



- **Proposed Changes to B2/AS1**
Report to Building Industry Authority

Attachment 2: Risk Matrix Approach considering
Weathertightness and Durability

November 2003

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1 Introduction

1.1 Purpose

The risk matrix approach was developed in order to provide a rational basis for deciding on appropriate claddings as part of a new E2/AS1, and as a basis for determining the timber treatments quoted in B2/AS1.

This document brings together material on weathertightness and durability that has been used to develop a risk matrix approach that accounts for the relative merits of different approaches and details that contribute to improved weathertightness and durability.

Descriptions of the process developed are included together with details of its application.

2 Risk Matrix Approach – Outline

An outline of the risk matrix approach is as follows:

2.1 E2, External Moisture (Weathertightness) Considerations:

- Develop a risk matrix that recognises the principal risk components: wind; number of storeys; eaves width; envelope complexity; decks/balconies.
- Include in the risk matrix levels of severity for each risk component
- Assign points for risk components according to severity – the more risk the higher the number – to arrive at an E2 Risk Score for each face of the building
- Determine allowable cladding types and need for drained ventilated cavities according to the E2 Risk Score. Note that the basis for this determination is to keep the risk to the external framing more or less constant. For example, to allow the external framing to be H1.2 or similar.

2.2 B2, Durability considerations:

- Develop a rating system that provides a measure of the risk of water/moisture entering the building (for external walls this would desirably be the same as that used in E2/AS1, but would need to stand alone within B2/AS1).
- Develop an index which accounts for the drying potential of the wall and/or roof components in a particular application.
- Account for the likely effects of exposure during construction and maintenance issues.
- Combine these considerations to produce an overall B2 Risk Score which is essentially a measure of the risk of moisture entering and remaining in the building.
- The higher the B2 Risk Score, the higher the level of timber treatment required.

- Develop a table relating the known or likely durability performances of various timbers to this B2 Risk Score.
- Allow separately for special features such as decks and balconies, to determine the treatment level required for supporting timber.

The combined approach thus takes account of the effectiveness of the weather skin and the factors that influence the degree of damage/health risk due to rot or fungus growth.

A flow chart of the process is shown in Figure 1.

3 Risk Matrix Process

3.1 General

This note is to explain how the risk matrix is intended to work and the basis for the decisions and numbering. There are three sheets:

- Sheet 1: E2 Risk Score - Weathertightness Risk Evaluation
- Sheet 2: B2 Risk Score – Determination of Required Timber Treatment – External Walls
- Sheet 3: B2 Risk Score – Determination of Required Timber Treatment – Internal Walls and Roofs

3.2 E2 Risk Score

The **E2 Sheet** is similar to that sent out for public comment and has had input and review from the E2 Working Group. Basically it:

- Comes up with a risk score depending on selected risk components and their severity.
- Specifies the cladding options allowable for each of four bands of risk score. (*Note The aim of this is to keep the external wall at roughly the same level of protection as the external risk score increases*)

This sheet will be part of the E2 document, but is subject to further refinement in finalizing the proposals for E2/AS1. The present form of this sheet was considered sufficient as background for decision making on B2/AS1.

3.3 B2 Risk Score

The **B2 Sheets** are intended as a background document to the decision on what treatment to allow in B2/AS1 in various situations for framing in external walls, (first table) internal walls and roofs (second table).

3.3.1 For External Walls

- The E2 Risk Score is taken as reflecting overall risk of water penetrating the cladding.
 - This Score is then modified to take account of the effects of any cavity in protecting the external wall framing. A Cavity Factor of less than 1.0 is used to modify the score, the value depending on the width of the cavity. Separation, drainage and ventilation are the main benefits accounted for.
 - A Cladding Factor is then used to reflect key characteristics, mainly its ability to hold water and the ease with which cladding materials dry out.
 - The Risk Score times the Cavity Factor times the Cladding Factor provides a measure of risk.
 - A number is then added to reflect the Residual Risk. This recognizes that in spite of best efforts, some risk will remain.
 - The resulting number (Total Points) determines the timber treatment according to the relationships shown.
 - Special “Risk Features” such as decks and balconies are treated separately. A score is allocated to them that results in an appropriate level of treatment for the framing supporting the Risk Feature.
 - A further separate factor is included to cover the risk of decay occurring as a result of exposure during construction. Again, a number is allocated that requires treatment of the timber when exposure during construction is unacceptably long.

