ADVISORY NOTE 34

Guidance on Performance Evidence of Fire Resisting Systems

About this document

This guidance has been published by ASFP to assist designers, project design teams and other end users to determine the suitability of supporting fire safety information (test reports, assessments and third-party certification) being used to evaluate a product, system or installation.

This document is NOT intended to be a guide to undertaking a technical evaluation (assessment) e.g. for a particular end-use application but it does provide a list of items to check as part of a review of the supporting information.

Best practice in conducting assessments is given in the document "A guide to undertaking technical evaluations of construction products based on fire test evidence," as referred to in Approved Document B of the Building Regulations. This document has been published by the Passive Fire Protection Forum (PFPF) under the umbrella of the Fire Sector Federation (FSF). A copy can be found here:- https://asfp.org.uk/page/ASFPTechnicalDocuments

The need to check a product's suitability for intended use

Architects, Designers, Building Control Officers, project design teams, and other end-users responsible for ensuring that installed products are suitable for the end use application are frequently presented with test fire safety evidence to demonstrate the fire performance of products. However, the evidence submitted often references a product/system which was installed in line with the requirements of a particular test method and may not reflect the actual end use application appropriate to the specific construction project. In some instances, the system installed on site will vary e.g. from the components tested or the way in which they are fitted into the installation.

Approval of products in applications which have been incorrectly specified may perform poorly in a fire and consequently could contribute to fire spread in a building.

This document will help you evaluate the suitability of the evidence presented.

Remember, the supporting evidence only covers the products/systems included within it. Any variation to these proposed by you could mean you assume some of the design liabilities. The project team is ultimately responsible for ensuring that the constructed details will provide the necessary levels of fire safety. As design of passive fire protection systems is a complex matter, use of third-party assessments of tested performance can help ensure the correct outcomes and minimise risk to the project team. Use of third-party assessments and certification will also aid passive fire protection installers in their efforts to maintain third-party certification of their installation activities.

If the project team is uncertain whether supplied performance evidence is appropriately prepared and relevant to the project design, then they are advised to seek out additional help to resolve these issues.

Sources of Product Performance Information.

When it comes to gathering information about product performance, there are several ways in which product performance in fire can be expressed. Users of the product performance evidence should ensure themselves that the information supplied is relevant and sufficiently reliable for the compliance decisions being made.

The below list is in order of their reliability and/or consequent risk. Each of the columns is **explained in further detail later in this document.**

