Building Products Performance
Good Practice Regulatory Framework

INTERNATIONAL BUILDING QUALITY CENTRE

February 2023

UNIVERSITY OF CANBERRA | UCL | MASSEY UNIVERSITY SCHOOL OF BUILT ENVIRONMENT | UNIVERSITY OF NAIROBI

Produced with support from the University of Canberra, University College London, Massey University, and the University of Nairobi

About the International Building Quality Centre

The IBQC is a collaboration of international public and private sector professionals with expertise relating to the regulation of the building and construction industry.

The IBQC intends to be a sounding board or point of reference for law reformers, policymakers and stakeholders intent on designing building regulation that provides the greatest opportunity for the realization of codes and laws that maximize:

- Public safety;
- Cost-effective and efficient construction systems; and
- Sustainability within the context of the built environment.

The IBQC provides a medium through which comparative analyses can be applied to reforming jurisdictions to enable the peer review of proposed concepts.

The paramount vision of the organization is that, through its research and its members, the IBQC will have a positive and material impact on building regulation and practices in jurisdictions across the world.

Disclaimer

All information provided within this publication is for general informational purposes only and does not, and is not intended to, constitute legal or other professional advice. This publication contains links to other third-party websites. Such links are only for the convenience of the reader and the IBQC does not endorse the contents of the third-party sites.

The views and/or recommendations expressed within this publication are those of the individual authors writing in their individual capacities only – not those of their respective employers. All liability with respect to actions taken or not taken based on the contents of this publication is hereby expressly disclaimed. The content within this publication is provided "as is;" no representations are made that the content is error-free.

Foreword

As Chair of the IBQC working group on Building Products Performance, I am delighted to be providing the foreword to our Good Practice Framework.

Our work began in early 2021 and it has been a long journey. The approach we have taken on this subject differs from other IBQC publications and for good reason. Building product performance is a complex subject involving supply chains that stretch around the world and where different jurisdictions already employ different approaches to regulation, compliance and conformance testing. The extent to which the current regulatory systems for building products around the world are perceived to be problematic also vary.

It was for this reason that we chose to start our journey by producing a discussion paper to prompt debate and to tease out those different perceptions of the extent of the challenges and also to look for evidence of where things were perceived to be working well. Our discussion paper was published in 2022 and did indeed promote a good deal of constructive debate.

From this debate and through the extraordinary efforts of members of the working group we have now been able to bring our work to a conclusion through the publication of this good practice framework.

It is important to note that the 31 elements of our Framework do not mean that everyone should implement them all! The Framework should be used to examine what is already in place in any given jurisdiction and to identify where there may be gaps. Even if there are gaps these may not need to be filled if the current system is deemed to be working effectively. But in countries where there are already known weaknesses in building product performance regulation, this framework provides the means to identify additional measures which others have already taken in this complex area in order to develop an improvement roadmap. Context, both in terms of what is already in place and the extent to which the current system is seen to be lacking, is essential in reading and using this framework.

My thanks and appreciation go to the whole team[1] who have worked so hard and unstintingly to bring this document to fruition.

Dame Judith Hackitt DBE FREng

1 The IBQC Working Group for the development of the Framework comprised Dame Judith Hackitt (Chair), Stephanie Barwise KC, Professor Charles Lemckert, Adjunct Professor Kim Lovegrove, Adjunct Professor Neil Savery, Adjunct Professor Bronwyn Weir and Judy Zakreski

Table of Contents

1. Purpose 1
2. Regulating building performance 2
3. Discussion 3
4. Framework elements 4
    - Governance 5
    - Evidence of suitability 7
        - » Option a) A recognised standard(s) exist 7
        - » Option b) i. Conformity Assessment Body evaluation 9
        - » Option b) ii. Independent Technical Group assessment 9
    - Batch Testing, Sample Testing and Re-testing For All Products 11
    - Product identification and documentation 11
    - Supply chain responsibility 12
    - Product traceability 13
    - Roles and responsibilities of building practitioners 14
    - Compliance 16
    - Education 17
5. Case studies 18
6. Conclusion 20

Glossary and acronyms 22

Bibliography 23

Appendix 1 – Framework Summary 24

Appendix 2 – Options for evidence of suitability schematic 30

Appendix 3 – Governance schematic 31

INTERNATIONAL BUILDING QUALITY CENTRE

Building Products Performance
Good Practice Regulatory Framework

The challenge of effectively regulating building products to ensure their performance is faced by many jurisdictions around the world. The nature of this challenge is well articulated by Paul Morrell OBE, Chair of the United Kingdom's Independent Review of Construction Products Testing Regime (2020-22) in his description of the challenges faced in his jurisdiction:

> *"…we know we are well off the pace in consistently delivering what clients, users and society are entitled to expect.*
>
> *This performance gap, and the risks that attend it, can only grow as products and technologies develop, and the ways in which they can be combined in order to make a building tend towards the infinite. Added to this diversity of demand and design response is the cast of thousands involved, and the extraordinary fragmentation of their interests.*
>
> *Faced with this complexity, the alternative to just pulling the duvet up over our heads is to break it down into manageable components, and to make a plan – or rather a series of plans: a jigsaw that adds up to a complete picture of what has to be done so that buildings and the wider built environment function as they should, and do so safely.*
>
> *Critical to those plans is a solid understanding of how construction products should be used appropriately. This too is complex. Very few products function on a stand-alone basis, and are reserved for a single purpose. Instead they are almost invariably built into assemblies comprising a number of other construction products, and quite possibly for purposes different from the manufacturer's original intent, so the possibilities of how a construction product might be used are boundless. It is therefore vital that decisions about construction product selection are informed by a full understanding of how those products will perform, individually or in combination with others, in reasonably contemplatable situations; how they should be handled, prepared for use and installed; and how they should be used and maintained in the finished project.[2]"*

1. PURPOSE

1.1 This paper sets out a system-wide good practice regulatory framework for building products (the Framework) so as to enable confidence in product performance by regulators, practitioners, industry and consumers.

1.2 The development of the Framework follows the publication of a paper by the IBQC, which set out to define the issues underlying instances of poor building product outcomes.[3] The IBQC then sought the submission of comments on the first paper. A second paper summarized the submissions received.[4] Having defined the issues, the IBQC now sets out its proposal for good practice regulation of building product performance.

---

2 built-environment-proposed-construction-product-competence-standard-white-paper_cpa-csg (1).pdf

3 IBQC-Building-Product-Performance-Part-1-2022.04-FINAL.pdf

4 Microsoft Word - IBQC - Building product performance public comments (003) (iccsafe.org)

1.3 As noted in the first paper,[5] evidence gathered indicates that the issues and concerns associated with building product performance are not experienced uniformly internationally. We have therefore looked to regulatory schemes from regions around the globe where product performance appears to be well regulated to inform the development of the Framework.

1.4 In proposing this Framework the IBQC acknowledges there may not be a 'one size fits all' approach. A Building Product Performance Framework is one of several components of an overall building regulatory system. Other components include a building approval and inspection regime, practitioner licensing or registration, performance or prescriptive codes and standards, and various consumer protection mechanisms such as insurance, statutory warranties and dispute resolution.[6] The extent to which any country or jurisdiction chooses to adopt elements of the IBQC Building Product Performance Framework will vary having regard to how other components of the overall system operate, regulatory maturity and the compliance culture.

1.5 The resulting Framework for building product performance covers the end-to-end processes of legislative settings; system administration; establishing evidence that products are suitable for use; accountability and traceability along the supply chain; through to product information, education, installation and maintenance.

1.6 For the purposes of this paper, the use of the word "products" includes components, materials and systems. The use of the word "building" includes plumbing, gas-fitting and electrical products used inside the envelope of the building to the property boundary. It does not include joinery, furnishings or other products that serve no purpose in satisfying requirements of a jurisdictions building code and referenced standards.

2. REGULATING BUILDING PRODUCT PERFORMANCE

2.1 The scope of this paper relates to the specification and use of products in buildings that are expected to comply with applicable standards, codes and laws to ensure they perform as intended, and occupant and public safety are not compromised. The scope also responds in a number in places to the IBQC Principles for Good Practice Building Regulation, where the principles for building product regulation are complemented by and support a broader building control environment.[7]

2.2 To simplify matters, there are two main issues the Framework seeks to address, namely, those products that do not conform to specified testing or building standards and those that have been used incorrectly. For the purpose of this paper, we define these as follows:

> (1) A **non-conforming building product** is one that claims to be something it is not, and/or does not in fact conform to the test/standards against which it purports to have been tested. In this circumstance the focus is on the product.
>
> (2) A **non-compliant building product** is one that has been specified or applied in a manner where its use does not comply with the requirements of a code or standard and/or regulation governing compliance of the building/structure in question. In this circumstance the focus is on the practitioner(s).

2.3 Most contemporary building codes place an important responsibility upon those who are specifying products to satisfy themselves that the products selected are fit for their intended purpose; this responsibility also passes to those who review and issue the resultant building approvals. This arrangement has increased importance in the case of innovative products, for which no prescriptive consensus standard or normative criteria exist against which a product can be tested and certified. In this circumstance, those responsible for

5 IBQC-Building-Product-Performance-Part-1-2022.04-FINAL.pdf

6 https://www.ibqc.org.au/wp-content/uploads/2020/09/IBQC-Principles-for-Good-Practice-Building-Regulation.pdf

7 IBQC-Principles-for-Good-Practice-Building-Regulation.pdf

specifying products need to satisfy themselves that the outcomes required by applicable regulations have been demonstrated in some other way.

For example, if through this process of product selection, a product's claim to have been tested to a prescribed standard when it hadn't or the evidence used in a situation where no prescriptive standard exists is fabricated, then that product may be described as non-conforming. The information used has been designed to deceive those responsible for specifying and approving the products used in the design of a building.