3.3.2 For Internal Walls

- Procedure is similar
- The relationship between B2 Risk Score and Timber Treatment has been derived semi-intuitively from Table 6 of the NZIER Draft Cost Benefit Analysis sent out with the proposed E2B2 changes. This table, prepared by BIA, gives an indication of the relative effectiveness of the various treatments available.

The overall number allocation for Risk Scores and for effectiveness of treatment has been made to reflect the relative impacts of the variables involved, and to provide a sensible result.

It is envisaged that the B2 Risk Score process could be developed to be part of a commentary on B2 or part of a guidance document. It may be useful to TA’s and Building Certifiers when assessing the merits of an Alternative Solution.

To reiterate the point, the B2 Risk Score matrix will not be part of B2/AS1, but will be used to back up the prescriptive requirements for timber treatment in various situations.

4 Risk Matrix Application

Appendix B contains the work sheets to be used in applying the risk matrix process. The Risk Matrix approach was applied to a range of situations reflecting different risks of moisture penetration and of risk of decay.

The work sheets comprise:

- Flow Chart
- E2 Risk Score determination
- B2 Risk Score determination – External Walls
- B2 Risk Score determination – Internal Walls and Roofs

These contain examples of the application of these sheets to a selection of situations.

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Appendix A – Durability Performance of Timbers

1. Relative Performance of Timbers

The risk process relies on numerical ratings being assigned to different timbers on the basis of their performance when exposed to moisture. The focus of comments and the B2 proposals is on the following:

- Untreated kiln dried radiata pine
- Untreated Douglas Fir (A mixture of heartwood and sapwood)
- Radiata pine treated to H1.2 with Boron or with LOSP
- Radiata pine treated to H3.1
- Radiata pine treated to H3.2

Table A1 *Estimated risk of damage and timber/treatment*, provides an overview of the likely performance of the various timbers. The numerical scores in the B2 Risk Score process were assigned to be generally consistent with this table. This table was produced by BIA to give some indication of the relative preservative and protective effects of various treatments.

Figures quoted are indicative only and are not based on scientific control tests.

It should be noted that the performance described for each timber is based on the attainment of a certain moisture condition. There may be differences in the likelihood of attaining and maintaining the quoted moisture condition, as for example between Douglas Fir and untreated radiata pine [Refer Hedley tests September/October 2003], but this is a separate issue.

Table A1: Estimated risk of damage and timber/treatment

Timber/treatment	Wet for 4 weeks then maintained 25-28% MC	Maintained at 30-40% MC	Maintained at +40% MC
Untreated KD <i>Pinus radiata</i>	Probability of brown rots starting and continuing 80%? Potential for extensive decay over 1-2 years	Probability of brown and wet rots starting and continuing 95%? Potential for extensive decay over 0.5-2 years	Probability of wet rots and soft rots starting and continuing 100%? Potential for extensive decay over 0.5-2 years
Douglas Fir (Heartwood)	Probability of brown rots starting and continuing 15%? Potential for moderate decay over 1-2 years	Probability of wet rots starting and continuing 50%. Potential for extensive decay over 1-2 years	Probability of wet rots and soft rots starting and continuing 60%? Potential for extensive decay over 1-2 years
Douglas Fir (Sapwood)	Probability of brown rots starting and continuing 80%? Potential for extensive decay over 1-2 years	Probability of brown and wet rots starting and continuing 95%? Potential for extensive decay over 0.5-2 years	Probability of wet rots and soft rots starting and continuing 100%? Potential for extensive decay over 0.5-2 years
H1.1 Boron	Probability of brown rots starting and continuing 10%? Limited decay over 3 years. But localized to affected areas.	Probability of wet rots starting and continuing 40%? Potential for moderate decay over 3 years	Probability of wet rots and soft rots starting and continuing 50%? Potential for extensive decay over 5 years
H1.1 LOSP	Probability of brown rots starting and continuing 50%? Potential for extensive decay over 1-2 years	Probability of wet rots starting and continuing 90%? Potential for extensive decay over 1-2 years	Probability of wet rots and soft rots starting and continuing 100%? Potential for extensive decay over 1-2 years
H1.2 Boron	Probability of brown rots starting and continuing 5% Limited decay over 5 years but very localised	Probability of wet rots starting and continuing 10%? Potential for moderate decay over 5 years but very localised	Probability of wet rots and soft rots starting and continuing 50%? Potential for moderate decay over 5 years but very localised
H1.2 LOSP	Probability of brown rots starting and continuing 5%? Limited decay over 3 years.	Probability of wet rots starting and continuing 10%? Potential for moderate decay over 3 years	Probability of wet rots and soft rots starting and continuing 65%? Potential for moderate decay over 5 years

