



Designation: D7186 – 14

# Standard Practice for Quality Assurance Observation of Roof Construction and Repair<sup>1</sup>

This standard is issued under the fixed designation D7186; 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 practice covers procedures for performing visual monitoring of roofing construction to:

1.1.1 Establish guidelines for quality assurance observation practices; and

1.1.2 Define the role and responsibilities of the quality assurance observer.

1.2 This practice pertains to quality assurance observation of roofing projects, and the report of information obtained from these observations. This practice is applicable to new construction or reroofing projects involving the installation of a new roof system, the removal of existing roofing and installation of a new roof system, or recovering an existing roof. It is also applicable to roofing projects involving repairs or scheduled maintenance to an existing roof.

1.3 This practice contains the following information:

1.3.1 The objectives of the quality assurance process;

1.3.2 The responsibilities and qualifications of the individual(s) involved in the observations of the roof construction or repair;

1.3.3 Identification and use of the basic tools or equipment required for the visual roof observation process; and

1.3.4 Monitoring, recording, and reporting procedures.

1.4 This practice addresses new construction or repair. This practice does not address the investigation, condition, or analysis of existing roofs.

1.5 This practice does not address practices of roof investigation, condition reporting, or analysis of preexisting roofs.

1.6 This practice does not pertain to quality control processes or techniques performed by persons or entities representing or under contract to the roofing contractor. The quality control process is separate and distinct from the quality assurance observation process.

<sup>1</sup> This practice is under the jurisdiction of ASTM Committee D08 on Roofing and Waterproofing and is the direct responsibility of Subcommittee D08.20 on Roofing Membrane Systems.

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1.7 Assessment of safe work practices or safety monitoring procedures followed by the contractor is outside the scope of this practice.

1.8 *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*:<sup>2</sup>

D1079 Terminology Relating to Roofing and Waterproofing  
E631 Terminology of Building Constructions

2.2 *Other Documents*:

The Contract Documents

Specification Literature or Roof System Installation Requirements, supplied by the applicable manufacturer, supplier, or distributor of the roof system material

ARMA/NRCA/SPRI Repair Manual for Low-Slope Membrane Roof Systems<sup>3,4,5</sup>

ARMA/NRCA Quality Control Guidelines for the Application of Built-Up Roofing<sup>3,4</sup>

ARMA/NRCA Quality Control Guidelines for the Application of Polymer Modified Bitumen Roofing<sup>3,4</sup>

NRCA/SPRI Quality Control Guidelines for the Application of Thermoset Single-Ply Roof Membranes<sup>4,5</sup>

NRCA/SPFA Quality Control Guidelines for the Application of Sprayed Polyurethane Foam Roofing<sup>4,6</sup>

NRCA Roofing Manual Current Edition<sup>4</sup>

<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 Asphalt Roofing Manufacturer's Association (ARMA), Public Information Department, 1156 15th St., NW, Suite 900, Washington, DC 20005.

<sup>4</sup> Available from National Roofing Contractor's Association (NRCA), 10255 W. Higgins Rd., Suite 600, Rosemont, IL 60018-5607.

<sup>5</sup> Available from Single Ply Roofing Institute (SPRI), 77 Rumford Ave., Suite 3B, Waltham, MA 02453.

<sup>6</sup> Available from Spray Polyurethane Foam Alliance (SPFA), 4400 Fair Lakes Ct., Suite 105, Fairfax, VA 22033.

RCI Manual of Practice Roof, Exterior Wall, and Waterproofing Consulting, and Quality Assurance Observation, Current Edition<sup>7</sup>

ARMA/NRCA Quality Control Guidelines for the Application of Asphalt Shingle Roof Systems

General Installation Guidelines for Natural Quarried Roofing Slate Current Edition<sup>8</sup>

National Slate Association's Slate Roofs Design and Installation Manual, Current Edition<sup>9</sup>

TRI/WSRCA Concrete and Clay Tile Design Criteria for Cold and Snow Regions, Current Edition<sup>10</sup>

TRI/WSRCA Concrete and Clay Tile Design Criteria for Moderate Climate Regions, Current Edition<sup>10</sup>

FRSA/TRI Concrete and Clay Tile Installation Manual, Current Edition<sup>10</sup>

### 3. Terminology

3.1 *Definitions*—For definitions of building terms, see Terminology E631. For definitions of roofing and bituminous materials terms, see Terminology D1079.

