SSPC: The Society for Protective Coatings

Abrasive Standard No. 1

Mineral and Slag Abrasives

1. Scope

1.1 This standard contains requirements for classification, evaluation, and performance of mineral and slag or other by-product abrasives used for blast cleaning steel and other surfaces for painting and other purposes.

1.2 The abrasives covered by this standard are primarily intended for one-time use without recycling, however, some media are capable of being recycled. Requirements for work mixes containing recycled media are contained in Sections 4.4.1 and 4.4.2.

1.3 Unless otherwise specified, the requirements of this standard are contained in Sections 2 through 6.

1.4 When specified, the requirements of Appendix B become mandatory requirements of this standard in addition to the requirements of Sections 2 through 6, and take precedence over any conflicting requirements in Sections 2 through 6.

2. Description

2.1 The abrasives are categorized into two types, three classes and five grades as described below. Normally the user shall specify the types, classes and grades required. If no abrasive type is specified, then either Type I or Type II is considered acceptable. If no abrasive class is specified, then any class will be considered acceptable. If no abrasive profile grade is specified, the abrasive shall satisfy the requirements of any of the five grades listed.

2.2 The following abrasive types are included:

Type I - Natural Mineral Abrasives: These are naturally occurring minerals, including, but not limited to, quartz sands, flint, garnet, staurolite, and olivine that meet the performance requirements of this standard.

Type II - By-Product or Manufactured Abrasives: Slag, manufactured, or by-product materials that meet the performance requirements of this standard.

2.3 The following abrasive classes are included.

Class A - Crystalline silica less than or equal to 1.0 percent (%)

Class B - Crystalline silica less than or equal to 5.0%

Class C - Unrestricted crystalline silica

The definition and requirements for Classes A, B, and C are given in Section 4.1.7 and subsections.

2.4 The abrasive grades and associated profile ranges are listed below:

Grade 1 - Abrasives that produce surface profiles of 0.5 to 1.5 mils (13 to 38 micrometers [μm]) when tested in accordance with Section 4.1.8.

Grade 2 - Abrasives that produce surface profiles of 1.0 to 2.5 mils (25 to 64 μm) when tested in accordance with Section 4.1.8.

Grade 3 - Abrasives that produce surface profiles of 2.0 to 3.5 mils (51 to 89 μm) when tested in accordance with Section 4.1.8.

Grade 4 - Abrasives that produce surface profiles of 3.0 to 5.0 mils (75 to 127 μm) when tested in accordance with Section 4.1.8.

Grade 5 - Abrasives that produce surface profiles of 4.0 to 6.0 mils (102 to 152 μm) when tested in accordance with Section 4.1.8.

The purchaser has the option to designate other profile ranges.

2.5 Definitions

Qualification tests are tests that are run to qualify that a material meets the requirements of the standard.

Conformance tests are tests that are performed to verify that the material being submitted has the same properties as the material that initially qualified.

Quality control tests are field tests that are performed to verify that the material complies with specified requirements immediately prior to use. A summary of required tests and responsibilities for testing is provided in Appendix D.

3. Referenced Standards

3.1 The latest issue, revision, or amendment of the referenced standards in effect on the date of invitation to bid shall govern unless otherwise stated. Those documents marked with an asterisk (*) are referenced only in the Notes, which are not requirements of this standard.

3.2 If there is a conflict between the requirements of any of the cited reference standards and this standard, the requirements of this standard shall prevail.

