Product conformity – a matter of trust

Empowering Trust®

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Table of contents

Introduction

A lack of confidence has plagued the Australian construction industry. Peter Shergold AC and Bronwyn Weir documented this in the seminal Building Confidence Report (BCR) at the request of federal, state and territory governments. Product conformity is often identified as one of the contributing factors.

As the Australian construction industry moves to improve confidence, UL developed this e-book to explore the components of product conformity and best practice approaches, drawing on our local and international expertise established throughout more than 125 years of testing and certifying construction products.

Education and information regarding these matters can improve understanding and shift local expectations for product acceptance, in particular, the benefits of third-party product certification as mandated and used in jurisdictions around the globe.

This e-book is for the consideration of stakeholders in the Australian construction industry, including, manufacturers and suppliers, designers, builders and installers, and authorities having jurisdiction (AHJs) for approval of building works, including building surveyors, both private and local government, fire authorities, utilities and other relevant approval authorities and regulators.

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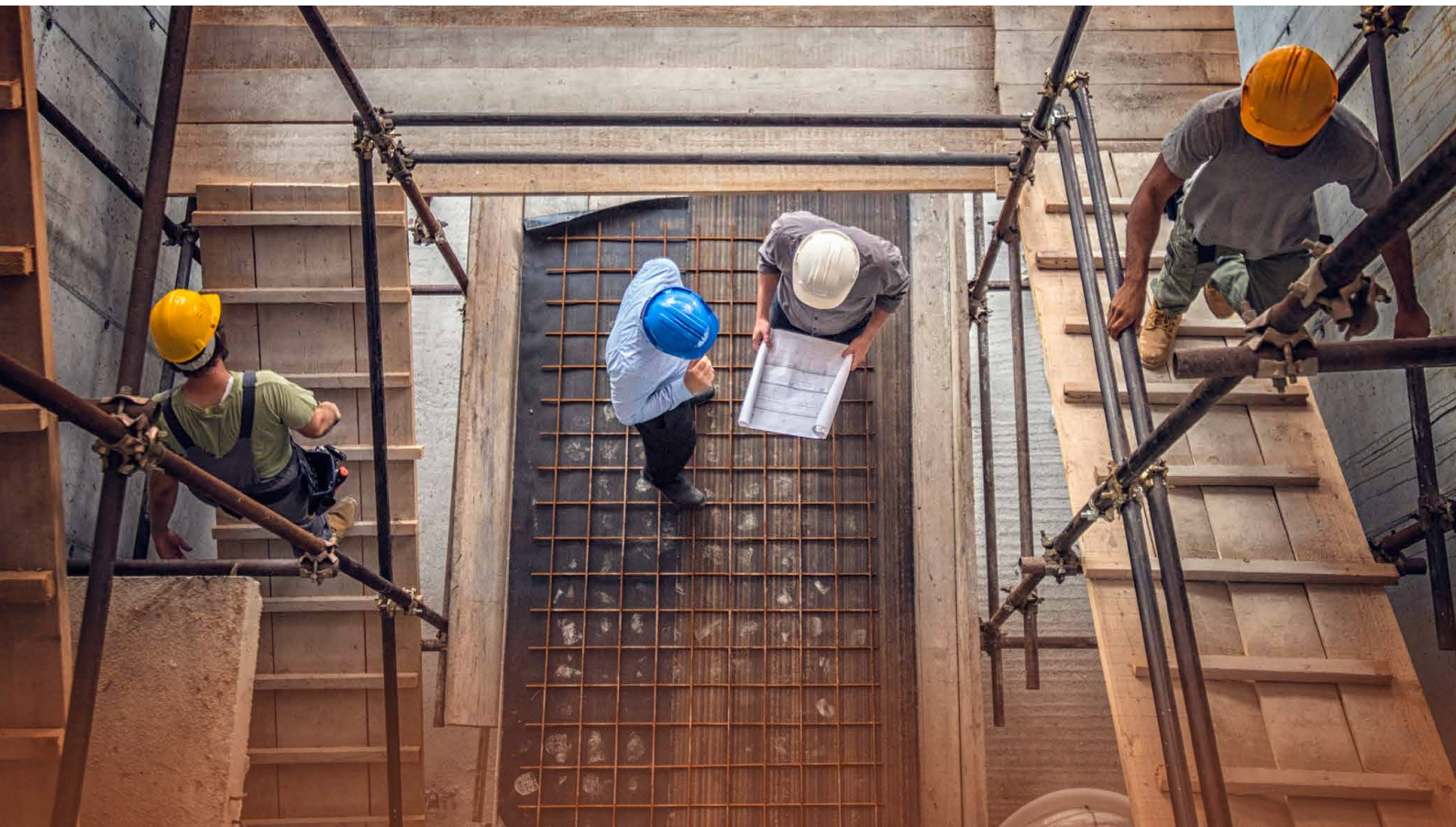
Executive summary

Conformity assessment in the context of this e-book can be seen as a 'certification system' and includes a number of activities that should be undertaken competently and impartially to determine a product's characteristics and whether it meets specified requirements or criteria. The ISO/IEC 17000 suite of standards provides an international framework for the development and implementation of conformity assessment, and UL practices align with that framework. This e-book highlights the components of this framework in the context of the Australian construction industry.

The Australian Bureau of Statistics[1] reported that the Australian construction industry contributes 8% of gross domestic product (GDP). This translates to more than an estimated AU$300 billion in total income, employing around 1 million people. Clearly a strong and confident construction industry is in the national interest.

The seminal BCR[2], authored by Professor Peter Shergold AC and Bronwyn Weir at the request of governments, has provided recommendations for 'improving the effectiveness of compliance and enforcement systems for the building and construction industry across Australia.' The report identified product compliance, including product conformity and compliant design and installation, as a critical issue for the industry that must be addressed.

Product conformity represents the foundation of safety outcomes. Without confidence in product conformity, it isn't possible to have confidence in design, installation or approval processes to deliver safe buildings and encourage economic investment and growth. Reforms associated with design and approval processes, including practitioner roles and responsibilities, are contingent on confidence in a product that conforms to specified requirements.

Multiple options to demonstrate product conformity are available in the Australian construction industry. These options have provided flexibility and supported free trade, reducing upfront supply costs and assisting in fuelling record construction growth. This flexibility has led to a fragmented understanding and application of product conformity options that lack consistency, jeopardising confidence, investment and safety.

Three significant contributing factors have impacted industry behaviour in Australia regarding product conformity:

- The presumption of equivalence between options to demonstrate product conformity that the current regulatory framework supports.
- A general lack of education regarding the differences between product conformity options, referred to as 'evidence of suitability,' in the National Construction Code (NCC)
- Competitive market conditions that rely on local and imported products, meaning that the performance of products is sometimes misaligned with the expected value.

One of the key elements to realising improved outcomes is education to increase common understanding regarding considerations for product acceptance, in particular, the value of third-party product certification. Progressing improvements and restoring confidence regarding building products relies on acknowledging and acting on the following:

- Product conformity is the building block that all other industry frameworks rely upon to deliver expected building compliance outcomes. Reform regarding product acceptance expectations is critical to restoring industry confidence.
- The current product conformity pathways in the Australian construction sector are not equivalent. This diminishes product consistency and impacts expected safety outcomes.
- Third-party product certification schemes that incorporate product testing and ongoing surveillance of product manufacture represent the appropriate level of evaluation and assessment to deliver confidence in the selection and conformity of high-risk products.
- Manufacturers who improve brand integrity by investing in best practice product conformity options should be rewarded with increased market access as a function of more ready acceptance and confidence in their products.
- Industry and government must work together to improve education regarding options and expectations for product conformity and signal expected behavioural change that supports best practice.

Below we share what a good practice landscape can look like when product conformity delivers improved community safety outcomes and restores the confidence of industry drivers such as insurers and investors.

Education of product conformity pathways provided to upskill and included in qualifications

DEVELOPED VIA INDUSTRY/GOVERNMENT PARTNERSHIPS

MANUFACTURERS
- Independently demonstrate product conformity — third-party certification of product
- Quality management and surveillance of production processes
- Brand integrity — increased market access, acceptability and trust in products

TRADE IMPORT/EXPORT
- Export and import opportunity increased through independent data review and acceptance
- Imports assessed to local product conformity benchmarks
- Confidence restored via third party product certification approach

DESIGNERS
- Readily specify product type, conformity and compliance expectations in design documentation
- Using commonly understood language
- Able to select product with confidence and mitigate liability for design compliance

BUILDERS AND INSTALLERS
- Clear obligations for product procurement
- Able to make informed product selection choices based on supplied product conformity information and justify selection
- Expect to receive documentation clearly describing product and extent of compliance assessment and can confidently refuse inferior product.