H3.1 (TBTO or TBTN)	Probability of brown rots starting and continuing 0%?	Probability of wet rots starting and continuing 7.5%? Potential for moderate decay over 5 years	Probability of wet rots and soft rots starting and continuing 25%? Potential for moderate decay over 5 years
H3.2 (CCA, ACQ, CuAz, CuN)	Probability of brown rots starting and continuing 0%?	Probability of wet rots starting and continuing 3%? Potential for minor decay over 5 years	Probability of wet rots and soft rots starting and continuing 10%? Potential for limited decay over 5 years

Note: The above Table was part of the NZIER Draft Cost Benefit Analysis sent out for comment.

2. Performance of Timber Species

2.1. Kiln dried Untreated Radiata

Susceptibility to decay

This material has been at the centre of the controversy concerning the weathertightness of buildings and the resulting damage to framing timbers. It absorbs moisture readily and has little resistance to development of rot or fungus. There is potential for extensive decay within 6 months to two years if exposed to sufficient moisture. The rate at which this decay occurs means that deterioration of the framing timber can occur before the presence of moisture becomes evident through the wall lining or exterior cladding. There is ample evidence in the recent examples of leaking buildings to bear this out.

In summary, for untreated kiln dried radiata to be used for framing timber, there has to be a very low probability of it getting wet and staying wet.

Resistance to insect attack

Resistance to insect attack for kiln dried planer gauged radiata has been claimed to be adequate for borer. The kiln drying process results in a hard surface that is not attractive to borers common in New Zealand. There is a potential vulnerability to the end grain, but there is little or no evidence of any concerns in framing built over the last 5 years since widespread usage of untreated kiln dried radiata.

The Working Group considered that there is potential for infestations by insects as yet unknown in New Zealand, but which could easily become established. Consequences of such infestations are likely to be significant, but the probability of them occurring was considered to be very low. Untreated radiata has been used in Australia for many years without major concerns, except for instances of termite infestation. In Australia, termite damage is controlled either by treatment of timber to H2 or by preventing termite access to timber framing. Similar measures would be needed in New Zealand if termites became established to a significant degree.

BIA Position

Provided that insect attack has a low probability of occurring and its consequences are regarded as moderate, untreated kiln dried Radiata should be allowed for roof trusses and rafters in traditional attic roofs (because these spaces are traditionally dry, for exposed rafters and beams because there is air circulation and because a leak would be noticed at an early stage, but that enclosed rafters such as in a skillion roof or flat roofs should not have untreated Radiata.

WHRS and other data, together with comments received, indicate that low risk buildings with masonry veneer show a low incidence of failure of untreated framing. On this basis, untreated kiln dried Radiata is acceptable in external walls for such buildings. A definition of a low risk masonry veneer building has been included in the proposed B2/AS1.

The risk of decay in internal wall framing is less than that to external walls, but more than that for roof framing exposed to good air circulation. Although there are other risks to internal wall framing, such as plumbing leaks, it is considered that untreated kiln dried framing can be accepted for internal walls.

The inclusion of untreated kiln dried Radiata as noted above raises the question of the need to treat bottom plates. Inclusion of a single piece of treated timber in an otherwise treated frame would have marked effects on the economics of framing assembly. There would still exist the possibility of error in placement. Overall it is considered that the incidence of decay as a result of construction exposure is sufficiently low not to require that bottom plates be different from the overall framing.

2.2. Douglas Fir

Susceptibility to decay

A variety of comments were received about the susceptibility of Douglas Fir to decay. Some commentators stated emphatically that Douglas Fir does not rot, while others quoted instances where it has rotted, and supplied photos.

