



Standard Specification for Agencies Involved in Testing, Quality Assurance, and Evaluating of Manufactured Building Components¹

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1. Scope

1.1 This specification defines the minimum requirements for agencies engaged in inspections and testing performance in accordance with ASTM standards for factory built building components and assemblies.

1.2 The criteria in this specification are provided for assessing the competence of an agency to properly perform designation testing, quality assurance, and inspection.

1.3 This specification does not cover Special Inspections or construction materials testing or inspection, or both. See Specification E329 for these items.

1.4 The criteria presented herein are divided into three categories of endeavor, namely,

Part A—Standards and Criteria for Testing Agencies

Part B—Standards and Criteria for Quality Assurance Agencies

Part C—Standards and Criteria for Evaluating Agencies

1.5 The fundamental purpose of this specification is to provide criteria for evaluating an agency as denoted in 1.4 either by a user of that service or by an accrediting authority.

1.6 It is not the purpose of this specification to provide a basis for determining the quality of a product or service being evaluated.

1.7 This specification is not intended for the evaluation of those activities normally associated with the production and sale of products and the like, such as a manufacturer's internal quality program. However, any organization may request or perform an evaluation of its own in-house facilities under this specification if it so desires.

1.8 It is not the intent of this specification to be the basis for the determination of the type of agency to be selected by the user.

1.9 This specification is used in conjunction with Specification E541 and Practice E651/E651M.

1.10 The use of SI or inch – pound units, or combination of, will be the responsibility of the technical committees referred to in this standard.

2. Referenced Documents

2.1 *ASTM Standards*:²

E329 Specification for Agencies Engaged in Construction Inspection, Testing, or Special Inspection

E541 Specification for Agencies Engaged in System Analysis and Compliance Assurance for Manufactured Building

E651/E651M Practice for Evaluating Capabilities of Agencies Involved in System Analysis and Compliance Assurance for Manufactured Building

3. Terminology

3.1 *Definitions*:

3.1.1 *accrediting authority*—a formal body (or an individual user) that evaluates the capability of an agency in certain specific fields of activity.

3.1.2 *affiliate*—as used in this specification, a corporate or organizational entity that has a management or an ownership relationship, or both, with the agency being evaluated. It does not refer to a contractual relationship between organizations, nor does it include the membership of a trade or similar association, or to the companies represented by such membership.

3.1.3 *agency*—an organization or part of an organization, engaged in the activities of testing, quality assurance, or evaluating test results.

3.1.4 *certification*—the process by which recognition is obtained from an appropriate party that a product meets certain specified requirements. Prototype or production models, or both, of the product(s) will have been tested and inspected to check that they do meet the requirements. Quality assurance programs are used to ensure that the product(s) continue to

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² For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

comply with the specified requirements. Satisfactory tests, inspections, and quality assurance are for the basis for certification. Certification may be evidenced by labeling of the product.

3.1.5 *criteria*—common characteristics pertaining to organization, human resources, material resources, and quality systems which provide a basis for evaluating agencies as to their capability to objectively and competently provide the specific service(s) needed by the user.

3.1.6 *evaluating*—the function of obtaining data developed by a testing agency, and utilizing such data to perform calculations, determine suitability, project results, or otherwise draw conclusions resulting from an analysis of these data.

3.1.7 *human resources*—those elements of support and capability that are provided by humans using their mental and physical capabilities.

3.1.8 *inspection*—the process of measuring, examining, testing, gaging, or making other determinations with respect to materials, products, services, or environments.

3.1.9 *material resources*—the instrumentalities, documentation, environments, structures, etc., needed to augment the elements of support and capability provided by humans. (See *human resources*.)

3.1.10 *organization component*—a portion of an organization with specific tasks and activities that constitute a part of the total effort and accomplishments of the organization.

3.1.11 *quality*—the totality of features and characteristics of a material, product, service, system, or environment that bear on its capability to satisfy a specified need(s).

3.1.12 *quality assurance*—a planned system of activities whose purpose is to provide assurance that the overall quality control program (see quality control) is in fact being effectively implemented. This system involves a continuing evaluation of the adequacy and effectiveness of the overall quality control program with a view to having corrective action initiated where necessary. For a specific material, product, service, etc., this involves verification, audits, and evaluations of the quality factors that affect the specification, production, inspection, and use of the material product, service, system, or environment.