3.2 *Definitions of Terms Specific to This Standard:*

3.2.1 *competent person, n*—a person knowledgeable in common roofing installation practices, the roof system and materials specified for the project, and the quality assurance observation process.

3.2.2 *contract documents, n*—agreement between owner and contractor, conditions of the contract (general, supplementary, and other conditions), drawings, specifications, addenda, modifications, change order, construction change directives, and written orders for minor changes in the work.

3.2.3 *quality assurance observation, n*—the process of recording and reporting the installation of materials and work procedures of the installer or contractor in a roofing project for the purpose of documenting compliance or non-compliance with the contract documents on a daily basis.

3.2.4 *roof designer, n*—person or entity responsible for the selection of the roof system and materials, and developing the project specifications and construction detail drawings.

### 4. Significance and Use

4.1 Quality assurance observation of roofing projects is an important process for determining if the removal, installation, repair, or maintenance of roofing materials or systems follows the scope and intent of the contract documents and are installed and executed in accordance with accepted roofing practices and the contract documents.

4.2 This practice is applied to full-time quality assurance observation of roofing projects involving the removal,

construction, and repair and maintenance of low and steep-slope roof systems and roofing-related accessories.

4.3 This practice establishes the role and responsibilities of those performing quality assurance observation and includes qualifications of the quality assurance observer, as well as procedures for observation and documentation during the roof construction or repair process.

4.4 If used, nothing in this practice shall be interpreted as precluding the use of all or parts of it while conducting full-time or part-time quality assurance observer (QAO) inspection.

### 5. The Role of the Quality Assurance Observer (QAO)

5.1 The presence of, or opinions expressed by, the QAO do not relieve the contractor or the manufacturer or other responsible party of their contractual requirements. The information provided by the QAO is for the benefit of the owner (or other client), and no warranty of roof performance, expressed or implied, is offered, neither should it be inferred based on the quality assurance observations.

5.2 The QAO's function is to provide on-site observation, and reporting of the roof construction process in a clear, accurate, and objective manner, using procedures indicated in this practice.

5.3 The QAO shall observe and record:

5.3.1 The general conditions of the job site, roof areas under construction, and materials used in the construction process and their storage;

5.3.2 Preexisting property damages, or property or material damages that occur during the roof construction process;

5.3.3 The condition of the substrate, and substrate preparation, repair, or replacement procedures;

5.3.4 The installation and attachment of any base sheets, including the type of fastener or adhesive used, the fastening pattern and spacing;

5.3.5 The installation and attachment of any vapor retarders or air barriers, including the type of fastener or adhesive used, the fastening pattern and spacing;

5.3.6 The installation and attachment of the insulation layer(s), recover or coverboard materials, including the type of fastener or adhesive used, the fastening pattern and spacing;

5.3.7 The installation and attachment of the roof covering or repair materials which comprise the finished roof system, including the type of fastener or adhesive used, the fastening pattern and spacing, as well as specific material quantities, temperatures, and measurements appropriate to the type of roof system under construction;

5.3.8 The installation and detailing of the roof system flashings at perimeter and roof penetration locations;

5.3.9 The installation and detailing of the sheet metal roofing accessories such as, but not limited to counterflashings, coping caps, joint covers, and edge and fascia metals;

5.3.10 The installation of roof surfacings or coatings;

5.3.11 The installation of temporary weather seals at the end of the workday or prior to inclement weather;

5.3.12 The installation of any other roof components specified in the project specifications;

<sup>7</sup> Available from RCI, Inc., 1500 Sunday Dr., Suite 204, Raleigh, NC 27607, <http://www.rci-online.org>.