3.3 SSPC STANDARDS:

VIS 1	Guide and Reference Photographs for Steel Surfaces Prepared by Dry Abrasive Blast Cleaning
SP 10	Near-White Blast Cleaning
PA 17	Procedure for Determining Conformance to Specified Steel Profile/Surface Roughness/Peak Count Requirements

3.4 AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM) STANDARDS:[1]

C128	Standard Test Method for Density, Relative Density, (Specific Gravity) and Absorption of Fine Aggregate
C136	Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates
C566	Standard Test Method for Total Evaporable Moisture Content of Aggregate by Drying
C702	Standard Practice for Reducing Samples of Aggregate to Testing Size
D75	Standard Practice for Sampling Aggregates
D4940	Standard Test Method for Conductimetric Analysis of Water Soluble Ionic Contaminants of Blasting Abrasives
D7393	Standard Practice for Indicating Oil in Abrasives
E18	Standard Test Methods for Rockwell Hardness of Metallic Materials
* **E1132**	Standard Practice for Health Requirements Relating to Occupational Exposure to Respirable Crystalline Silica

3.5 NATIONAL INSTITUTE FOR OCCUPATIONAL SAFETY AND HEALTH (NIOSH)[2]

Method 7500 Silica, crystalline, by XRD (filter redeposition)

4. Requirements

4.1 Qualification Tests: Unless otherwise specified, the supplier shall provide documentation certifying that the abrasive delivered complies with the requirements of Sections 4.1.1 through 4.1.10.3. The required documentation shall be furnished by a testing facility that meets the requirements of Section 6.2. Qualification testing shall be performed every 2 years unless otherwise specified.

4.1.1 Specific Gravity: The specific gravity shall be a minimum of 2.5 as determined by ASTM C128.

4.1.2 Hardness: The hardness shall be a minimum of 6 on the Mohs scale when tested as follows: Examine a random sample of 5 grams (or 2 cubic centimeters) of the material under low-power microscope (10X) and if grains of different colors or character are present, select a few grains of each color type. Place in succession a minimum of three of the grains thus differentiated between two glass microscope slides. While applying pressure, slowly move one slide over the other with a reciprocating motion for 10 seconds. Examine the glass surface, and if scratched, the material shall be considered as having a minimum hardness of 6 on the Mohs scale. If more than 25% of the grains by count fail to scratch the glass surface, the abrasive does not meet this standard.

4.1.3 Weight Change on Ignition: The maximum permissible loss on ignition is 1.0% and the maximum permissible gain is 5.0% when tested as follows: A representative portion of the sample shall be ground in an agate mortar and thoroughly dried at 105 to 110 degrees centigrade (°C) (220 to 230 degrees Fahrenheit [°F]) for one hour. Transfer approximately 1 gram of the dried sample to a tared crucible with cover and weigh to the nearest milligram. Cautiously heat the crucible with contents, at first partially covered, and then at approximately 750 ± 50 °C (1382 ± 90 °F) covered. Hold at 750 ± 50 °C (1382 ± 90 °F) for 30 minutes, then cool in a desiccator and reweigh. The percent of weight change shall be computed as follows:

$$\text{percent weight change} = \frac{(\text{final weight} - \text{original weight}) \times 100}{\text{original weight}}$$

4.1.4 Water Soluble Contaminants: The conductivity of the abrasive shall not exceed 1000 micromhos/cm (1 mho = 1 siemen) when tested in accordance with ASTM D4940 (see Note 8.1).

4.1.5 Moisture Content: The maximum moisture content shall be 0.5% by weight, when tested in accordance with ASTM C566.

4.1.6 Oil Content: When tested in accordance with ASTM D7393 no oil shall be visible on the surface of the water or as an emulsion.

4.1.7 Crystalline Silica Content: All abrasives shall be classed based on crystalline silica content in accordance with NIOSH Method 7500 (see Note 8.2). Abrasives designated as Class A or B must meet the requirements of Sections 4.1.7.1 or 4.1.7.2, respectively.

4.1.7.1 Class A - Less Than 1% Crystalline Silica: Abrasives shall contain no more than 1.0% by weight of crystalline silica.

4.1.7.2 Class B - Less than 5% Crystalline Silica: Abrasives shall contain no more than 5.0% by weight of crystalline silica.