3.1.13 *quality control*—a planned system of activities whose purpose is to provide a level of quality that meets the needs of users; also, the use of such a system. The objective of quality control is to provide an overall system integrating the quality factors of several related steps including: the proper specification for what is wanted; production to meet the full intent of the specification; inspection to determine whether the resulting material, product, service, etc., is in accord with the specification; and review of usage to determine necessary revisions of the specification.

3.1.14 *testing*—the determination, by technical means, of the properties, performance, or elements of materials, products, services, systems, or environments, which may involve application of established scientific principles and procedures.

4. Significance and Use

4.1 This specification provides basic criteria for evaluating the qualifications of agencies utilizing the ASTM test methods

to test and evaluate manufactured building components. The existence of a formal accrediting authority such as a federal, state, municipal, or nongovernmental body is not necessary for the use of this specification. These criteria may be supplemented by more specific criteria for particular classes of testing, quality assurance, and evaluative agencies.

4.2 The intent of this specification is to provide a “consensus-system” standardized basis for evaluating a testing, quality assurance, or evaluating agency with respect to its capability to provide the specific service(s) needed by the user without prejudice to the agency offering other services or being affiliated with other agencies or organizations. In those situations where a strict literal interpretation of the phrase “shall be made available,” as used in this specification, would be inordinately burdensome to an agency, it will generally be sufficient that the agency concerned has the information available for “on-site” review. This specification is not intended to be used by accredited agencies or personnel in the performance of Special Inspection services listed in the IBC Code or any other Code.

4.3 The criteria of this specification are described in terms of the basic information necessary for an accrediting authority to evaluate the capability, with respect to objectivity, and competency of a testing, quality assurance, and evaluating agency regarding common characteristics pertaining to the organization, human resources, material resources, and quality systems employed by the agency in performing the services offered. Typically, accreditation of an agency involves the following three essential phases:

4.3.1 Submittal, to an involved accrediting authority, of basic information in accordance with the criteria of this specification by an interested agency.

4.3.2 Evaluation of the agency-submitted information by the involved accrediting authority.

4.3.3 Verification, “on-site,” of the agency-submitted information by the representative(s) of the involved accrediting authority.

4.4 Although three categories are presented, an agency may provide one or any combination of these categories for which it can qualify. An agency requesting qualification under more than one category must satisfy the criteria for each category for which acceptability is desired.

4.5 The criteria set forth herein represent areas upon which agreement can be reached. There may be other areas to be given consideration which may be of importance to the user. The user should include such other areas as a part of its own criteria.

4.6 This specification represents minimum criteria necessary to perform, monitor, or evaluate the test results of those standards promulgated by ASTM Committee E06.

4.7 It is anticipated that the ultimate user of this specification will have the expertise necessary to exercise good judgment in the areas of human resources, physical resources, and quality systems of the agency being evaluated.

NOTE 1—For example, when judging the qualifications of the various individuals in a particular agency, related factors or alternative resources

(such as mechanical, electrical, or electronic equipment used to aid, control, or monitor the work of the personnel) should be considered when assessing the overall qualifications of such individuals. The job experience and the reliability of the individual should also be considered in the judgment, where applicable.

4.8 When assessing the organization and the resources of a particular agency, the judgment should take into account only those factors or resources specifically related to the technological area being served by the agency in terms of the specific evaluation, and only as necessary to form an adequate judgment in relation to the evaluation. Conversely, those technological areas served by a particular agency that are not required to be evaluated in a specific instance should not be impugned through the lack of such evaluation. The absence of evaluation or the denial of accreditation by any one party should not prejudice future evaluations by other parties because small differences in needs can influence the judgement of users. The use of this specification does not abrogate the right to “due process” necessary to all assessments under this specification. The right of rebuttal to any conclusions drawn during an accreditation procedure shall be extended to the agency.

4.9 Each act of evaluation should be viewed as a “one-to-one” judgment and should not be construed as being a universal judgment by others interested in the agency’s services. In order to ensure proper interpretation of each act of evaluation, the purpose of the evaluation and the evaluation area shall be clearly specified in any report of an evaluation made pursuant to this specification.