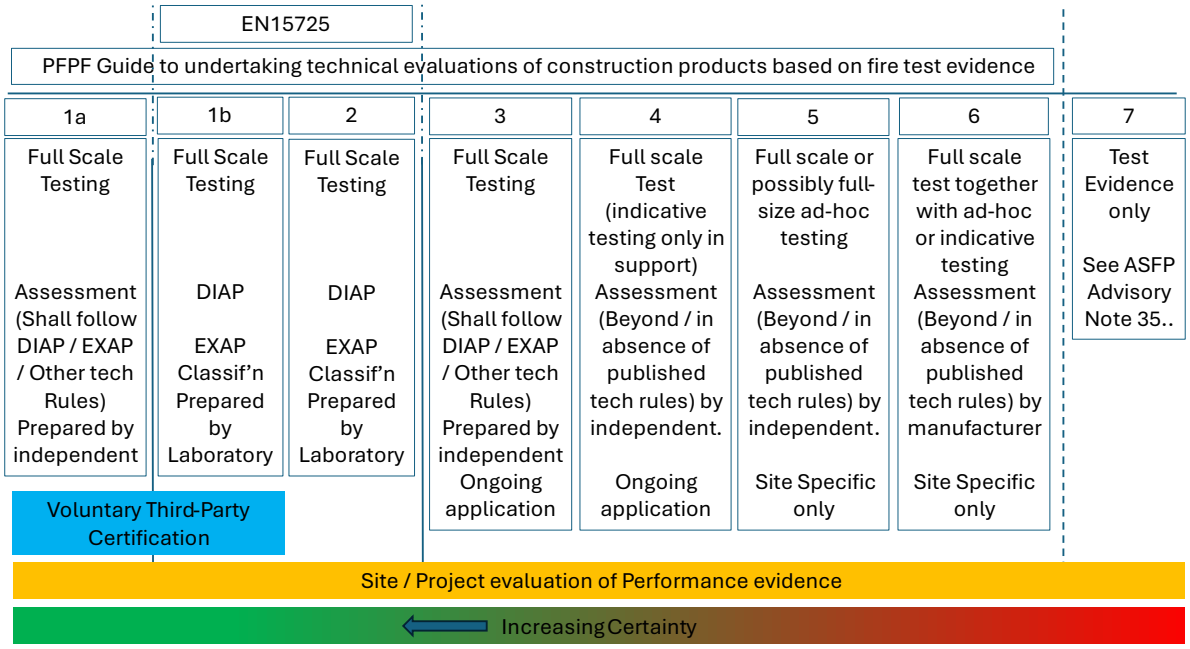

Figure 1 – Different sources of assessment

What is meant by "Assessment"

Assessments of product performance have been historically labelled as many different things including Assessments, Technical Assessments, Technical Evaluations, Appraisals of performance and Engineering Judgements. None of these titles have specific definitions attached to them in legislation in the UK. Some of the terms are defined in isolated risk assessment standards, but there is no common definition of these terms used across the industry.

Assessments in support of products are documents based on sufficient and relevant test evidence giving an opinion on how a material, product, system or structure would perform if it were to be tested to a particular standard and often offer an increased scope of application.

There are four key components to check in determining the suitability of an assessment. These are listed below: -

- The relevance of the assessed design vs the actual constructed detail.
- The quality and validity of the input fire test data being assessed.
- The technical rules and principles used to form the basis of the assessment.
- The competence and independence of the person/organisation conducting the assessment.

Most assessments are done in accordance with a set of rules contained in a published standard document, such as a BS or EN standard, or in some instances standards published by industry bodies after appropriate consultation process. When using a formal EN standard these assessment rules are often referred to in terms of Direct Field of Application (DIAP) and Extended Field of Application (EXAP). DIAP rules are identified within the main body text of the relevant test standard and as such can be applied by the manufacturer without any third-party involvement. EXAP rules sit within their own formal published standard. For example, the DIAP rules for service penetration seals are contained within BS EN1366-3, whereas the EXAP rules are written in BS EN 15882-3. It should be noted that all BS EN test standards contain information on the relevant DIAP field of application, but not every test standard has an appropriate complementary EXAP standard. Many of the Passive Fire Protection EXAPs are still to be written.

Both third-party certification and classification sections of this document will involve some form of assessment of the product in accordance with a published and recognised standard conducted by an independent body. For a formal classification based on DIAP and EXAP, that needs to be the laboratory that conducted at least some of the testing.

It is crucial that assessments, for whatever purpose and however they are produced, are undertaken in a professional and correct manner. The Passive Fire Protection Forum (PFPF), of which the ASFP is a founder member, updated their guidance document "Guide to undertaking technical assessments of the fire performance of construction products based on fire test evidence in 2021", following the Governments 2018 consultation on Assessments and subsequent response document.

The PFPF guide explains all the necessary steps that should be undertaken to ensure that an assessment is rigorous, transparent and undertaken by appropriate personnel. An assessment should be written in such a way, that any subsequent reviewer can clearly understand the four bullet

points above, namely, the relevance to the constructed detail, the underpinning evidence, the basis of the assumptions made and the competence of the assessor in making the assessment.