4.1.7.3 Class C - Unrestricted Crystalline Silica: No restrictions on crystalline silica content.

[1] ASTM International, 100 Barr Harbor Drive, West Conshohocken, PA 19428-2959. For referenced ASTM standards, visit the ASTM website, <http://www.astm.org>, or contact ASTM Customer Service at <http://www.service@astm.org>. For Annual Book of ASTM Standards volume information, refer to the standard's Document Summary page on the ASTM website

[2] National Institute of Occupational Safety and Health standards are available online from< http://www.cdc.gov/NIOSH/srchpage.html>. Enter the number of the method at this search page to download a .pdf file.

4.1.8 Surface Profile: Unless otherwise specified, the abrasive supplier shall provide documentation that the average surface profile, when determined in accordance with the description below, is within the ranges specified in Section 2.4 when measured in accordance with SSPC-PA 17 using ASTM D4417 Method C (see Note 8.3). Steel test plates for performance evaluations shall meet a Rockwell hardness of 76 ± 5 HRBW when tested in accordance with ASTM E18. A representative sample of the material shall be obtained in accordance with ASTM D75 and used to abrasive blast a 61-centimeter [cm] x 61-cm x 6-millimeter [mm] (or 2-foot [ft] x 2-ft x ¼-inch) steel plate having intact mill scale (SSPC-VIS 1 Rust Grade A) to a cleanliness of SSPC-SP 10 (Near-White Metal Blast Cleaning). A minimum 3550-cm^2 (550-$inch^2$ [approximately 4 ft^2]) area of the plate shall be blast cleaned. The blasting shall be done using a 9.5-mm (3/8-inch) #6 or 6.3-mm (1/4-inch) #4 venturi nozzle with a nozzle pressure of 670 ± 35 kilopascals [kPa] (95 ± 5 psig) at a distance of 61 ± 15 cm (24 ± 6 inches) from the surface at an angle of 75 to 105 degrees.

4.1.9 Particle Size Distribution

4.1.9.1 The abrasive supplier shall designate range(s) for maximum and minimum retention of each sieve size to meet the profile range(s) specified in Section 2.4 and determined in Section 4.1.8. The particle size distribution shall be measured in accordance with ASTM C136 using a combination of a minimum of four of the following U.S. standard sieves: 6, 8, 12, 16, 20, 30, 40, 50, 60, 70, 80, 90, 100, 110, 120, 130, 140, 150, 160, 170, 180, 190 and 200. The sieve sizes used to characterize an abrasive sample shall cover the range starting with smallest sieve opening that results in 100% passing and ending with the sieve size giving 95% retention. Upon request, the supplier shall substantiate that the specified abrasive size range will meet the required profile range using the blasting methods specified in Section 4.1.8.

4.1.9.2 The supplier-designated sieve size distribution and ranges shall become the acceptance standard for the specific abrasive submitted (see Section 6).

4.1.10 Health and Safety Requirements

4.1.10.1 The abrasive material as supplied shall comply with all applicable federal, state, and local regulations (see Note 8.4). The abrasive supplier shall provide a letter stating that the abrasives do not contain any hazardous materials at levels that would cause the abrasive to be classified as a hazardous waste under current guidelines at the location of use (e.g., U.S. EPA limits as listed under Federal Register, Vol. 55, paragraph 261.24, Maximum Concentration of Contaminants for the Toxicity Characteristic).

4.1.10.2 The manufacturer shall provide the purchaser with sufficiently detailed chemical analyses to provide the protective engineering and administrative controls for blast cleaning identified in federal, state, and local codes.

4.1.10.3 Material Safety Data Sheets shall be furnished for all abrasive materials supplied.

4.2 Conformance Tests: If the purchaser of the abrasive requires batch or lot testing to confirm that the material delivered is consistent with the material ordered, the abrasive shall meet the requirements of Sections 4.1.2, 4.1.3 (if required by Appendix B), 4.1.4, 4.1.5, 4.1.6, and 4.1.9 (see Appendix D).