5. Organization of the Agency

5.1 The following information shall be made available by the agency:

5.1.1 A description of the organization including:

5.1.1.1 The complete legal name and address of the main office.

5.1.1.2 The names and positions of the principal officers and directors.

5.1.1.3 The agency’s principal ownership, its managerial structure, and its principal members.

5.1.1.4 All relevant internal organizational components including their locations and their primary functions.

5.1.1.5 All relevant organizational affiliates of the agency, and the principal officers of the affiliates and directors of the affiliates, where applicable.

5.1.1.6 External organizations and organizational components and their functions that are utilized for significant supporting technical services.

5.1.1.7 A brief history of the agency, including its relationship with its organizational components, affiliations, and other supporting information, to ensure that any and all possible conflicts of interest may be judged from the standpoint of the user.

5.1.2 A general description of the geographical area served.

5.1.3 A general description of the types of users of the services.

5.1.4 A listing of the relevant technical services offered.

5.1.5 A functional description of the agency’s organizational structure for the services listed in 5.1.4 including operational departments, support departments, and services.

This may be demonstrated in the form of charts that depict the relevant groups and their relationship.

5.1.5.1 This description shall be inclusive of all the locations that are to be used for performing the services listed in 5.1.4 including the functions being performed at each location. The accreditation of an agency includes the accreditation of all locations of the agency performing services or support functions for which accreditation is being sought. All information required by this specification shall be supplied for each location.

5.1.6 A brief resume of all full-time managerial and supervisory employees used to perform the services for which accreditation is being sought. Where part-time employees, contractors, consultants, etc., are utilized in any capacity for these services, their relationship to the agency shall be stated.

5.1.7 A statement determining the managerial or financial relationship, or both, between the agency, its owners, its management, its directors, and the users of the services to be performed.

PART A—STANDARDS AND CRITERIA FOR TESTING AGENCIES

6. General

6.1 The testing agency is responsible for the performance of the applicable tests with the objective of ascertaining that the manufacturer’s product complies with the testing requirements of the applicable standard or specifications. An understanding of the requirements of each individual test method to be used is a necessity. It is essential that the test agency has a copy of each applicable test method available, in its entirety, before undertaking the test program.

6.2 The test agency shall prepare and submit a report in compliance with the requirements of the test method. This test report shall stipulate that the tests were performed in accordance with all requirements of the test method when such is the case. In those cases where a deviation is made from the test method requirements, each such deviation shall be enumerated in the test report separately so that proper evaluation of the test results can take the deviations into account.

6.3 The function of a test agency encompasses only the performance of the tests required, the reporting of the results, and a statement of compliance to the particular function under consideration. Evaluation of the test results is the function of the evaluating agency, the criteria for accreditation for which are set forth in Part C of this specification.

6.4 Where the test agency performs several testing procedures encompassing changes in the manufacturer’s product, leading to improved or acceptable results, each such change and its effect shall be reported in a supplement to the test report, in order to allow the evaluating agency and quality assurance agency to properly appreciate and incorporate this knowledge into their functions.

6.5 The test agency shall be capable of providing the following elements:

6.5.1 An organization identifying the person(s) responsible for the overall operation of the test agency and for the supervision of the test program.

- 6.5.2 A record of calibrations performed.
- 6.5.3 A suitable method for storing records and test results.

6.6 The test agency shall demonstrate the following capabilities:

- 6.6.1 The agency shall have a definite program for training new testing personnel and supervision of all testing personnel.
- 6.6.2 The agency shall conduct training programs for all testing personnel to ensure uniform application of the test methods and improving existing techniques.
- 6.6.3 If feasible, the agency shall participate in round-robin evaluations, when required by the accreditor.
- 6.6.4 The agency shall maintain records to allow verification of test reports.

6.7 *Criteria*—The test agency shall provide documentation to establish that its procedures meet the standard in 6.1, 6.2, 6.3, 6.4, 6.5, and 6.6.

7. Test Agency Representative in Responsible Charge

7.1 *Task*—To provide those services required of the person in responsible charge of the test functions, including the following:

7.1.1 *Project Liaison*—Represent the test agency in all relationships with the manufacturer, the quality assurance agency, the evaluating agency, or such other agencies having an interest in the test results.