Where on the other hand, the scope of a product's certification demonstrates it is suitable for use in a number of situations, but it is specified or substituted for application outside of this scope, then the product's use would likely represent non-compliance with the applicable regulations.

2.4 The extent to which non-conforming and non-compliant building products are representative of systemic failures and how they are experienced in different countries is subject to debate. It is, however, useful for all jurisdictions, even those that have not experienced a recent failure, to regularly consider and explore these issues and use the study of good practice to ensure their regulatory systems provide the necessary protections to prevent catastrophic events caused by compromised/fraudulent building products used in construction, by inappropriate product selection or the poor application of conforming products.

3. DISCUSSION

3.1 The environment in which building products are manufactured, distributed and assembled has changed considerably over the past few decades. This stems from several factors, including:

- innovation in the types of products and materials used in buildings;
- global supply chains for building products becoming longer, more complex and more opaque;
- changes to regulatory practice, including, in some cases, deregulation;
- the drive to reduce costs; and
- the level of knowledge and demonstrated competence required of practitioners.

It is for this reason the IBQC has prioritized building product performance as an area worthy of further thought leadership through research and collaboration of ideas and knowledge.

3.2 The application of products (which includes systems of products) that do not conform to regulations and standards or are incorrectly used is not a new phenomenon, nor is it restricted to the building industry. It is, however, a key issue for the construction sector where a building is the sum of its parts, comprising potentially thousands of components, making up products and systems that are in many cases complex and inter-dependent. These products therefore have a huge bearing on the performance and safety of a building.

3.3 Unlike many other sectors in the economy, the performance or risk associated with a building product is determined not just by its characteristics, but also its application. This combination of factors makes it critical for products to perform to the necessary standards (i.e. be fit for purpose), be specified, approved and installed by competent practitioners,[8] reliably supplied and correctly maintained.

3.4 It is hoped that most building products on the market conform to the tests/standards against which they have been assessed, but experience has shown that some do not. Further problems arise (particularly in jurisdictions with outcomes-based technical regulations), when products used in buildings are selected by members of the design team or building contractor without a full understanding of what performance criteria

8 Peter Johnson et al, 'Fire Safety Engineering – Final Report' (2020) Report 8 in Series of 8, Warren Centre for Advanced Engineering University of Sydney

should be applied to meet the regulations governing compliance. If products are not fit for their intended use and where they compromise the integrity of the building, the consequences can be substantial, including property damage, injury, and at the extreme, death.[9] In order to develop guidelines to assist regulators, inform practitioners and prevent harm to consumers in any given jurisdiction, it is important to first understand the extent to which building product performance is a problem or challenge in that jurisdiction.

3.5 Good practice for building product regulation is set out in Principle IV of the IBQC's Principles of Good Practice Regulation.[10] The nature of this subject will vary for different countries and often manifests itself differently even within a country, particularly one that is based on a federated model, where regulatory practices may differ considerably by jurisdiction.

3.6 The subject of building product performance was considered in the Part 1 paper,[11] which explored the known problems and challenges associated with ensuring that building products both conform to the standards against which they have been tested and, once selected for use by the designer, perform in the manner required in order for the building to be compliant with regulations.

3.7 Building product performance and selection is an area of building regulation that has been identified in some countries as representing a significant problem and risk over recent years. In the United Kingdom and Australia, it has been the subject of formal parliamentary inquiries and examination by governments. Other countries, such as the USA, have not experienced recent catastrophic events tied to building product regulation, but many still regard the regulation of these products as a challenge that – if not attended to – could present considerable risk. Learning from regulatory success or failure can have equal value in informing the development of good practice regulatory principles for building product performance and selection.

3.8 There is a noted contrast among regulatory regimes that adopt a predominantly prescriptive approach and those that specify an outcome to be achieved (or levels of performance), leaving the designer greater latitude.

3.9 In the case of performance-based design, a different approach to testing and compliance is required where no established standard or specification for assessment exists. In cases where prescriptive technical requirements are utilized, products are typically tested using prescribed methods to demonstrate they conform with the specified requirements. Where no such standards exist, the manufacturer, the designer and those who issue the approval need to consider what performance requirements the product must meet in order to be compliant with the targeted outcomes.

4. FRAMEWORK ELEMENTS

4.1 Emanating from the analysis of the problems identified in Paper 1, the submissions received and summarised in Paper 1A, the review of several product regulatory systems both in operation and contemplated, and deliberations of various inquiries and reports, the IBQC has arrived at a Framework of Elements that it regards as a good practice regulatory framework for building product performance.

4.2 Not all elements of the Framework can necessarily be applied by all jurisdictions having regard to their governance configuration, resource capacity and/or administrative capabilities, however, the central construct is a system that has a legislative framework which provides for:

9 Ann Marucheck et al, 'Product safety and security in the global supply chain: Issues, challenges and research opportunities,' (2011) 29 (7-8) *Journal of Operations Management 707*, accessed at <https://www.sciencedirect.com/science/article/abs/pii/S0272696311000945>.

10 International Building Quality Centre, IBQC Principles for Good Practice Building Regulation (Report No 1, September 2020), available at <http://www.ibqc.org.au/wp-content/uploads/2020/09/IBQC-Principles-for-Good-Practice-Building-Regulation.pdf>.

11 IBQC-Building-Product-Performance-Part-1-2022.04-FINAL.pdf

- Administrative arrangements relating to governance, roles and responsibilities, monitoring and compliance, education and training, and information requirements.
- Processes for testing, inspection, certification and the traceability of products and their documentation.
- Assessment option pathways.

4.3 In this way the elements of the Framework that can have the most benefit for a jurisdiction could be adopted from the suite of measures identified.

4.4 The Framework elements are not arranged by priority, but rather a sequential order of steps. A good practice regulatory system, however, will benefit from having all features of the Framework covered in some shape or form.

4.5 It is important to note the elements represent the features of the Framework at a relatively high level, meaning that a significant level of detail will be involved in their application. This includes how they are integrated within a jurisdiction's system of governance and how they operate inter-dependently.

Governance

Element 1: *To operate efficiently and cost effectively, the Framework should ideally be employed at a national level. In the case of countries with federal systems of government, at a minimum the Framework should be consistent amongst jurisdictions within a country, including a mechanism to enable the sharing of information amongst regulators.*

Put simply, the movement of building products within countries requires a consistent national approach to their regulation. Whilst these products or their components may originate from many international sources, once within a country the system of tracking their movement, understanding their credentials, knowing where they have been used and being aware of issues that may arise will benefit most from being national in scope. This may be easier to achieve in a centralised form of government, but does not detract from its importance in a federal or devolved system of administration.

Once within countries, products are readily moved across geo-political borders that may exist at different levels of government; they are increasingly part of global supply chains and manufactured by multi-national corporations that look for the consistency of regulation within the jurisdictions in which they operate; and they will be used by practitioners who move across borders and regions with a justifiable expectation that the products are permitted to be used nationally.

Conversely, if there is sound regulatory reason to limit or prevent the use of a building product, and possibly recall or rectify its use, this will best be achieved through a national arrangement rather than jurisdiction by jurisdiction.

Element 2: *The Framework needs to be implemented in a manner that will not adversely affect competition between the manufacturers of products. This Framework should enable a "level playing field" in which all manufacturers are required to disclose information to enable adequate assessment of their claims; ensuring that technical codes and standards do not specify proprietary products, techniques, solutions or the like; and that mechanisms for the development of standards and codes are not compromised by commercial interest.*

The nature of constructing buildings is such that there are many thousands of products involved, a majority of which will have competitors in the marketplace. This is to be encouraged to avoid monopolistic and therefore predatory behaviours, as well as operate within the norms of established mechanisms for fair trade. Further, large numbers of these products will be sourced from different manufacturers, yet when assembled as part of a building, involve important interdependencies.

For practical administrative reasons, the systems for governing how these products are selected places significant responsibility in the hands of building practitioners[12] who need access to reliable, and what will in many cases be, technically complex information.

To remain cost effective and efficient, these governance systems need to provide for different pathways to establish product compliance with the technical regulation. At the same time, however, it is critical for these systems to explicitly provide for a regime where one manufacturer cannot gain an unfair advantage or achieve a pathway for inferior products through inappropriate application of the technical requirements.

Element 3: *Central to an effective and credible product performance framework is a rigorous, testing, inspection and certification (TIC) infrastructure, which as a best practice, should fully utilize the standards included in ISO's Committee on Conformity Assessment (CASCO) Toolbox.*[13]

a) *Within this infrastructure, a conformity assessment body (CAB) is an independent entity that evaluates a building product or system for compliance with recognized consensus standards or technical regulations. CABs need to be accredited by an accreditation body that is recognized by the International Accreditation Forum (IAF) to the ISO/IEC 17065 standard, which sets forth requirements for bodies certifying products, processes and services. CABs also need to be subject to ongoing monitoring and auditing by the recognized accreditation body to ensure they are acting ethically and independently from their manufacturing clients.*

b) *In those jurisdictions whose experience of building product conformance has been, or is suspected of being, the subject of inadequate scrutiny or systematic abuse, even where some or all of the TIC infrastructure exists, a further safeguard, such as the establishment of an independent technical group (ITG) for building product performance, might be considered. This entity's unaffiliated technical experts could:*

   - *determine or advise governments/regulators if products should be subject to mandatory certification;*
   - *define and scope the parameters for compliance of innovative building products and systems that do not adhere to an existing recognized consensus standard, for which CABs would then conduct assessment for certification; and*
   - *provide a range of advice to government, other regulators, building practitioners, manufacturers/ suppliers and CABs.*

The TIC infrastructure operates to verify claims made by product manufacturers, enable those supplying the market to demonstrate that a product is fit to use for an intended purpose, provide documentation to enable building practitioners to satisfy themselves a product has evidence that it is suitable for a particular application, and provides an evidence trail for regulators and scheme owners to follow when conducting audits.