APPROVAL AUTHORITY
- Able to clearly identify if compliance is achieved by design or installation of product
- Product conformity information clearly describes product conforming parameters
- Empowered to refuse inferior product

DIGITAL TRANSPARENCY
- Product conformity information digitally accessible including installation details/ requirements
- Capability to link to digital twin
- Digital link between physical product and conformity information (marking and online directory)

LEGISLATION, CODES, STANDARDS
- Promotes product conformity and compliance requirements commensurate with risk and expectations to report non-compliance
- Establishes minimum requirements to demonstrate and document product conformity and compliance
- Ensure any flexibility to accommodate free trade is subject to appropriate independent assessment to local benchmarks

REGULATORS AND ENFORCEMENT
- Education approach first. Course content, seminars and guidance developed with industry support
- Clear powers for proactive and reactive inspection, corrective actions and penalties as necessary across the supply chain
- Product conformity identified as the foundation supporting all other compliance requirements

Insurance
- Increase confidence of risk landscape control
- Premiums adjusted to reward good practice
- Share data with regulators and industry to identify areas for improvement

Investors
- Increased confidence in building quality
- Improved appetite to invest broadly
- Stimulates industry, economy and jobs growth

Safety
- Increased confidence that community safety objectives are achieved
- Community safety benchmarks maintained
- Reputation restored and maintained

Lack of confidence

Multiple documented investigations into product conformity assessment and achieving compliance regarding design and installation have been completed in recent years. These include reports by industry bodies such as the Housing Industry Association[3] and the Australian Industry Group[4], as well as comprehensive guidance from the Australasian Procurement and Construction Council[5] and even a federal government Senate Inquiry. Attention has been largely the result of product failures (electrical cable, combustible cladding) and an acknowledgement of the changing market conditions impacted by global supply chains that the local regulatory environment is yet to adapt to.

Much of the issues relating to the status of the industry has been captured by the seminal BCR[2] produced by Professor Peter Shergold AC and Bronwyn Weir in 2018.

The BCR produced recommendations for 'improving the effectiveness of compliance and enforcement systems for the building and construction industry across Australia.' The authors' view was that 'that the nature and extent of the problems' put to them were 'significant and concerning.'

In relation to building product safety, and in particular conformity assessment, the BCR flagged awareness of:

"A high incidence of building products in the market that are not compliant with the standards set out in the National Construction Code (NCC), resulting in inferior and sometimes dangerous products being used in the construction of buildings."

Product failures can be costly and dangerous. Addressing the lack of confidence in conformity assessment that underpins design and installation compliance is critical for the health of the industry and the safety of the community. Recommendations of the BCR seek to 'enhance public trust,' and the report also identifies that 'the work required to bring positive change cannot be done by governments alone.'

Over two years on from the publication of the BCR, the NCC and regulatory requirements for its implementation and enforcement are evolving. Regulators have begun exercising new and existing enforcement powers focused on driving change and improving outcomes. Compliance expected to be achieved through appropriate product conformity assessment, design and installation remains a major concern.

Education regarding the differences between conformity assessment options including terminology and frameworks has not been a core knowledge requirement of recognised practitioner qualifications. Consequently, many practitioners are unsure of the differences and what they should be presenting, requesting or accepting as evidence of conformity assessment. This permeates through the entire supply chain and building life cycle. There has been a lack of enforcement of expectations that would otherwise inform best practices as embraced by other countries.

The Australian construction industries' approach to conformity assessment has generally been informed by learned behaviours based on past practices or conventions that have continued in a vacuum, free from scrutiny and applied understanding. This can extend to a general nonchalant approach to conformity assessment, ignoring the potential short-, medium – or long-term consequences and liabilities.

There is a general sense that it is difficult for those investing in best practices to continue to take a more diligent approach. They are not rewarded or recognised by regulation. Industry practices instead allow for the acceptance of other options without providing an incentive to change. There has also been a general lack of enforcement by regulators. This was acknowledged by the BCR[2], which recommended 'provision of broad powers to audit building work and take effective compliance and enforcement action' and the 'need to develop effective enforcement programs to overcome the culture of complacency that has emerged as a result of modern construction practices.'

Product compliance that is demonstrated with consistency, technical accuracy and integrity can lead to restoration of industry confidence. Any industry that can compete and innovate on the basis of fit-for-purpose products is a healthy industry that is able to demonstrate safety.

Why conformity assessment matters

Product conformity represents the foundation of community safety objectives. Without confidence in product conformity assessment, it isn't possible to have confidence in design, installation or approval processes to deliver safe buildings and encourage economic investment and growth.

Legislation, codes and standards determine minimum design requirements in different countries around the globe. Requirements continually evolve to cater to changes in technology, new hazards or new methodologies, yet have remained centred on delivering community safety objectives. Realising these requirements with confidence is only possible with demonstrable product conformity assessment.

International standard ISO/IEC 17067 defines product certification as follows:
> '4.1.2 Product certification is an established conformity assessment activity that provides confidence to consumers, regulators, industry and other interested parties that products conform to specified requirements, including for example product performance, safety, interoperability and sustainability.'

These established requirements are typically those nominated by legislation, codes and/or standards which may therefore be a lawful requirement or nominated as voluntary options. Not all product conformity options are equivalent, so appropriate selection requires a good grasp of the objectives and the differences.

In 2015, the Australasian Procurement and Construction Council (APCC) recognised in its document 'Procurement of Construction Products — A guide to achieving compliance[5]' that:

"The Australian construction industry operates in a global marketplace and utilises a vast, increasingly complex and innovative range of construction products — many of which are manufactured overseas."

"The most concerning consequence of construction product failure is its impact on safety...without doubt, the use of faulty construction products puts lives at risk."

The APCC has also noted that 'it is therefore vital that the industry works together to create an environment in which all stakeholders in the building and construction process, including the community, are confident that construction products meet a minimum acceptable level of quality and compliance and are fit for the purposes for which they are intended.'

Outside of safety implications, the Australian Industry Group report titled 'The quest for a level playing field: The non-conforming building products dilemma[4], published almost six years ago, flagged that from a survey of 222 respondent companies:

'45% of respondents reported NCP had adversely impacted on revenue, margins and employment numbers.'

The Senate inquiry, formally known as the 'Senate Economics References Committee's Inquiry into Non-Conforming Building Products,' called for a 'coherent and robust regulatory regime.' Recommendation 3 of the inquiry stated:

'The committee calls on the Building Ministers' Forum to expedite its consideration of a mandatory third-party certification scheme for high-risk building products and a national register for these products.'

The government's response published in April 2020[6] advised that the government was 'working to support the Building Ministers' Forum's (BMF's) careful consideration of whether a mandatory third-party certification scheme is an efficient and effective option to address the issued identified with non-conforming building products.'

Acknowledging the issues associated with products, the Senate inquiry also made recommendations, including but not limited to:
- Government to develop a confidential reporting system for nonconforming building products.
- Sampling and testing to be conducted for goods deemed high-risk prior to import.
- Consideration of international approaches, including the European Union's regulations and processes, for testing of high-risk products prior to import to determine if these regulations and processes could be adapted to and support Australian requirements.
- Increased accountability for participants across the supply chain.
- Establishing national licensing supported by continuous professional development.
- Developing a national database of conforming and nonconforming products.

The Reserve Bank of Australia released a snapshot of the Australian Economy in August 2020 that recognised that the construction industry represented 8% of GDP[7], which is a significant contribution to the national economy. A confident and healthy construction industry is clearly in the national interest.

Both the economic and safety impact of product failures can have a devastating impact on industry and consumer confidence. Confidence in product conformity is the foundation for confidence in the industry and the provision of safety.

Global marketplace, supply trends and technical barriers to trade

There are numerous considerations when planning to launch into new markets. Identifying the best potential markets for your products and navigating the complexities of international product safety and market access, especially regulatory compliance, product performance testing and certification, are among the most important. With numerous certification scheme and marking requirements around the world, it is essential to have a trusted resource familiar with what is required long before you reach the border.
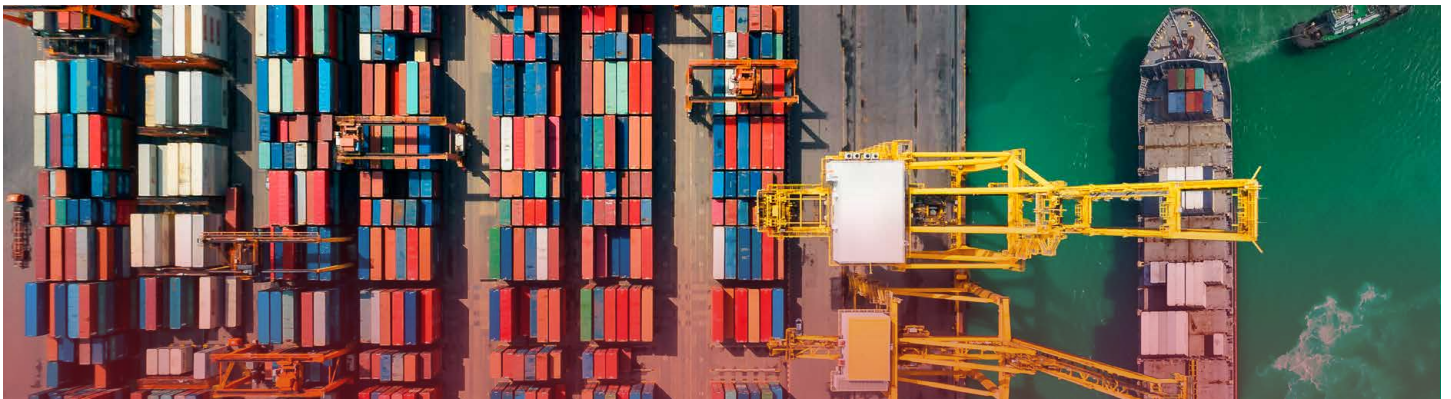
With UL's accredited laboratories and offices throughout the globe, we can help you obtain the required certifications and AHJ approvals you need to sell your products in your target markets. Together with experts located in your destination market, our team provides seamless support across time zones.

