



Designation: D7127 – 17

# Standard Test Method for Measurement of Surface Roughness of Abrasive Blast Cleaned Metal Surfaces Using a Portable Stylus Instrument<sup>1</sup>

This standard is issued under the fixed designation D7127; 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 test method describes a shop or field procedure for determination of roughness characteristics of surfaces prepared for painting by abrasive blasting. The procedure uses a portable skidded or non-skidded stylus profile tracing instrument. The measured characteristics are:  $R_t$  and  $R_{pc}$ . Additional measures of profile height ( $R_{max}$  and/or  $R_z$ ) may also be obtained as agreed upon by purchaser and seller. (The digitally-determined profile parameters  $R_t$ ,  $R_{max}$ ,  $R_y$  and  $R_{z1max}$  are extremely similar in definition.)

1.2 The values stated in SI units are to be regarded as the standard. The values given in parentheses are for information only.

1.3 In general, this method should be limited to the measurement of surface roughness where  $R_t$  is in the range 10 to 150  $\mu\text{m}$  (0.4 to 6 mil) and where the Peak Count,  $R_{pc}$  is less than 180 peaks/cm (450 peaks/in.).

1.4 SSPC standard SSPC-PA 17 provides additional guidance for determining conformance with surface profile requirements.

1.5 *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.*

1.6 *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.*

<sup>1</sup> This test method is under the jurisdiction of ASTM Committee D01 on Paint and Related Coatings, Materials, and Applications and is the direct responsibility of Subcommittee D01.46 on Industrial Protective Coatings.

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## 2. Referenced Documents

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

D4417 Test Methods for Field Measurement of Surface Profile of Blast Cleaned Steel

E177 Practice for Use of the Terms Precision and Bias in ASTM Test Methods

E691 Practice for Conducting an Interlaboratory Study to Determine the Precision of a Test Method

2.2 *SSPC Standard:*<sup>3</sup>

SSPC-PA 17 Procedure for Determining Conformance to Steel Profile/Surface Roughness/Peak Count Requirements

2.3 *ASME Standard:*

ASME B46.1-2002 Surface Texture, Surface Roughness Waviness and Lay<sup>4</sup>

2.4 *ISO Standards:*

ISO 4287: 1997 Geometrical Product Specifications (GPS)—Surface Texture: Profile Method—Terms, Definitions, and Surface Parameters<sup>5</sup>

## 3. Terminology

3.1 *Definitions*—The following definitions are provided as an aid to users of this document. Formal definitions of the surface roughness and instrument parameters below are contained in the referenced standards (Fig. 1).

3.1.1 *deadband, n*—that distance above and below the mean line that a continuous trace line must cross in both directions (up and down) to count as a single peak.

<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 The Society for Protective Coatings (SSPC), 800 Trumbull Drive, Pittsburgh, PA 15205-4365, <http://www.sspc.org>.

<sup>4</sup> Available from American Society of Mechanical Engineers (ASME), ASME International Headquarters, Three Park Ave., New York, NY 10016-5990, <http://www.asme.org>.

<sup>5</sup> Available from International Organization for Standardization (ISO), 1, ch. de la Voie-Creuse, CP 56, CH-1211 Geneva 20, Switzerland, <http://www.iso.org>.