To ensure confidence in the rigor, authenticity and accuracy of product certificates issued against a recognized standard, certificates need to be prepared by CABs, for which the ISO/IEC 17065 standard is internationally recognized for this purpose. This may be augmented through the requirements of a third-party certification scheme that has been properly endorsed and has legitimacy through regulation.

An ITG, in the context of this Framework, is an independent group of technically competent advisors, appointed by a government or a regulator, to define risk parameters related to innovative building products

12 Whilst titles that describe building practitioners may vary, they are typically those involved in the design of buildings, the specification of products, builders and installers. Depending on the jurisdiction, it may also involve those who have the authority to approve plans.

13 ISO - ISO/CASCO - Committee on conformity assessment

and make determinations as to the scope of evaluation and peer review a draft certificate.[14] An ITG should be subject to oversight by a government or independent organization with the power to withdraw its authority if the group fails to act appropriately. It could function as an extension in scope to an existing government entity.

In some jurisdictions, accredited CABs may exist that can also perform the work of an ITG. In the case of a single organization performing both types of work, a delineation should exist between the technical advisory and conformity assessment work for the prevention of any conflict of interest.

Evidence of Suitability

Element 4: *Applicable building codes or building legislation should expressly state that all building products must be fit to use for their intended purpose. This should be demonstrated to the designer, building consent authority, regulatory authorities having jurisdiction, builder and consumer through the provision of documentary evidence that a product is suitable ("evidence of suitability").*[15]

Noting the volume and diversity of products used in buildings, where construction often operates in an open process of production, the system of governance needs to establish as an overarching principle, a legislative mechanism that mandates the need for a manufacturer/supplier to produce, and a building practitioner or end user to procure, an acceptable form of evidence that a product is fit to be used for its intended purpose.

At the same time, given the level of innovation that occurs in bringing new products into the market, where regulation will not be able to maintain pace with the rate of change, a pathway needs to exist whereby an alternative form of rigorous evidence can be developed to demonstrate, in circumstances to be specified, that a product satisfies the technical requirements of a jurisdiction's building code and referenced standards, and is fit for purpose.

Element 5: *The Framework envisages two options for determining evidence of suitability. This approach provides for rigour and transparency in establishing that a product is fit to use for its intended purpose. Notably, for those jurisdictions that elect to use the two options, there is provision for a mandatory certification mechanism for some products. The two options are as follows:*

a) *Providing proof of compliance to a recognized consensus standard(s) when one exists.*

b) *For cases in which a building product does not fully adhere to a recognized consensus standard(s), suitability can be demonstrated thr*ough:

   i. evaluation and certification by a CAB to the requirements of a jurisdiction's building code; or

   ii. risk assessment by an ITG to determine if the product belongs in a category for which a test standard is required.

The two options for determining evidence of suitability are illustrated schematically in Appendix 2 and set out below.

Option a) – A recognized standard(s) exists

Element 6: *Product suitability can be demonstrated through evaluating its performance based on an appropriately recognized consensus standard(s) referenced in a building jurisdiction's technical regulations. This may be augmented in some jurisdictions by government or third-party product certification scheme(s) accredited or endorsed by an independent accreditation entity recognized by the International Accreditation Forum (IAF).*

---

14 An example of this can be found as part of the WaterMark Certification Scheme, where the WaterMark Administrator, as Scheme owner, operates a technical advisory panel.

15 Evidence if suitability means a product has evidentiary documentation of having been assessed through an appropriately recognized process as being safe and compliant with any applicable standard or other normative document where no standard exists.

One means of demonstrating product compliance with the requirements of building regulations can be through a prescribed and relevant consensus technical standard against which a product's attributes and claims can be determined as meeting the documented specification. This will involve associated testing where prescribed. For this process to be legitimate in purely performance-based regimes, the standard will need to be recognized and referenced in legislation by the regulating jurisdiction.

Some jurisdictions may also choose to operate and/or recognize third-party product certification schemes that are appropriately authorized to provide additional oversight of certain product categories, where established standards are the means by which compliance is demonstrated. In such circumstance, accredited CABs still perform the process of evaluating products for certification, but in accordance with scheme rules and with a Mark of conformity provided by the scheme owner.

Where a recognized consensus standard does not exist, a product manufacturer may seek to have normative criteria independently developed for the purpose of testing and evaluating an innovative product, akin to a European Assessment Document.[16] Development of this normative criteria could be by either a technically-competent CAB or internationally recognized and reputable standards writing body, which will establish the performance and purpose of the product having regard to its intended application. The normative document would be submitted for consideration by a jurisdictional regulator or where established, an ITG, to determine its adequacy.

The normative criteria would be subject to the rigors expected in any process of standards development to achieve an outcome equivalent to *Element 6* and if accepted, the product would be tested and certified as per *Elements 8 and 9*.

Element 7: *Such recognized consensus standard(s), including any tests to be relied upon, shall be the subject of rigorous analysis and review to ensure that performance can replicate the types of conditions a product will likely be exposed to in its actual application and the results transparently reported.*

A prescribed technical standard, which should be allowed to be developed by both national and internationally recognized standards development organisations, will need to demonstrate to the regulating jurisdiction that it satisfies a range of critical criteria, such as not being anti-competitive, has had broad industry input, followed a proper process of due diligence and impact analysis.

Whilst a standard that prescribes a test can't anticipate and therefore replicate every application a product may be used for in a building, the test should reasonably be able to demonstrate performance for the types of conditions a product is likely to experience and for which the manufacturer is intending to make claims.

Element 8: *Testing of products will be conducted by test laboratories accredited to ISO/IEC 17025 by an independent and duly authorised accreditation entity recognized by the International Laboratory Accreditation Cooperation (ILAC), which has responsibility to accredit, audit and instruct test laboratories.*

To ensure confidence in the rigor, authenticity and accuracy of test results conducted for building products, tests need to be conducted by laboratories that have been properly accredited, for which ISO/IEC 17025 is internationally recognized for this purpose.

Element 9: *Product performance certified against a recognized international standard should be conducted by a Conformity Assessment Body (CAB), accredited to ISO/IEC 17065 by an independent accreditation entity recognized by the IAF. This entity will have responsibility to accredit, audit and instruct CABs.*

16 European assessment documents and European technical assessments (europa.eu)

To ensure confidence in the rigor, authenticity and accuracy of product certificates issued against a recognized standard, certificates need to be prepared by accredited CABs, for which ISO/IEC 17065 is internationally recognized for this purpose.

This process, including that of testing, can occur either directly in response to the evidence of suitability requirements of technical building regulations, or where established, in accordance with an endorsed product certification scheme authorized by regulators and/or established by government(s) or industry third parties where an unaffiliated status can be clearly demonstrated.

Option b) i. – CAB Evaluation

Element 10: *In the absence of full adherence to any appropriately recognized consensus standard, an innovative product will be evaluated by a CAB to determine the criteria against which it needs to be judged and subsequent assessment for certification in order to establish if it is fit to be used for its intended application and under what conditions.*

Product innovation is an on-going process and one that often occurs in response to new technical regulations or an increase in stringency, such as for fire, structure or energy efficiency in buildings. The increasing complexity of buildings and the inter-dependence of the systems that operate within them also creates situations where new products are introduced for which there are no established standards against which they can be assessed.

Building codes and endorsed product certification schemes may limit the potential for these products to be used until such time that a reliable standard is available against which it can be tested and assessed. A more common approach, however, is for building codes and associated regulation to allow for product innovation by subjecting an innovative product to independent analysis to determine that it is fit to be used for its intended purpose and against which provisions of the code it is assessed as performing to. This process, which needs to result in some form of evidence determined by an independent body, will also typically involve limitations as to the applications in which the product can be used.

The mechanism for conducting this exercise is set out in the CASCO Toolbox[17] and should be performed by a CAB consistent with the scope of its accreditation, which should also have in place quality assurance practices, including peer review.

Option b) ii. – ITG Risk Assessment

Element 11: *Where, in jurisdictions that elect to establish an ITG for building product performance, an innovative product for which there is no appropriately recognized consensus standard could be subject to an assessment of building occupant and public risk relating to fire, structural and environmental hazard properties. The ITG would determine the scope of the required testing based on risk assessment, including not only how and what the product is made of, but also its intended application.*

a) *Where the risk assessment mandates a comprehensive testing and certification process as determined by the ITG, this will be managed by a CAB, with testing to be conducted by an accredited test laboratory in accordance with Element 8 to a standard or normative criteria described in Elements 6 and 7. The CAB will issue a certificate in a prescribed form. If a certificate is obtained, that product will carry a recognized Mark and should be the subject of regulated mandatory acceptance by the authority having jurisdiction (AHJ).*

17 ISO - ISO/CASCO - Committee on conformity assessment

b) *If the risk assessment does not warrant a comprehensive testing process, as determined by the ITG, a certificate that documents how the product fulfils the requirements of the building code and the basis upon which it is given can be accepted by the AHJ as a form of evidence of suitability, if prepared by a CAB or suitably qualified person(s) recognized by the jurisdiction.*

In some jurisdictions, including those that employ the CASCO Toolbox, problems associated with non-conforming building products and/or the misuse of products has given rise to the need to consider additional safeguards. This situation can in part be attributed to the construction of buildings being an open system of production (see *Element 18*), combined with a mixture of:

- accountability being spread among many actors within the regulatory system;
- governance arrangements involving a high level of de-regulation;
- technical regulation being outcomes-based;
- the building approval process being largely outsourced to third parties; or
- low levels of compliance checking or reliance on self-certification.

