

The FORUM for International Cooperation on Fire Research

A position paper on evaluation of products and services for global acceptance

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Introduction and background

There are two aspects to the issue of evaluating products and services for global acceptance: who does the testing and what tests are done. A number of laboratories worldwide are gearing up for this activity, and some form of cooperative mutual acceptance among these labs appears to be the most likely means for achieving global acceptance of test results. One major issue yet to be addressed here is that of quality assurance. A lab that is independently accredited cannot accept the result from a non-accredited lab since there is no assurance that they have the minimum level of competence. Since most such accreditation programs are local, the solution will likely come from the implementation of international quality systems and standards such as ISO 9000¹ and ISO Guide 25².

A more crucial issue perhaps is what testing should be done. Many tests are currently available. Each laboratory has their own preferences, and some have their own tests. These ad hoc tests were developed for specific purposes and applications. Each has its own advantages and limitations, and many have acquired national roots as the global marketplace has grown and become more active. The selection and use of tests is accordingly influenced by political and economic reasons, as well as technical considerations. As a result, and not surprisingly, there is

¹The ISO 9000:2000 Family of Standards, International Organization for Standards.

²ISO Guide 25, 1990, General Requirements for the Competence of Calibration and Testing Laboratories.

disagreement as to the usefulness of most of these tests. Rather than discussing the pros and cons of these ad hoc tests, this position paper is intended to address the technical aspects of acceptance testing approaches, recognizing that a sound approach will require certain testing capabilities and therefore lead to good test methods.

Assessment of options

In examining alternate approaches, it is stated as a premise that testing must be directed at achieving approval for end use applications. The options available for end use approval, in ascending order of sophistication and effectiveness, are:

1. Ad hoc tests.
2. Use of small and/or intermediate-scale tests correlated with large-scale tests.
3. Property data coupled with a first-principle model of an intermediate-scale test that can be correlated with large-scale end-use tests.
4. Property data combined with models of the end use application.

The first option most represents our current situation. Although we operate this way today, it is widely recognized that this approach is inadequate. Different labs are using different tests. The application of many of these tests has been extended beyond the initial purpose, oftentimes yielding misleading results. Because of the need to do multiple tests and often rework, this approach tends to be wasteful of resources.

We are currently moving in the direction of the second option. This approach is better than option 1, but also has shortcomings. We can “get it right” for the particular condition being tested, but results can still be misleading if the correlation with large-scale test results is not adequately broad in range and/or end use. With this approach, it is likely that a number of current ad hoc tests will fall by the wayside because they are not suited to this approach. The resulting reduction in the number of tests for acceptance is desirable, but may be difficult to achieve because some of the disparaged tests may be “preferred”.

Option 3 is promising. Although it is not the ultimate goal, it makes better use of scientific knowledge than do the first two options, does not rely on difficult correlations between small-scale and large-scale results, is achievable in a reasonable time frame and may serve adequately until option 4 is available. It also should be easy to understand by the user, the practitioner and the regulator.

The fourth option is the ideal approach, using material properties and other scenario-based quantities as input to comprehensive end use computer models. Currently, we do not know enough for most situations to use this approach. Temperature-dependent material properties are proving to be quite difficult to measure, existing models are relatively limited and broadly applicable end use computer models are becoming more complex. Hence, validation and verification is extremely critical. As computing power advances, this option should become easy to use for the practitioner.

FORUM position

The FORUM position for evaluating products for global acceptance is as follows:

- Approval tests become ingrained. Once established, it is difficult if not impossible to remove or even revise them. They also create burdensome legacy issues.
- FORUM members should encourage and advocate use of the most practicable scientifically-based technology.
- In moving from prescriptive towards performance-based codes and standards, more scientifically-based tests are required to provide data needed for predictive models.
- The intent is to move towards the provision of tools—accurate data, tests, models—as a basis for equitable performance levels needed to support performance-based codes and standards.
- Rather than acceding to tradition, researchers and practitioners bear the responsibility to demonstrate the value of using most practicable technology.
- Research laboratories need to serve the interests of all stakeholders—product manufacturers, product users, practitioners, testing laboratories, insurers, regulatory agencies, society.
- Research laboratories have the further responsibility to advance science needed to progress toward the most scientifically-based approach for accepting products.

The FORUM takes this position because it recognizes that adoption of an inadequate test doesn't necessarily improve safety, can add an unreasonable burden of cost to manufacturers of products and eventually adds to the panoply of ad hoc tests. Globalization, though not complete, is coming fast. Currently there are three major markets—the European Union, the Americas and Asia/Pacific. Failure to press the FORUM position in one market may preclude options for others, resulting in a continuation of parochial/preferred tests in different market areas and the often-wasteful search for a meaningful way to compare different tests.