4.3 Quality Control Tests for New Media: Unless otherwise specified, the end user of the abrasive (e.g., shop or contractor) shall perform field testing immediately prior to use at a minimum frequency of one test per every 50 bags of abrasive or three tests per bulk shipment of abrasive to verify compliance with Sections 4.1.4 (Conductivity), and 4.1.6 (Oil Contamination) of this standard. Refer to Section 5.3 and subsections for sampling procedures for conductivity and oil contamination testing.

4.4 Quality Control Tests for Recycled Work Mix:

4.4.1 Unless otherwise specified, the cleaned abrasive work mix shall meet the requirements of Sections 4.1.4 and 4.1.6 when tested immediately prior to use at a minimum frequency of once every 8 hours or every work shift, whichever is shorter. Refer to Section 5.3 and subsections for sampling procedures for conductivity and oil contamination testing.

4.4.2 Unless otherwise specified, the cleaned abrasive work mix shall have a particle size distribution capable of producing and maintaining the specified profile range when evaluated by preparing a 61 x 61 cm (2 x 2 ft) test area and determining profile in accordance with SSPC-PA 17 using ASTM D4417 Method C (replica tape).

4.5 Additional Optional Performance Tests: Optional performance tests for abrasive consumption rate and abrasive cleaning rate are described in Appendix A.

5. Qualification Testing and Conformance Testing

The specific responsibilities for qualification testing and conformance testing are normally established in the procurement documents. Unless otherwise specified, the supplier is responsible for performing and documenting the qualification and conformance tests called for in this standard (see Note 8.5).

5.1 Sampling for Qualification Tests

5.1.1 Bagged Abrasive: Three or more sacks of abrasive shall be randomly selected from each inspection lot. The sacks shall be mixed and separated and a 50-kg (110-lb) composite sample prepared in accordance with ASTM C702.

5.1.2 Bulk Abrasive: A 50-kg (110-lb) composite sample shall be obtained from the blended finished product in accordance with ASTM D75 (see Note 8.6).

5.2 Sampling for Conformance Tests

5.2.1 Bagged Abrasive: One sack of abrasive shall be randomly selected from each inspection lot and a 2-kg (4-lb) composite sample prepared in accordance with ASTM C702.

5.2.2 Bulk Abrasive: A 2-kg (4-lb) composite sample shall be obtained from the blended finished product in accordance with ASTM D75.

5.3 Sampling for Quality Control Tests

5.3.1 Conductivity Test: Collect a single random sample per 50 bags of abrasive (or 3 random samples from each shipment if abrasive is delivered in bulk) to perform the conductivity test. Sample size shall be 300 milliliters [ml] (approximately 10 fluid ounces).

5.3.2 Oil Contamination: Collect a single random sample of approximately 125 ml (4 fluid ounces) per 50 bags of abrasive [or 3 random samples from each shipment if abrasive is delivered in bulk] to perform the oil contamination test. Sample size shall be 125 milliliters (approximately 4 fluid ounces).

6. Documentation Requirements

Unless otherwise specified, the supplier shall provide documentation to certify the abrasive meets the requirements of Section 4.1 and subsections. At a minimum, the documentation shall include the following:

6.1 List of tests performed, including the title of the test, the appropriate standards used, any deviation from standard practice, and the numerical results of the testing.

6.2 Testing facilities, including the name and location of the laboratory, the responsible laboratory official, and laboratory certification or other evidence of qualification. Evidence of qualification shall include documentation that the laboratory is engaged, as a regular part of its business, in performing the inspections and tests required in Section 4.1 and subsections.

6.3 Date of testing including date of original qualification (if applicable) and dates of completion and official approval of testing results.

7. Disclaimer

7.1 While every precaution is taken to ensure that all information furnished in SSPC standards is as accurate, complete, and useful as possible, SSPC cannot assume responsibility nor incur any obligation resulting from the use of any materials, coatings, or methods specified herein, or of the standard or standard itself.

7.2 This standard does not attempt to address problems concerning safety associated with its use. The user of this standard, as well as the user of all products or practices described herein, is responsible for instituting appropriate health and safety practices and for ensuring compliance with all governmental regulations.