Australia is part of this global marketplace. As a signatory to the World Trade Organisation's agreement, Reduction of Technical Barriers to Trade[8], Australia is obliged to support product import and export opportunities and has largely managed this in the construction sector by providing flexibility. In a changing global economy and manufacturing landscape, reciprocal acceptance of local and foreign products is highly attractive. It also demands understanding to ensure the

application of this powerful agreement is not undermined by acceptance of products that do not meet local expectations for product conformity.

Flexibility regarding product acceptance has been welcomed yet has ultimately left the industry in a position where best practice is neither supported nor rewarded. Presenting multiple pathways for product conformity that are not equivalent in their assessment of products has delivered an uneven and inconsistent playing field that has left different parties exposed and diminished interest and/ or viability to undertake more appropriate assessments of product conformity in order to remain competitive.

Such flexibility also makes product comparison and selection difficult

to navigate with confidence for manufacturers, practitioners and consumers. These parties may present or be presented with multiple and differing demonstrations of product conformity for the same or similar product types.

Despite the obvious significant differences in levels of scrutiny and third-party involvement, product acceptance pathways have been presented in the NCC as equivalent options, which they are most definitely not.

Global marketplace conditions have challenged other nations who have responded differently to protect product conformity expectations and deliver confidence and a level playing field.

European approach

The harmonised rules for the marketing of construction products laid down by the Construction Products Regulation (CPR) in the EU allow for products to be evaluated only once before freely circulating in the EU single market. With this 'common technical language,' users of construction products can better compare and define their product performance demands, and market surveillance can rely on one common information structure.

China approach

China has also established national standards called 'Guobiao' standards (GB standards), which are derived mostly from the International Organisation for Standardisation (ISO) standards. The China Compulsory Certification (CCC) mark is China's national safety and quality mark. Though the CCC mark is China's most widely required product certification mark, other product certification requirements and voluntary certification schemes exist. In July 2019, the Chinese government revised the CCC scheme for fire protection products into a voluntary certification scheme. Only three product categories remain in the CCC scheme: fire alarm systems, emergency rescue lighting systems and portable extinguishers.

U.S. approach

In the United States, model codes are developed that provide for standardised regulations on construction products and building codes, but local and regional amendments allow these regulations to vary slightly from one state to another. However, product certification processes are embedded in local acceptance practices and local codes, which refer to UL and other safety standards. Most contractors choose to use UL Certified products to comply with code requirements, avoid potential liability issues and increase timely acceptance of their construction or products.
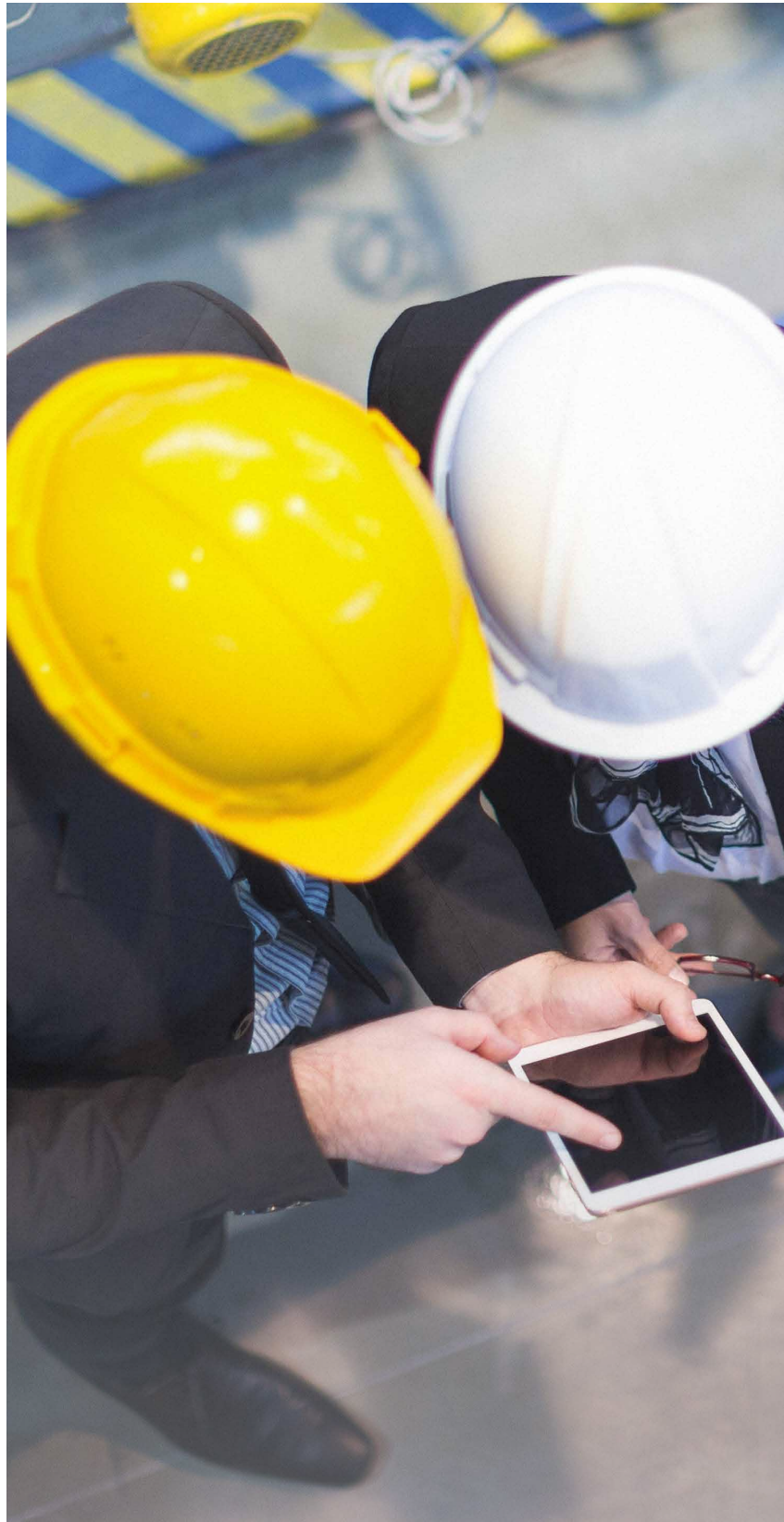
When does product conformity matter?

Product conformity is the foundation on which all other industry components rely in order to deliver expected building compliance outcomes. The product conformity options in Australia might differ compared to other jurisdictions; however, the arrangement of each stage of the construction process is similar. These stages are generally represented in Figure 2 below and fall into two distinct periods in the life cycle of a building, pre-occupation and post-occupation.
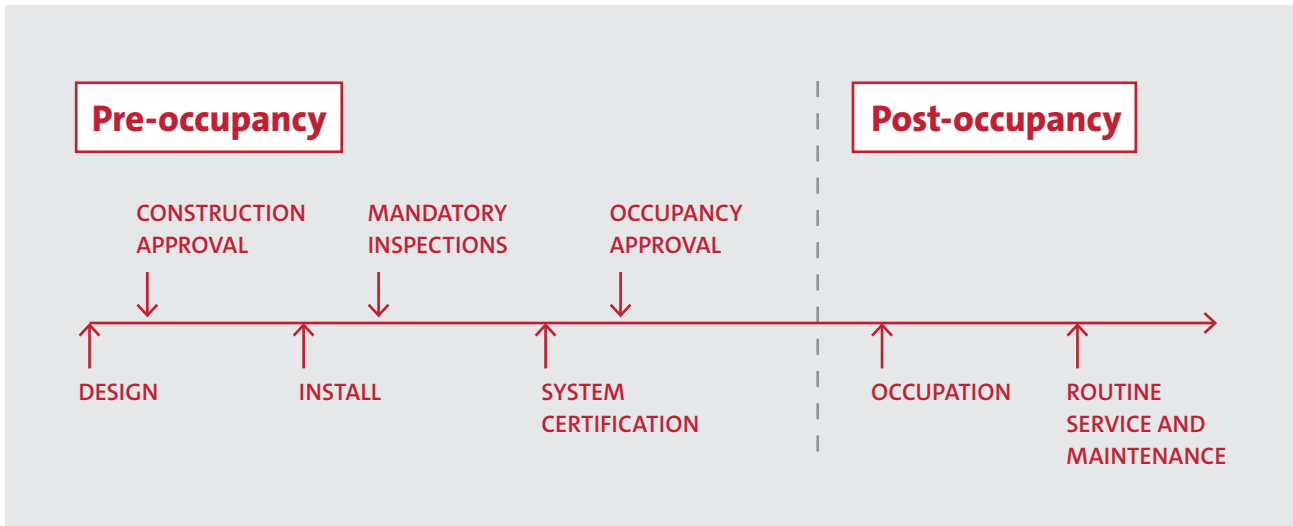

Figure 2: Stages of building life cycle

Product conformity information should inform every one of these stages, helping ensure building safety and system performance objectives can be met.

