BUILDING PRODUCTS INNOVATION COUNCIL

Substitution of Construction Products

A guide to managing product substitution

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Contents

This Guide has been prepared by the Building Products Innovation Council (BPIC) as general guidance only. It is not a substitute for professional, independent technical advice.

Introduction

Purpose of this Guide

This guide will help designers, contractors, clients, building surveyors and building owners to manage product substitution (using building products other than those originally specified or requested). It provides an easy 3-step control process for managing the possible risks.

Use of this Guide

This guide has been written to link with the existing framework of building laws across Australia and the use of the National Construction Code (NCC) as referenced in those laws.

Acknowledgement

This Guide is based on documents created by the New Zealand Ministry of Business, Innovation and Employment. BPIC has used those documents under a Creative Commons (CC) license and thanks the New Zealand Government for its support.

Disclaimer

While BPIC has taken every care in preparing this document, it should not be relied upon as the basis of any requirements of the NCC as they relate to building work or the use of building products. Readers should always refer to the NCC and connected regulations as the source document, and be aware that for particular situations or problems, it may be necessary to seek independent legal opinions about what could or should be done about a situation.

Product Substitution Context

For many reasons a party to a building project may think about using building products that are different to those originally specified or requested.

Substitution can sometimes be simple and easy, but it can also be complex, time consuming and risky. Some substitutions can be successful and save money or time. But many do not, especially where unforeseen results occur because of not doing a full evaluation of the proposed change.

In many cases, products substituted after building approval has been granted, are actually unauthorised and may void some contract conditions and warranties. They may have no evidence of compliance with building code requirements. They may expose people to extreme liability (financial, insurance, legal and law-based) should a failure happen. Substituted products may also reduce the performance of the building as a whole.

Often the rectification costs and risks of product substitution far outweigh any perceived benefits of doing it in the first place.

Managing Product Substitution

When might substitution be thought about?

- The specified product might not be available locally, may cost too much to transport to site, or may take too long to deliver.
- Different products might be easier to install/assemble, or have better on-site durability, or performance.
- The specified product might be available only through a limited production run or custom manufacture, making it expensive.
- Contractors may not be familiar with the specified product and charge a higher price for installation or due to unfamiliarity with the product, concerns may be raised about installation quality.
- In the time between project design and project build, specified products may have become unavailable, may be superseded by newer products, have reported performance or durability problems, etc.

What substitution options are available?

- Products may be specified by reference to a Standard. If so, any other product meeting or going beyond that Standard from any manufacturer could be used.
- Products may be specified by naming a specific product or manufacturer or showing the option of selecting equivalent products by stating 'or equivalent' in the plans or specifications. In these situations, a product substitution control process should be used such as the one outlined below. At the same time, the specifier should be contacted to find out exactly what product performance features a substituted product should be equivalent to.

Three-Step Process

For all types and sizes of project, the following principles should be thought about to guide everyone involved in product selection and use. For projects other than single detached houses, or where the substitution or variation is major, these principles have been supplemented by an example checklist (Product Substitution Request Form - **Attachment 1**) which may help in managing the process of product substitution.

Regardless of the size or type of project, the responsibility falls on the applicant (or their agent) to show that the proposed substitution will meet the performance requirements of the National Construction Code. Where a proposed new product performs differently to the one specified, the applicant should describe the effect of the change on other work.

When thinking about substituting a product in a building project, it is important to follow a process that considers the effects of the change and makes sure that the related parties are aware, and where needed, have approved the change. The following is such a process.

Product Substitution: Three-Step Process

Step 1
Think about the Law

When thinking about substituting a building product:

- Check your contract with the owner for any possible problems.
- Make sure the implied and implicit warranties in the relevant building legislation are not affected.
- If the product will be used in building work, check the manufacturer/supplier has provided evidence of NCC and building legislation compliance and that the proposed use is within scope.

Step 2
Think about the building implications

Next, think about the wider issues for the building project including any:

- Environmental challenges.
- Effect on other design features, materials and systems.
- Restrictions under heritage or health and safety laws, planning restrictions or similar interaction with other regulatory responsibilities.
- Effect on building performance or other features expressly demanded by the designer or building owner.

