

Winds of Change for Roofing Slate Testing

By David Large

As reported in our association's Spring 2005 NSA Update, ASTM International is continuing their efforts to review and revise the C406 and C120 test methods and standards for natural roofing slate, to make them more relevant, accurate and understandable for our industry and testing laboratories.

Recent changes, now approved by ASTM, include a 575 lbf Breaking Load rather than the previous 9000 PSI Modulus of Rupture requirement for C120 Flexure Testing of Slate. The sample size for C120 testing has also been increased from 6 to 10 specimens. A corresponding change to C406 Standard Specification for Roofing Slate has also been approved, noting the minimum 575 lbf minimum breaking load requirement in order to meet the standards of any ASTM S1, S2 or S3 rating.

As confirmation that these changes benefit our industry and our customers, we recently received a frantic call from a roofing contractor stating that material testing conducted on Unfading Green slate, after installation had already begun on a large university project (under a tight deadline), had failed C120 testing. The project was being brought to a halt by the architect and university... the sky was falling.

Having experience in these matters, we asked the roofer to remain calm and requested a copy of the test results. A review of the data was most interesting. It was easy to note that only three samples had been tested instead of the ten required by ASTM. In addition, the slate testing had been done to the old C120 Modulus of Rupture Test, not the current C120 Breaking Load Test, and in the reporting of the data; lay the very reason that the test method had required change.

The individual modulus of rupture figures reported for the test specimens ranged from 4270 to 6467 PSI with the average being 5448 PSI. The old Modulus of Rupture pass was 9000 PSI...this was an obvious and dreadful failure! Looking at the breaking load values used to calculate these modulus of ruptures, however, revealed breaking loads of 600 to 755 lbf with the average being 652 lbf. A breaking load pass under the current C120 is 575 lbf...we have an obvious and spectacular pass!

The purpose of C120 testing is to ensure that roofing slates have a minimum physical strength to resist light foot traffic, accidental impact and wind uplift. This minimum physical strength was effectively established sixty years ago by ASTM as 575 lbf under the old modulus of rupture test method calculation. Based on the breaking load data reported, the supplied slate more than met the requirements of the current C120 for strength. The project went ahead on schedule, and the university got a world class, quality, natural slate roof.

At the time of writing, the approved ASTM standards related to roofing slate are C406-05, C-120-05, C121-90 (Reapproved 1999), C217-94 (Reapproved 1999), C99-87 (Reapproved 2000) and C119-04a. These are the ASTM documents which should be noted when referring to standards for your projects. Outdated ASTM documents listed in specifications or bid documents should be brought to the attention of the architect, specification writer, general contractor, roofing contractor and building owner for revision.

Additional proposed changes to roofing slate specifications and testing are still before ASTM. These changes include a method of testing and approving slates of a specific thickness, in order to meet the new breaking load requirements. We will see changes in the specimen dimensions, that will ensure slates are properly oriented in test stands. As well, allowable dimensional tolerances for “squareness” will also be addressed.

All these developments will be reported in future issues of your NSA Update... as the wind continues to blow.

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