7.1.2 *Scheduling of Testing Activities*—Prepare and monitor the complete management plan for testing activities, keeping them on schedule and performing effectively.

7.1.3 *Training*—Establish and evaluate training programs appropriate to the performance of the specific job tasks of the testing staff and to maintain the technical competence of the staff.

7.1.4 *Administrative Support*—Provide for effective clerical and administrative support for testing agency activities.

7.1.5 *Work Review*—Establish that all testing agency personnel have access to the test methods. Observe that test procedures are followed explicitly. Determine that the results are accurately reported. Validate the test reports.

7.2 *General Requirements:*

7.2.1 *General Expertise*—General knowledge and experience of the test methods and requirements.

7.2.2 *Knowledge of the Testing Function*—Understanding of the testing agency function and the relationship to other evaluative and quality assurance agencies.

7.2.3 *Logical Approach to Problem Resolution and Decision Making*—Ability to define the testing problem, to determine the appropriate test method, and to organize the test agency resources to obtain the required data.

7.3 *Criteria:*

7.3.1 *Education*—Bachelor's degree in the physical sciences or engineering disciplines, or a high school education plus a minimum experience factor of four years in the particular field for which accreditation is desired.

7.3.2 *Professional Competence*—Registration as a professional engineer or architect.

7.3.3 *Experience:*

7.3.3.1 One year cumulative responsibility for technical project planning and management and

7.3.3.2 Four years of actual or supervisory exposure in testing or use of test methods for the product or similar products involved.

7.3.3.3 Active participation in developing test methods or standards for the product or similar products is desirable.

8. Test Agency Representative in Direct Charge of Testing Program

8.1 *Task:*

8.1.1 *Supervision*—Provide first-hand review of the performance of test agency technicians in their work.

8.1.2 *Resolve Problems*—Resolve nonroutine testing problems presented by technicians or others.

8.1.3 *Procedure Implementation*—Implement administrative and operational procedures, such as training procedures, test procedures, etc., as delegated by the test agency representative in responsible charge.

8.2 *General Requirements:*

8.2.1 *General Knowledge*—Detailed knowledge of applicable standards.

8.2.2 *Supervisor Ability*—Ability to select and motivate technicians to perform as required, and to provide a proper balance between efficient utilization of personnel and assurance of quality.

8.2.3 *Personnel and Physical Plant Evaluation*—Ability to review activities and performance of testing operations for the purpose of ensuring the quality of the tests performed.

8.3 *Criteria:*

8.3.1 *Education*—Bachelor's degree in engineering, quality control, or closely related physical science; or high school education and four years of experience in testing similar items.

8.3.2 *Certification*—Certifications applicable to the task being performed are required.

9. Technicians

9.1 *Task*—To perform under the supervision of the representative in direct charge of the work.

9.2 *General Requirements:*

9.2.1 *Technical Characteristics*—The ability to follow detailed instructions and checklists that provide the criteria for testing.

9.2.2 *Orientation and Training*—The technician shall undergo a period of orientation and training for the testing functions that he will perform. This training shall be under the direction of a supervisor designated by the representative in direct charge and fully qualified in accordance with these criteria.

9.2.3 *Testing Ability*—Ability to evaluate the results of well-defined or routine measurements or tests by reason of experience or familiarity with such measurements or tests.

9.3 *Criteria:*

9.3.1 *Education*—The technician shall possess the mathematical and communicative skills equivalent to those acquired by a high school education.

9.3.2 *Experience*—A training program as described in 9.2.2 sufficient to satisfy the training supervisor.

9.3.3 *Certification*—Certifications applicable to the task being performed are required.

PART B—STANDARDS AND CRITERIA FOR QUALITY ASSURANCE AGENCIES

10. General

10.1 The quality assurance agency is responsible for the development and implementation of a quality assurance program with the objective of ascertaining that the manufacturer's product complies with the applicable standard(s). An understanding of the elements of the manufacturer's quality control program is necessary for identifying the activities of the quality assurance agency.