For example, such is the importance of design documentation being completed to demonstrate compliance, the BCR[2] recommended each jurisdiction's legislation 'should expressly state that design documentation presented for building approval must:
- Adequately demonstrate compliance with the NCC.
- Include any relevant certificates of conformity, accreditations and other prescribed material.
- Require a declaration by each registered practitioner responsible that he/she reasonably believes that documentation demonstrates compliance with the NCC.'

The 'Building a Safer Future – Independent Review of Building Regulations and Fire Safety' report[9] was commissioned by the U.K. government following the tragic Grenfell Tower fire in 2017. Authored by Dame Judith Hackitt and consequently known as the 'Hackitt Report', it identified cultural practices in the U.K. that were not dissimilar to those contributing to a lack of confidence in Australia.

Hackitt observed that:

'Products used throughout the life cycle of a building have a critical impact on its safety.'

Hackitt identified that transparency and documentation regarding product conformity is important. So much so that Hackitt identified the...

'...need for a 'golden thread' approach to ensure the original design intent is preserved and changes can be managed through a formal review process.'

This golden thread is an information portal (preferably digital) that should be accessible at each stage of the building life cycle.

Hackitt recommended that 'full material and manufacturer product information' should be included in a list of critical information that should be retained for golden thread reference.

Identifying and selecting products for use and approval in a building project should be informed by:
- The relevant legislative requirements.
- Intended use and risk.
- Evidence to demonstrate product compliance.

When this information is provided, it increases the confidence that:
- Designers have in selecting and specifying a product.

- AHJs have that designs satisfy legislative requirements.
- Builders and installers have procured and installed conforming products.
- System certifiers with subject matter expertise can verify the use of conforming products.
- Occupancy approval can be granted.
- Any alterations and modifications in the future, along with routine maintenance, can be undertaken with base knowledge of compliant products having been installed.

Furthermore, product conformity reduces the risk to all stakeholders in the process, including insurers and consumers.

International standard for product certification

International standard ISO/IEC 17067:2013, a joint publication by ISO and IEC, outlines the 'fundamentals of product certification and guidelines for product certification schemes.' This standard provides guidance on the best practices for the development of a certification scheme and therefore does not restrict the possible 'scheme types' that exist or may be informed by the standard.

The ISO 'is an independent, non-governmental international organisation with a membership of 165 national standards bodies.' The ISO was established in 1947 and develops 'voluntary, consensus-based, market-relevant international standards that support innovation and produce solutions to global challenges.' Product compliance and conformity is certainly a global challenge and accordingly, the ISO has published a series of standards regarding this.

Similar to ISO, the International Electrotechnical Commission (IEC), founded in 1906, prepares and publishes 'international standards for all electrical, electronic and related technologies', collectively known as 'electrotechnology.'

These two organisations have published a joint suite of standards regarding the product certification process, such as the global importance for consistency.

ISO/IEC 17067 acknowledges that 'product certification is the provision of assessment and impartial third-party attestation that fulfilment of specified requirements has been demonstrated.' It also advises that the concept of product certification is 'an established conformity assessment activity that provides confidence to consumers, regulators, industry and other interested parties that products conform to specified requirements, including for example product performance, safety, interoperability and sustainability.'

Clause 4.2.1 of ISO/IEC 17067 states that the fundamental objectives of product certification are:
- To address the needs of consumers, users and, more generally, all interested parties by giving confidence regarding the fulfilment of specified requirements.
- To allow suppliers to demonstrate to the market that their product has been attested to fulfil specified requirements by an impartial third-party body.

Individual product certification schemes may choose to include a different number or type of functions or activities depending on the type of product or the level of scrutiny desired by the market.

Table 1 – Building a product certification scheme' from ISO/IEC 17067 assembles these in a manner that allows for the application of different product certification scheme types that gradually ascend in product assessment rigour from 1a through 6 and beyond. It also highlights the types of activities that could occur under each component.

Conformity assessment functions and activities within product certification schemes[a]		Types of product certification schemes[b]							
		1a	1b	2	3	4	5	6	N[c,d]
I	Selection, including planning and preparation activities, specification or requirements, e.g. normative documents and sampling as applicable	X	X	X	X	X	X	X	X
II	Determination of characteristics, as applicable, by: a - testing b - inspection c - design appraisal d - assessment of services or processes e - other determination activities, e.g. verification	X	X	X	X	X	X	X	X
III	Review Examining the evidence of conformity obtained during the determination stage to establish whether the specified requirements have been met	X	X	X	X	X	X	X	X
IV	Decision on certification Granting, maintaining, extending, reducing, suspending, withdrawing certification	X	X	X	X	X	X	X	X
V	Attesting, licensing								
	a - issuing a certificate of conformity or other statement of conformity (attestation)	X	X	X	X	X	X	X	X
	b - granting the right to use certificates or other statements of conformity	X	X	X	X	X	X	X	
	c - issuing a certificate of conformity for a batch of products		X						
	d - granting the right to use marks of conformity (licensing) is based on surveillance (VI) or certification of a batch.		X	X	X	X	X	X	
VI	Sureveillance, as applicable (see 5.3.4 to 5.3.8), by:								
	a - testing or inspection of samples from the open market			X		X	X		
	b - testing or inspection of samples from the factory				X	X	X		
	c - assessment of the production, the delivery of the service or the operation of the process				X	X	X	X	
	d - management system audits combined with random tests or inspections						X	X	

a - Where applicable, the activities can be coupled with initial audit and surveillance audit of the applicant's management system (an example is given ISO/IEC Guide 53) or initial assessment of the production process. The order in which the assessments are performed may vary and will be defined within the scheme.

b - An often used and well-tried model for a product certification scheme is described in ISO/IEC Guide 28; its is a product certification scheme corresponding to scheme type 5.

c - A product certification scheme includes at least the activities I, II, III, IV and V a).

d - The symbol N has been added to show an undefined number of possible other schemes, which can be based on different activities.

ISO/IEC 17067 Table 1 – Building a product certification scheme

Note that, as highlighted above in accordance with ISO/IEC 17067, a product certification scheme that incorporates ongoing product production surveillance is what sets apart Type 2 to 6 schemes from Type 1a and 1b.

Confidence regarding fulfilment of specified requirements is accomplished by following scheme rules, procedures and management for carrying out the product certification. These conformity assessment functions and activities are applied in addition to the requirements of a prescribed test standard or methodology. This significantly increases the reliability and confidence that the industry can have in product certification. When continued use of a certification mark is authorised, surveillance is used as a basis for maintaining the validity of the certification. Surveillance is defined by the scheme but may involve taking samples of the product and subjecting them to determination activities (tests) to check that items produced subsequent to the initial certification fulfil the specified requirements. It may also include periodic assessment of the production process. Where a product certification scheme incorporates

production surveillance, this helps to ensure that a product supplied to the market is continuing to be manufactured in a manner that will result in it performing as originally tested.

Product certification also includes the publication of searchable directories of product conformity documentation or listings for the individual certified products.

For product certification schemes of Type 2 to 6 and beyond as described by Table 1 of ISO/IEC 17067, this also is complemented by the license to use conformity marks on individual products. For Type 1b product certification schemes, conformity marks can be used based on certification of a batch of products, which is quite different from ongoing production surveillance which can be more comprehensive.

Production surveillance

Surveillance is an integral part of product certification that builds trust and confidence in products. Application of the certification mark and ongoing (successful) surveillance is an attestation that the product continues to be manufactured as described, therefore as per the specified requirements. It may also be used by product manufacturers as a layer of quality assurance that reduces their liability risk by identifying and rectifying production faults early, avoiding costly and brand-damaging recalls or retrofits.

As identified by ISO/IEC 17067, certification schemes can incorporate production surveillance into scheme requirements in a number of ways. Ultimately, the certification scheme describes the type and extent of surveillance required.

Production surveillance can include inspections and audits of records, production quality systems, critical components and completed production articles.

Some product surveillance regimes are informed by factory inspections of varying frequency. Such inspections focus on assessment of the production process and sampling products from the product line and/or the open market and subjecting them to re-testing to determine whether or not they continue to conform.

Alternative approaches have considered the overall quality management system (QMS) for product production as well as factory inspections. As recognised by ISO/IEC 17067, this means auditing the application of the QMS by the manufacturer as well as factory inspections and sampling of products from the open market.

