



AEROSPACE STANDARD	AS7109™/5	REV. B
	Issued 1995-03 Revised 2005-09 Cancelled 2017-06	
	Superseded by PRI AC7109/5	
Nadcap Requirements for Coating Evaluation Laboratory Practices		

RATIONALE

AS7109/5B is being cancelled and superseded by PRI AC7109/5.

CANCELLATION NOTICE

This document has been declared "CANCELLED" as of June 2017 and has been superseded by PRI AC7109/5. By this action, this document will remain listed in the Numerical Section of the Aerospace Standards Index noting that it is superseded by PRI AC7109/5. Cancelled specifications are available from SAE.

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1. SCOPE:

This SAE Aerospace Standard (AS) is to be used as a supplement to AS7109. In addition to the requirements contained in AS7109, the requirements contained herein shall apply to suppliers seeking Nadcap Coatings accreditation who are engaged in evaluation of coatings. Suppliers accredited to AS7101 that perform evaluations of coating shall demonstrate compliance to the applicable portions of the Standard as described in the Nadcap Auditor Handbook.

2. APPLICABLE DOCUMENTS:

The following publications form a part of this standard to the extent specified herein. The latest issue of SAE publications shall apply. The applicable issue of other publications shall be the issue in effect on the date of the purchase order.

2.1 SAE Publications:

Available from SAE, 400 Commonwealth Drive, Warrendale, PA 15096-0001, Telephone: (724) 776-4841, Web address: <http://www.sae.org>.

AS7101	Nadcap - Requirements for Materials Testing Laboratories
AS7109	Nadcap - Requirements for Coatings
AMS 2750	Pyrometry

2.2 PRI Publications:

Available from PRI, 161 Thornhill Road, Warrendale, PA 15086-7527, Telephone: (724) 772-1616, Web address: <http://www.pri.sae.org>.

AC7101/4	Nadcap - Audit Criteria for Materials Testing Laboratories - Metallography and Microhardness
AC7101/5	Nadcap - Audit Criteria for Materials Testing Laboratories - Hardness
AC7109/5	Nadcap - Audit Criteria for Coating Evaluation Laboratory Practices

2.3 ASTM Publications:

Available from ASTM, 100 Barr Harbor Drive, PO Box C700, West Conshohocken, PA 19428-2959, Telephone: (610) 832-9585, Web address: <http://www.astm.org>.

ASTM C 633	Standard Test Method for Adhesion or Cohesion Strength of Thermal Spray Coatings
ASTM E 4	Standard Practices for Force Verification of Testing Machines
ASTM E 1012	Standard Practice for Verification of Specimen Alignment Under Tensile Loading

3. PERSONNEL:

3.1 There shall be a training program for coatings evaluation personnel.

3.2 The supplier shall have the necessary trained personnel to perform the required tests: minimum of two laboratory personnel or one laboratory person with a subtiered laboratory Nadcap accredited to AS7109/5 or equivalent as approved by Nadcap Coatings Task Group, identified for coating evaluation in the absence of the laboratory person.

3.3 Personnel certification shall meet customer requirements.

4. PROCEDURES:

4.1 The supplier shall have the necessary procedures to perform the required tests.

4.2 The laboratory procedures shall be approved by the customer (and prime) if required.

- 4.3 Replaced tests, invalidated tests, nonconforming tests, and re-tests shall be logged and cross indexed, including explanations.
- 4.4 There shall be a policy/procedure for replacement testing and re-testing of failed or questionable samples including specific criteria.
- 4.5 Test result invalidation shall be permitted only when authorized (i.e., specification, contract, purchase order, etc.).
- 4.6 Provisions for replacement testing and re-testing shall comply with customer requirements.

5. EQUIPMENT AND FACILITIES:

- 5.1 The supplier shall have the necessary functional equipment and facilities to perform the required tests.
- 5.2 The testing environment shall be suitable for evaluations performed (i.e., external factors that can adversely affect test results).

6. ROUND ROBIN PROGRAMS:

- 6.1 The suppliers shall have an internal Round Robin plan that covers each coating family (as defined in Table 1 of AC7109/5), testing procedure, testing personnel, preparation personnel, preparation equipment, and testing equipment at least once every three years.

- 6.1.1 The Round Robin plan shall include all personnel who are certified to prepare and evaluate coatings for Nadcap accepting/mandating customers.

NOTE: If all personnel are not certified, then a system shall be in place that segregates the preparation and evaluation of hardware.

- 6.1.2 There shall be a separate Round Robin for each coating family (per Table 1 of AC7109/5) evaluated. If separate evaluation procedures are required for the “same” coating (e.g., different customers requiring different evaluation procedures), then each subsequent Round Robin shall use a different procedure.
- 6.1.3 All specimens of each coating family for the Round Robin shall be coated during the same coating run.
- 6.1.4 The Round Robin procedure shall define acceptance criteria of personnel participating.
- 6.1.5 All Round Robin test results are recorded and maintained for a minimum of four years.
- 6.1.6 The Round Robin results are used to identify and correct problems, and/or to initiate changes in testing methods or practices.

6.1.7 The Round Robin shall be conducted at a minimum of annually.

6.2 The laboratory shall participate in an external Round Robin program, if required by contract.

6.3 The laboratory shall participate in an external Round Robin program, if there is only one laboratory person.

7. HARDNESS TESTING:

7.1 If the supplier performs hardness/macrohardness testing, the applicable portions of PRI AC7101/5 shall be executed (reference Auditor Handbook for guidance) or the supplier shall be Nadcap accredited to AS7101.

7.2 If the supplier performs microhardness testing, the applicable portions of PRI AC7101/4 shall be executed (reference Auditor Handbook for guidance) or the supplier shall be Nadcap accredited to AS7101.

7.2.1 If values are calculated manually, conversion charts shall be available for all combinations of load and varied calibrated reticles.

7.2.2 The conversion shall be based upon millimeter or filar length.

7.2.3 There shall be procedures to indicate how the data are to be reported.

7.2.4 If indentations are found to be unacceptable, there shall be criteria to judge the impressions and the number of new indentations shall be defined.

7.2.5 Do the procedures for microhardness evaluation reflect the specification requirements for number and pattern of indentations?

8. METALLOGRAPHY AND THICKNESS:

8.1 Metallographic Preparation:

8.1.1 Calibration:

8.1.1.1 Filar eye-pieces used for dimensional measurement shall be calibrated against calibrated stage micrometers and calibrations shall be documented.

8.2 Standards:

8.2.1 Required metallographic comparison standards shall be convenient to the operator.

8.2.2 Photo standards shall be clear and legible or as provided by customer?