Shot
 - SAE J1830 Size, Classification and Characteristics of Ceramic Shot for Peening

3. Terminology

3.1 Definitions:

3.1.1 *Almen strip*—UNS G10700 carbon steel specimens that are used to calibrate the energy of a shot peening stream (see Fig. 1).

3.1.2 *Almen strip holding fixture*—a fixture for holding Almen strips in suitable locations that represent the position and angular orientation of the surfaces of a part where intensity is to be determined and verified (see Fig. 2).

¹ This specification is under the jurisdiction of ASTM Committee B08 on Metallic and Inorganic Coatings and is the direct responsibility of Subcommittee B08.02 on Pre Treatment.

Current edition approved April 1, 2004. Published April 2004. Originally approved in 1994. Discontinued January 2004 and reinstated in 2004 as B 851–04.

² For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

³ Withdrawn.

⁴ Available from Standardization Documents Order Desk, Bldg. 4 Section D, 700 Robbins Ave., Philadelphia, PA 19111-5094, Attn: NPODS.

⁵ Available from Society of Automotive Engineers, 400 Commonwealth Drive, Warrendale, PA 15096.