A mandatory system for assessing the suitability of all building products presents significant challenges, including one of practicality given the number of products that go into the construction of buildings. One approach to overcome this could involve unique and innovative products not covered by a technical standard needing to be the subject of an assessment for risks relating to fire, structural and environmental hazard properties.

This acknowledges the greatest risk to the safety and health of building occupants and the need to stay within practical limits so as not to overwhelm any administrative system.

The risk assessment would be conducted by an ITG comprising unaffiliated technical experts, ideally established under national laws for this and other purposes. Testing may be required to establish the level of risk, which needs to consider both product characteristics and building application.

Through this process, where a risk assessment identifies the need for comprehensive testing and certification as determined by the ITG, this will be managed by a CAB, with testing to be conducted by an accredited test laboratory in accordance with *Element 8*.

If the risk assessment does not warrant a comprehensive testing process, as determined by the ITG, a certificate that documents how the product fulfils the requirements of the building code and the basis upon which it is given can be accepted by the AHJ as a form of evidence of suitability, if prepared by a CAB or suitably qualified entity recognized by the jurisdiction.

The intention here is to ensure that innovative products are the subject of assessment using the technical standards infrastructure of CASCO, in the absence of a specified product or testing standard. This includes the use of CABs in conducting product certification, with testing undertaken using the rigor expected of a product test to a specified standard.

In addition, in order to reduce the regulatory burden of this process, it is not necessary for the ITG of one jurisdiction to repeat the same exercise where it has been conducted by a comparable ITG in another jurisdiction (i.e. mutual recognition).

The ITG can review the assessment for documentary adequacy and through this process determine the application of a recognized Mark; however, the CAB is responsible for the accuracy of claims made in any certificate issued.

Importantly, given the mandatory nature of this process and the significant steps that will have been undertaken, it is appropriate that the resultant certificate (assuming one is issued) be the subject of regulation that mandates acceptance by an AHJ within any limitations of use that may be specified.

Batch Testing, Sample Testing and Re-testing For All Products

Element 12: *Any product that is the subject of a certificate should undergo periodic batch and sample inspection by the responsible CAB, with a maximum period set for re-certification. Places of manufacture should also be the subject of random audit. These requirements can be mandated by governments or set out through the rules contained within product certification schemes accredited or endorsed by an independent accreditation entity recognized by the International Accreditation Forum (IAF).*

As part of good regulatory practice and in acknowledgement that technical regulation may change over time, certificates need to be routinely reviewed to ensure they reflect contemporary requirements and renewed no less than five years after their original date of issue.

In the interim, products that have been certified should be subjected to periodic inspection to ensure they remain representative of the original product prototype that was tested and against which the certificate was issued. This period can be specified in technical regulations or product certification schemes where they exist. This can occur at the point of manufacture or other strategic points in the supply chain and be performed by the CAB, regulators or other persons authorised in regulation.

Element 13: *The CAB responsible for certification will decide if, as a result of re-design, changes to material inputs or the like, the product should be the subject of re-testing, re-certification and place of manufacture inspection.*

When a product is the subject of re-design or some form of material change, it is necessary for it to be re-evaluated by the CAB that issued the original compliance certificate for the purpose of re-certification. At this point it is also important for the place of manufacture to be inspected to ensure actual product compliance and replication.

In order for this practice to work effectively, it needs to be a requirement of holding a certificate, which can be an arrangement specified by the CAB or through the rules of a product certification scheme where they exist, for certificate holders to notify the CAB when a change occurs.

Product Identification and Documentation

Element 14: *Acting in accordance with national consumer protection laws, manufacturer and supplier product marketing material will only use verifiable documentary evidence relevant to the claims being made for a particular product.*

It is essential that the marketing claims and materials used by manufacturers to promote their products accurately reflect the outcomes of any tests and certification to which their products have been subjected. The principles of international consumer laws operate on the expectation that consumers are not misled or deceived in the use of any type of product. Building products should be no different, where accuracy in describing how a product will perform and in what circumstances it is fit to be used need to be authentically represented and capable of being verified by consumer protection authorities.

Element 15: *Where a product is the subject of certification by a CAB, that body will be responsible for ensuring a manufacturer's labelling, marketing and advertising claims are accurate. Where products have been subjected to this process, the independent accreditation entity recognized by the IAF and/or scheme owners will be responsible for auditing this function of CABs.*

One of the functions of a CAB (or endorsed third-party certification scheme) will be to ensure the marketing claims and materials used by manufacturers to promote their products accurately reflect the outcomes of any tests and certification to which their products have been subjected. Where the CAB finds this not to be the case it will both seek redress by the manufacturer and notify the regulator, scheme owner, or ITG where relevant, which can suspend any certificate until the necessary changes have been made.

In all other circumstances it will be the responsibility of consumer protection authorities, building authorities or potentially in the case where an ITG has been established, for these bodies to monitor such claims.

Element 16: *Documentation in the form of a product technical sheet (PTS) will be provided by the manufacturer, supplier or distributor. The PTS will at a minimum, provide transparency as to the performance characteristics of a product, including its durability; enable appropriate specification for application of the product at the design stage; provide for the identification at the approval and goods receipt stage; support compliant installation that will optimise the products performance and not void any warranties; and contain maintenance and replacement life details.*

Building practitioners need to be able to easily identify how a product will perform in different circumstances, how it meets technical requirements, conditions of use and what the characteristics of a product are. This information can be conveyed in a PTS that accompanies a product along with its label, installation specifications and any warranty materials.

A PTS needs to be digitally available for those who are undertaking product specification and approval, since at this point they will not have access to the product. The documentation of a product's durability characteristics is particularly important as this will be influential in the choice of products in certain circumstances. At point of delivery, those responsible for receiving products need to be able to see the PTS as an additional form of product identification, and for those installing, to have access to any important information relevant for installation.

Element 17: *Test results, certificates issued, as well as historic records of products previously issued with certificates that applied at a point in time, will be submitted to and made publicly available on a database administered either by a jurisdictions' regulator or where established, an ITG.*

Depending on which pathway for establishing compliance is used and the construct of building product regulation within a jurisdiction, product data in the form of certificates, test reports and other information relevant for establishing compliance may be held by more than one regulatory entity. The preference, however, is for there to be a single source of truth, even if the information is reproduced by others.

This information needs to be publicly available, including test results and historic records that apply to products at an earlier point in time that may remain in use or are still circulating in the supply chain after manufacture has ceased. It should not, however, include material that is business confidential and provided to the CAB to ensure accurate assessment. This material will need to be accessible by auditors if requested.

Supply chain responsibility

Element 18: *All those engaged in the product supply chain will be capable of being held accountable for their responsibilities in the specification, approval, supply and installation of building products. This will include a requirement that all participants have a duty to ensure that the relevant PTS be provided with each product as it moves along the supply chain. Where a manufacturer is located overseas, the local supplier and/or distributor will be held accountable as if they are the manufacturer.*

Product liability chain of custody obligations are not a new concept or unique to building, being a principle that features generally in consumer laws. Adapting this concept beyond manufacturers, suppliers and distributors to

all actors in both the supply, specification, procurement, approval and installation of products may, however, be somewhat novel for the building sector. Nonetheless, its application to this sector should acknowledge some of the features unique to the processes of construction, which is typically an open system of production.

This involves multiple parties, often where it is difficult to identify a single point of ownership and responsibility for decision making; where there can be overlapping points of product handling; where material selection is a complex process of aligning evidence of a product's suitability with its actual application, which may vary in circumstance to those for which it was tested; and where products, components and materials come from multiple sources to be assembled on-site outside of a strict quality control system that might be observed as part of assembly within a factory.[18]

Given the array of actors and the multiple points of decision making in the process of constructing a building, it is important that everyone who has a role in product supply, procurement, approval and installation understands they have a responsibility. This includes where a conforming product is substituted with a non-conforming alternative by a developer seeking to reduce costs, in which instance the manufacturer and specifier have played no part.

Some parties will potentially operate beyond the legal reach of the domestic regulatory jurisdiction, however, in these circumstances there will be a local actor, such as a supplier, wholesaler or distributor who will have facilitated the importation of a product, who should under the law, be treated as the equivalent of the manufacturer for this purpose.

In contemporary society an increasing number of consumable building products are being purchased directly by consumers either for use as part of 'do it yourself projects' or where the expectation is that a building practitioner will use them in the project they have been commissioned to construct. Whilst this will require a more sophisticated approach to enforcement, there are still key actors involved who should be capable of being held to account for ensuring products are fit for use, including the importer, distributor, wholesaler and builder. Education of consumers is also important and there may be capacity in some circumstances to also hold them accountable in the chain of custody.

The intention with chain of custody legislation is to cultivate a behaviour amongst all those involved in the supply, selection and installation of products to ensure they are fit for use and therefore protect the public interest. Where this does not occur, there should be consequences.

Product Traceability

Element 19: *At a minimum, all products used in a building that perform a health and safety function or have been the subject of a high-risk assessment by an ITG where established, must have the PTS digitally provided to future building owners.*

Buildings are the sum of their parts, where some are critical in their own right or in the relationship they have with other features of the building. This is particularly the case for those products that through the risk assessment process at *Element 11* have been judged to have important fire, structural or environmental hazard properties.

At a minimum, the technical information relating to the durability, maintenance and replacement regimes for these products, which may form part of critical life safety systems, should be passed onto future owners in the form of a digital manual.

---

18 This is different in the case of off-site construction involving pre-fabrication of modules or whole buildings, which is considered to be a closed system of production.