It is generally recognized that:

- Heartwood and sapwood Douglas Fir are readily distinguishable visually.
- Douglas Fir heartwood content varies with the age of log. While in a mature log the heartwood can be up to 80%, typical NZ-produced Douglas Fir is milled at around 40 to 50 years, giving a heartwood content of around 50%.
- Douglas Fir sapwood is capable of being treated, but there is some doubt that the durability of heartwood can be improved through treatment. Treatment of Douglas Fir in NZ has not been proven or done in commercial quantities.
- Current log characteristics and cutting practices make the cutting of Douglas Fir heartwood-only uneconomic for most forests.
- NZ Douglas Fir is comparable in strength and density to Radiata pine.

Recent data from Auckland indicates that homes framed in Douglas Fir were proportionately represented in the overall number of leaking buildings in which the framing had decayed. This indicates that run of the mill Douglas Fir, containing both heartwood and sapwood is susceptible to decay.

The key question is to what extent, if any, is Douglas Fir better than untreated Radiata. Douglas Fir heartwood is distinctly different in appearance from its sapwood, and it has been suggested that Douglas Fir heartwood is equivalent to H1.1 boron and approaching H1.2 treated radiata. The sapwood, however, has much higher susceptibility to decay and is more in line with untreated radiata.

Recent comparative tests at FRI indicate quite clearly that DOUGLAS FIR absorbs water at a much lower rate than untreated radiata. More importantly, in over 60 days of exposure to outside conditions, the run of the mill DOUGLAS FIR did not reach the critical moisture content required for rot to start. The untreated radiata, on the other hand quickly exceeded this level and even in the dry spells between rains did not dry out to below the 30% level [Table A.1].

On the face of it this appears to be evidence of the superior qualities of Douglas Fir. However, the tests consisted of leaving sticks of timber exposed to the outside elements over an extended period. Thus there was plenty of ventilation and drying out available in between the rains. Clearly, this does not simulate the mechanisms of moisture uptake in an enclosed wall. In this situation, the presence of liquid water and sustained very high humidities will result in moisture uptake to 28-30% by diffusion as well as liquid water absorption.

Furthermore there was no distinction made between the moisture content of the heartwood and sapwood. It is possible that the sapwood absorbed moisture to a much higher level than the heartwood, possibly to over the threshold for decay to initiate. Until further tests to clarify this situation are completed, it is not possible to make distinction between heart and sap in this respect.

It seems that Douglas Fir should be regarded as susceptible to rot when in wet situations with inadequate ventilation, but heartwood at least, is superior in durability to untreated Radiata in terms of the time it would take to decay. Once further results are available, it may be possible to conclude that Douglas Fir is less likely to reach the moisture content needed to initiate decay than untreated Radiata where there is an opportunity for wetting and drying to take place (e.g. in drained and ventilated cavities. These are advantages that should be allowed for in any risk analysis.

Resistance to insect attack

Heart Douglas Fir is believed to have good natural resistance to the common house borer. In approximately 70 years of use in New Zealand insect attack in Douglas Fir has not emerged as a significant concern.

BIA Position

There is certainly a strong argument that:

- o rafters and trusses in traditionally dry roof spaces; and
- o internal exposed post and beam construction in houses could be Douglas fir because:
 - o there is plenty of air circulation around an exposed beam
 - o any leaks would be detectable during normal use

At present, it is recommended that Douglas fir, as currently milled in New Zealand, be classified within the same durability class as untreated kiln dried Radiata.

There could also be a further concession in the future where there is a drained and ventilated cavity in low risk areas, or even high risk areas. The work that Forest Research (Mick Hedley) is doing could be tied to the drying rate in cavities but the full outputs are still several years away.

2.3. H1.2 Treated Radiata

Susceptibility to decay

Treatment to H1.2 can be achieved using Boron compounds, CCA or LOSP. Boron and LOSP are the most common. This level of treatment is intended to provide adequate resistance to borers and some decay protection for timbers protected from weather but with a risk of moisture content conducive to decay.

The treatment is expected to reduce the potential for decay so that it is localized and develops over 5 years or more.

Resistance to insect attack

All H1.2 treatments provide adequate borer protection

BIA Position

H1.2 is suitable for 50yr durability in external walls where there is a risk of moisture penetration conducive to decay. It is not suitable for situations in which the timber is exposed to the elements.