Step 3
Make the changes

Finally:

- Discuss the proposed substitution with all parties and record any changes in the contract.
- If building work is involved and the building consent has already been issued, contact the building surveyor for approval before going ahead. The building surveyor will decide whether a change is a minor variation or whether you need to apply for an amendment to the building approval.
- Advise the owner of any commissioning and maintenance requirements.

Step 1
Think about the Law

Building work is subject to a range of contractual responsibilities that apply to all parties involved in undertaking the work. The work must be approved and outline how it will meet the requirements of the National Construction Code (NCC) and relevant State/Territory building legislation. In deciding whether to substitute a building product that has already been included in a building approval and/or contract documentation, you need to take into account the possible results.

Contractual responsibilities and implied warranties

There will be responsibilities specific to each building contract. There are also implied warranties under various Building Acts applying to building work – and remedies for breaches of these – that you cannot contract out of and that will apply even if you have no written agreement. Some of these implied warranties include:

- The building work will be done properly, competently and in accordance with the plans and specifications.
- All the materials used will be suitable and will also be new, unless otherwise stated in the contract.
- The building work will comply with the NCC and relevant building legislation. Note that most building legislation also prescribes clear processes to be carried out where changes to the approved plans (such as product substitutions) are proposed.
- If the contract states any particular outcome and the owner depends on the skill and judgement of the contractor to achieve it, the building work and the materials will be fit for purpose and of a nature and quality suitable to achieve that result.

Builders should check the contract they have with the owner. If a builder substitutes a product, they may no longer be building what they have been contracted to provide. There could be possible legal, insurance or liability issues.

Reliance on product performance under the NCC and building laws

Building owners, builders, designers, building approval authorities, product manufacturers and suppliers all have responsibilities in the building process. Product manufacturers and suppliers

(Australian and international) have particular responsibilities relating to the information they provide about their products and their later performance.

Building legislation requires all parties in the supply chain to make sure that the materials and products used in building work are fit for purpose. Part A2 (Volume One) and Part 1.2 (Volume Two) of the NCC set out the requirements for acceptance of design and construction for building products (excluding plumbing and electrical products). These provisions explain how to provide evidence of suitability for 'a material, form of construction or design', They specifying the types of evidence that are required to demonstrate that a product meets a Performance Requirement or Deemed-to-Satisfy provision. These may include one or a combination of the following.

- *"A report issued by a Registered Testing Authority, showing that the material or form of construction has been submitted to the tests listed in the report, and setting out the results of those tests and any other relevant information that demonstrates its suitability for use in the building.*
- *A current Certificate of Conformity or a current Certificate of Accreditation.*
- *A certificate from a professional engineer or other appropriately qualified person which:*
  - *certifies that a material, design or form of construction complies with the requirements of the NCC.*
  - *sets out the basis on which it is given and the extent to which relevant specifications, rules, codes of practice or other publications have been relied upon.*
- *A current certificate issued by a product certification body that has been accredited by the Joint Accreditation System of Australia and New Zealand (JAS-ANZ).*
- *Any other form of documentary evidence that correctly describes the properties and performance of the material or form of construction and adequately demonstrates its suitability for use in the building."*

For more information on those compliance pathways you should refer to the NCC directly and consider other reference documents such as the *APCC Procurement of Construction Products - A guide to achieving compliance.*

Where building products rely on compliance with Deemed-to-Satisfy provisions and referenced Australian Standards to demonstrate acceptable performance, these provisions and standards will often spell out the documentary evidence that must be provided to verify conformance. For example, some Australian Standards include requirements for marking or labelling of conformance e.g. AS 2047: 1999 *Windows in buildings*. Some products are required to demonstrate conformity against specific testing standards. For example, passive fire safety

systems are required to be tested against the AS1530 suite of standards. Any substituted product would need evidence of being tested to the same standards.

Requirements if building work is involved

Products included in 'building work' must comply with all the related clauses of the relevant building code. To carry out building work, a building approval must also be obtained from the relevant building surveyor where the product is being used (i.e. the final building site). If the building work is considered 'exempt work', this means a building approval is not required but, as it is still building work, it must comply with the relevant Building Code.