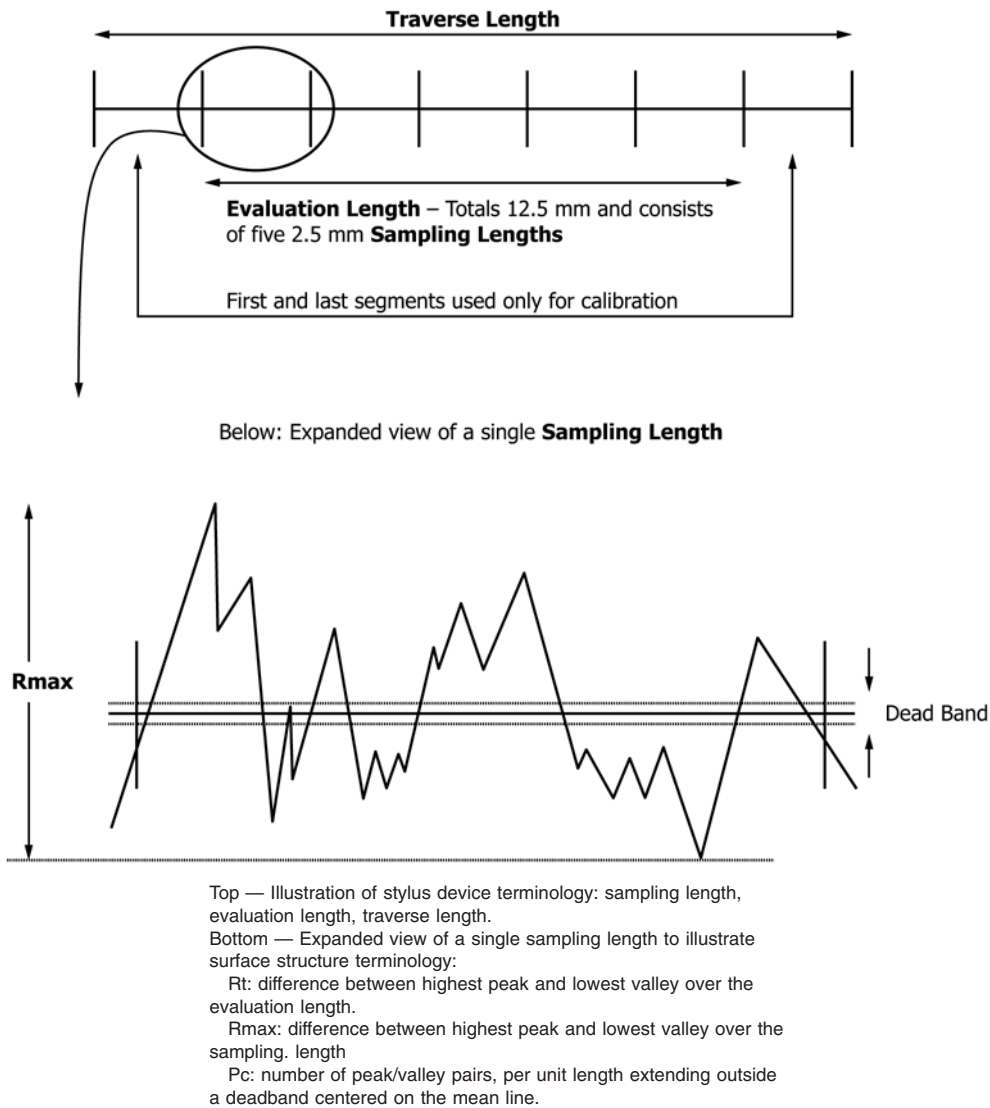


FIG. 1 Illustration of Terminology

3.1.1.1 *Discussion*—Use of a deadband diminishes the effect of small, spurious peaks due to noise.

3.1.2 *evaluation length, n*—a sequence of five consecutive sampling lengths.

3.1.3 *R<sub>pc, n</sub>*—the number of peak/valley pairs, per unit of length, extending outside a “deadband” centered on the mean line.

3.1.4 *R<sub>t, n</sub>*—the vertical distance between the highest peak and lowest valley within any given evaluation length.

3.1.5 *R<sub>max, n</sub>*—the greatest vertical distance between highest peak and lowest valley for any of the five sampling lengths that comprise an evaluation length.

3.1.6 *R<sub>z, n</sub>*—the vertical distance between the highest peak and lowest valley in a sampling length averaged over the five sampling lengths comprising the evaluation length.

3.1.7 *sampling length, n*—the nominal distance parallel to the surface being assessed within which a single value of a surface parameter is determined.

3.1.8 *surface preparation, n*—the cleaning and profiling of a metallic surface using an abrasive blast media or mechanical means to prepare that surface for coating.

3.1.9 *surface profile, n*—for purposes of the standard, the positive and negative vertical deviations (peaks and valleys) are measured from a mean line approximately the center of the profile being evaluated.

3.1.10 *surface roughness, n*—the combined characteristics of surface profile (height) and peak count (linear density) for a surface.

3.1.11 *traversing length, n*—seven sampling lengths comprising the evaluation length and the pre-travel and post-travel segments.