8. Notes

Notes are not requirements of this standard.

8.1 The limitation for abrasive conductivity is based on results reported in SSPC 91-07, "Effect of Surface Contaminants on Coating Life."[3]

8.2 Users of abrasives containing quartz (crystalline silica) should comply with the requirements of ASTM E1132.

8.3 Materials furnished under this standard that produce the required surface profile under standard test conditions may produce a different surface profile depending upon job condition, type of surface, blasting pressure, etc.

8.4 Note that the spent abrasive may contain hazardous paint and other foreign matter. Federal, state, and local regulations govern proper disposal of spent abrasives.

8.5 It is recommended that tested abrasive samples be retained for a minimum of 3 years or as required by project specifications.

8.6 The importance of properly obtaining a sample cannot be over-emphasized. All subsequent analyses performed on the selected sample are likely to be affected by particle size, so it is imperative that every reasonable effort be made to select the sample in a way that will assure proper representation. Therefore, it is important to select the proper sampling location, and to use proper techniques to select the sample.

The following guidelines should be kept in mind when deciding on a sampling method:

8.6.1 If possible, sample the material to be tested when it is in motion, in such places as a conveyor output point or a chute discharge.

8.6.2 The whole of the material stream should be taken for many short periods of time in preference to part of the material stream being taken for the whole of the time.

Appendix A. Optional Test To Determine Rates of Surface Cleaning by Abrasives and of Abrasive Consumption (Nonmandatory)

A.1 TEST PROCEDURE

A.1.1 For testing purposes hot-rolled carbon steel plates or other flat structural steel with surface area of 1.9 to 7.4 m^2 (20 to 80 ft^2) shall be abrasive blast cleaned to a SSPC-SP 10 "Near White" condition. Surface profile shall range from 51

[3] SSPC report 91-07 is available online at no cost to SSPC members.

to 76 μm (2.0 to 3.0 mils) when measured in accordance with SSPC-PA 17 using ASTM D4417 Method C. These panels shall be coated within 4 hours of abrasive blasting, or before surface rusting is visible—whichever occurs first.

A.1.2 The panels prepared in A.1.1 shall be coated with three coats of epoxy-polyamide paint (total DFT 178 to 254 μm [7 to 10 mils]) conforming to MIL-DTL-24441[4] or other specified painting system. The panels shall be cured for a minimum of seven days at a minimum temperature of 21 °C (70 °F). Following curing, the panels shall be marked in such a manner as to form a grid of squares, each being approximately 0.09 m^2 (1 ft^2) area. Each plate shall contain a minimum of 20 squares.

A.1.3 Each abrasive type and size selected shall be tested using a No. 6 (9.6-mm [3/8-inch]) venturi nozzle operated at 655 ± 35 kPa (95 ± 5 psig) at the nozzle. A 272-kg (600-lb) pot shall be loaded with 227 kg (500 lbs) of abrasive and the test panel blasted to SSPC-SP 10 near-white condition. Each trial shall cover a surface area of approximately 2 m^2 (20 ft^2). The blast pot shall be disconnected and weighed before and after each blast trial, and the following data recorded: start weight, finish weight, weight of abrasive used, square footage blasted, and time required to blast.

A.2 ABRASIVE CONSUMPTION RATE: The abrasive consumption rate shall be determined as the weight of abrasive used divided by the area cleaned, and reported in kilograms of abrasive per square meter or pounds of abrasive per square foot.

A.3 SURFACE CLEANING RATE: The surface cleaning rate shall be determined as the area cleaned divided by the time required to blast and reported in square meters (square feet) cleaned per hour.