Element 20: *Internationally accepted and standardised digital product conformance ('passport') and traceability ('internet of things') technology will be used to enable:*

a) *practitioners to verify a product's certification credentials and performance claims for its intended application(s) for specification and approval, and subsequently integrated into manuals for completed buildings with a specified risk classification (a golden thread of information).*

b) *ease of verifying a product's provenance throughout its supply to site and installation.*

Whilst still evolving and inevitably subject to a process of continuous improvement, digital technology is key to managing an effective building product conformance regime going forward. Aspects of this type of technology already exist and it is not necessarily a case of regulating a specific form of technology, but rather what it must be capable of delivering, along with both its level of accessibility, reliability and ability to be interrogated by regulatory authorities.

Digital technology has the capability to be deployed at all points in the supply chain, from encryption of product labelling through to tracking of smart containers in which products are assigned. These technologies give rise to the use of terms such as product passports that help enable their movement across borders, through to digital fingerprints that provide a point of authenticating a product is what it says it is.

Critical in the supply of materials, including building products, is not only the ability to validate a product, but access its documentation. Technology that enables this to occur throughout the supply chain provides the means to link a products documentation with its provenance, movement and digital authenticity.[19]

As many building products are part of a global supply chain, it will be important to select technologies that form part of international arrangements between authorities and can seamlessly trace the movement of products across multiple jurisdictions.

Embedding the use of technology as a means of helping regulators and practitioners establish confidence that products are what they claim to be and are the goods specified, is a critical part of eradicating non-conforming products and creating a level playing field for product manufacturers doing the right thing.

Increasingly, governments and consumers are also interested in the carbon footprint of products, systems and buildings. Whilst this Farmwork is focused on conformity with technical standards that regulate life safety properties, the digital approach proposed in this element could also capture information about the embodied carbon of individual products and systems as this information becomes available across the market.

Roles and responsibilities of building practitioners

Element 21: *All practitioners involved in specifying, approving, supervising the receipt of and installing building products must be able to demonstrate a minimum level of competency set by the authority having jurisdiction for the purpose of obtaining and renewing their licence to practice. This needs to include an understanding of their duties and the exercise of judgement that includes protecting the public interest.*

Minimum competencies for practitioners involved at various points from design to the installation of products, need to be competent for their part in specifying and constructing buildings in order to maximise product compliance. This is most appropriately achieved as part of practitioner registration by regulators, which needs to be complemented by effective education and training as per *Elements 29 to 31*.

19 WP-DigitalProductConformity-CertificateExchange.pdf

A necessary part of testing for competence is a demonstration that practitioners are fully conversant with all of their duties of responsibility, which extend beyond their client, as well as how to exercise appropriate levels of judgement in the selection of products having regard to a range of potential applications.

Element 22: *Practitioners specifying a product as part of the design must be familiar with the relevant testing guidance and its underlying principles; check that the products being specified have appropriate test certificates or reports, which are credibly applicable to the envisaged end use condition; and communicate with the rest of the design team about possible pitfalls when specifying a product. This can be further enabled by requiring the team of design practitioners to conduct a secondary review of plans internally prior to seeking building approval, to ensure all key product requirements have been considered as part of the design process.*

As part of their competency and through the training they receive, including on-going professional development, practitioners should be familiar with and capable of understanding what materials need to be sighted and the claims made in order to reach decisions about their use against the technical requirements.

Whilst not necessarily a mandatory requirement, as is the case with other aspects of building design, product selection and verification of fitness for purpose can be enhanced by the team involved in the plan design process also reviewing product selection and the associated documentation as a form of peer review. In those circumstances where a building regulatory system includes mandatory peer review of plan design for certain classes of buildings, product verification should be picked up at this point.

Element 23: *Practitioners accepting a product for use on a construction site must be able to identify suitable documentation to satisfy themselves that the product is identical to what has been specified and approved, and where the product has become unavailable or too expensive, that any alternative has been through the relevant steps of the Framework to satisfy its fitness for purpose and is approved by the authority having jurisdiction.*

Related to evidence of suitability and product documentation, practitioners involved in choosing, approving and installing products should have the competence to examine product information, discern supplied identification and distinguish limitations so as to ensure correct product selection and application.

When faced with the unavailability of a product or the need to reduce costs to meet budget, the practitioners involved in product selection (and clients if they are involved) need to follow the same process on each occasion in the identification of alternatives to satisfy themselves that products are fit for use with their intended purpose and carry the necessary documentation to support their claims. Anyone involved in accepting substitutions should be accountable for this practice. Further, there needs to be a robust practice for updating specifications and other approved documentation to ensure that any substitution is reflected in records of what has been built at the time the building work is completed.

Element 24: *Practitioners involved in handling and fitting products must have knowledge of the manufacturers' specifications and be trained in their installation. Manufacturers should be proactive in ensuring proper installation through the creation of clear manuals, training, installation services and/or onsite inspection to ensure the proper installation of their products.*

It is incumbent upon those who are installing products to be fully conversant with a manufacturer's specifications for installation in order to achieve optimal performance and avoid compromising either the product or building of which it is to form a part. This will also help ensure a product achieves its design life and limit the potential for warranties to be voided. Manufacturers have a role to play in implementing this element. They should have a strong interest in how their products are installed to enable them to achieve compliance.

Compliance

Element 25: *Governments must take steps to ensure that regulating jurisdictions have or can access adequate resources to monitor/inspect and enforce compliance with the codes, standards and legislative provisions.*

A regulatory system can only be effective if it is adequately resourced to enable inspection, evaluation and enforcement. Leaving this responsibility to self-assessment is not considered acceptable practice and regulators should have both monitoring capabilities to audit compliance, as well as the capacity to conduct inspection and enforcement.

The sophistication of any system of monitoring and compliance will vary according to the resources of jurisdictions, but there needs to be a commitment to both legislate and enforce if a culture of discouraging bad practice, and reward for good practice, is to be achieved.

The enacted legislation should also provide the regulator with provisions that enable it to accomplish its task, including a funding mechanism (which could include the assessment of fees for regulatory services), whilst providing all of the necessary checks and balances in the system for proper processes to be followed.

This needs to be complemented by the oversight responsibilities of international accreditation bodies at *Elements 8 and 9* and product certification scheme owners to ensure the test laboratories, CABs and certificate owners are complying with their responsibilities.

Element 26: *Legislative provisions should be enacted to provide the building regulator with the powers to compel the provision of prescribed information, issue fines and conduct disciplinary and/or criminal proceedings, including:*

a) *director liabilities for non-compliance*
b) *imprisonment where breaches result in injury or loss of life*
c) *financial and/or administrative penalties sufficient to deter unethical conduct*
d) *stringent penalties, including loss of accreditation, for false certification by accredited bodies*

A key component of the legislative framework for building products that will enable a regulator to accomplish its tasks involves the ability to gather evidence and pursue actions against those identified as being responsible for non-compliance. This should not be limited to one option, which can have the perverse effect of influencing the behaviour of the regulator to be unduly severe or not to act as the punishment may be deemed unnecessarily harsh for the observed indiscretion.

The purpose here is to help institute a culture of ethical behaviour within the industry, which is facilitated not only through the threat of legal remedies for non-compliance, but education, training, licensing and clearly articulating accountabilities.

Element 27: *Legislative provisions should be enacted to provide the building regulator or authority having jurisdiction with the powers to inspect products at any point in the supply chain.*

There are multiple points in the supply chain where it may be possible to observe the entry of non-conforming products and/or the non-compliant use of products. Depending on where, this may involve agencies with different legislative powers and responsibilities, particularly as it relates to products moving across international borders.

Within a jurisdiction, however, and having regard to *Element 19*, a building regulator can establish a product is non-conforming at a number of points in the domestic supply chain and hold those involved in its distribution and disclosures accountable as if they were responsible for the product's manufacture.

Element 28: *Legislative provisions should be enacted to provide the building product regulator or other relevant authorities with jurisdiction, with the powers to recall and ban products found to be unfit for purpose.*

Upon establishing that a product is non-conforming or in some way represents a risk to public health and safety, the building product regulator (potentially on the advice of an ITG where established), or where they exist other authorities that have the appropriate jurisdiction, should have the powers necessary to recall or ban that product's availability in the market.

Such powers need to be exercised with a high degree of caution and appropriate process to ensure that both duty of care and procedural fairness are embraced as principles of practice.

Education

Element 29: *Building code provisions and legislation on the subject of building product performance should be accompanied by informative guidance material that assists all involved in understanding the elements of the system, what is expected of each participant, through to explaining the intent and definitions of particular terms.*

The laws that oversight building regulation and the technical provisions that accompany them are complex and substantial. Building product performance, which in turn relates to compliance with specified requirements, is a subset of a much broader regulatory environment.

It is incumbent upon all those involved in product selection, procurement, installation and maintenance to be suitably trained and skilled for the roles they perform. It is also essential that those responsible for the design and administration of the system governing building products to ensure all reasonable steps are taken to provide those participants with easy access to and useful information to enable them to properly understand the system and its expectations.

Element 30: *Guidance and training should be developed for manufacturers and suppliers as to the requirements of the product compliance regime; and separately for those involved in the specification, approval and installation of products (including by manufacturers and suppliers of products, particularly those with a high-risk assessment).*

Training associated with the use of building products needs to be multi-dimensional. It should cover the needs of both licensed and unlicensed building practitioners to understand the regulatory system, their responsibilities and the tools in place to assist them in product selection. This should include guidance on ethical behaviour and the roles of other actors.

Product manufacturers and suppliers also need to be trained in understanding the regulatory system(s) their products are subject to, their responsibilities and the means by which their products can establish evidence that they are fit for purpose.

There should also be an expectation of product manufacturers and suppliers to ensure those involved in distributing their products are suitably knowledgeable in their application and the circumstances in which they should not be used, as well as providing those responsible for installation of their products with appropriate training for this purpose (see *Element 24*).