<sup>8</sup> Available from Slate Roofing Contractors Association of North America, Inc. (SRCA), 143 Forest Lane, Grove City, PA 16127, <http://www.slateroofers.org>.

<sup>9</sup> Available from National Slate Association, P. O. Box 172, Poultney, VT 05764, <http://slateassociation.org>.

<sup>10</sup> Available from Tile Roofing Institute (TRI), 23607 Highway 99, Suite 2C, Edmonds, WA 98026, <http://tileroofing.org>.

5.3.13 The weather conditions that occur during the roof assembly installation;

5.3.14 The crew size and foreman, and type of work being performed on a given day; and

5.3.15 All visitors to the roof and their length of stay.

## 6. Qualifications of the Quality Assurance Observer

### 6.1 *Significance of Qualifications:*

6.1.1 It is necessary that the person(s) performing quality observation of the construction process understand the project specifications and the specified roof system. Knowledge of industry-accepted good roofing practices is critical to the success of the quality assurance observation process, which knowledge may be attained by achieving the ends described in

### 6.2.

6.1.2 A record of experience and training shall be maintained by the QAO and submitted to the project file. An optional, sample form is located in Attachment A;

6.1.3 A thorough understanding of the contract documents, specifically the project specifications, construction detail drawings, pre-bid and pre-construction conference minutes, and any addenda to the roofing specifications is required; and

6.1.4 A thorough understanding of the type of roof system specified including knowledge of the manufacturer's requirements is required.

6.2 *Technical Qualifications of the QAO* can be achieved by either 6.2.1 or 6.2.2:

6.2.1 Completion of specialized training or certification in Quality Assurance observation. The training or certification program shall be specific to roofing quality assurance observation and shall be administered by an industry-recognized organization.

6.2.2 Completion of a roof system application program provided by the roof system manufacturer specified.

6.2.3 In lieu of the requirements in 6.2.1 and 6.2.2 by either:

6.2.3.1 Completion of a minimum of 400 h of experience performing quality assurance observation of roofing construction, or 400 h of experience in technical services with roof system manufacturers and a minimum of 2000 h of trade experience in roof construction.

6.2.3.2 Completion of a minimum of 400 h of experience in the generic type of roof system specified either performing quality assurance observation or roof construction, or technical services for roof system manufacturers. For this purpose, the generic roof type categories are defined as: Built-Up Roofing, Polymer-Modified Bitumen, Thermoplastic Single-Ply, Thermoset Single-Ply, Sprayed Polyurethane Foam Based Roofing, Structural Low-Slope Metal Roofing, Steep Slope Roofing, including, but not limited to, asphalt shingles, slate, tile, or metal.

## 7. Required Project Documents

7.1 A copy of the following project documents shall be maintained on-site by the QAO and updated as necessary:

7.1.1 The contract documents, including scope of work, specifications, roof plan, construction detail drawings, addenda, and modifications;

7.1.2 The pre-bid and pre-construction conference minutes and project meeting minutes;

7.1.3 Stamped material submittals;

7.1.4 The contractor's original construction schedule and any revisions;

7.1.5 Appropriate manufacturer's literature containing roof system or material application requirements;

7.1.6 Construction Change Directives, Change Orders, and any field orders;

7.1.7 Written and photographic documentation prepared by the QAO;

7.1.8 Other pertinent project correspondence; and

7.1.9 An emergency contact list for all pertinent project personnel.

## 8. Observation and Recording Procedures

8.1 *Documentation* shall include both a written and photographic record for historical file purposes and shall be made available to all parties involved in the roofing project. Project documentation may begin at the pre-construction conference or earlier and shall be continuous for the duration of the roofing project. Written documentation shall be clear, concise, and present an accurate, objective account of the roof construction project. Reports shall accurately describe the sequence of events, installation methods, workmanship by the contractor, and problems encountered and corrective actions taken.

8.2 *Pre-construction Damage Reporting*—Thorough examination of building surfaces, equipment, and other property items is necessary to document preexisting damages prior to commencing construction. An optional, sample form is included in Attachment B.