If a building approval is needed, the building surveyor assesses the plans and specifications and, before issuing approval, must be satisfied 'on reasonable grounds' that the proposed building work will comply with the relevant Code.

When the building work is complete, the owner (or person acting on their behalf) must apply to the building surveyor for a Code compliance certificate. This is a formal statement that building work carried out under a building approval complies with that approval.

In other words, the building work must reflect the work shown in the approved plans. The Code compliance certificate is issued against the approved plans so any later changes must be recorded and approved by the building surveyor before (not after) the work begins.

In summary, product substitutions (i.e. using different products to those specified in the original building consent application) will fall into one of the following categories:

- Those that can be done as of right as they do not involve building work (e.g. changing skirting or decorative mouldings, or using wallpaper instead of paint), or
- Small variations, which need to be approved first by the building surveyor and then recorded on the consent file (these may require updated drawings or new technical information to be given), or
- Big variations, which will require a formal change to the building consent involving new plans and specifications before they can go ahead.

Step 2
Think about the building implications

When substituting a material or product it is important to understand the building context. Certain products may have been specified for a reason, and a substituted product may significantly change the level of Code compliance that has been achieved or may have other results for the project. Points you should think about include the following:

What environmental challenges are there?

Is the property in a high wind, bushfire, flood or corrosion zone? What are the expected loadings on the building such as snow or seismic activity? Is the substituted product appropriate for these?

What are the existing design features?

Certain design choices have already been made. Understand why these have been made and whether substituting a product will reduce compliance or alter any aesthetic building features desired by the owner.

Are there any restrictions under heritage or health and safety legislation, planning restrictions or similar interaction with other regulatory responsibilities?

For example, the building could be in a heritage zone and changing products or even colours may be an issue.

What does the product do in terms of performance required by the NCC, Australian Standards and relevant building law?

For example, does it provide structural support or help keep the building weathertight? Or will the product substitution change a deemed-to-satisfy building solution into a performance based solution?

What are the consequences of it failing?

Is it critical to building structure, fire safety and weather-tightness? Will degradation or failure be noticeable or catastrophic?

The greater the risk and consequences of failure, the more robust and detailed technical information and evidence a building surveyor is likely to require.

Products that are components of building systems

A building system is a combination of products specified by a manufacturer, supplier or designer to be used together, as a system, to achieve the performance requirements of the NCC and relevant building law.

Extra caution needs to be taken when thinking about substituting a product that is part of a building system. This is because the change will most likely affect the performance of the whole system. The proposed substitute product may not have been tested for use with the other components, or the system may become outside the scope of use defined by the manufacturer.

Changing a component that forms part of a system may also void any warranty offered by the supplier or manufacturer.

Example

A manufacturer has designed a residential wall system consisting of cladding, framing and wall lining. The manufacturer has tested the system with a specific type of insulation and window joinery. The manufacturer states that if all products are used together as specified the system will meet Australian Standards and NCC requirements for structural integrity, durability, external moisture and energy efficiency. If one component of the system is substituted, such as the wall lining, the use of the products becomes outside the scope defined by the manufacturer. This may mean the building surveyor cannot rely solely on the technical information provided by the manufacturer (as it is no longer relevant) and further evidence is needed to demonstrate compliance.

Evaluate the current building context and proposed changes

Determine the following:

- Is there information about the product and have the manufacturers and suppliers met their responsibilities under Australian Standards, the NCC and relevant building laws?
- If product information has been provided, does the product's intended use fit within the scope of that information?
- Is there enough evidence to show that the product meets the relevant performance requirements of the Australian Standards, the NCC and relevant building laws? This could

include a product technical statement, technical data, independent test results and assessments, product appraisals or product certification.

