NEW ZEALAND STANDARD

FOR PRESSED METAL TILE ROOFS

Part 1

Specification for roofing tiles and their accessories

Part 2

Code of practice for preparation of the structure and the laying and fixing of metal roofing tiles

© The Crown in right of New Zealand, administered by the New Zealand Standards Executive. Access to this standard has been sponsored by the Ministry of Business, Innovation, and Employment under copyright license LN001319. You are not permitted to reproduce or distribute any part of this standard without prior written permission from Standards New Zealand, on behalf of New Zealand Standards Executive, unless your actions are covered by Part 3 of the Copyright Act 1994.

Single User PDF Terms & Conditions

You have material which is subject to strict conditions of use. Copyright in this material is owned by the New Zealand Standards Executive. Please read these terms and conditions carefully, as in addition to the usual range of civil remedies available to Standards New Zealand on behalf of the New Zealand Standards Executive for infringement of copyright, under New Zealand law every person who infringes copyright may be liable to a fine of up to $10,000 for every infringing copy or imprisonment of up to 5 years, or a fine of up to $150,000 or imprisonment not exceeding 5 years.

You have access to a single-user licence to read this non-revisable Adobe Acrobat PDF file and print out and retain ONE printed copy only.

We retain title and ownership of the copyright in this PDF file and the corresponding permitted printed copy at all times.

Under this license use of both the PDF file and the single permitted printed copy of this PDF file you may make are restricted to you. Under no circumstances are you permitted to save, sell, transfer, or copy this PDF file, the one permitted printed copy of this PDF file, or any part of either of them.

You undertake that you will not modify, adapt, translate, reverse engineer, decompile, disassemble or create derivative works based on any of the downloaded PDF file, nor will you merge it with any other software or document, even for internal use within your organization.

Under no circumstances may this PDF file be placed on a network of any sort without our express permission.

You are solely responsible for the selection of this PDF file and any advice or recommendation given by us about any aspect of this PDF file is intended for guidance only and is followed or acted upon entirely at your own risk.

We are not aware of any inherent risk of viruses in this PDF file at the time that it is accessed. We have exercised due diligence to ensure, so far as practicable, that this file does not contain such viruses.

No warranty of any form is given by us or by any party associated with us with regard to this PDF file, and you accept and acknowledge that we will not be liable in any way to you or any to other person in respect of any loss or damage however caused which may be suffered or incurred or which may arise directly or indirectly through any use of this PDF file.

Regardless of where you were when you received this PDF file you accept and acknowledge that to the fullest extent possible you submit to New Zealand law with regard to this licence and to your use of this PDF file.

Copyright Standards New Zealand

© The Crown in right of New Zealand, administered by the New Zealand Standards Executive. Access to this standard has been sponsored by the Ministry of Business, Innovation, and Employment under copyright license LN001319. You are not permitted to reproduce or distribute any part of this standard without prior written permission from Standards New Zealand, on behalf of New Zealand Standards Executive, unless your actions are covered by Part 3 of the Copyright Act 1994.

Copyright Standards New Zealand

© 1980 STANDARDS COUNCIL

Declared on 29 February 1980 by the Standards Council to be a standard specification pursuant to the provisions of section 23 of the Standards Act 1965.

First published February 1980

The following SANZ references relate to this standard:

Project No. P 4217
Draft for comment No. DZ 4217
Printing code: IM–1979/2016/6518.

Copyright Standards New Zealand

AMENDMENTS

No.	*Date of issue*	*Description*	*Entered by, and date*

JOHN MILNE LTD.
WELLINGTON, NEW ZEALAND

© The Crown in right of New Zealand, administered by the New Zealand Standards Executive. Access to this standard has been sponsored by the Ministry of Business, Innovation, and Employment under copyright license LN001319. You are not permitted to reproduce or distribute any part of this standard without prior written permission from Standards New Zealand, on behalf of New Zealand Standards Executive, unless your actions are covered by Part 3 of the Copyright Act 1994.

NEW ZEALAND STANDARD

FOR PRESSED METAL TILE ROOFS

Part 1

Specification for roofing tiles and their accessories

Part 2

Code of practice for preparation of the structure and the laying and fixing of metal roofing tiles

© COPYRIGHT

The copyright of this document is the property of the Standards Council. No part of it may be reproduced by photocopying or by any other means without the prior written permission of the Director of the Standards Association of New Zealand unless the circumstances are covered by the exemption sections (19 and 21) of the Copyright Act 1962.

