



The Engineering Society
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I N T E R N A T I O N A L

400 Commonwealth Drive, Warrendale, PA 15096-0001

Submitted for recognition as an American National Standard

AEROSPACE STANDARD



AS7109/2

Issued 1995-03

NATIONAL AEROSPACE AND DEFENSE CONTRACTORS ACCREDITATION PROGRAM REQUIREMENTS FOR VAPOR DEPOSIT

1. SCOPE

This Aerospace Standard (AS) is to be used as a supplement to SAE 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 vapor deposit.

1.1 Class Qualification shall include one of the following:

1.1.1 Class A Physical Vapor Deposit (PVD)

- a. Sputter
- b. Electron Beam

1.1.2 Class B Chemical Vapor Deposit (CVD)

2. REFERENCES

2.1 SAE Publications

Available from SAE, 400 Commonwealth Drive, Warrendale, PA 15086-0001.

AS7109 National Aerospace and Defense Contractors Accreditation Program
(NADCAP) - Requirements for Coatings

AS7109/6 National Aerospace and Defense Contractors Accreditation Program
(NADCAP) - Requirements for Plating of Coated Parts

AS7109/7 National Aerospace and Defense Contractors Accreditation Program
(NADCAP) - Requirements for Heat Treating For Suppliers of Coatings

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2.2 PRI Publications

Available from Performance Review Institute, 163 Thornhill Road, Warrendale, PA 15086 - 7527.

AC7109 NADCAP - Audit Criteria for Coatings

AC7109/6 NADCAP - Audit Criteria for Plating of Coated Parts

AC7109/7 NADCAP - Audit Criteria for Heat Treating for Suppliers of Coatings

3. TECHNICAL EXPERIENCE

3.1 Pre-production coating runs shall be conducted to insure the coating will meet material/process specifications as applicable.

3.2 The supplier shall have approved technical plans for hardware as required by customer.

3.3 There shall be a formal training and certification program for PVD/CVD coating operators.

3.4 All of the designated PVD/CVD operators shall be currently certified to company standards.

3.5 There shall be a training program for support personnel (e.g. in masking, surface preparation).

4. MANUFACTURING

4.1 The supplier shall have detailed work instructions describing each step in the PVD/CVD coating process:

- a. Preparation of coating materials before coating parts
- b. Methods of cleaning and/or preparing parts before coating
- c. Masking techniques
- d. Coating application procedure including all process parameters and their limits including deposition rate on part or mounted sample tab
- e. Details of post coating thermal treatments
- f. Methods for removing non-conforming coatings

5. MATERIAL CONTROL

5.1 The supplier shall have a material control system which has the following components:

- a. A listing of approved material sources as required
- b. Certification for each material lot supplied
- c. Segregation of new lots of material pending approval from production materials

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5.1 Continued

- d. Production material properly stored and identified
- e. Material storage in appropriate environment

6. VAPOR PROCESS OPERATION SHEET

6.1 Fixed processes shall contain the following elements:

- a. Part number
- b. Substrate material
- c. Coating material
- d. Coating schedule
- e. Customer specification
- f. Method of pre-cleaning
- g. Masking information
- h. Fixture identification
- i. Chamber/Coater number
- j. Process gases used
- k. Flow rates
- l. Definition of part manipulation
- m. Vacuum or pressure levels
- n. Power settings
- o. Test specimen material and configuration
- p. Test specimen location (Test specimen may be a part.)
- q. Post coating treatment (e.g., peening)
- r. Accept/reject criteria

7. PART TREATMENT

- 7.1 If the supplier performs a supplemental heat treat in support of the coatings operations, the requirements contained in SAE AS7109/7 shall apply.

8. CLEANING

- 8.1 The supplier shall have controls for maintaining concentrations and temperature for cleaning solutions.
- 8.2 There shall be provisions used to avoid contamination after cleaning.

9. MASKING

- 9.1 Parts shall be suitably masked to protect surfaces not to be coated.

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9.2 Work instructions shall specify the method and type of masking material.

9.3 Criteria for application shall be specified.

9.4 If hard mask tooling is utilized, it shall be controlled and properly maintained.

10. SURFACE PREPARATION

10.1 The supplier shall maintain and control surface preparation material.

10.2 Filters shall be installed in the compressed air lines to extract oil particulate matter and water.

11. CHAMBERS/PUMP SYSTEMS

11.1 Chambers shall be kept clean to prevent contamination.

11.2 The supplier shall have procedures for qualifying the following:

- a. Vacuum system integrity (leak rate)
- b. Calibration of vacuum instruments, recorders, and sensors

11.3 The vacuum system qualification procedures shall be in accordance with customer requirements.

11.4 Vacuum/pressure gages shall be on a calibration system.

11.5 Leak rates shall be controlled.

12. PROCESS GASES

12.1 The supplier shall have defined gas specifications.

12.2 There shall be a system in place to verify gas quality as applicable.

12.3 Dew point requirements shall be established.

12.4 Dew points shall be monitored.

13. SUPPLEMENTARY CHEMICAL TREATMENT

13.1 If the supplier performs a chemical treatment (i.e, chromate), the requirements contained in SAE AS7109/6 shall apply.