The conformity assessment approach via a certification scheme that incorporates surveillance is clearly more comprehensive than any test report following a single point in time, one-off test of a product. By contrast, such product certification provides real and tangible confidence in the selection and use of products. The figure below describes how product certification incorporating production surveillance builds on the process of testing and evaluation and employs a constant feedback loop at pre-determined intervals to help ensure production of the product continues to deliver products that meet specified requirements.
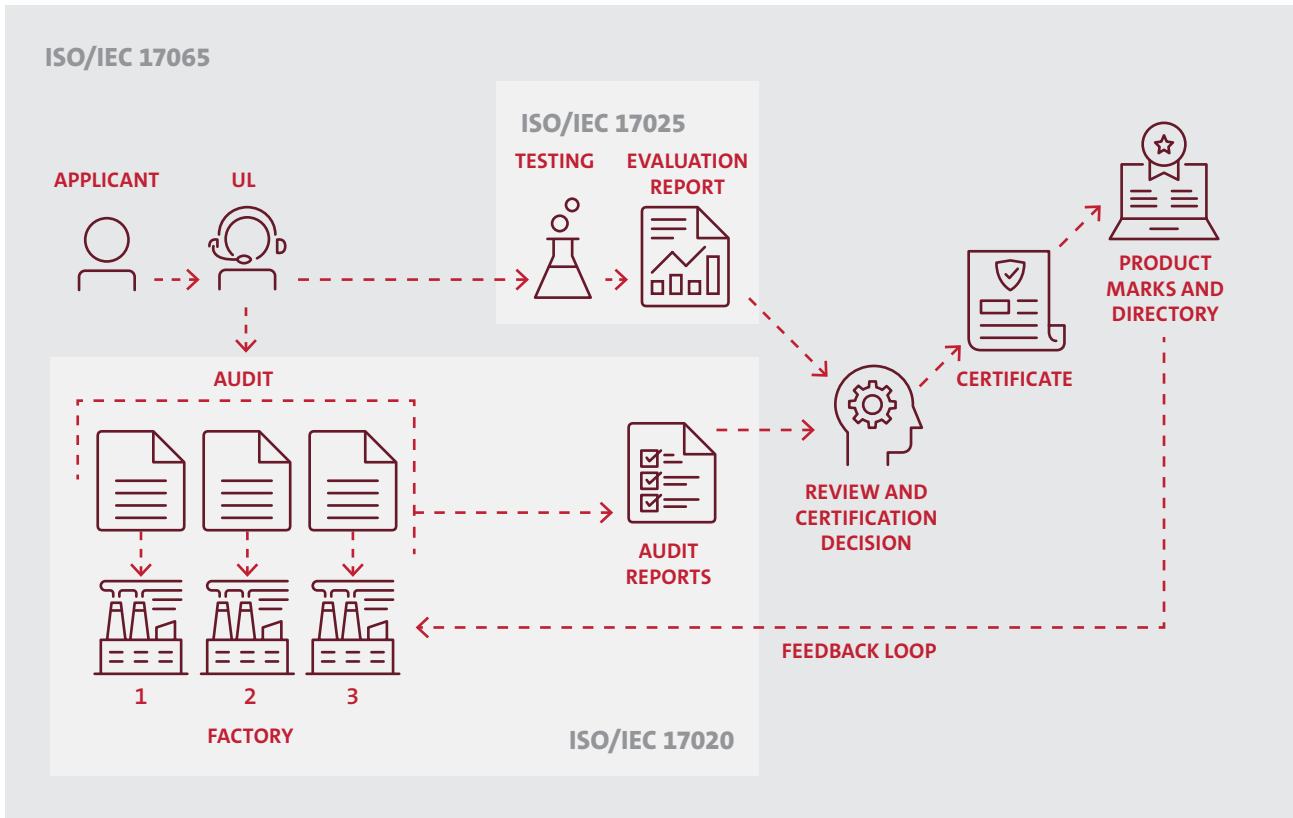

Figure 3: Product certification components and ongoing feedback loop

Where surveillance activities indicate impacts on product compliance with specified requirements, the certification body may reduce, suspend or withdraw product certification, including withdrawal of the product unless these issues are rectified.

In all cases, product certification schemes that incorporate surveillance activities have pre-established procedures that are followed for each inspection activity.

Importantly, the individual conducting surveillance activities must be competent to do so and independent from the manufacturer.

Product marks and directory

In addition to an initial evaluation of the product and ongoing surveillance to determine consistent product compliance with specified requirements, product certification also offers additional references that can assist in the identification of certified products.

Certification bodies make certification decisions on products in accordance with the criteria prescribed in product certification schemes by demonstrating that the specified requirements have been fulfilled.

This results in issuing of a certificate attesting to product conformity for a batch of products or granting the authorisation to use marks of conformity based on surveillance. A mark of conformity allows the identification of certified products post-production.

Certification marks mean that the product bearing the mark conforms to the specified requirements of the certification scheme and particular certification that has been delivered.
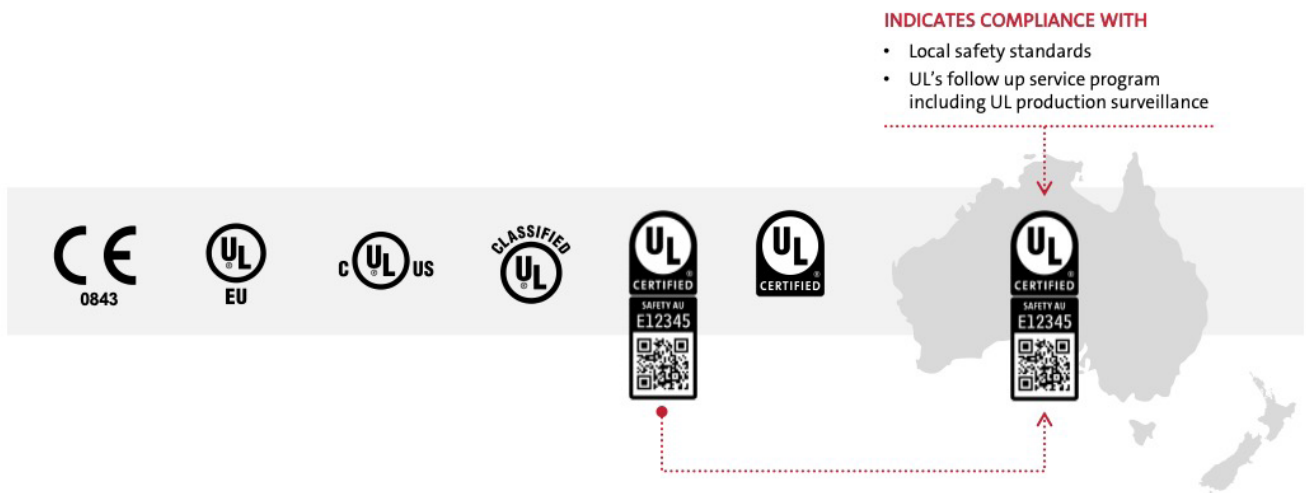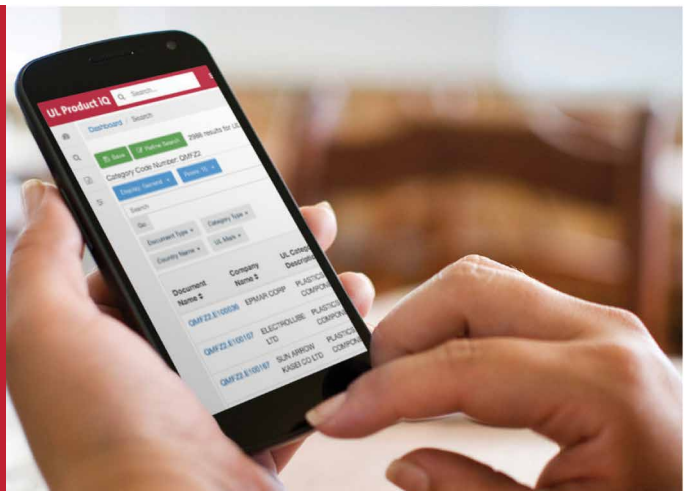

Figure 4: Markings for different product certification schemes

Information on the mark can link to information in product certification scheme directories. These directories are publicly accessible and can be used to verify product conformity, including details of the specified requirements met.

Components for product conformity best practice

Any discussion regarding product conformity must acknowledge the diverse amount of terminology used to describe the different activities associated with demonstrating and documenting how products satisfy specified requirements.