There is also a formal European standard which cover procedure to be conducted by laboratories which are conducting BS EN 15725 “Extended application on the fire performance of construction products and building elements: Principle of EXAP standards and EXAP reports”**.**

BS EN 15725 gives the procedures for preparing EXAP reports based on appropriate fire test results when undertaken for the purposes of classification of products and product families to the BS EN 13501 series of standards. Such EXAP reports and classifications are based upon defined European EXAP and Product standards.

Use of Assessments

In 2018, UK Government consulted on whether technical evaluations had a place and a role to fill within construction. The outcome of that consultation was published in a December 2018 response document. The document identified that whilst it is inappropriate to conduct assessments on the use of combustible materials in external walls, there are still several areas where assessment of fire resistance performance is a necessary process for the construction industry.

As previously indicated, an Assessment should be prepared in accordance with the PFPF “Guide to undertaking technical evaluations of construction products based on fire test evidence” referred to at the start of this document.

There are a number of different ways in which the assessment of fire resistance performance can be expressed. Each of these methods and their relative features and benefits are explained below. All these methods have their place within the construction industry. A project team should take steps to satisfy themselves that the appropriate assessment route is being used for the competence of those accepting the assessment.

Third Party Certification

(Columns 1a & 1b in Figure 1)

ASFP believes that the fire performance of factory produced products is best evaluated by independent third-party product certification of which testing is only one part.

The process by which third party certification is achieved includes sampling, testing and assessment in line with a published method. Certification also includes initial auditing of production processes and regular follow up audits. All these steps are conducted by an independent certification body in accordance with published standards and certification schedules. These steps are explained in more detail below.

Sampling: Sampling involves the certification body selecting a representative subset of products from a larger batch for evaluation. Where prototypes are being tested, this may involve full witnessing of the production of the first production. Witnessing and sampling records should include traceability back to the original raw materials and suppliers of the same, manufacturing records and

factory production control results. This process helps ensure that the tested products are indicative of the overall quality and performance of the entire production lot, and representative of normal production.

Auditing of production processes: As part of the initial product certification, the Certification body will review the factory production control processes. After certification is issued, follow-up auditing is conducted by the certification body on a regular basis. This is essential to monitor ongoing compliance. Regular audits help verify that the manufacturer continues to meet the required standards and specifications, and the product remains the same as that was initially sampled.

Testing: The sampled product is independently tested within a third-party laboratory in accordance with recognised standards. The testing will be required to be based on full scale testing, as covered in the appropriate test standards. The laboratory will be accredited to conduct the test, by an organisation such as the United Kingdom Accreditation Service (UKAS).

Assessment: Third party certification usually also includes a scope of the applicability of the fire performance to variations in the products size, configuration etc and interpolation and extrapolation of product ranges, in line with published standards. The assessment may be conducted entirely in line with BS EN based DIAP and EXAP rules, in which case an EN 13501 series classification is possible as part of the certification process. If the testing and assessment uses other published rules and principals, then a European classification will not result.

Assessment within third party certification may also be used to increase the scope of applicability outside of DIAP and EXAP. In this case, the certification body will follow the PFPF “Guide to undertaking technical evaluations of construction products based on fire test evidence” referred to at the start of this document.

Certification: Once all the above steps have been completed, the certification body produces a detailed certificate, incorporating the full scope of applicability of fire performance, which is then published on the Certification bodies own website. The certificates will contain a detailed explanation of the product performance, and the rules followed in establishing that performance.

Certificates produced in this way often have an expiration date, after which a review can be conducted to extend the validity. The processes, procedures and materials manufactured under the scope of the certificate are the subject of regular, typically annual audit by the certification body. This will include auditing of processes and factory production control results. It may also include an audit testing of the products fire performance.

If a third-party certificate of product performance is presented, and that certificate covers the scope of the as-built detail, then there is usually no need for the individual test reports to be provided in addition. The original test reports have been summarised within the assessments that underpin the certificate. Indeed, in many instances, you may not find the precise detail that you are looking for within the test evidence.

