

# NRCA calls *Quality Control* ultimate built-up roofing tool

NRCA announces the birth of its long-awaited child, *Quality Control in the Application of Built-Up Roofing*. Specifiers, manufacturers, building owners, architects and consultants are advised that NRCA is placing the document up for immediate adoption.

The 18-page booklet defines application variances that can safely be allowed in a high-performance roof system. It also discusses how to deal with "improper workmanship" as it is discovered.

All segments of the construction industry have traded opinions on these critical points for more than 100 years. NRCA has spent the last three gathering and evaluating their comments and conducting research for what it believes will be the ultimate tool for BUR contractors.

The document's origin can be traced back to 1976, when the U.S. Air Force, specifically, the Strategic Air Command Sector, determined that its own roof costs were excessive, and that better criteria for roofing installation would help bring those costs down. The Air Force's ultimate goal was to develop an "in-house" document to include guidelines for owner-related maintenance, assessment of the roof condition, criteria for repairs, a master specification for reroofing, and installation tolerances for these assemblies.

The final document, published Sept. 3, 1980, was titled AFM 91-36. Chapter five (specification development) and chapter six (application tolerances) were the two portions of the Air Force document that directly affected roofing contractors. The document's specification was, in many cases, impossible to maintain. Contractors unfamiliar with the new restrictive guidelines were suddenly being held liable for improper applications. In some cases, whole membranes were ripped off because of the findings of a single test cut made during the application.

In response to these reports, NRCA assigned a special task force to review the criteria of AFM 91-36 and to recommend specific changes. NRCA also asked that all Air Force bid documents include the tolerance criteria defined in chapter six; at least contractors bidding on the work could be formally apprised of the criteria by which they would be judged.

The task force's recommendations, specifically on field evaluation methods (test guidelines), the concept of the "Quality Controller" and inclusion of the application tolerances in the bid documents, were the basis for NRCA's *Quality Control*.

Gaining industry consensus on exactly what is and what is not important in terms of quality control has been anything but easy. Even before its official release last month, *Quality Control* was receiving mixed reviews from manufacturers.

"We know that it will be difficult to get all segments of the industry to agree on all of the elements of this document," NRCA Executive Vice President Fred Good says. "Our goal is to create a reference that all parties involved in the roofing process can use to agree on sound application methods and allowable variances."

Still, some manufacturers have chosen not to endorse the document in its present form. In an effort to reach some kind of agreement, NRCA officers met with representatives of the Asphalt Roofing Manufacturers Association (ARMA). At press time, ARMA had still not endorsed the document.



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To understand ARMA's objections, one must first look at the three basic areas covered in *Quality Control*: "Examination of the Installation," "Test Cuts" and "Workmanship."

### The physical exam

"The most effective means to evaluate quality installation is by thorough, continuous visual examination at the time of application," the document states, "conducted by a person who is knowledgeable in roofing technology and good workmanship practices." This implies that inspection of the roof after it has been installed can lead to an ineffective and inaccurate assessment of the application.

The document does not specify who should monitor the application, only that the inspector is knowledgeable and understands the application variances such as fastener spacing, preformed insulation joints, laps, and interply bitumen rates cited in the document. Should the variances be exceeded, corrective action, which is described in the booklet, is recommended.

"Some have taken the position that the roof must be put on perfectly and there can be no tolerances allowed," Wayne Mullis, past NRCA president, said at the recent CSI convention. "But membrane integrity depends on the quality of the adhesive between plies of felt, as may be evidenced by a minimum of interply voids, dry spots and entrapped moisture."

The variables of materials, human factors, application techniques and climatic conditions associated with the construction of a membrane frequently produce some variation from the perfect membrane, he continued. "The fact is, there are no contractors or applicators capable of installing a roof with zero defects or inclusions. However, variances must not be such that they reduce the performance and durability of the system."

The document supports Mullis by clearly stating, "A deviation from the variances is not an indication that the roof will not perform its intended purpose or that a roof problem will ensue." But for interply bitumen rates, this deviation, when it conflicts with the manufacturer's criteria, has caused a great deal of controversy.

In the past, many have felt that the quality of a membrane should be judged by the amount of interply bitumen between the individual plies. On this point, the document states: "It can be misleading to judge quality of a membrane with respect to performance and durability on the basis of the amount and uniformity of bitumen between individual plies. During state-of-the-art bituminous membrane construction, certain deviations from the specified interply bitumen rates are expected. A continuous, firmly bonding film of interply bitumen is the critical characteristic." Is it possible, then, that manufacturers are placing emphasis on the "wrong" things when determining proper BUR application?

"I don't think it's a matter of right or wrong," said Bob Lilleston, national manager of technical and business development at Genstar. "We have felt from the beginning that a quality control document was important in the field. We support such a document except when the criteria is in conflict with the manufacturer's guarantee. We were simply looking for some verbiage stating that when a manufacturer is contractually bound by the financial obligation of a warranty, then that warranty must supercede all other documents."

But according to Good, NRCA offered to make this concession if, in turn, the manufacturers would agree to fully endorse the document.

"We drafted a statement that read, 'Certain provisions of manufacturer's application criteria or guidelines may differ with regard to some application details. Where the manufacturer is contractually involved in the performance of the finished product (the built-up roof), through the issuance of a bond, guarantee or other warranty, then the manufacturer and installing contractor should agree to the details of that particular project.'

"It was only after ARMA chose not to endorse the document that we decided to remove this introductory clause," Good reports.