Element 31: *Curriculum, including accredited continuing professional development courses, should be developed for all practitioners involved in selecting, specifying and handling products as part of their work. The curriculum should include content as to how the system of product assurance operates, practical case studies of product categories, what is expected of them in exercising their judgement, specifying and handling products, what tools are available to assist them and their duties.*

As part of educating practitioners who may be involved in the selection of products in construction and those likely to participate in their handling, the curriculum needs to include content that makes clear how the system of product regulation and the technical requirements operates. Whilst practitioners may move between jurisdictions with nuances in their systems, their exposure to this fundamental feature of good building practice should alert them to the basic principles and the need to familiarise themselves with any possible local variations.

The curriculum needs to include how to exercise judgement, which involves an understanding of ethical behaviour and being mindful of the public interest, as well as the tools that should be in existence to assist practitioners in product selection and installation as described in other parts of the Framework.

4.6 In recognition that the Elements are presented at a high level and need to be adapted to the circumstances of individual jurisdictions, several notes are provided here to provide some important clarifications:

Note 1: Products include systems or assembly of components, including modular construction, where the 'whole' needs to be able to demonstrate evidence of suitability, including for critical parts that may have a high-risk assessment.

Note 2: Under the Framework there are essentially two options for establishing evidence of suitability, depending on the existence of an established standard and risk assessment. This is schematically illustrated in Appendix 2.

Note 3: The work of testing laboratories and CABs operates under a fee for service arrangement by companies seeking testing and certification of their products. At the discretion of a jurisdiction's government, the activities of an ITG can be funded by appropriation from the budget, on a fee for service basis, a cost recovery royalty arrangement through either CAB licenses or certificates issued to clients, or a combination of these.

Note 4: The criteria for fire, structural and environmental hazard properties risks need to be specified and terms such as risk assessment, suitably qualified person, etc, will need to be defined. It can be anticipated that if a body equivalent to an ITG were to be established, this process would become more sophisticated over time, including the potential grouping of product types.

Note 5: Several features require detailed administrative arrangements that need to be developed and tailored to the arrangements of particular jurisdictions.

Note 6: The dumping of sub-standard building products into less regulated jurisdictions is not addressed in the Framework, but needs to be considered particularly in the markets of emerging economies that may struggle with resources to fully implement all or a surrogate of the Framework's elements.

5. CASE STUDIES

5.1 The elements that feature in the Framework are derived from a range of sources, including established systems within international jurisdictions that have building laws, codes and standards that include provision for product performance; a review of some recent inquiries into the subject of building product safety; the experience of those on the IBQC working group, input from those who made submissions to the Part 1 paper and drawing on what is regarded as good practice.

5.2 In addition, principles that exist within regulatory systems for other types of products have provided useful lessons for the Framework. These are briefly covered below, but with the caveat that these cases selected are not intended to suggest this is an exclusive list or that these systems incorporate all features of good practice.

Food Products

5.3 Broadly speaking, traceability represents the means to track and identify the history, distribution, location and application of products, parts and materials; to ensure the reliability of claims made by manufacturers.

5.4 This practice has been particularly prevalent in the production and distribution of food for many decades, noting that food historically is one of the most widely traded global commodities, and the recent advent of genetically modified food has further added to the need to distinguish between these and organically grown produce.

5.5 Traceability in the food supply chain, which is not uniformly observed as being in the state it needs to be within all countries, is also an important tool in the logistical management of food, much of which is highly perishable and therefore needs to be distributed from 'farm to fork' in relatively short timeframes.

5.6 Various international standards have been developed for the evolution of internationally recognized approaches for designing food traceability systems, such as ISO 22005:2007 – Traceability in the feed and food chain, and new technologies, such as blockchain and smart tag are being evaluated for different applications[20]. Many countries also have established food regulators with the powers to inspect, recall and ban products.

Hazardous Materials

5.7 Hazardous materials clearly pose a significant health and safety risk not only to people, but to the natural environment as well. Despite their close regulation in many parts of the world, there continue to be gaps in the availability and traceability of these types of products.

5.8 In 2006 the European Commission introduced the registration, evaluation, authorization and restriction of chemicals (REACH) regulations, administered by the European Chemicals Agency.[21]

5.9 The main purpose behind the regulations is to overcome the absence of information sufficient to identify the hazard and risks of substances to enable their safe use and handling. This material is stored in a central database, which enables public access to critical information and the evaluation of suspicious chemicals.

5.10 REACH forms part of broader international efforts to restrict and eliminate the existence of hazardous materials, which involves being able to document and trace the movement of hazardous chemicals through a raft of United Nations conventions.

Modular Construction

5.11 In the construction sector, there is increasing use of off-site or modular construction, which has been the subject of oversight in the USA for many decades and more recently the development of new standards for off-site construction: planning, design, fabrication and assembly; and inspection and regulatory compliance.[22] New Zealand and the Australian jurisdiction of New South Wales have more recently developed laws which are intended to regulate off site construction.[23]

---

20 Traceability of food products: General framework and experimental evidence (2007) | Alberto Regattieri | 617 Citations (typeset.io)

21 REACH - Chemicals - Environment - European Commission (europa.eu)

22 International Code Council and Modular Building Institute Release New Standards for Off-Site Construction - ICC (iccsafe.org)

23 https://www.mbie.govt.nz/about/news/new-laws-will-support-housing-supply-and-improve-building-product-information/ and https://www.haveyoursay.nsw.gov.au/regulating-prefabricated-homes

5.12 This represents a paradigm shift in the way buildings or parts of buildings are constructed, where manufacture occurs in a factory and the module or parts are transported to site for assembly either as complete units or in modules that are added together. Other technology, such as 3D printing is also in use and no doubt other innovations for off-site construction are or will be employed in the future.

5.13 One of the benefits of this approach to the construction of buildings and the relationship to product regulation is that it increases the quality control of the components going into the production of buildings and reduces the number of overlapping processes occurring on site that require a high level of supervision. This alternative, which will not be practical in all circumstances and may only apply to parts of some buildings, enables the focus to shift to the practices of quality assurance at the point of manufacture rather than on the product.

Plumbing Products

5.14 Products associated with the distribution of drinking water represent a potentially significant health hazard if they are composed of materials that can leach toxins into the potable water supply. There are international standards that exist for both water quality and materials testing associated with plumbing systems.

5.15 In Australia these standards are strengthened further through the WaterMark plumbing product certification scheme, which is a prescriptive system that requires mandatory certification of plumbing products listed on a schedule and where a licensed plumber is only permitted to install these products where required.[24]

5.16 This system is complemented by a technical advisory committee that informs product risk assessment; a publicly available database of products that have been the subject of testing by accredited test laboratories and certified by accredited CABs, which are subject to periodic audit; product batch testing and factory inspections; random audits of product installation by plumbing regulators; education and training of licensed plumbing practitioners; and the ability to develop technical specifications for innovative products.

6. CONCLUSION

6.1 No regulatory system is perfect. To achieve the likely objective of cost effectively minimizing the risk to public safety whilst enabling the regulated sector to operate efficiently and fairly, it is necessary to see the system in its entirety and ensure appropriate checks and balances exist.

6.2 In the case of buildings, construction often takes place in an open system of production, with multiple parties involved and no single point of accountability. It is also the case that in this environment there are many different products in use, some of which do not have recognized standards or tests to be assessed against given their relative level of innovation, and others where their performance may depend on their relationship to other products and the quality of installation.

6.3 Other than restricting the use of products to only those for which there is a prescribed solution, which would still require a significant level of regulatory oversight because of the numerous combinations of components used in the construction of a building, it is necessary for the system of governing building product performance to leave the selection of products to the discretion and judgement of trained professionals having regard to the circumstances of their application.

24 What is WaterMark? | WaterMark (abcb.gov.au)

6.4 This then requires a highly sophisticated system of regulatory oversight that incorporates features to assist practitioners and consumers in the choice of products; reduces the ability of non-conforming products to enter the market; and provides for real and actionable consequences for those who might seek to abuse or disregard the system.

6.5 The Good Regulatory Practice Framework for Building Product Performance looks to address all these considerations through addressing the inter-operable processes of product supply chain and custody, and the chain of decision making and accountability.

6.6 A system being designed from the ground up will benefit from incorporating all these features, but having regard to established systems, as well as a jurisdiction's capacity and capability, it will be helpful to benchmark against critical elements to determine where the best investment can be made to enhance the use of reliable products on building sites.