- If the product has a product certificate, is the proposed use within the scope and limitations of that certificate? While building surveyors must accept a product certificate as evidence of compliance, this is only one of the considerations for product substitution.
- Be on the look-out for fraudulent building product certification. Fraudulent documents are showing up more often, so carefully check documentation for misspellings - a common indication of fake certification. Certified products must have a schedule as well as a certificate - fraudulent copies often lack details like: licence number, licence expiry date and first certified date. Does the certification come from a recognised body (e.g. NATA or JAS-ANZ accredited labs) and can that body confirm the authenticity of the documentation?
- Will the change affect any other products? For example, check any limitations on its use that might involve other products (e.g. incompatibility with other building materials). What can be thought of as a minor variation could lead to necessary changes to other building products, components or the design of the building. This can turn a simple variation into a complex change requiring an amendment to the building approval, and could add costs and delays to the building work.
- Does the designer/builder/owner have other performance requirements, preferences or considerations (e.g. product warranties) that you need to take into account?

In some cases, products may appear to be very similar, but do not achieve the levels of performance required by Australian Standards, the NCC and relevant building laws, or there may not be enough good, relevant evidence to show that they do. This means the impact on compliance needs to be carefully assessed.

In other cases, the proposed substitute product may clearly comply with the Code but still not achieve particular performance levels that designers or owners are looking for.

Example

A designer specifies stainless steel fixings for a renovation at the home owner's request. The builder suggests substituting galvanised fixings as these are cheaper and will still be compliant. However, the owner prefers the stainless steel fixings as these should require less maintenance and have better durability than the galvanised option.

In deciding if it should approve a product substitution, the building surveyor's considerations will include whether:

- The product achieves an equivalent level of durability or the structural properties are similar.
- The product has been tested or assessed (as noted earlier, product certification provides evidence of compliance but is not the only consideration for use in a particular project).
- There are any special conditions for use.
- The product has a negative impact on other building elements.

It is the applicant's responsibility to justify the proposed substitution in these terms. The building surveyor's role is to think about this and decide if they are satisfied that the alternative will still comply with the NCC and building approval.

If the building surveyor has existing knowledge about a suggested alternative they may choose to rely on this knowledge rather than requiring every applicant to submit the same or similar information demonstrating that the product is compliant. If so, justifying its compliance can be a simple matter.

Step 3
Make the changes

Discuss with all parties

Product substitution should be discussed between all parties – the designer, builder, project manager and building owner – as all have roles and responsibilities in the process.

Building owners will usually be responsible for making final product decisions unless they have delegated this responsibility to another person.

Record any changes in the contract

Once you have the owner's agreement (if needed) and you have decided to use materials and products different from those specified in the plans, these changes should be recorded in the contract documentation.

Get building surveyor approval where necessary

If the substituted products are part of building work requiring a building approval, the building surveyor should be informed. The building surveyor's should:

- Think about all proposed variations to the building approval (including substituted products).
- Decide whether these variations can be approved.
- If they can, advise the applicant whether the variations can be treated as minor variations or will require an amendment to the building approval.

Minor variations should still be approved by the building surveyor before going ahead. The building surveyor should note a sufficiently detailed description of these variations on the approved plans and specifications, so that these documents remain an accurate record of what is built.

Notify the building surveyor promptly

Ideally, you should notify the building surveyor as early as possible to avoid any unnecessary delays while you wait for any amendment to be processed and under no circumstances proceed before receiving approval.

If a product is substituted without approval from the building surveyor it is likely that you will encounter a problem when the building surveyor goes to issue the Code compliance certificate, as the building work will not match what is on the consent. This can mean that the building surveyor may not be able to issue the Code compliance certificate and might issue a notice to fix to redo or remedy the work.

Advise the owner of any commissioning and maintenance requirements

Obtain commissioning and maintenance information for the substituted product from the supplier or manufacturer and make sure you give this to the owner.

Example Product Substitution Situations

The following examples describe common situations where product substitution could be thought about and some of the decisions involved.

Electrical Wiring Example

A builder investigating various alternative materials for the electrical wiring of a small apartment block comes across a product that is available in Australia and will save him thousands of dollars to purchase, yet cost the same or less to install as the specified electrical wiring product. The alternative product is manufactured overseas and he checks the manufacturer's website to confirm the performance of the product. He can find compliance information for what he believes might be UK requirements but can find no mention of suitability for Australian conditions or compliance with local standards and codes.