8.2.1 The report shall be distributed to all parties and shall be generated, whenever possible, with the contractor's representative and building personnel to indicate preexisting damage. It shall include photographic documentation of the areas viewed and damages noted. The report shall include, but is not limited to inspection of the roof areas under contract; interior spaces directly below the project areas; condition of related rooftop equipment and adjacent building(s), as well as building facades; pavement and landscaping in staging areas.

8.3 *Material Delivery and Examination Reporting*—Prior to the start or during the initial staging of the project, and following the delivery of materials thereafter, the QAO shall examine the materials delivered to verify conformance with the contract documents. An optional, sample report form is located in Attachment C.

8.3.1 The report shall note the condition of materials, the manufacturer, specific product designations, approximate quantity, lot or batch numbers, and if the materials are stored properly, noting the use of pallets, dunnage, tarpaulins, and so forth, in the report.

8.3.2 The report shall include photographic documentation of the general condition of the material, including any damages or defects in the material.

8.3.3 The QAO shall immediately notify the contractor or its representative if any materials are determined to be damaged or defective.



8.4 *Daily Construction Reporting*—A report documenting the nature of roofing work performed, progress, problems encountered, and actions taken by given individuals shall be completed each day. An acceptable, recognized reporting format shall be utilized by the reporting QAO. An optional, sample report form is located in Attachment D. The RCI Manual of Practice, Section 3, Paragraph 3.1.4 shall be permitted to be used in conjunction with the optional, sample report form located in Attachment D.

8.4.1 The report shall include, but is not limited to: crew size, daily temperatures, wind, relative humidity, weather conditions, roof removal procedures (if applicable), structural deck or substrate condition, deck/substrate preparation, application and securement of any vapor retarders, base sheets, insulation layers, roofing and flashing membranes, sheet metal components, and other related roof accessories.

8.4.2 The report shall record the size of the roof area(s) completed each day, deck repair or replacement dimensions, application temperatures of bitumens or adhesives, fastening pattern and spacing used to secure roof system components, exposure, headlap, side and end lap dimensions of felt or membranes, and approximate linear footage of flashing membrane and sheet metal installation.

NOTE 1—The report shall also record any measurements necessary for tracking unit price work items or authorized work in addition to the contract work as required by the entity contracting with the QAO.

8.4.3 The report shall record the use and construction of temporary weather protection (for example, night seals or tie-offs).

8.4.4 The report shall contain a record of any visitors, including the name and title of the visitor, and nature of the visit to the roof site by project managers, building representatives, roof system designer, manufacturer's representatives, and anyone else.

8.4.5 If workmanship defects are noted, or if the installation of a specific material does not appear to meet the project specifications, the QAO shall notify the contractor, or its representative, immediately.

8.4.6 The report shall note on the same day the final resolution of all variances listed in the report. If this is not possible, the QAO shall track these variances daily in the daily construction reports until such time as the final resolution can be documented. It is essential and imperative that the project file be complete and accurate for each variance listed, and that the file contains the resolution and any corrective actions taken.

8.4.7 Photographic documentation of the project shall accompany daily reports.

8.5 *Progress Reporting and Unit Tracking*—A progress summary and unit tracking report shall be submitted weekly, or more often, to the project file and distributed to the parties involved in the project. The information contained in the reports shall be verified with the contractor prior to distribution.

NOTE 2—The progress reporting and unit tracking for additional work by the contractor shall be recorded as required by the entity contracting with the QAO. An optional, sample form is located in Attachment E.

8.5.1 The report shall summarize the progress of the roofing construction to date and shall include: size of project in square

feet, roof area completed to date, roof area to be completed, number of working days in construction schedule, working days to date, remaining working days, and anticipated completion date. The report shall summarize any delays encountered during the record's period, as well as the issuance of any change order to work order affecting the construction schedule.

8.5.2 The report shall indicate unit cost work items, including the amount or size of the unit cost work completed and estimated costs to date.

8.5.3 A roof plan shall be attached to the progress report showing the location of work and date for each day of construction.