Third party certification is common in industries where standardisation and categorisation are essential, such as in the certification of electrical appliances, building materials, or other products subject to regulatory scrutiny. These certificates play a crucial role in communicating the product's

characteristics and compliance with relevant standards to various stakeholders, including regulatory bodies, consumers, and manufacturers. The purpose of accredited independent third-party product and installer certification schemes is to provide confidence to end-users and enforcement authorities alike that products and installations conform to specified requirements.

Like the third-party laboratories, third party certification bodies are also accredited by the United Kingdom Accreditation Service (UKAS) for this role to ensure consistency and quality of certification.

The ASFP always recommends third party product certification be used as the first choice to determine product performance. However, the following sections give advice to designers and enforcement authorities where the product being installed is not covered by such schemes.

Classification Report

(Column 2 in Figure 1)

Classifications & Classification reports, follow well defined rules published within the framework of European classification and test standards. Classification involves categorising the product based on its characteristics and performance. This process typically provides a simple and clear understanding of the product's capabilities within a defined scope. For instance, a fire resisting wall system that resists the passage of fire or heat for 2 hours, might be classified as EI120 in accordance with BS EN13501-2 (E= Integrity, I = Insulation, 120 = period in minutes).

BS EN 13501 series classifications are only possible where the relevant test standards are referred to in the appropriate part of BS EN 13501. Classifications are based on testing conducted to the appropriate listed BS EN test standard. **A BS EN 13501 based classification using the letters R, E or I cannot be based upon BS 476 based testing due to difference in the test methods.**

The extent to which a classification covers other than what was directly tested comes from the direct field of application (DIAP) rules contained within the appropriate BS EN test standard, augmented where appropriate by Extended Field of application (EXAP) rules, also published as BS EN standards. Such standards are based on rules and calculation methods as clearly defined in the standards.

Classification reports can only be published by laboratories which are accredited to conduct the tests and produce such reports. Formal DIAP, EXAP and Classification reports should be prepared by a laboratory that was involved in the testing of the product. The accreditation of test laboratories in the UK is conducted by UKAS. Accredited laboratories for this process are listed on UKAS website and on UK Government website. If appropriate an EU accredited laboratory – listed on the NANDO website may also provide relevant classification reports. **Classifications and classification reports are less reliable than third party certification because they are not underpinned with sampling and certification audits of factory production control.**

Assessments within published rules

(Column 3 in Figure 1)

These assessments are underpinned by full scale tests in accordance with a published test standard. The assessment assumptions made are then determined by independent assessors.

Historically referred to a Field of Application or 'Global' Assessments, these assessments may be undertaken to increase the scope of a test result or results when there are numerous changes; or when testing all the combinations and permutations is impractical, uneconomic and technically unnecessary.

Using fire doors as an example, the variations in size, configuration (single doors, double doors, single swing, double swing), ironmongery, intumescent protection, inclusion/changes of glazing, inclusion/deletion of side and over panels etc would soon result in hundreds of fire resistance tests for one basic design. In reality, these can be covered by a test programme featuring several combinations and permutations which can cover many of the less onerous variations required and an assessment to 'fill in the gaps' and provide some extension to scope by interpolation and/or extrapolation. Such assessments cannot be used for assessments towards a European classification, as explained above.

Assessments of this type can also, however, be undertaken using the European Extended Application or EXAP standard rules, without completing the classification process. An EXAP standard uses a combination of defined rules, calculations methods and agreed expert judgement to increase the field of application of the test result for a given product. However, in many cases, EXAP standards give only a very narrow increase in the field of application and are often inadequate for what is required in buildings. For example, the EXAP standard for fire-resisting ducts, only allows a very modest increase in duct size and cross section area and it is totally inadequate for buildings that are being constructed now and for those which have been built over the years. In such cases, assessments by test laboratories have been undertaken safely on much larger duct sizes and cross-sectional areas for many years. Such assessments undertaken by test laboratories and certification bodies will have followed the PFPF "Guide to undertaking technical evaluations of construction products based on fire test evidence" referred to above.