The following diagram outlines product assessment activities in an order that demonstrates increasing product scrutiny that is directly proportional to confidence in product conformity.
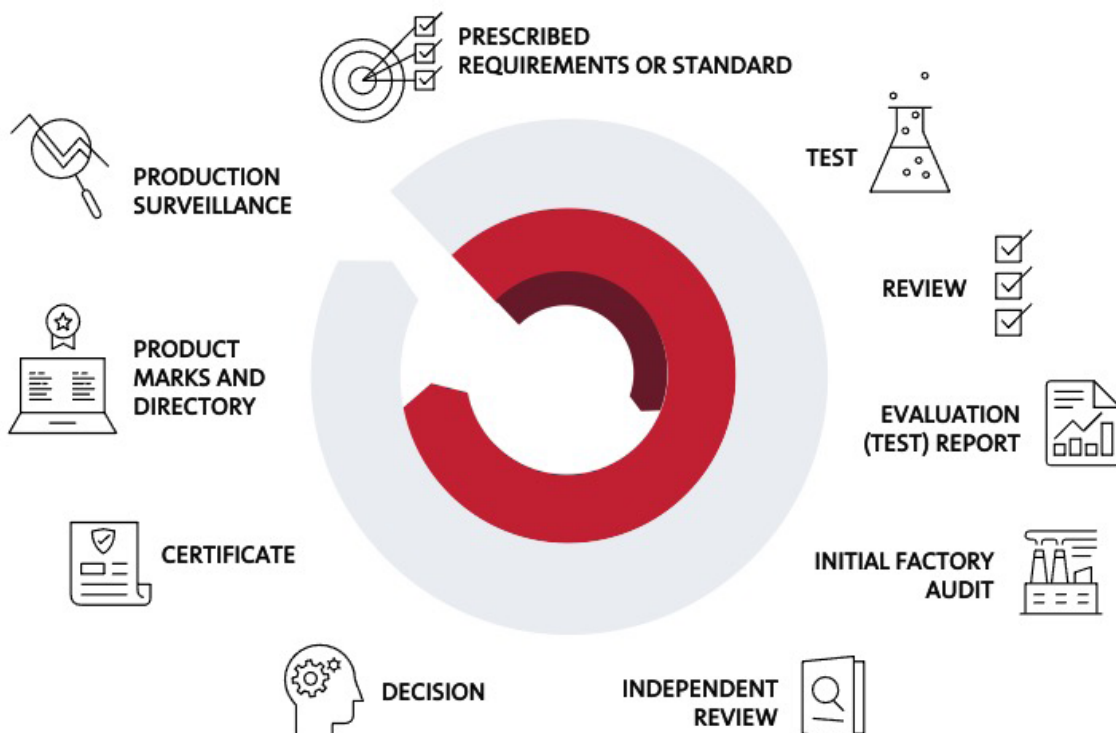

Figure 5: Components of demonstrating product conformity

Despite the multiple product compliance options presented in the NCC, three types of product conformity are commonly used in the Australian construction market. The extent of these are depicted in the diagram above and relate to:

1. Field evaluation, self or second-party declaration or third-party test report, i.e., single-point-in-time evaluation or testing only, no product certification processes.

2. ISO/IEC 17067 Type 1b product certification that includes initial evaluation and may include batch testing, but does not include initial factory audit production surveillance. Successful completion may grant the use of product marks based on certification of a batch of products and be linked to a product directory.

3. ISO/IEC 17067 Type 5 product certification that includes evaluation, testing, initial factory audit and authorised use of product marks, linked to a product directory and production surveillance.

Critical aspects

Product testing and certification are both options under Australia's NCC[10] to demonstrate evidence of suitability regarding product conformity. Generally considered as the go-to product conformity solutions, they represent two vastly different pathways that may complement each other but are not the same.

Testing represents an important part of the evaluation of a product and is used to determine product properties and performance against measurable and repeatable criteria.

Measurable and repeatable criteria is typically detailed in test standards in order to control variables that can contribute to the accuracy or reliability of test results. Product testing informs the creation of a product test report describing product performance under test conditions at that point in time.

Product certification can be considerably more comprehensive. Product certification includes evaluation (construction review, review of marking/labelling, instructions for installation, etc.) along with testing — not to mention the development of a test plan that requires associated engineering judgements. The thoroughness of product certification establishes trust and confidence in product conformance to specified requirements beyond the initial testing itself but through ongoing surveillance that includes inspection or confirmation of the manufacturing process that has been applied.

Some product certification schemes extend surveillance activities to the ongoing manufacturing process or testing and inspecting products selected at random from the point of sale. Such measures help ensure product conformance beyond the initial evaluation process and are informed by technical expertise that is applied with integrity beyond the evaluation process.

As expressed in ISO/IEC 17065, 'the value of certification is the degree of confidence and trust that is established by an impartial and competent demonstration of fulfilment of specified requirements by a third party.'

This means that the technical expertise from a certification body is operating the evaluation/testing process in a consistent, impartial and competent manner. Good practice regarding testing and product certification includes the following:

Testing

1. Testing should be undertaken in accordance with the methodology specified in a nominated standard to determine product properties and performance against measurable and repeatable criteria.
2. Test reports provide comprehensive information regarding how a test specimen performed under an agreed test methodology. However, they represent a single-point-in-time check regarding product conformity to specified requirements. A test report alone cannot provide confidence that the product ultimately supplied to the market will continue to conform to specified requirements like the sample selected for the test. The test specimen may represent a one-off performance capability only demonstrated during the individual test.
3. Test certificates commonly complement test results. This test certificate is not to be confused with product certification. A test certificate simply confirms the level of performance that the product achieved under nominated test conditions, without disclosing the manufacturer's proprietary information that would be associated with a complete test report. This type of document could best be considered as a statement of conformity, as detailed in ISO/IEC 17025 Clause 7.8.6.
4. Test report contents are generally determined by the relevant test standard and may vary between laboratories. This can make acceptance and comparison difficult, and it is important to check that the test parameters and results are relevant to the compliance requirements expected to be met.

Product certification

Consider the components of the certification scheme. Do they include:
- Marking of product and publicly searchable directory listings to ensure the compliant product is readily identifiable by relevant stakeholders responsible for design, approval, installation or enforcement?
- Production surveillance to ensure ongoing consistency in product conformity, including items such as material variations and production tolerances?

What are the production surveillance activities required by the certification scheme? These can vary in frequency and nature and may include:
- Testing or inspection of samples from the open market.
- Testing or inspection of samples from the factory.
- Assessment of the production process.
- QMS audits combined with random tests or inspections.

Consider the type of attestation; whereby the issuing a certificate or other statement of conformity based on a decision following review, demonstrates the fulfilment of specified requirements. By issuing a certificate or other statement of conformity based on a decision following review, that fulfilment of specified requirements has been demonstrated. This includes granting the right to use marks of conformity based upon surveillance.
- Check that the certificate or statement of conformity aligns with product marks or directory listings if these are specified in the certification scheme.
- Where production surveillance is part of the certification scheme, certification will only remain valid if this surveillance activity determines that production is continuing to produce conforming products and an attestation by the manufacturer that the product complies with the applicable requirements.

Accreditation of laboratories, product certification schemes and certification bodies

It is important to independently determine the competence, impartiality and consistent operation of laboratories.

Best practice is to ensure a testing laboratory is independently accredited by the National Association of Testing Authorities (NATA) or International Laboratory Accreditation Cooperation (ILAC) Mutual Recognition Arrangement (ILAC-MRA), confirming the:
- Capability of testing apparatus and the calibration of measuring equipment.
- Competency of test laboratory staff to conduct testing.

Accreditation is also important for certification bodies and the certification schemes they operate. Ensure that the certification scheme is independently accredited by a body such as the Joint Accreditation System of Australia and New Zealand (JAS-ANZ), confirming:
- The appropriateness of the product certification scheme to achieve regulatory compliance or other nominated outcomes.
- The capability (competency and consistency) and impartiality of the certification body and its staff to issue product certification in accordance with the product certification scheme.

In Australia, the NCC nominates that the JAS-ANZ is the independent body appropriate to offer accreditation to certification bodies.

Independent accreditation from JAS-ANZ ensures that the organisation issuing product certification is trustworthy and acts with:
- Integrity
- Independence
- Credibility
- Competence

JAS-ANZ accreditation states that a 'certification body can be counted on to perform its duties in an authoritative and impartial way' and that product has been approved by an 'independent third-party as a professional body that acts with integrity when certifying or inspection for conformity assessment.'

Similar to NATA's participation in the ILAC-MRA, JAS-ANZ participates in the International Accreditation Forum (IAF) Multi-Lateral Agreement (MLA). The IAF advised that 'the primary purpose of the IAF-MLA is to establish multilateral recognition arrangements between accreditation body members in order to contribute to the freedom of world trade by eliminating technical barriers to trade.'

Product testing versus product certification summary

As outlined above, many definitive differences in the extent of product assessment exist between product testing and product certification. Best practice for both options is for the laboratory or certification body performing the assessment of the product to be independently accredited to demonstrate the competency, consistency and impartiality of their activities. Beyond this, product testing only represents an assessment of a product's ability to perform at a single point in time.

Product certification can include further assessment and evaluation, including independent review, production surveillance, product marks and links to product directories with certificates or statements of conformity to specified requirements. It is clear that through the 'competency, consistency and impartiality' applied under a product certification process, it can comprehensively provide increased trust, value and confidence in the mark of conformity and that the product supplied to the market will continue to conform to specified requirements.

National Construction Code evidence of suitability — not all options are created equal

Current product evidence of suitability (EoS) options to demonstrate product conformity with the requirements of the NCC are not triaged to reflect a product's potential contribution to life safety risk and are prescribed in a manner that suggests that they are interchangeable and equivalent.

Addressing equivalence concerns

The product compliance EoS options of the NCC have remained effectively the same since the introduction of the Building Code of Australia in 1990.