The addition of this statement was not the only thing holding the manufacturers back, according to Ted Michaelson, manager of marketing engineering services at the Manville Corp. "We were not completely satisfied with the sketchiness of several of the recommended corrective actions suggested in the document," he says. "For example, in the section dealing with visual examination of interply bitumen rates, if a lack of continuous film is revealed, the document recommends that 'adjustments be made immediately in application procedures.' How that adjustment is to be made and what this variance means to the existing membrane is never addressed," Michaelson says.

### The unkindest cut

Another part of the document that has met with stiff opposition from the manufacturers is the section on test cuts. The booklet states: "Continuous visual inspection during the application provides a far more complete, realistic and meaningful means of examining workmanship practices than do test cuts. Roof cuts are an unrealistic basis for drawing conclusions about an entire roof and do not address many of the factors that are critical to obtaining watertight integrity (e.g., flashing, penetrations, drainage, securement, roof-mounted equipment, etc.). Focusing on roof cuts tends to give undue emphasis to the weight of interply, even though the actual interply bitumen weight is not the controlling factor in obtaining a watertight installation."

The disagreement over the value of test cuts is one of the reasons Owens-Corning Fiberglas Corp. decided not to endorse the document.

"We believe cutouts are important factors in assisting us in evaluating built-up roofing applications as a supplement to visual audits," David Richards, manager of technical services in O-C's Commercial Roofing Division. "Cutouts have always been an effective means for helping us determine whether or not our materials have been applied correctly. We are not saying that this is a substitute for visual inspection by any means, but you don't simply take 25 years of a proven testing method and disregard it as no longer valid."

Richards adds that O-C requires individual cutout averaging of interply bitumen weight. This is opposed to the three-samples-a-day-technique (or total job average basis) required in ASTM D3617-83, which is suggested in *Quality Control*.

Although the document does not specifically discuss the test cut procedures of any one manufacturer, it does point out that "the precision and accuracy of the analytical methods described in the ASTM D2829 have not been established by round-robin testing."

Because of this the booklet states, "The value of drawing conclusions concerning the quality and watertight integrity of a roof membrane on the basis of such test results is highly questionable."

ASTM D2829 calls for test cut samples to be removed and sent to a laboratory for analysis. Another standard, ASTM D3617-83, calls for jobsite testing; the samples are cut, weighed and replaced at the jobsite to allow roofing work to continue.

Consultant Paul Tente of Paul Tente Associates believes that test cuts are necessary, but says he feels that the number of test cuts to be used should be clearly stated up front. "If a manufacturer or building owner feels that test cuts should be a required part of the roofing process, then this should be specified in the original contract. Every specification should give the owner the option to make these cuts, but the owner should also be the one who pays for them—not the contractor. This protects the contractor against the simple random daily cuts we sometimes see."

"If you are one wit suspicious of your contractor's work," Tente adds, "the threat of a test cut and daily inspection will help put the fear of God into them."

Tente also advises owners to pre-qualify their contractors before the bidding process. "An experienced contractor who is interested in educating his workers and providing training in the field is going to give the building owner the quality workmanship he is looking for," he said.

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In a recent roundtable discussion sponsored by *Architectural Record* (July issue), NRCA representatives discussed in some detail how specifying contractors can help insure professional workmanship.

"It would be good if architects would put the prequalifications for the roofing contractor right into the specification," Wayne Mullis said. "If I were an architect specifying three manufacturers, I would ask those manufacturers: Who are your installers? Do you prequalify them? What are your criteria for their qualifications?"

"There are objective criteria that can and should be specified to prequalify roofing contractors and that allow for competitive bids such as experience, financial stability and ability to supervise," contractor Melvin Kruger, a roundtable participant and past president of NRCA, said.

Job size, the degree of difficulty, scheduling, performance requirements, logistics, and many other variables are part of the first considerations in selecting a qualified contractor. Specifying reasonable application criteria in the field is the next step to insuring that quality workmanship is maintained. The underlying disagreements about the specifics of the document should not dilute the common goal of the manufacturers, owners, specifiers and contractors: professionalism and uniformity throughout the industry.

ARMA spokesman Dick Snyder couldn't agree more. "There is no question that ARMA is in total support of the concept of this document. There are just certain things that are contrary to the specifications of the manufacturers. We do look forward to reaching agreement in the future," he says.

## Getting the word out

With or without ARMA's endorsement, the National Roofing Contractors Association has already begun to promote *Quality Control* to its members, affiliates and the rest of the construction community. "We held off printing the document in the hope of gaining the support of the manufacturers," Good says. "But we feel that it is too important to hold back any longer. We hope to have ARMA support in the near future."

NRCA's campaign will include sending the document, accompanied by information releases and an explanation of its value and use, to building owners, contractors, specifiers, architects, engineers and others involved in the building process. These materials will be included in all NRCA educational conferences.

The document is being widely distributed. NRCA members will be sent one free copy along with suggestions for using the information effectively. Non-member subscribers to *Roofing Spec* have a copy of the document bound into this issue. In addition, the document will be available at selected industry trade shows throughout the year.

A free additional copy of the document will be available from NRCA upon request until Oct. 1. The cost of purchasing the document after Oct. 1 will be \$1 for NRCA members and \$2 for non-members. For those individuals or companies interested in ordering more copies in multiples of 10, a discount rate of 75 cents per copy for members and \$1.50 per copy for non-members will be available. Order requests should be sent to NRCA, 8600 Bryn Mawr Ave., Chicago, Ill. 60631. NRCA requires prepayment on all orders. Visa, Master Card, and American Express cards will be accepted by calling 312/693-0700.

NRCA has already begun plans to develop a similar quality control booklet on the application of single-ply systems.