Appendix B – (MANDATORY WHEN INVOKED BY PROCUREMENT DOCUMENTS)

B.1 Additional Referenced Standards that must be considered part of this standard:

California Administrative Code

Title 17, Subchapter 6, Section 92530 (California Test Method 371-A[5]

Title 22, Division 4, Chapter 30, Minimum Standards for Management of Hazardous and Extremely Hazardous Waste, Section 66261.24, Persistent and Bioaccumulative Toxic Substance, Pages 660.3-660.5, Register 95, No. 25; 6-23-95.[6]

Department of Defense Standards

RR-S-366 Sieve Test[6]
MIL-I-45208 Inspection System Requirements[6]

U.S. Environmental Protection Agency (EPA)

Federal Register (FR) Vol. 55, paragraph 11798, March 19, 1990 (55 FR 11798), Toxicity Characteristic Leaching Procedure (TCLP)[7]

Federal Register (FR) Volume 55, paragraph 26986, Subparagraph 261.24, June 29, 1990, Maximum Concentration Contaminants for the Toxicity Characteristic.[8]

Occupational Safety and Health Administration (OSHA)

Occupational Safety and Health Administration, 29 CFR Parts 1910, 1915, 1917, 1918 1926, and 1928 – Hazard Communication Act, Final Rule[9]

ASTM International Standard

E1132 (latest edition) Standard Practice for Health Requirements Relating to Occupational Exposure to Respirable Crystalline Silica

B.2 Friability: The spent abrasive shall meet the requirements of California Administrative Code, Title 17, subchapter 6, section 92530 and shall be listed on the most recent list of abrasives approved for use in open air blasting in the state of California.

B.2.1 The friability test shall be performed in accordance with California Test Method 371-A.

B.2.2 The abrasive supplier shall certify that the size and mix of abrasives supplied originate from the same material source and have the same chemical and physical properties as the material qualified under Appendix B.2.

B.3 Crystalline Silica Content: Material shall meet the requirements of Class A as listed above in Section 4.1.7.

B.4 Hazardous Waste Minimization

B.4.1 Soluble and total metal content: Soluble and total metal content shall be determined on the abrasive blasting material in accordance with and shall not exceed limits established by the Title 22, Division 4, Section 66261.24 of the California Code of Regulations. For qualification, the abrasive shall be certified to meet all requirements of this article. Specific test results shall be provided to demonstrate levels of Table II are not exceeded. For conformance testing, the purchaser reserves the right to randomly test to ensure compliance with these provisions.

B.4.2 Radioactivity: The maximum gross gamma radioactivity of the abrasive shall be no greater than 20.0 picoCuries per gram. Gross Cobalt-60 gamma equivalent shall be determined by summing the net gamma photons

[4] U.S. Department of Defense standards are available online at <https://assist.daps.dla.mil/quicksearch/>
[5] Application for copies should be addressed to the California Environmental Protection Agency Air Resources Board, Compliance Division, 2020 L Street, Sacramento, CA 95816.
[6] Application for copies should be addressed to the State of California Environmental Protection Agency Department of Toxic Substances Control, Region 2, Office of External Affairs, 700 Heinz Avenue, Berkeley, CA 94710.
[7] Copies of the TCLP are available at <http://www.epa.gov/SW-846/pdfs/1311.pdf>
[8] A copy of this table is available via the Electronic Code of Federal Regulations at <http://www.ecfr.gov>
[9] The US Code of Federal Regulations may be accessed online at <http://www.ecfr.gov>

of energies from 0.1 Million electron volts (MeV) to 2.1 MeV and determining the activity as if the net gamma photon were produced by Cobalt-60. The specific Cobalt-60 activity shall be based on the photo peak produced by the 1.332 MeV gamma photon. Limits of detectability, for example, minimum detectable activity, and so forth, shall be determined at the 90 percent confidence level. Procuring activity must validate that this level of radiation satisfies all local, and job-specific radiation requirements.

B.4.2.1 Cobalt-60: The concentration of cobalt-60 shall be less than 0.05 picoCuries per gram, determined according to the procedure in B.4.2.