There are currently six EoS options in the NCC

1 A CodeMark Australia or CodeMark Certificate of Conformity

2 A Certificate of Accreditation

3 Product Certification issued by a JAS-ANZ accredited Certification Body

4 Product Test Report issued by an Accredited Testing Laboratory

5 A certificate or report from a professional engineer or other appropriate qualified person

6 Any other form of documentary evidence that demonstrates compliance

Also, specific minimum requirements for products are required to demonstrate compliance with the Deemed-to-Satisfy prescriptive provisions of the NCC for:
- Fire-resistance of building elements
- Fire hazard properties
- Resistance to the incipient spread of fire

These include the use of a building material already prescribed by the NCC, a report from an accredited testing laboratory, and design to prescribed standards or calculation.

Presentation of such a range of EoS options outside of a corresponding, risk-based framework leaves the market to determine the favoured approach alone. This can lead to the effective requirement becoming the lowest possible denominator. In fact, by not currently differentiating options based on risk, the NCC effectively treats all products as if they were low risk.

Risk comparison table

The following table outlines the variation in risk mitigation measures associated with the different NCC EoS options. This has also been expanded to show the differences between all EoS types currently permitted by the NCC, including:

- A Type III-V ISO/IEC 17067 product certification scheme.
- A Type I-II ISO/IEC 17067 product certification scheme.
- A listing scheme (using any other form of documentary evidence option), where products are evaluated and listed but not certified due to a lack of production surveillance.

The option to adopt the opinion of a professional engineer or other appropriately qualified person has been excluded for comparison in this table on the basis that this approach is purely subjective. It is not bound by any consistent framework or prescribed approach and is therefore not comparable. Such an approach places enormous liability on the individual providing the opinion.

Also excluded from the comparison is the option to provide 'any other form of documentary evidence that demonstrates compliance.' Used in the appropriate manner, this could include product certification from a certification scheme that is not JAS-ANZ accredited but is recognised under the IAF-MLA or complies with relevant local standards. However, without the prescribed need to compare to local product performance benchmarks, this option is prone to abuse and could be exploited by individuals attempting to demonstrate product conformity by means that have no consistent framework or prescribed process.

Note that the application of CodeMark Australia or CodeMark Certificate of Conformity evidence is important and best suited for application of a performance solution where there is no nominated standard to test or measure product performance against. Refer to the next section for further discussion regarding this.

Assessment to **Prescribed Requirements or Standard**	1 **Product Certification Type III-V**	2 **CodeMark Certificate**	3 **Product Certification Type I-II**	4 **Listing Scheme**	5 **Evaluation (Test) Report from Accredited Lab**	6 **Evaluation (Test) Report**
Test	✓	✓	✓	✓	✓	✓
Review	✓	✓	✓	✓	✓	✓
Evaluation (Test) Report	✓	✓	✓	✓	✓	✓
Independent Review	✓	✓	✓	✓		
Decision	✓	✓	✓	✓		
Certificate	✓	✓	✓			
Product Marks and Directory	✓	✓	✓	✓		
Production Surveillance	✓	✓				

INCREASING RISK OF NON-CONFORMITY

Table 1 – Comparison of NCC EoS/product compliance options

This table illustrates the diversity of NCC EoS options and the lack of equivalence between them.

Product certification of ISO/IEC 17067 Type III-V stands alone as the most robust approach, earning more confidence than any other option beyond CodeMark.

By comparison, subjective opinions from an engineer or other appropriately qualified person may not be based on any assessment components, and this option has the potential to be exploited, placing considerable pressure on the AHJ to accept such evidence and increasing liability for all stakeholders.

NCC compliance options — performance versus prescriptive requirements

Satisfying the performance requirements of the NCC can be achieved by either a performance solution, prescriptive (Deemed to Satisfy (DtS) or standard) solution or a combination of both.

The NCC does not clearly determine which EoS option is required for a product depending on whether the product's suitability is being demonstrated via a performance solution or a prescriptive solution. Developing a product to satisfy performance requirements where there is no dedicated test standard is a process that commands deep assessment rigour given that this option is chosen because there is no prescriptive standard to inform decision-making.

Reports or opinions that rely on a single subjective opinion are clearly not equivalent to testing or product certification processes that employ multiple decision-makers under an independently accredited framework.

It is difficult to rely on any form of EoS that does not mandate a third-party audited process of independence, competent determination and technical review, especially for high-risk scenarios.

A more proactive way to utilise these individual opinions is for them to be considered as part of certification for performance solutions or prescriptive-based outcomes. This results in the following framework where EoS options currently prescribed as equivalent to CodeMark or Product Certification are more correctly shown as supporting evidence to one of either of these.

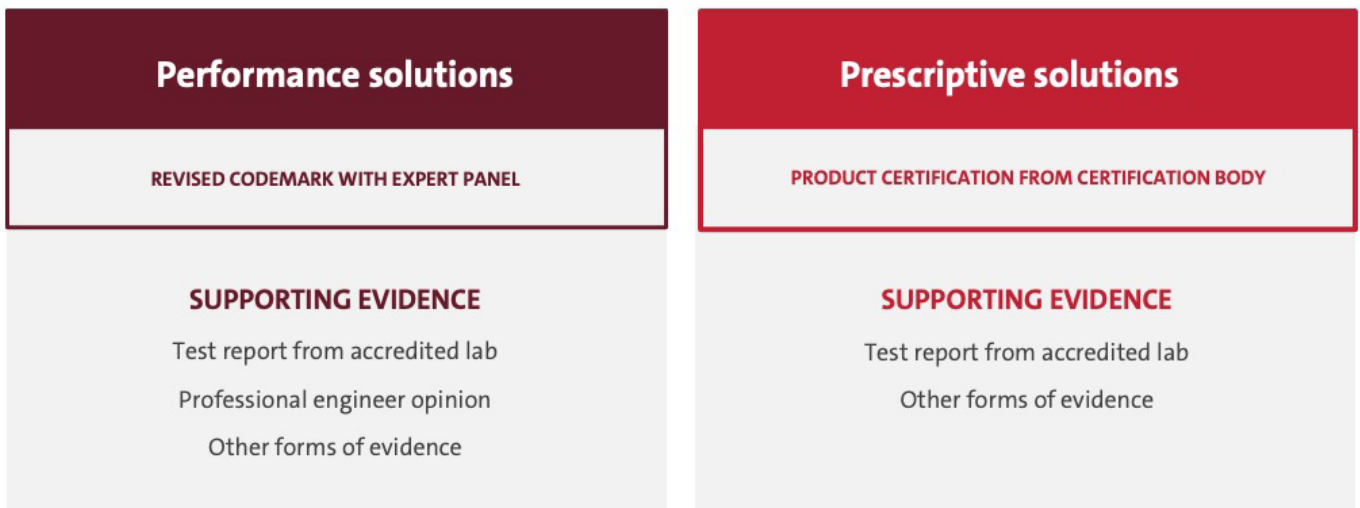| Performance solutions	Prescriptive solutions
REVISED CODEMARK WITH EXPERT PANEL	PRODUCT CERTIFICATION FROM CERTIFICATION BODY
SUPPORTING EVIDENCE	**SUPPORTING EVIDENCE**
Test report from accredited lab	Test report from accredited lab
Professional engineer opinion	Other forms of evidence
Other forms of evidence	

Figure 6: Supporting evidence of suitability

Changing perspectives and what 'good' looks like

In a vacuum of dedicated and consistent training and education, the perspective of product conformity options has driven industry behaviours.

Depending on an individual's perspective, they may consider that all product conformity options are equivalent. As demonstrated throughout this ebook, this is not the case. In some ways, it depends on what side of the fence you are on. Are you getting the full picture, or is your perspective blocked by a lack of explanation?

Not all product compliance options are equal

ALL OPTIONS LOOK THE SAME

BUT NOT ALL OPTIONS ARE EQUAL

Any form of evidence

Subjective opinion

Test report

PRODUCT CERTIFICATION

- Independent accreditation
- Third party certification to ISO/IEC 17067
- Product marks
- Publicly searchable directory
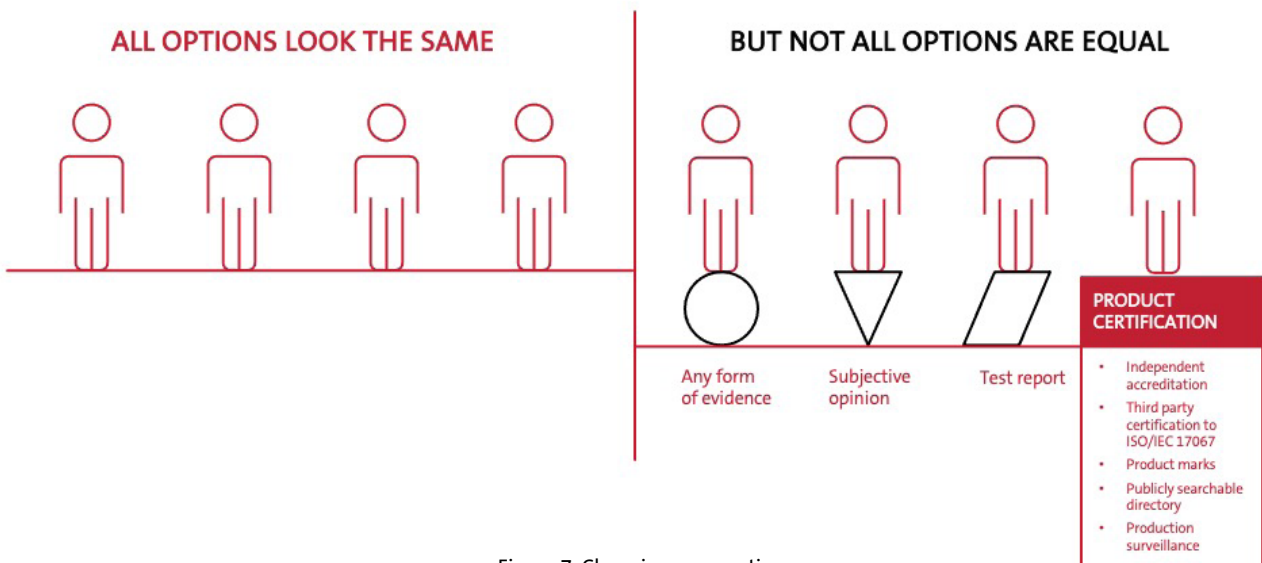- Production surveillance

Figure 7: Changing perspectives

For many practitioners, product conformity is a matter that they need to address amongst a sea of other requirements and commitments. Understanding the differences between product conformity options can make these decisions quicker, more deliberate and increase overall confidence.