STANDARDS ASSOCIATION OF NEW ZEALAND
WORLD TRADE CENTER, 15–23 STURDEE STREET, WELLINGTON 1
Postal address: Private Bag, Wellington Telex: NZ 3850

FEBRUARY 1980

© The Crown in right of New Zealand, administered by the New Zealand Standards Executive. Access to this standard has been sponsored by the Ministry of Business, Innovation, and Employment under copyright license LN001319. You are not permitted to reproduce or distribute any part of this standard without prior written permission from Standards New Zealand, on behalf of New Zealand Standards Executive, unless your actions are covered by Part 3 of the Copyright Act 1994.

Copyright Standards New Zealand

REQUEST FOR NEXT AMENDMENT

If this address label has not been returned SANZ has no record that you wish to receive future free amendments to this standard.

To confirm that the next amendment has been requested, enter details of despatch below:

.....

REQUEST FOR NEXT AMENDMENT

NZS 4217 : 1980
Amendment No. 1

If more than one copy is required state quantity here ..... COPIES

Name and full postal address

.....
.....
.....
.....

Please type or print clearly

This is your request and mailing label for the next amendment to this

© The Crown in right of New Zealand, administered by the New Zealand Standards Executive. Access to this standard has been sponsored by the Ministry of Business, Innovation, and Employment under copyright license LN001319. You are not permitted to reproduce or distribute any part of this standard without prior written permission from Standards New Zealand, on behalf of New Zealand Standards Executive, unless your actions are covered by Part 3 of the Copyright Act 1994.

Copyright Standards New Zealand

STANDARDS ASSOCIATION
OF NEW ZEALAND
Private Bag, Wellington.

© The Crown in right of New Zealand, administered by the New Zealand Standards Executive. Access to this standard has been sponsored by the Ministry of Business, Innovation, and Employment under copyright license LN001319. You are not permitted to reproduce or distribute any part of this standard without prior written permission from Standards New Zealand, on behalf of New Zealand Standards Executive, unless your actions are covered by Part 3 of the Copyright Act 1994.

CONTENTS **PAGE**

Committee representation 4
Related documents 5
Foreword 5
Acknowledgment 5

GENERAL

Section

1 Scope 7
2 Interpretation 7

PART 1 SPECIFICATION FOR ROOFING TILES AND THEIR ACCESSORIES

Section

101 Product standards 8
101.1 Steel 8
101.2 Zinc coating 8
101.3 Other metals 8
102 Applied finish 8
103 Dimensional tolerances 8
104 Shape 8
105 Fastenings 8
106 Handling and storage 8
107 Other materials and proprietary products 8

PART 2 CODE OF PRACTICE FOR PREPARATION OF THE STRUCTURE AND THE LAYING AND FIXING OF METAL ROOFING TILES

Section

201 New roofs 10
201.1 Design requirements 10
201.2 Roof framing 10
201.3 Underlays 10
201.4 Tiling battens 10
202 Re-roofing 10
202.1 Alternative methods 10
202.2 Design requirements 10
202.3 Preparation of roof 11
202.4 Counter battens 11
202.5 Tiling battens 12
203 Laying and fixing 12
203.1 Preparatory work 12
203.2 Workmanship 12
203.3 Laying of tiles 12
203.4 Fastening of tiles 14
203.5 Concentrated rainwater discharge 14

Table

1 Size and fixing of tiling battens spaced at up to 400 mm (new roofs) 10
2 Allowable rafter spans supporting metal tile roof overlays 11
3 Spacing of 50 mm x 25 mm counter battens 11
4 Size and fixing of tiling battens spaced at up to 400 mm (re-roofing) 12
5 Nail size, type, and spacing 13
6 Wind area for various localities 15

Figure

1 Wind areas 16

Appendix

A Basic wind speeds 15

Copyright Standards New Zealand

© The Crown in right of New Zealand, administered by the New Zealand Standards Executive. Access to this standard has been sponsored by the Ministry of Business, Innovation, and Employment under copyright license LN001319. You are not permitted to reproduce or distribute any part of this standard without prior written permission from Standards New Zealand, on behalf of New Zealand Standards Executive, unless your actions are covered by Part 3 of the Copyright Act 1994.

COMMITTEE REPRESENTATION

This standard was prepared under the supervision of the Building and Civil Engineering Sectional Committee (38/–) for the Standards Council, established under the Standards Act 1965. The committee consisted of representatives of the following:

*Building Research Association of New Zealand
Department of Scientific and Industrial Research
Department of Trade and Industry
*Housing Corporation of New Zealand
Ministry of Energy
*Ministry of Works and Development
Municipal Association of New Zealand
New Zealand Contractors Federation
New Zealand Counties Association
New Zealand Forest Service
*New Zealand Institute of Architects
New Zealand Institution of Engineers
*New Zealand Manufacturers Federation
New Zealand Master Builders Federation
New Zealand Government Railways Department
New Zealand Sawmillers Federation
New Zealand Timber Importers Association
New Zealand Timber Merchants Federation
New Zealand Timber Research and Development Association
Post Office

The Pressed Metal Tiles Committee (38/14) was responsible for the preparation of the standard and consisted of representatives of the organizations marked with an asterisk (*) above.