8.6 The contract documents provide the criteria for compliance of the materials, application, and work procedures for the roofing project. The following documents may be useful as supporting literature:

8.6.1 Roof system installation requirements supplied by the applicable manufacturer, supplier, or distributor of the roof system or material.

8.6.2 ARMA/NRCA/SPRI Repair Manual for Low-Slope Membrane Roof Systems.

8.6.3 ARMA/NRCA Quality Control Guidelines for the Application of Built-Up Roofing.

8.6.4 ARMA/NRCA Quality Control Guidelines for the Application of Polymer Modified Bitumen Roofing.

8.6.5 NRCA/SPRI Quality Control Guidelines for the Application of Thermoset Single-Ply Roof Membranes.

8.6.6 NRCA/SPFA Quality Control Guidelines for the Application of Sprayed Polyurethane Foam Roofing.

8.6.7 NRCA Roofing Manual.

8.6.8 ARMA/NRCA Quality Control Guidelines for the Application of Asphalt Shingle Roof Systems; Slate Roofs, Design, and Installation; RCI Manual of Practice, Section 3, paragraph 3.1.4 only.

## 9. Photographic Documentation

9.1 A minimum of six photographs shall be taken daily and processed promptly to ensure sufficient photo quality for file purposes, unless modified by mutual agreement.

9.2 The photographs shall be separated by date and type of report, and marked accordingly.

9.3 The photographic record of the roofing project should accurately and objectively portray the workmanship of the contractor, documenting problems encountered and corrective actions, as well as providing normal and acceptable depictions of the installation.

## 10. Reporting Procedures/Schedule

10.1 Documentation and distribution of paperwork shall be performed in a timely manner to prevent delayed communication of pertinent issues to the parties involved.

10.2 Meeting minutes shall be prepared and distributed no more than five working days following the date of the meeting.

10.3 Provide copies of all written daily reports to contractor upon completion of the report, but no later than the commencement of work on the following day.

10.4 At the contractor's request and expense, provide copies of photographic documentation.

10.5 A specification variance reporting installation, work practices, or material usage thought to be in conflict with the project specifications shall be reported immediately to the Contractor, or its representative, to minimize further installation of materials and facilitate immediate corrective action.

## **11. Tools and Equipment**

11.1 The QAO shall have and maintain on-site the tools or equipment necessary for performing quality assurance observation of the roofing project.

11.2 The QAO is responsible for maintaining the tools and equipment used by the QAO in good working condition. The repair, maintenance, and calibration of the tools and equipment are the responsibility of the QAO.

11.3 The types of tools and equipment required for the observation of a roofing project are determined, at a minimum, by the nature of the construction and type of roof system.

11.4 The tools and equipment required for quality assurance observation of a roofing project may include, but are not limited to: camera, colored marking tool, tape measure, utility knife, flashlight, thermometer (infrared or direct sensing, or both), wind speed indicator, hygrometer, and seam probe.

11.5 Depending on the nature and logistics of the project, safety equipment such as personal protection equipment (PPE) or fall protection may be required for the QAO. If so, it is the responsibility of the QAO to furnish and maintain any and all necessary PPE or fall protection equipment required by the project specifications or regulating authorities. The QAO shall follow all applicable safe work practices.

11.6 The QAO shall provide or have immediate access to a method of communication, located in the roof area, to facilitate immediate communication when conditions arise requiring consultation with project personnel not on-site.

## **12. Insurance Requirements of the QAO**

12.1 The QAO or firm providing the quality assurance observations shall submit a certificate of insurance which shall include coverage for worker's compensation, comprehensive general liability, automobile insurance, and professional liability insurance, only if applicable. Insurance limits shall be in the amounts as required by the entity contracting with the QAO or the QAO's firm.