10.2 An essential element of every quality assurance program is the procedural guide. The procedural guide shall be prepared by the quality assurance agency establishing the provisions of the quality assurance program, its administration, and its details of operation. The procedural guide shall contain as a minimum of the following:

10.2.1 Details of participation.

10.2.2 Provisions for communications.

10.2.3 Applicable standards and exceptions to those standards.

10.2.4 Provisions for quality testing.

10.2.5 Provisions for making or labeling.

10.2.6 Method or approach, or both, for handling noncompliance to standards.

10.2.7 Contract, referencing the procedural guide, stipulating the duties and standards of each party.

10.2.8 Forms that are to be used in the operation of the program.

10.2.9 Method and procedures for listing.

10.2.10 Inspection frequency.

10.3 The quality assurance agency shall be capable of providing the following elements:

10.3.1 An organization identifying the person(s) responsible for the overall administration and functioning of the program.

10.3.2 A method of identifying the units produced and the inspection made.

10.3.3 Methods for verifying that only approved materials and equipment are purchased and used.

10.3.4 Methods for making product verification measurements.

10.3.5 Procedures for corrective actions for deficient construction and materials.

10.4 The quality assurance agency shall demonstrate the following capabilities:

10.4.1 The agency shall have a definite program for the training of new agency inspections and for the supervision of all inspectors.

10.4.2 The agency shall arrange and conduct training programs for all inspectors to ensure uniform interpretation and application of standards where certified products are made.

10.4.3 The agency shall maintain records to control its certification marks.

10.4.4 The agency shall conduct field surveys to determine that certification marks are properly applied.

10.4.5 The agency shall be capable of performing field inspections of installed products.

10.4.6 The agency shall establish methods for investigating field failures reported to it.

10.4.7 The agency shall employ a registered certification mark.

10.5 *Criteria*—The quality assurance agency shall provide documentation to establish that its procedures meet the standards in 10.2, 10.3, and 10.4.

11. Quality Assurance Agency Administrator

11.1 *Task*—To provide the services of an administrator in the quality assurance function, including the following:

11.1.1 *Project Liaison*—Represent the quality assurance agency in coordinating meetings with other evaluation agencies and users. Familiarize the manufacturer with the quality assurance function and the agency staff with the project.

11.1.2 *Prepare the Procedural Guide*—Establish or consult in the establishment of the scope of the project and the quality assurance effort. Review technical input and prepare management portion of the proposed procedural guide.

11.1.3 *Schedule the Quality Assurance Activities*—Prepare and monitor the complete management plan for quality assurance activities to keep it on schedule and performing effectively.

11.1.4 *Training*—Establish and evaluate training programs appropriate for the performance of the specific job tasks of the quality assurance inspection staff and for the maintenance of the technical competency of the staff.

11.1.5 *Administrative Support*—Provide for effective clerical and administrative support of all agency activities.

11.2 General Requirements:

11.2.1 *General Expertise*—General knowledge of the testing and the control of manufacturing processes and assurance of standard quality.

11.2.2 *General Knowledge*—Detailed knowledge of the applicable standards.

11.2.3 *Knowledge of the Quality Assurance Function*—Understanding of the quality assurance agency function and relationship to other evaluating and governmental agencies.

11.2.4 *Logical Approach to Problem Resolution and Decision Making*—Ability to define problems and organize resources to obtain a solution.

11.3 Criteria:

11.3.1 *Education*—Bachelor's degree in engineering, quality control, or closely related physical science.

11.3.2 Experience:

11.3.2.1 Two years of the quality control or quality assurance function,

11.3.2.2 One year of cumulative responsibility for technical project planning and management, and

11.3.2.3 Two years of actual or supervisory experience in testing of the product or similar products involved; or two years of active participation in developing test methods or standards of the product or similar products involved.

11.3.3 *Professional Competence*—Registration as a professional engineer or architect.

12. Quality Assurance Supervisor of Inspection

12.1 Task:

12.1.1 *Monitor Field Inspection*—Provide periodic, first-hand review of the performance of the quality assurance agency inspection in the field.

12.1.2 *Resolve Problems*—Resolve nonroutine inspection problems referred by field inspectors.

12.2 General Requirements:

12.2.1 *General Knowledge*—Detailed knowledge of the applicable standards.