B.5 Quality Assurance Provisions

B.5.1 Responsibility for Inspection: Unless otherwise specified in the contract or purchase order, the contractor is responsible for the performance of all inspection requirements (examinations and tests) as specified herein. Except as otherwise specified in the contract or purchase order, the contractor may use his own or any other facilities suitable for the performance of the inspection requirements specified herein, unless disapproved by the Purchaser. The Purchaser reserves the right to perform any of the inspections set forth in this standard where such inspections are deemed necessary to ensure supplies and services conform to prescribed requirements.

B5.2 Responsibility for Compliance: The inspection set forth in this standard shall become a part of the contractor's overall inspection system or quality program. The absence of any inspection requirements in the standard shall not relieve the contractor of the responsibility of ensuring that all products or supplies submitted to the Government for acceptance comply with all requirements of the contract. Sampling inspection, as part of manufacturing operations, is an acceptable practice to ascertain conformance to requirements, however, this does not authorize submission of known defective material, either indicated or actual, nor does it commit the Purchaser to accept defective material.

B.5.3 Classification of Inspections: The inspection requirements specified herein are classified as follows:

(a) Qualification inspection
(b) Conformance inspection

B.5.4 Qualification Inspection: Qualification inspection for abrasive blast material shall be conducted at a laboratory satisfactory to the Purchaser. Qualification tests for abrasive blast materials shall consist of all tests specified in Sections 4.1, Appendix B.2, and Appendix B.4. Detection of any nonconformance during qualification inspection shall result in rejection of the qualification samples, initiation of corrective action to remove the root cause of the nonconformance, and repetition of all qualification inspection tests on samples that incorporate the corrective action.

B.5.5 Conformance Inspection: Conformance inspection for acceptance of individual lots shall consist of tests specified in Sections 4.1.2, 4.1.3, 4.1.4, 4.1.5, 4.1.6, and 4.1.9. Quality conformance testing shall be performed at either the plant or at the delivery site.

APPENDIX D - CHECKLIST FOR ABRASIVE TESTS (Nonmandatory)

TEST	AB 1 SECTION	MANUFACTURER Supplies Documentation from Qualified Lab		CONFORMANCE (PURCHASER)	FIELD
		AB 1 with Appendix B*	AB 1 ONLY		
Specific Gravity, ASTM C128	4.1.1	X	X	---	---
Mohs Hardness, glass slide	4.1.2	X	X	X	---
Weight Change on Ignition	4.1.3	X	X	X (if required by App. B)	---
Water Soluble Contaminants	4.1.4	X	X	X	X
Moisture Content, ASTM C566	4.1.5	X	X	X	---
Oil Content, ASTM D7393	4.1.6	X	X	X	X
Crystalline Silica, NIOSH Method 7500	4.1.7	X	X	---	---
Surface Profile	4.1.8	X	X	---	---
Particle Size Distribution, ASTM C136	4.1.9	X	X	X	--
Not Hazardous Waste per TCLP	4.1.10.1	X	X	---	---
OPTIONAL TESTS (IF SPECIFIED)					
Abrasive Cleaning Rate	A.1	X (if specified)	X (if specified)	---	---
Abrasive Consumption Rate	A.2	X (if specified)	X (if specified)	---	---
Abrasive Breakdown	as specified	X (if specified)	X (if specified)	---	---

In addition to the above tests, the following are required if Appendix B is invoked by contract	**AB 1 SECTION**	CONTRACTOR** Supplies Documentation (laboratory approved by Owner)	PURCHASER'S OPTION (if required for verification)	FIELD
ASTM C36 Standard Test Method for Analysis of Fine and Coarse Aggregates	B.1	X	X	---
MIL-I-45208, Inspection System Requirements (canceled 1996, no replacement, but still available)	B.1	X	X	---
ASTM E1132, Health Requirements for Exposure to Respirable Crystalline Silica	B.3	X	X	---
CA Test Method 371-A Friability	B.2	X	X	---
CA Title 22,4, 66261.24, Soluble and Total Metal Content	B.4.1	X	X	---
Radioactivity	B.4.2	X	X	---

X = required

* Specify Appendix B for the highest level of quality.
** See Appendix B5.1 for clarification of this requirement.