Assessments outside or beyond published rules

When field conditions differ from original design or unanticipated construction hindrances are encountered and the field conditions cannot be easily or cost effectively be redesigned, design recommendations are typically made to propose alternative methods that ensure performance of the passive fire protection system is not compromised. Since these recommendations are not based upon identical designs as that which were fire tested, it is important that they be developed using sound technical and conservative principles.

Assessments of this type, as all assessments must always be based on suitable test evidence for the specific performance characteristic under review. Any evaluation produced of this type should be underpinned by appropriate test evidence, including at least one full scale test. Therefore, for the

same reason, assessments must never be written without reference to suitable test evidence as the foundation for any expansion of scope. For example, equivalent reaction to fire performance cannot be used to justify a product switch in a fire-resistance application.

As previously stated, the assessment report should be written so that any subsequent reviewer i.e. a non-expert, can understand the underpinning evidence, the assumptions made and the competence of the assessor in writing the assessment.

There are several approaches that can occur when assessing product performance for such designs, with increasing levels of risk.

Column 4 in Figure 1 covers a case where the data from full scale testing is augmented by some smaller scale indicative testing for an assessment beyond or in absence of published technical principals by an independent body.

Column 5 covers an assessment done on a construction based upon a full scale or full-scale ad-hoc test. This may well be required for a construction detail where no formal test method exists, for example structural test of a steel beam in conjunction with a cross-laminate timber floor slab. Assessment of such a test outcome may represent the best quality data possible to validate the performance of the system but given the necessary ad-hoc nature of the test, the use of such an assessment should be limited to a particular named project.

Column 6 covers the possibility of the assessment being conducted by a manufacturer. The conflict of interest in an assessment undertaken by the manufacturer concerned is usually very apparent. Notwithstanding this, many manufacturers are very reputable and can have more and better knowledge on the fire performance of their products than independent laboratories, certification bodies or other consultants. The PFPF guide referred to above allows assessments produced by manufacturers, provided that any conflict of interest is managed and apparent. The Scope of applicability of assessments of this type should again be limited to a single named project.

Fire Test report only

(Column 7 in Figure 1)

There are obvious benefits and drawbacks to using the raw fire test data as a form of performance evidence. If the tested detail matches exactly the as built situation, then some of the risk is mitigated. However, it should be recognised that the project team has the responsibility for determining the extent of equivalence between the test evidence and the as built scenario. The project team may not have the competence to make such a decision, in which case competence needs to be sourced elsewhere.

Beyond the above, it is worth stressing that a fire test report is purely a statement of a test result, a snapshot in time. It does not have the same rigour in determining ongoing product performance that comes with third party certification.

For further information about the different types of fire test evidence, please consult ASFP Advisory Note 35, this document will be published shortly.

Summary

This document was developed to provide guidance on evaluating the suitability of fire safety evidence, such as certifications, assessments and test reports for products and systems. It hopefully emphasises the importance of ensuring that the performance evidence is relevant to the intended use within a construction project.

Third-party certification is the preferred method for evaluating the fire performance of factory-produced products. It involves independent testing, assessment, and auditing conducted by accredited certification bodies. Third party certification from an accredited certification body does not need to be accompanied by submissions of the individual supporting test reports.

Other methods of demonstrating performance include classification reports, which categorise products based on their performance according to European standards and assessments, which provide opinions on how a material or system would perform if tested.

The ASFP provides this guidance to assist designers, architects, building control officers, and other end-users in determining the suitability of passive fire protection performance evidence for specific applications and construction projects.

As a reminder, the four key components in determining the suitability of an assessment are listed below: -

- The relevance of the assessed design vs the actual constructed detail.
- The quality and validity of the input fire test data being assessed.
- The technical rules and principles used to form the basis of the assessment.
- The competence and independence of the person/organisation conducting the assessment.

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