INTERNATIONAL BUILDING QUALITY CENTRE

GLOSSARY AND ACRONYMS

The following terms are used in this paper with relevant links provided:

AHJ	Authority having jurisdiction to approve the specification or use of a product
CAB	conformity assessment body being an independent entity that evaluates a building product or system for compliance with recognized consensus standards or technical regulations. CABs need to be accredited by an accreditation body that is recognized by the IAF to the ISO/IEC standard 17065,
CASCO	ISO Committee for conformity assessment
CASCO Toolbox	International standards and guides used for conformity assessment
Evidence of suitability	Documentation that verifies that a product has been tested in accordance with 1 or more of the established pathways to demonstrate that the product is fit for purpose
IAF	International Accreditation Forum
ILAC	International Laboratory Accreditation Cooperation – which has responsibility to accredit, audit and regulate test laboratories
IEC	International Electrotechnical Commission
ISO	International Organization for Standardization
ISO/IEC 17025	Standard for testing and calibration laboratories
ISO/IEC 17065	Standard for conformity assessment
IBQC	International Building Quality Centre
ITG	Independent Technical Group – as proposed under *Element 11* of this Framework
Normative criteria	Criteria used to evaluate or judge something, which are rules based and enforceable
PTS	Product technical sheet – as proposed under *Element 17*
Recognized consensus standard	A technical standard that has been reviewed through a transparent consensus process and referenced in legislation by the regulating jurisdiction that establishes measures against which a product or system's attributes and claims can be tested to confirm that the product or system meets the documented specification.
Recognized Mark	A Mark or logo of conformity that appears on a certificate issued by a CAB and that a product manufacture holding a certificate from a CAB must also include on their product
TIC	Testing inspection and certification

INTERNATIONAL BUILDING QUALITY CENTRE

BIBLIOGRAPHY

Australian Building Codes Board – "What is WaterMark? | WaterMark." https://watermark.abcb.gov.au/consumers/what-watermark

Construction Products Association – "Proposed construction product competence standard – white paper." – September 2022 – https://www.constructionproducts.org.uk/publications/technical-and-regulatory/built-environment-proposed-construction-product-competence-standard-white-paper/

European Commission – Registration, Evaluation, Authorisation, and Restriction of Chemical (REACH) https://ec.europa.eu/environment/chemicals/reach/implementation_en.htm

European Commission – The European Assessment Document https://single-market-economy.ec.europa.eu/sectors/construction/construction-products-regulation-cpr/european-assessment-documents-and-european-technical-assessments_en.htm

International Building Quality Centre – "Building Product Performance Part 1- Discussion Paper." – April 2022. https://www.ibqc.org.au/wp-content/uploads/2022/04/IBQC-Building-Product-Performance-Part-1-2022.04-FINAL.pdf

International Building Quality Centre – "Building Product Performance Part1a – Supplementary Submissions Paper – January 2023. https://www.iccsafe.org/wp-content/uploads/IBQC-Building-Product-Performance-Part-1A.pdf

International Building Quality Centre – "Principles for Good Practice Building Regulation (Report No.1)." – September 2020. https://www.ibqc.org.au/wp-content/uploads/2020/09/IBQC-Principles-for-Good-Practice-Building-Regulation.pdf

International Code Council and Modular Building Institute – "Release New Standards for Off-Site Construction" – November 2021. https://www.iccsafe.org/about/periodicals-and-newsroom/international-code-council-and-modular-building-institute-release-new-standards-for-off-site-construction/

ISO/CASCO Toolbox – "Standards by ISO Committee on conformity assessment." https://www.iso.org/casco.html

Johnson, P., et al. – Warren Centre for Advanced Engineering, University of Sydney. Fire Safety Engineering – Final Report 8." 2020. https://ses.library.usyd.edu.au/handle/2123/23546

Marucheck, M., et al. – *Journal of Operations Management 707* – "Product safety and security in the global supply chain: Issues, challenges and research opportunities." 2011. https://www.sciencedirect.com/science/article/abs/pii/S0272696311000945

New South Wales Government – "Regulating pre-fabricated and manufactured homes." November 2022. https://www.haveyoursay.nsw.gov.au/regulating-prefabricated-homes

New Zealand Ministry for Business, Innovation and Employment – "New laws will support housing supply and improve building product information." – June 2022. https://www.mbie.govt.nz/about/news/new-laws-will-support-housing-supply-and-improve-building-product-information/

Regattieri, A. Gamberi, M. and Manzini, R. "Traceability of food products: General framework and experimental evidence." – 2007. https://www.sciencedirect.com/science/article/abs/pii/S0260877406006893

UNECE – "White Paper Digital Product Conformity Certificate Exchange Public Review Draft" – February 2022. https://uncefact.unece.org/display/uncefactpublicreview/Public+Review:+White+Paper+Digital+Product+Conformity++Certificate+Exchange

INTERNATIONAL BUILDING QUALITY CENTRE

APPENDIX 1

SUMMARY OF FRAMEWORK ELEMENTS

A good practice regulatory framework for building product performance has been developed that comprises *31 Elements*, which are summarised below.

The elements within the Framework are not arranged by priority, but rather represent a sequential order of steps.

Governance

1) To operate efficiently and cost effectively, the Framework should ideally be employed at a national level. In the case of countries with federal systems of government, at a minimum the Framework should be consistent amongst jurisdictions within a country, including a mechanism to enable the sharing of information amongst regulators.

2) The Framework needs to be implemented in a manner that will not adversely affect competition between the manufacturers of products. The Framework should enable a "level playing field" in which all manufacturers are required to disclose information to enable adequate assessment of their claims; ensuring that technical codes and standards do not specify proprietary products, techniques, solutions or the like; and that mechanisms for the development of standards and codes are not compromised by commercial interest.

3) Central to an effective and credible product performance framework is a rigorous, testing, inspection and certification (TIC) infrastructure, which as a best practice, should fully utilize the standards included in ISO's Committee on Conformity Assessment (CASCO) Toolbox.

    a. Within this infrastructure, a conformity assessment body (CAB) is an independent entity that evaluates a building product or system for compliance with recognized consensus standards or technical regulations. CABs need to be accredited by an accreditation body that is recognized by the International Accreditation Forum (IAF) to the ISO/IEC 17065, which sets forth requirements for bodies certifying products, processes and services. CABs also need to be subject to ongoing monitoring and auditing by the recognized accreditation body to ensure they are acting ethically and independently from their manufacturing clients.

    b. In those jurisdictions whose experience of building product conformance has been, or is suspected of being, the subject of inadequate scrutiny or systematic abuse, even where some or all of the TIC infrastructure exists, a further safeguard, such as the establishment of an independent technical group (ITG) for building product performance, might be considered. This entity's unaffiliated technical experts could:

        - determine or advise governments/regulators as to which products should be subject to mandatory certification;
        - define and scope the parameters for compliance of innovative building products and systems that do not adhere to an existing recognized consensus standard, for which CABs would then conduct assessment for certification; and
        - provide a range of advice to government, other regulators, building practitioners, manufacturers/suppliers and CABs.

Evidence of Suitability

4) Applicable building codes or building legislation should expressly state that all building products must be fit to use for their intended purpose. This should be demonstrated to the designer, building consent authority, regulatory authorities having jurisdiction, builder and consumer through the provision of documentary evidence that a product is suitable ("evidence of suitability").

5) The Framework envisages two options for determining evidence of suitability. This approach provides for rigour and transparency in establishing that a product is fit to use for its intended purpose. Notably, for those jurisdictions that elect to use the two options, there is provision for a mandatory certification mechanism for some products. The two options are as follows:

   a. Where a recognized consensus standard(s) exists.

   b. Where a building product does not fully adhere to a recognized consensus standard(s)

      i. evaluation and certification by a CAB to provide the means of demonstrating conformance to satisfy the requirements of a jurisdiction's building code; or

      ii. risk assessment by an ITG to determine if the product belongs in a category for which a test standard is required.

Option a) – A recognized standard(s) exists

6) An appropriately recognized consensus standard(s) against which a product's performance can be evaluated to demonstrate that it is fit for purpose and is referenced in a building jurisdiction's technical regulations, represents one form of evidence of suitability. This may be augmented in some jurisdictions by government or third-party product certification scheme(s) accredited or endorsed by an independent accreditation entity recognized by the IAF.

7) Such recognized consensus standard(s), including any tests to be relied upon, shall be the subject of rigorous analysis and review to ensure that performance can replicate the types of conditions a product will likely be exposed to in its actual application and the results transparently reported.

8) Testing of products will be conducted by test laboratories accredited to ISO/IEC 17025 by an independent and duly authorised accreditation entity recognized by the International Laboratory Accreditation Cooperation (ILAC), which has responsibility to accredit, audit and instruct test laboratories.

9) Product performance certified against a recognized international standard should be conducted by a Conformity Assessment Body (CAB), accredited to ISO/IEC 17065 by an independent accreditation entity recognized by the IAF. This entity will have responsibility to accredit, audit and instruct CABs.

Option b) i. – CAB Evaluation

10) In the absence of full adherence to any appropriately recognized consensus standard, an innovative product will be evaluated by a CAB to determine the criteria against which it needs to be judged and subsequent assessment for certification in order to establish if it is fit to be used for its intended application and under what conditions.

Option b) ii. – ITG Risk Assessment

11) Where, in jurisdictions that elect to establish an ITG for building product performance, an innovative product for which there is no appropriately recognized consensus standard could be subject to an assessment of building occupant and public risk relating to fire, structural and environmental hazard properties. The ITG would determine the scope of the required testing based on risk assessment, including not only how and what the product is made of, but also its intended application.

    a. Where the risk assessment mandates a comprehensive testing and certification process as determined by the ITG, this will be managed by a CAB, with testing to be conducted by an accredited test laboratory in accordance with Element 8 to a standard or normative criteria described in Elements 6 and 7. The CAB will issue a certificate in a prescribed form. If a certificate is obtained, that product will carry a recognized Mark and should be the subject of regulated mandatory acceptance by the authority having jurisdiction (AHJ).

    b. If the risk assessment does not warrant a comprehensive testing process, as determined by the ITG, a certificate that documents how the product fulfils the requirements of the building code and the basis upon which it is given, can be accepted by the AHJ as a form of evidence of suitability, if prepared by a CAB or suitably qualified person(s) recognized by the jurisdiction.

Batch testing, Sample testing and Re-testing for all products

12) Any product that is the subject of a certificate should undergo periodic batch and sample inspection by the responsible CAB, with a maximum period set for re-certification--. Places of manufacture should also be the subject of random audit. These requirements can be mandated by governments or set out through the rules contained within product certification schemes accredited or endorsed by an independent accreditation entity recognized by the International Accreditation Forum (IAF).

13) The CAB responsible for certification will decide if, as a result of re-design, changes to material inputs or the like, the product should be the subject of re-testing, re-certification and place of manufacture inspection.

Product Identification and Documentation

14) Acting in accordance with national consumer protection laws, manufacturer and supplier product marketing material will only use verifiable documentary evidence relevant to the claims being made for a particular product.