2.4. H3.1 Treated Radiata

Susceptibility to decay

H3 is a hazard class which includes fungal decay risk. H3.1 LOSP is intended for use in exterior locations but for maximum durability should be protected from full exposure to the weather. Sunlight is reported to have an adverse effect on the preservative and in fully exposed locations unprotected H3.1 timber is likely to have a durability of maybe 10-15 years. In fully enclosed wet wall situations, it will be more durable than H1.2 but is likely to last only 5-15 years.

Resistance to insect attack

All H3.1 treatments provide adequate borer protection

BIA Position

H3.1 provides 50yr durability for timber in situations where there is a risk of moisture conducive to decay and particularly where there is some degree of direct exposure to external elements.

2.5. H3.2 Treated Radiata

Susceptibility to decay

H3.2 CCA has a long history of use. It is for use in exterior applications not in ground contact. In fully enclosed wet wall situations, it will be more durable than H3.1 but is not likely to last more than 15-25 years.

Resistance to insect attack

All H3.2 treatments provide adequate borer protection.

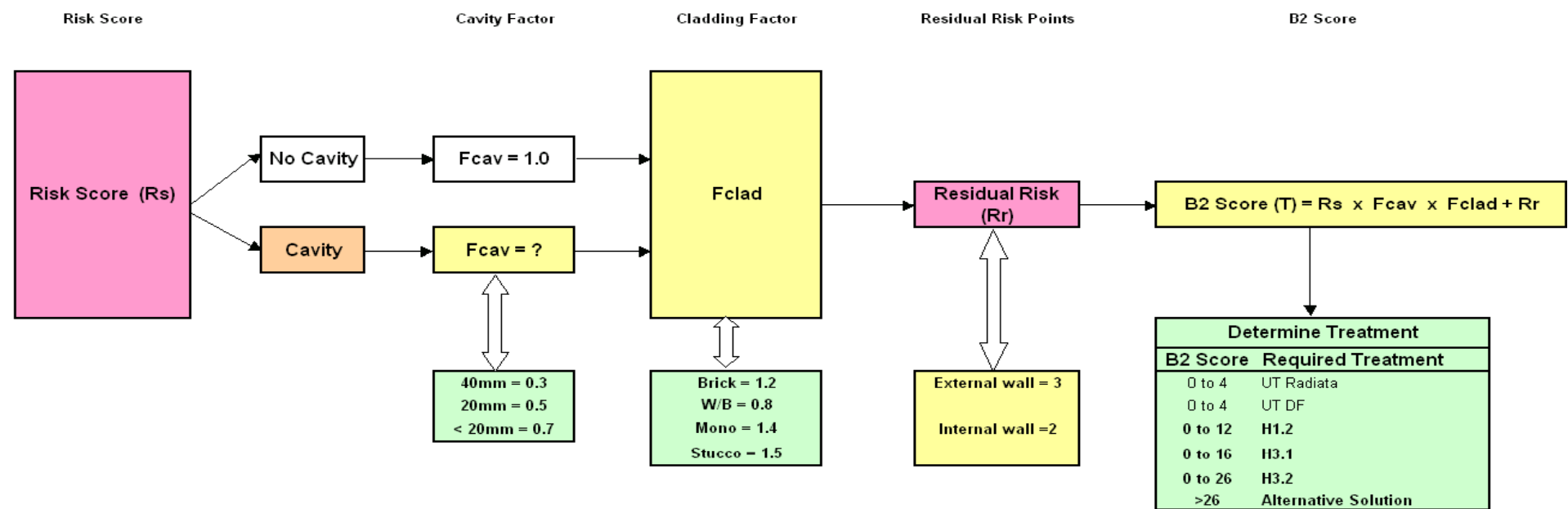
BIA Position

H3.2 is an effective treatment to prevent or at least delay fungal growth and decay for prolonged periods. Its use requires significant amounts of treatment, and special treatment of fixings. It should not be used unless there is an exposure situation similar to that to being exposed to the weather.

Appendix B - Risk Matrix Worksheets

Figure 1 Risk Matrix Approach - Flow Chart

Step 1 - General Risks



Step 2 - Assess Construction Risk

Construction Risk Score	
Risk of decay during construction	
Exposure	Score
Indoor construction	0
Up to 8 weeks to close in	4
8 to 16 weeks to close in	10
Over 16 weeks to close in	16
Treatment required is for supporting elements only	

Step 3 Assess Risk Features

Risk Features		Internal Walls Only
Feature		Score
Deck/Balcony		8
Skillion Roof		8
Internal gutter		8
Flat Roof		8

Risk Features		External Walls Only
Feature		Score
Deck/Balcony		12
Skillion Roof		8
Internal gutter		12
Flat Roof		8

Add to B2 risk score to determine final score. Treatment required applies to affected element only	
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E2 Risk Score - Weathertightness Risk Evaluation

Sheet 1

Building plan to be evaluated for weathertightness risk on all four faces.