Thinking that the information he is looking for might be on a different but related website, he does a more thorough online search and is shocked to learn that despite the assurances on the manufacturer's website the product is implicated in a number of building fires around the globe, and has been banned in the US as an electrical product. The builder reflects on the consequences of installing such a product as well as his responsibility should the worst happen, and decides that the saving of a few thousand dollars on a multi-million dollar project is not worth the risk.

Plasterboard Wall Lining Example

A builder is in the process of carrying out alterations to an existing house. He visits his supplier to purchase the interior plasterboard wall lining needed for the building work, noting that the designer has specified a certain brand of plasterboard to be used. The suppliers advise that they are out of stock of the specified plasterboard but have a similar product of a different brand available.

The builder requires the plasterboard urgently and thinks about substituting the product. He is not familiar with this brand or manufacturer so he asks the supplier for detailed information about the product and its compliance with the Australian Standards and the NCC.

The supplier is able to provide a copy of the manufacturer's product technical statement which the builder reviews and finds clear and comprehensive. In particular, the builder checks that

the product is suitable for use in wet areas as the house alteration involves the addition of a new bathroom.

As the builder's contract with the owner does not authorise him to make any decisions about which product to use, he contacts the owner to seek approval to use the alternative brand of plasterboard. The owner agrees and they both note the changes in their contract. The builder then contacts the building surveyor who issued the building consent for the alterations regarding the proposed change.

The building surveyor is familiar with this type of wall lining and does not require any further product information from the builder. The building surveyor thinks that using a different brand of wall lining is a minor variation to the building consent, processes the change and notes this on the consent file.

The builder is now able to go ahead with purchasing and using the plasterboard.

External Glazing Example

Building consent has been granted for a new house to be constructed and the building work has recently begun. However, there has been a delay of six months from the time the consent was granted until building work started and during this time a new glazing system has come onto the market. As the owner would prefer to use this new product, she thinks about substituting it for the glazing specified in the original consent. This alternative glazing has slight differences in the way it is framed and attached to the wall framing.

The owner discusses the proposed substitution with the designer. After reviewing the product's technical information the designer is satisfied that this glazing will be suitable, that its intended use is within the scope defined by the manufacturer, and there is clear evidence of compliance with the relevant clauses of the NCC. The change does not affect the use of any other products that have been specified and it still provides the same level of performance for weather-tightness and durability.

The designer updates the plans and specifications to reflect the proposed change and submits these to the building surveyor on the owner's behalf along with the product technical statement from the manufacturer. As the product is new to the market the manufacturer has provided a copy of independent test results and assessments to help demonstrate compliance. This information is also provided to the building surveyor.

The building surveyor reviews the proposed substitution and advises that because this is a significant change it will require a formal application for amendment to the building consent.

Once the building surveyor has approved the amendment the owner contacts her builder to confirm the change. One of the manufacturer's requirements for installation of the new glazing is that it is installed by a qualified and approved contractor. The builder notes the changes on his contract to prevent any disputes or legal issues and agrees to employ a qualified contractor to install the glazing.

Insulation Example

Construction work is underway on a new block of apartment buildings. The designer of the apartments has (at the owners' request) specified a type of insulation that will provide high levels of soundproofing between apartments and significantly exceeds the minimum performance requirements of the NCC.

A supplier visits the construction site. He is selling a new imported insulation product at a very competitive price. The sales material says the product has been tested and used successfully overseas and that it has been assessed by a reputable Australian importer which has determined it is suitable for use in Australia and will comply with the NCC.

The construction firm is thinking about using the new type of insulation to cut down on costs. As it does not have the authority to substitute products, it contacts the owners to discuss this.

The owners review the product information and talk to the designer and building surveyor. However, they decide that they do not want to make this substitution. Although the new product is cheaper, the level of verifiable compliance documentation is poor. The owners want to ensure they are not accepting sub-standard product.

The Role of BPIC

The Building Products Innovation Council (BPIC) is a national peak body representing Australia's leading building products industries and related services (listed in the footer of this document) in:

Steel	Gypsum Board	Concrete	Quantity Surveyors
Insulation	Timber Products	Roof Tiles	Glass
Windows	Clay Bricks	Concrete Masonry	
Cement	Housing Industry	Insulated Sandwich Panels	

BPIC's members and associated companies directly employ over 200,000 Australians with more than 470,000 employed indirectly. Their collective industries are worth over $54B in annual production to the Australian economy. BPIC is a not for profit organisation governed by a Board of Directors comprised of representatives from its member organisations.