15) Where a product is the subject of certification by a CAB, that body will be responsible for ensuring a manufacturers labelling, marketing and advertising claims are accurate. Where products have been subjected to this process, the independent accreditation entity recognized by the IAF and/or scheme owners will be responsible for auditing this function of CABs.

16) Documentation in the form of a product technical sheet (PTS) will be provided by the manufacturer, supplier or distributor. The PTS will at a minimum, provide transparency as to the performance characteristics of a product, including its durability; enable appropriate specification for application of the product at the design stage; provide for the identification at the approval and goods receipt stage; support compliant installation that will optimise the products performance and not void any warranties; and contain maintenance and replacement life details.

17) Test results, certificates issued, as well as historic records of products previously issued with certificates that applied at a point in time, will be submitted to and made publicly available on a database administered either by a jurisdictions' regulator or where established, an ITG.

Supply chain responsibilities and duties

18) All those engaged in the product supply chain will be capable of being held accountable for their responsibilities in the specification, approval, supply and installation of building products. This will include a requirement for all participants to ensure that the relevant PTS be provided with each product as it moves along the supply chain. Where a manufacturer is located overseas, the local supplier and/or distributor will be held accountable as if they are the manufacturer.

Product traceability

19) At a minimum, all products used in a building that perform a health and safety function or have been the subject of a high-risk assessment by an ITG where established, must have the PTS digitally provided to future building owners.

20) Internationally accepted and standardised digital product conformance ('passport') and traceability ('internet of things') technology will be used to enable:

    a. practitioners to verify a product's certification credentials and performance claims for its intended application(s) for specification and approval, and subsequently integrated into manuals for completed buildings with a specified risk classification (a golden thread of information).

    b. ease of verifying a product's provenance throughout its supply to site and installation.

Roles and responsibility of building practitioners

21) All practitioners involved in specifying, approving, supervising the receipt of and installing building products must be able to demonstrate a minimum level of competency set by the authority having jurisdiction for the purpose of obtaining and renewing their licence to practice. This needs to include an understanding of their duties and the exercise of judgement that includes protecting the public interest.

22) Practitioners specifying a product as part of the design must be familiar with the relevant testing guidance and its underlying principles; check that the products being specified have appropriate test certificates or reports, which are credibly applicable to the envisaged end use condition; and communicate with the rest of the design team about possible pitfalls when specifying a product. This can be further enabled by requiring the team of design practitioners to conduct a secondary review of plans internally prior to seeking building approval, to ensure all key product requirements have been considered as part of the design process.

23) Practitioners accepting a product for use on a construction site must be able to identify suitable documentation to satisfy themselves that the product is identical to what has been specified and approved, and where the product has become unavailable or too expensive, that any alternative has been through the relevant steps of the Framework to satisfy its fitness for purpose and is approved by the authority having jurisdiction.

24) Practitioners involved in handling and fitting products must have knowledge of the manufacturers' specifications and be trained in their installation. Manufacturers should be proactive in ensuring proper installation through the creation of clear manuals, training, installation services and/or onsite inspection to ensure the proper installation of their products.

Compliance

25) Governments must take steps to ensure that regulating jurisdictions have or can access adequate resources to monitor/inspect and enforce compliance with the codes, standards and legislative provisions.

26) Legislative provisions should be enacted to provide the building regulator with the powers to compel the provision of prescribed information, issue fines and conduct disciplinary and/or criminal proceedings, including:
    a. director liabilities for non-compliance
    b. imprisonment where breaches result in injury or loss of life
    c. financial and/or administrative penalties sufficient to deter unethical conduct
    d. stringent penalties, including loss of accreditation, for false certification by accredited bodies

27) Legislative provisions should be enacted to provide the building regulator or authority having jurisdiction with the powers to inspect products at any point in the supply chain.

28) Legislative provisions should be enacted to provide the building product regulator or other relevant authorities with jurisdiction, with the powers to recall and ban products found to be unfit for purpose.

Education

29) Building code provisions and legislation on the subject of building product performance should be accompanied by informative guidance material that assists all involved in understanding the elements of the system, what is expected of each participant, through to explaining the intent and definitions of particular terms.

30) Guidance and training should be developed for manufacturers and suppliers as to the requirements of the product compliance regime; and separately for those involved in the specification, approval and installation of products (including by manufacturers and suppliers of products, particularly those with a high-risk assessment).

31) Curriculum, including accredited continuing professional development courses, should be developed for all practitioners involved in selecting, specifying and handling products as part of their work. The curriculum should include content as to how the system of product assurance operates, practical case studies of product categories, what is expected of them in exercising their judgement, specifying and handling products, what tools are available to assist them and their duties.

Additional Comments

Note 1: Products include systems or assembly of components, including modular construction, where the 'whole' needs to be able to demonstrate evidence of suitability, including for critical parts that may have a high-risk assessment.

Note 2: Under the Framework there are essentially two options for establishing evidence of suitability, depending on the existence of an established standard and risk assessment.

Note 3: The work of testing laboratories and CABs operates under a fee for service arrangement by companies seeking testing and certification of their products. At the discretion of a jurisdiction's government, the activities of a technical advisory body can be funded by appropriation from the budget, on a fee for service basis, a cost recovery royalty arrangement through either CAB licenses or certificates issued to clients, or a combination of these.

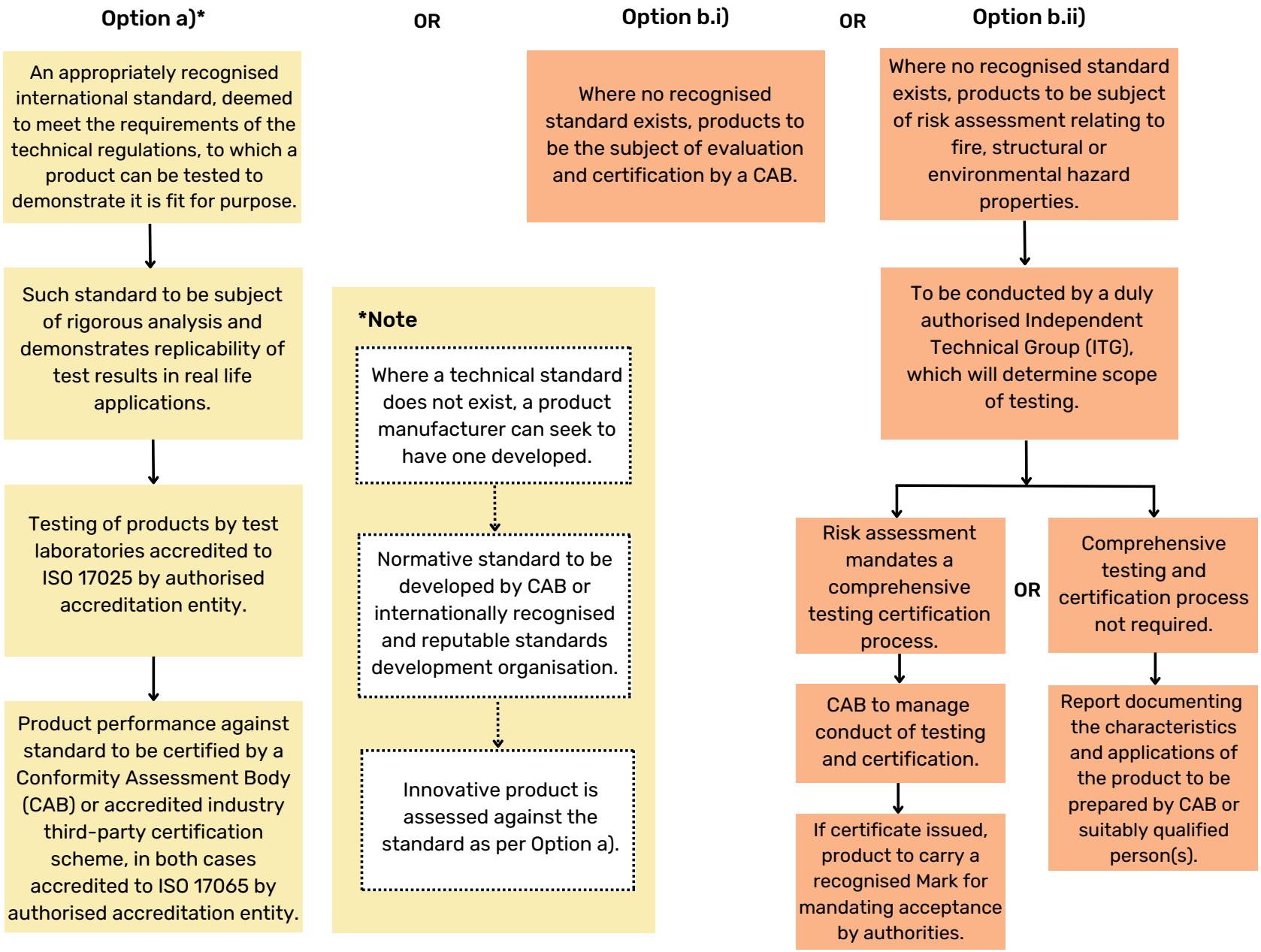
Note 4: The criteria for fire, structural and environmental hazard properties risks need to be specified and terms such as risk assessment, suitability qualified person, etc, will need to be defined. It can be anticipated that if a body equivalent to an ITG were to be established, this process would become more sophisticated over time, including the potential grouping of product types.

Note 5: Several features require detailed administrative arrangements that need to be developed and tailored to the arrangements of particular jurisdictions.

Note 6: The dumping of sub-standard building products into less regulated jurisdictions is not addressed in the Framework, but needs to be considered particularly in the markets of emerging economies that may struggle with resources to fully implement all or a surrogate of the Framework's elements.

APPENDIX 2

Options for Evidence of Suitability - Schematic



APPENDIX 3

Governance Schematic