Cladding option selected shall not be less than that permitted for the level of risk for each face but may exceed it.

Risk Component	Risk Severity							
	Low		Medium		High		Very High	
Wind zone (NZS3604)	Low	0	Medium	0	High	1	Very High	2
No. of storeys	One	0	Part two storey*	1	Two	2	More than two	4
Roof type	Hip	0	Simple monopitch/curve	1	complex shape/dormers	3	Multiple level with complex shapes or parapet	5
Eave width (ignore if parapet)	Greater than 600mm at 1st floor level	0	450mm - 600mm or greater than 600 mm at 2nd floor level	1	100mm - 449mm or 450mm - 600mm 2nd floor level	2	0 - 99mm or 100-449 at 2nd floor level	5
Envelope complexity *	Simple	0	Moderate	1	Moderately complex	3	Complex	6
Decks/Balconies	None or timber slat deck over subfloor only and attached at ground floor level	0	Fully covered in plan by roof or timber slat deck over subfloor only and attached at 1st or 2nd floor level	2	Exposed in plan	4	Exposed in plan and cantilevered	6
Sub- totals			+		+		+	6

* Envelope complexity	Simple	Simple rectangular shape, all walls fully covered by roof overhang
	Moderate	Buildings with roof line abutting adjacent walls
	Moderately complex	Buildings with multiple claddings and roof line abutting adjacent walls
	Complex	Buildings with multiple claddings and roof-line abutting adjacent walls. Multiple penetrations through walls, Complex junctions

Risk score	Allowable claddings for each risk score
0-6	All claddings in E2/AS1 direct fixed or with cavity
7-12	Bevel back weatherboards, vertical profiled steel, vertical board and batten, or any cladding in E2/AS1 with a 20 mm minimum drained ventilated cavity or brick veneer
13-20	Vertical profiled steel, brick veneer or any cladding in E2/AS1 with a 20 mm minimum drained ventilated cavity
20+	Specific design

*Simple gable/hip	0
Simple monopitch/curve	1
Complex shape/penetrations/dormers	2
Multiple level with complex shapes	4
Sloping	0
less than 10 degree slope	1
less than 10 degree slope: sloping	1
Flat	3
Flat: sloping	3
Flat: less than 10 degree slope	3
Flat: less than 10 degree slope: sloping	3

B2 Risk Score Determinations - External Wall Framing						
	E2 Risk Score	Cavity	Cladding	Residual	B2 Risk	
	Ext Risk	Factor	Factor	Risk	Score	Treatment
	(Rs)	(F _{cav})	(F _{clad})	(Rr)	(T)	
				Residual		
Brick Veneer Cladding		Cavity	Cladding	Risk	Total	Treatment
	0	0.3	1.2	2	2	ut
	2	0.3	1.2	2	3	ut
	4	0.3	1.2	2	3	ut
	6	0.3	1.2	2	4	h1.2
	12	0.3	1.2	2	6	h1.2
	18	0.3	1.2	2	8	h1.2
	24	0.3	1.2	2	11	h1.2
				Residual		
Weather Board	Ext Risk	Cavity	Cladding	Risk	Total	Treatment
No cavity	0	1	0.8	2	2	ut
	6	1	0.8	2	7	h1.2
	12	1	0.8	2	12	h1.2
	18	1	0.8	2	16	h3.1
	24	1	0.8	2	21	h3.2
				Residual		
Weather Board	Ext Risk	Cavity	Cladding	Risk	Total	Treatment
Cavity	0	0.5	0.8	2	2	ut
	6	0.5	0.8	2	4	ut
	12	0.5	0.8	2	7	h1.2
	18	0.5	0.8	2	9	h1.2
	24	0.5	0.8	2	12	h1.2
				Residual		
Monolithic	Ext Risk	Cavity	Cladding	Risk	Total	Treatment
No cavity	0	1	1.4	3	3	ut
	2	1	1.4	3	6	h1.2
	4	1	1.4	3	9	h1.2
	6	1	1.4	3	11	h1.2
	12	1	1.4	3	20	h3.2
	18	1	1.4	3	28	Alt Des
	24	1	1.4	3	37	Alt Des
				Residual		
Monolithic	Ext Risk	Cavity	Cladding	Risk	Total	Treatment
Cavity	0	0.5	1.4	3	3	ut
	2	0.5	1.4	3	4	ut
	4	0.5	1.4	3	6	h1.2
	6	0.5	1.4	3	7	h1.2
	12	0.5	1.4	3	11	h1.2
	18	0.5	1.4	3	16	h1.2
	24	0.5	1.4	3	20	h3.2
B2 Score		Required Treatment		Risk Features		
0 to 4		UT Radiata		External Walls Only		
0 to 4		UT DF		Feature		
0 to 12		H1.2		Deck/Balcony		
0 to 16		H3.1		Skillion Roof		
0 to 26		H3.2		Internal gutter		
>26		Alternative Solution		Flat Roof		
				Add to B2 risk score then determine required timber treatment		