## **13. Keywords**

13.1 equipment; low-slope roofing; project documentation; project reporting; QAO; quality assurance observation; reroofing; roof construction; roof maintenance; roof repair; steep-slope roofing; tools

## **APPENDIX**

### **(Nonmandatory Information)**

### **X1. ATTACHMENTS**

#### **INTRODUCTION**

The following attachments are optional and can be used as a guide for the purpose of creating these project forms:

- Attachment A: Sample form, *Record of Training & Experience*
- Attachment B: Sample form, *Pre-Construction Damage Report*
- Attachment C: Sample form, *Material Delivery Examination Report*
- Attachment D: Sample form, *Daily Construction Report, Page 1 & 2*
- Attachment E: Sample form, *Progress Summary and Unit Cost Tracking Report*

ATTACHMENT A

**Record of Training/Experience-Roof Quality Assurance Observation (QAO)**

---

[name]

Date:

[title]

[company]

[company address]

[city/state/zip code]

[company phone]

ASTM classification: [list type]

---

PART I: Record of Specialized Training / Professional Certifications

(list in chronological order, sample format as follows:)

[month/year] – [name or title of specialized training/certification]  
[name of provider]  
[provider's city/state]  
[provider's phone]

---

PART II: Record of Roof QAO Experience

(list in chronological order, sample format as follows:)

[month/year] – Project: [project name, city/state]  
Client: [client, city/state]  
Contact: [contact person, company, phone]  
Project Type: [new construction, reroofing, repair, maintenance]  
Roof System Type: [type of roof]  
Size of Project: [for example, number of squares]  
Duration: [approximate total hours of QAO work]

---

ATTACHMENT B

Pre-Construction Damage Report

Project:

Date:

Job No.:

Property: [name]
[address]
[city/state/zip code]

Roofing Contractor: [Company name]

A cursory examination of the listed rooftop area, interior locations, and exterior surfaces was completed to determine pre-existing damages or defects. Photographic and/or video documentation of the area viewed is attached. A summary of pre-existing damages is as follows:

Sample format
[Area Viewed] - [date of examination]
[location (for example, rooftop, interior, exterior, staging area, etc.)]
Damage description: [brief summary of viewed damages]

Photographs/Video [circle one]

Persons in Attendance:

Owner's Representative

Contractor's Representative

Building Personnel

Name

Name

Name

Company

Company

Company

**ATTACHMENT C**

**Material Delivery Report**

---

Project:

Date:

Job No.:

Property: [name]  
          [address]  
          [city/state/zip code]

Roofing Contractor: [Company name]

Date of Material Delivery:

---

Product Name, Manufacturer, Description	Meets Specifications	Conditions	See Comments

---

Comments:

---

Report By:

\_\_\_\_\_

Name

\_\_\_\_\_

Company

---





**ATTACHMENT D**

**Daily Construction Report  
(Page 2)**

---

Project:

Job #:

Date:

Material Shipment Received?

Night Seals Installed?

---

Comments: (Explain variances & actions taken to resolve)

---

Unresolved Variances: (identify items)

---

Unresolved Variances on Record: (list daily report #'s)

---

Report By:

Delivered To:

Signature: \_\_\_\_\_

Signature: \_\_\_\_\_

---

**ATTACHMENT E**

**Progress Summary Report & Unit Cost Tracking Report**

---

[name]:  
[title]:  
[company]:  
[company address]:  
[city/state/zip code]:  
company phone]:

Date:

ASTM Designation [list type]:

---

Progress Summary

Project Duration: \_\_\_\_\_

Total Area: \_\_\_\_\_

Work days to date: \_\_\_\_\_

Area Completed: \_\_\_\_\_

Anticipated work day: \_\_\_\_\_

Area Remaining: \_\_\_\_\_

Estimated days behind schedule: \_\_\_\_\_

Nature of construction delays:

\_\_\_\_\_

---

Unit Cost Tracking

Unit Cost Work Description	Unit Cost	Total Units to Date	Estimated Cost to Date
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\_\_\_\_\_

\_\_\_\_\_

Total \$ \_\_\_\_\_

Comments: (Explain variances & actions taken to resolve)

Report Prepared by:

\_\_\_\_\_

Name

\_\_\_\_\_

Company

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