12.2.2 *Supervisory Ability*—Ability to select and motivate inspectors to perform as required, and to provide a proper balance between efficient utilization of personnel and assurance of quality.

12.2.3 *Personnel Evaluation*—Ability to perform periodic unscheduled in-plant inspections using the procedural guide for the purpose of providing an ongoing evaluation of the performance of the quality assurance inspectors and the adequacy of the program.

12.3 Criteria:

12.3.1 *Education*—Mathematical and communicative skills equivalent to those acquired by a high school education.

12.3.2 *Experience*—Two years as an inspector in the same or related fields.

13. Quality Assurance Inspectors

13.1 Task:

13.1.1 To perform the in-plant monitoring of the manufacturer's quality control program using the procedural guide developed by the technical staff.

13.1.2 To perform production inspection or tests for the purpose of monitoring production or witnessing such tests performed by others.

13.2 Standards:

13.2.1 *Personal Characteristics*—The inspector shall possess the personal characteristics of tact and a sense of authority.

13.2.2 *Technical Characteristics*—The inspector shall have the ability to follow detailed instructions and checklists that provide the criteria for construction, including both material and fabrication standards.

13.2.3 *Orientation and Training*—The inspector shall undergo a period of orientation and training for the inspection functions which he is to perform. This training shall be under the continuous direction of a supervisor fully qualified under these criteria.

13.2.4 *Production Inspections or Tests*—The inspector shall have the ability to evaluate the results of well-defined or routine measurements or tests by reason of experience or familiarity with such test measurements.

13.3 Criteria:

13.3.1 *Education*—The inspector shall possess the mathematical and communicative skills equivalent to those acquired through a high school education.

13.3.2 *Experience*—The inspector shall have undergone a training program as set forth in 13.2.3 sufficient to satisfy the training supervisor.

PART C—STANDARDS AND CRITERIA FOR EVALUATING AGENCIES

14. General

14.1 The evaluating agency is responsible for evaluating the data developed on the performance of the buildings and building components with the object of ascertaining that the manufacturer's product complies with the requirements of the applicable standard or specification. An understanding of the performance requirements of the applicable standard or specification is a necessity. It is essential that the evaluating agency has copies of the test methods, quality assurance documents, and all applicable standards or the specification against which the manufacturer's product is to be evaluated.

14.2 The evaluating agency shall prepare a report enumerating the compliance of the manufacturer's product. The report shall state the explicit conditions, criteria, and applications for which the manufacturer's product is evaluated for compliance. Any limits of use or application shall be stated. The report shall also set forth the tests which were performed; the results obtained; the tests that are pertinent to the performance of the product in compliance with the applicable standard or specification; the calculations and analyses performed; the conclusions drawn; and a statement of compliance listing any deficiencies or discrepancies.

14.3 The evaluating agency shall be capable of providing the following elements:

14.3.1 An organization identifying the person(s) responsible for the overall operations of the evaluating agency and for the supervision of the evaluation program.

14.3.2 A suitable method of storing the records, test data, calculations, and reports of each evaluation project.

14.4 The following procedures are desirable:

14.4.1 It is desirable that the agency have a program to permit key personnel to participate in the national standard's-writing and specification-formulating activities of those organizations which promulgate the standards and specifications used in the agency's evaluation program.

14.4.2 It is desirable that the agency have a program to permit key personnel to participate in national and regional conferences, seminars, and workshops on the performance of building constructions and the evaluation process.

14.4.3 It is desirable that the agency have a definite in-service education program for training and updating the evaluation personnel. Particular emphasis in the in-service education program should be given to the dissemination of information obtained through the programs of 14.4.1 and 14.4.2.

14.5 *Criteria*—The evaluating agency shall provide documentation to establish that its procedures accomplish the standards set in 14.1, 14.2, 14.3, and 14.4.

15. Evaluation Agency Representative in Responsible Charge

15.1 *Task*—To provide certain services by the person in responsible charge of the evaluation functions, including the following:

15.1.1 *Project Liaison*—Represent the evaluation agency in all relationships with the manufacturer, the quality assurance agency, the test agency, and other such agencies having an interest in the evaluation of product performance.