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Appendix C – Summary of Common Timber Treatments

Summary of Common Timber Treatments				
Hazard Class		Common Reference	Active Ingredients	Comment
Existing	Proposed New Class			
Untreated	Untreated	Untreated, Chemical-free Kiln-dried	Kiln-dried to 75° C, planer gauged	Existing requirement states where it can be kept at a moisture content of 18% or less during installation and for the whole of its life time. Current thinking is that this is not suitable for external walls or internal partitions with pipework or adjacent to wet areas. Proposal is to not allow it in all exterior housing framing, except simple single storied buildings with brick veneer
H1	H1.1	LOSP ⁽¹⁾ Kiln-dried	Permethrin	Resistant against insect attack only – as above. Has no resistance to decay. Should not be confused with Boron treated H1 as it has no fungicidal effect
		Boron	Boric acid 0.1% retention (was higher when introduced in the 50s, reduced over the years as accuracy of treatment increased.)	Resistant against insect attack but with a small resistance to decay. The current thinking is that this small resistance to decay is not sufficient to protect the home owner from failure of cladding or pipework or wet area linings. Not usually kiln-dried but can be done for a higher cost
none	H1.2 (H1 Plus)	LOSP	Permethrin plus Tributyltin 0.6% retention (75% of H3 retention)	In dry situations but where there is a risk of moisture content conducive to decay – all framing in houses including external wall framing, roof framing and trusses, inter-storey joists, ceiling joists and internal framing. Not officially approved but is proposed in the new NZS 3640 Timber Treatment Standard, currently in final draft form.
		Boron	Permethrin plus IPBC ⁽²⁾ Boric acid 0.4% retention (4 x current requirement)	
H2	(used in Australia only against termites)			

Summary of Common Timber Treatments continued				
Hazard Class		Common Reference	Active Ingredients	Comment
Existing	Proposed New Class			
H3	H3.1	LOSP	Tributyltin oxide (TBTO)	Weatherboards, exterior joinery and exterior finishing timbers, framing in dry situations but where there is a risk of moisture content conducive to decay Not to be used for structural timbers requiring a 50 year durability
			Tributyltin naphthenate (TBTN)	
			IPBC ⁽²⁾	
	H3.2	Copper based preservatives	Copper Chrome Arsenate (CCA) Not advised for children's playground structures, and need to think about decks	Structural timber members exposed to exterior conditions and dampness – posts, beams, joists etc (but not in contact with the ground)
			Alkaline Copper Quaternary (ACQ)	
			Copper Azole (CuAz)	
			Copper Napthenate (CuN)	
H4 and H5	No change	Copper based preservatives	Copper Chrome Arsenate (CCA)	Ground contact or conditions of severe or continuous wetting - Post in ground for 50 years
			Alkaline Copper Quaternary (ACQ)	Ground contact or conditions of severe or continuous wetting, but not post in ground for 50 years (okay with 25 years specified intended life).
H6	No change	Copper based preservatives	Copper Chrome Arsenate (CCA)	Marine timber and piles

NOTES

Light Organic Solvent Preservative – named after the medium by which the chemical is dispersed through the timber.
IPBC stands for Iodo propynyl butyl carbonate, a fungicide