BPIC's primary objective is to provide coordinated representation of the building products industry to interested parties including Government, the construction industry, and the general public to help improve building and construction standards. We also provide a forum for discussion, information sharing and policy formulation among major product categories in the building industry.

BPIC's mission is to:

- Promote the efficient production and use of building products within a nationally consistent regulatory environment.
- Develop policy and make submissions or representations to governments, industry and the community on agreed technical standards, codes and regulatory issues of mutual concern to Members.
- Promote the innovative use of building products.

BPIC works to fulfill these aims by gathering and supplying practical and current industry information on behalf of BPIC member organisations and other organisations and companies that are not members but follow BPIC through various means. This industry-wide approach to responding to regulatory issues, helps to ensure that Governments are informed of possible problems in the building industry and are provided with appropriate industry-considered responses. BPIC also encourages investment in skills formation, product development and industry research by helping to identify and remove regulatory impediments to innovation.

Attachment 1

Product Substitution Request Form - Example

Reference Information			
Project Name:		Date of Request	
Location:		Job No	
Requested by:			
Address			
Contact Person		Phone	
		Email	

Substitution Request Information		
Request is for:		**Reason for Requested Substitution**
Named Product	YES/NO	
Product Type, Material or Formulation	YES/NO	
Fabrication or Installation Methods	YES/NO	

Specified Product / Material / Method is shown on the following documents:			
Specification: Section no.		Page(s)	Clause No.(s)
Drawing No.(s)		Issue No.	
		Issue Date:	
If specified product/materials/method is not sufficiently detailed/described to fully complete this Request, the documents shall be considered incomplete and appropriate remediation action should be taken to make them so.			

Options Comparison			
SPECIFIED PRODUCT, MATERIAL OR METHOD		**PROPOSED SUBSTITUTION**	
Description		Description	
Product Name		Product Name	
Type		Type	
Model No.		Model No.	
Fire Rating (hrs)		Fire Rating (hrs)	
Dimensions		Dimensions	
Composition		Composition	
Availability (time)		Availability (time)	
Place of Manufacture		Place of Manufacture	
Required Substrate Preparation		Required Substrate Preparation	
Ease of Installation		Ease of Installation	
CAD/BIM Object Code		CAD/BIM Object Code	
Standards Compliance		Standards Compliance	
NCC Compliance		NCC Compliance	
EPD No.		EPD No.	
Fire Indices		Fire Indices	
NATA Lab Test		NATA Lab Test	
Warranty Period		Warranty Period	
Resistance to Chemicals, Marine Exposure, etc		Resistance to Chemicals, Marine Exposure, etc	
Other Specified Performance		Other Specified Performance Criteria	

Criteria			
What purpose(s) is the product fit for?		What purpose is the product fit for?	
What purpose(s) is the product NOT fit for?		What purposes is the product NOT fit for?	
UNIT COST OF PRODUCT, MATERIAL OR METHOD		**UNIT COST OF PROPOSED SUBSTITUTION**	
$	per	$	per
Units Required		Units Required	
Total Value (1)	$	Total Value (2)	$
Total Unit Cost Saving: (1) minus (2)		$	
INSTALLATION COST OF PRODUCT, MATERIAL OR METHOD		INSTALLATION COST OF PROPOSED SUBSTITUTION	
$	per	$	per
Units Required		Units Required	
Total Value (3)		Total Value (4)	
Total Installation Cost Saving: (3) minus (4)		**$**	
Cost / Benefit Justification			
What alterations (excluding installation) will be required to the Works if the requested substitute is used?			
Total net cost of all alterations work required including overhead and profit:		$	
Cost of Builder's administration:		$	
Cost of Architects documentation and administration:		$	

Cost of other professions/trades:	$
Total Cost (5)	$
Total cost saving achieved by substitution: (subtract (5) from the sum of Total Unit Cost Saving and Total Installation Cost Saving:	**$**
Benefits to Client and Building Users other than financial:	