15.1.2 *Schedule the Evaluation Activities*—Prepare and monitor the complete management plan for the evaluation activities and to coordinate the development of the evaluative results.

15.1.3 *Training*—Establish and evaluate the educational and professional development programs appropriate to the performance of the specific job tasks of the evaluation staff and to maintain the technical competence of the staff.

15.1.4 *Administrative Support*—Provide for effective clerical and administrative support for the evaluative agency activities.

15.1.5 *Evaluation Results Review*—Provide for an effective review of the procedure involving critique by all the key professional personnel. Determine that the evaluation results are reported accurately and completely.

15.2 General Requirements:

15.2.1 *General Expertise*—General knowledge and experience of the testing methods and requirements, quality assurance, and control of manufacturing processes and the performance requirements of buildings and building components.

15.2.2 *Knowledge of Evaluative Function*—Knowledge of the evaluative agency function and the relationship to testing and quality assurance agencies and to the authority having jurisdiction.

15.2.3 *Logical Approach to Problem Resolution and Decision Making*—Ability to denote the evaluation problem, to determine the appropriate data requirements and relevant test methods, and to organize the evaluative agency resources to perform the required analyses.

15.3 Criteria:

15.3.1 *Education*—Bachelor's degree in the physical sciences, engineering disciplines, or architecture.

15.3.2 *Professional Competence*—Registration as a professional engineer or architect.

15.3.3 Experience:

15.3.3.1 Two-year cumulative responsibility for technical project planning and management,

15.3.3.2 Seven-year actual or supervisory experience in testing quality assurance or evaluation of the performance requirements of buildings and building components, including at least four years of active participation in developing specifications, test methods, or codes and standards for buildings and building components, and

15.3.3.3 Continued active participation in activities in **15.3.3.2**.

16. Test Agency Representative in Direct Charge of Evaluative Tasks (Speciality Division or Section Heads)

16.1 Task:

16.1.1 *Supervision*—Provide review and guidance for staff engineers and architects in the performance of their work.

16.1.2 *Resolve Problems*—Determine methods, analyses, and evaluation procedures to be used for each project.

16.1.3 *Professional Development and Training*—Provide opportunities for the professional development and training of staff engineers and architects and encourage staff participation.

16.2 General Requirements:

16.2.1 *Expertise*—Detailed knowledge of applicable test methods and requirements, quality assurance, and control of manufacturing processes and the codes for performance requirements of buildings and building components.

16.2.2 *Supervising Ability*—Ability to select and motivate staff engineers and architects and provide guidance and technical leadership in the performance of the evaluation function.

16.3 Criteria:

16.3.1 *Education*—Bachelor's degree in the physical sciences, engineering disciplines, or architecture.

16.3.2 *Professional Competence*—Registration as a professional engineer or architect.

16.3.3 Experience:

16.3.3.1 One-year cumulative responsibility for technical project planning and management,

16.3.3.2 Four-year actual or supervisory experience in testing, quality assurance, or evaluation or the performance requirements of buildings and building components, including at least four years of active participation in developing specifications or test methods or codes and standards for buildings and building components, and

16.3.3.3 Continued active participation in activities in **16.3.3.2**.

17. Staff Engineers and Architects

17.1 Task:

17.1.1 To perform the calculations and analyses required to conduct the evaluation process or the supervision of the representative in responsible or direct charge of the work, or both.

17.1.2 To draw the tentative conclusions and prepare the initial draft of the evaluation report.

17.2 General Requirements:

17.2.1 *Expertise*—Detailed knowledge of the applicable test methods and requirements for the standards for performance requirements of the buildings and building components involved.

17.2.2 *Technical Characteristics*—The ability to determine the relevant data required, discern the appropriate test methods to develop those data, perform the logical steps to analyse the results, and rationally evaluate the requisite performance.

17.3 Criteria:

17.3.1 *Education*—Bachelor’s degree in the physical sciences, engineering disciplines, or architecture.

17.3.2 *Professional Competence*—Registration as an engineer in training or as an architect intern.

17.3.3 *Experience*—A professional development program sufficient to satisfy the representative in responsible or direct charge of the work.

18. Keywords

18.1 evaluating building components; evaluation of agencies; inspectors; product certification; quality assurance; testing

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