The chart below illustrates what a good practice landscape can look like when accessible product conformity information delivers improved community safety outcomes and restores the confidence of demand drivers such as insurers and investors.

Education of product conformity pathways provided to upskill and included in qualifications
DEVELOPED VIA INDUSTRY/GOVERNMENT PARTNERSHIPS

MANUFACTURERS
- Independently demonstrate product conformity — third-party certification of product
- Quality management and surveillance of production processes
- Brand integrity — increased market access, acceptability and trust in products

TRADE IMPORT/EXPORT
- Export and import opportunity increased through independent data review and acceptance
- Imports assessed to local product conformity benchmarks
- Confidence restored via third party product certification approach

DESIGNERS
- Readily specify product type, conformity and compliance expectations in design documentation
- Using commonly understood language
- Able to select product with confidence and mitigate liability for design compliance

BUILDERS AND INSTALLERS
- Clear obligations for product procurement
- Able to make informed product selection choices based on supplied product conformity information and justify selection
- Expect to receive documentation clearly describing product and extent of compliance assessment and can confidently refuse inferior product.

APPROVAL AUTHORITY
- Able to clearly identify if compliance is achieved by design or installation of product
- Product conformity information clearly describes product conforming parameters
- Empowered to refuse inferior product

DIGITAL TRANSPARENCY
- Product conformity information digitally accessible including installation details/ requirements
- Capability to link to digital twin
- Digital link between physical product and conformity information (marking and online directory)

LEGISLATION, CODES, STANDARDS
- Promotes product conformity and compliance requirements commensurate with risk and expectations to report non-compliance
- Establishes minimum requirements to demonstrate and document product conformity and compliance
- Ensure any flexibility to accommodate free trade is subject to appropriate independent assessment to local benchmarks

REGULATORS AND ENFORCEMENT
- Education approach first. Course content, seminars and guidance developed with industry support
- Clear powers for proactive and reactive inspection, corrective actions and penalties as necessary across the supply chain
- Product conformity identified as the foundation supporting all other compliance requirements

Insurance
- Increase confidence of risk landscape control
- Premiums adjusted to reward good practice
- Share data with regulators and industry to identify areas for improvement

Investors
- Increased confidence in building quality
- Improved appetite to invest broadly
- Stimulates industry, economy and jobs growth

Safety
- Increased confidence that community safety objectives are achieved
- Community safety benchmarks maintained
- Reputation restored and maintained

Brand integrity —
a matter of trust

Shortfalls in product conformity potentially increase the liability of all stakeholders in the construction process and increase the chances of costly retrofitting and brand integrity damage. Product recalls, counterfeiting and misleading marketing messages have taken their toll on market confidence.

Product certification provides brand integrity for manufacturers. Every brand is vulnerable in today's connected world. Ultimately, brand integrity means transparency, truthfulness, commitment, consistency and trust. At UL, our commitment and coordinated services help companies manufacture safely, effectively and ethically while safeguarding their consumers, brands, good names and reputations.

And that's why product conformity matters.

Product conformity can be a matter of trust. Trust increases with shared knowledge.

Ask these questions to guide your confidence with product conformity.

1. What is the product risk in relation to failure and contribution to overall building safety?
2. What evidence of conformity has been presented? Is the rigour of this evidence appropriate for the product risk?
3. Does the evidence reference the appropriate legislation, code, standard or contract requirements?
4. Can you verify the independence, competency and capability of the person or body issuing the product conformity evidence?
5. How many components providing confidence are associated with the product conformity option?
6. Is production surveillance undertaken to confirm ongoing product conformity?
7. Can you match the product with the documentation of conformity by way of markings or publicly searchable directories?
8. Are there any limitations associated with product installation to achieve compliance?

Asking questions like these will shift attitudes and behaviours from simply ticking a box to actually reducing risks and liability and restoring industry confidence.

What might seem inconvenient questions at the time will provide long-lasting trust.

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References

AS 1530.4:2014 — Methods for fire tests on building materials, components and structures – Part 4 fire-resistance tests for elements of construction

8772.0 – Private Sector Construction Industry, Australia, 2011-12. (n.d.).
Retrieved December 08, 2020, from https://www.abs.gov.au/ausstats/abs@.nsf/Latestproducts/8772.0Main Features22011-12?opendocument

The Australian Industry Group – The quest for a level playing field – The non-conforming building products dilemma. (2013, November). Retrieved from https://web.archive.org/web/20160307082709/http:/www.aigroup.com.au/portal/binary/com. epicentric.contentmanagement.servlet.ContentDeliveryServlet/LIVE_CONTENT/Publications/Reports/2013/REPORT_NCP_ FINAL.pdf

Department of Industry, Science, Energy and Resources. (2018, July 04). Building Confidence: Building Ministers' Forum Expert Assessment. Retrieved December 08, 2020, from https://www.industry.gov.au/data-and-publications/building-confidence-building-ministers-forum-expert-assessment

Department of Industry, Science, Energy and Resources. (2018, July 04). Senate inquiry into non-conforming building products. Retrieved December 08, 2020, from https://www.industry.gov.au/data-and-publications/senate-inquiry-into-non-conforming-building-products

HIA Response to NCBP. (n.d.). Retrieved December 08, 2020, from https://hia.com.au/business-information/standards-regulations/non-conforming-building-products-and-residential-construction/HIA-Response-to-NCBP

ISO/IEC 17025 — Testing and Calibration Laboratories

ISO/IEC 17020 — Conformity assessment – Requirements for the operation of various types of bodies performing inspection

ISO/IEC 17067 — Fundamentals of product certification and guidelines for product certification schemes

Latest Updates view all. (n.d.). Retrieved December 08, 2020, from http://www.abcb.gov.au/

Publications. (n.d.). Retrieved December 08, 2020, from https://www.apcc.gov.au/publications

AGLSTERMS.AglsAgent; Reserve Bank of Australia. (2020, December 03). Composition of the Australian Economy Snapshot. Retrieved December 08, 2020, from https://www.rba.gov.au/snapshots/economy-composition-snapshot/

Welcome to GOV.UK. (n.d.). Retrieved December 08, 2020, from http://www.gov.uk/

WORLD TRADE ORGANIZATION. (n.d.). Retrieved December 08, 2020, from https://www.wto.org/english/docs_e/legal_e/17-tbt_e.htm

Endnotes

1. Australian Bureau of Statistics Private Sector Construction Industry Australia 2011-2012 8772.0

2. Building Confidence – Improving the effectiveness of compliance and enforcement systems for the building and construction industry across Australia – Peter Shergold and Bronwyn Weir February 2018.

3. Housing Australians Reforming Building and Planning Laws – Submission to the Senate Economics Reference Committee – Inquiry into Non-Conforming Building Products – HIA 3 August 2015

4. The Australian Industry Group – The quest for a level playing field – The non-conforming building products dilemma – November 2013

5. Australasian Procurement and Construction Council – Procurement of Construction Products – A guide to achieving compliance – 2nd Edition December 2016

6. Australian Government – Senate Economics References Committee's Inquiry into Non-Conforming Building Products - Government response to the final report: Non-conforming building products – the need for a coherent and robust regulatory regime – April 2020

7. Composition of the Australian Economy Snapshot – Reserve Bank of Australia – August 2020

8. World Trade Organisation – Agreement on Technical Barriers to Trade

9. Building a Safer Future – Independent Review of Building Regulations and Fire Safety, Final Report, May 2018 Dame Judith Hackitt DBE FREng

10. National Construction Code – Volume One Building Code of Australia, published by the Australian Building Codes Board

11. ISO/IEC 17025 — Testing and Calibration Laboratories

12. ISO/IEC 17020 — Conformity assessment — Requirements for the operation of various types of bodies performing inspection

13. ISO/IEC 17067 — Fundamentals of product certification and guidelines for product certification scheme

14. AS 1530.4:2014 Methods for fire tests on building materials, components and structures — Part 4 fire-resistance tests for elements of construction

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