Copyright Standards New Zealand

RELATED DOCUMENTS

Reference is made in this document to the following:

	Clause reference herein
NEW ZEALAND STANDARDS	
NZS 4203 : 1976 *Code of practice for general structural design and design loads*	104.1, 104.2
NZS 3441 : 1978 *Hot-dipped zinc-coated steel coil and cut lengths*	101.1.1, 101.2.1
NZS 3602 : 1975 *Code of practice for specifying timber and wood-based products for use in building*	201.4.1
NZS 3604 : 1978 *Code of practice for light timber frame buildings not requiring specific design*	2.4, 201.3, Table 1, 202.2.5, 203.4.1.2 (a)
MP 3801 : 1972 *A guide to the adoption of the model building bylaw (NZS 1900) by local authorities using the standard adoption and annual updating procedures*	C2.3
BRITISH STANDARD	
BS 4940 : 1973 *Recommendations for the presentation of technical information about products and services in the construction industry*	C101

FOREWORD

In order to allow flexibility of design, this standard does not purport to give guidance on standard dimensions, tile pattern, or decorative coatings. For information on these characteristics the manufacturer's literature should be consulted.

The materials clauses of the specification cover tiles made of hot-dipped galvanized steel, in some detail, and make provision for tiles pressed from other metals. Other forms of roofing are not within the scope of this standard.

ACKNOWLEDGMENT

Preparation of the original draft for this standard was carried out by JASMAD Architectural Information in consultation with manufacturers of pressed metal tiles and with the Building Research Association of New Zealand.

Copyright Standards New Zealand

© The Crown in right of New Zealand, administered by the New Zealand Standards Executive. Access to this standard has been sponsored by the Ministry of Business, Innovation, and Employment under copyright license LN001319. You are not permitted to reproduce or distribute any part of this standard without prior written permission from Standards New Zealand, on behalf of New Zealand Standards Executive, unless your actions are covered by Part 3 of the Copyright Act 1994.

© The Crown in right of New Zealand, administered by the New Zealand Standards Executive. Access to this standard has been sponsored by the Ministry of Business, Innovation, and Employment under copyright license LN001319. You are not permitted to reproduce or distribute any part of this standard without prior written permission from Standards New Zealand, on behalf of New Zealand Standards Executive, unless your actions are covered by Part 3 of the Copyright Act 1994.

Copyright Standards New Zealand

(BLANK)

NEW ZEALAND STANDARD FOR PRESSED METAL TILE ROOFS

GENERAL

1 SCOPE

1.1 This standard defines the quality of the material used in the manufacture of pressed metal roofing tiles and accessories. In addition it describes a suitable means of fixing the tiles on new or existing structures. Material specifications relate specifically to products made from hot-dipped galvanized steel, with performance standards which are required to be met by other metals used in the manufacture of pressed metal roofing tiles and accessories.

1.2 This standard applies only to the roofing and re-roofing of buildings less than 10 m high and not subject to specific design.

2 INTERPRETATION

2.1 In this standard the word "shall" indicates a requirement that is to be adopted in order to comply with the standard, while the word "should" indicates a recommended practice.

2.2 Subject to clause 2.1, clauses prefixed by "C" and printed in italic are included as comments on the corresponding mandatory clauses.

2.3 Where any other standard named in this standard has been declared or endorsed in terms of the Standards Act 1965, then –

(a) Reference to the named standard shall be taken to include any current amendments declared or endorsed in terms of the Standards Act 1965, *or*

(b) Reference to the named standard shall be read as reference to any standard currently declared or endorsed in terms of the Standards Act 1965 as superseding the named standard, including any current amendments to the superseding standard declared or endorsed in terms of the Standards Act 1965.

C2.3 The date at which an amendment or superseding standard is regarded as "current" is a matter of law depending upon the particular method by which this standard becomes legally enforceable in the case concerned. In general, if this is by contract the relevant date is the date on which the contract is created, but if it is by Act, regulation, or bylaw then the relevant date is that on which the Act, regulation, or bylaw is promulgated; for bylaws, promulgation includes updating by the procedure set out in MP 3801.*

2.4 In this standard, unless inconsistent with the context, terms used shall have the meanings given in NZS 3604*.

2.5 Definitions

2.5.1 In this standard, unless inconsistent with the context:

ACCESSORIES means ridge caps, gable end cover or other purpose-made flashing supplied by the manufacturer in matching material.

APPLIED FINISH means a surface finish applied to a metal tile and accessories before or after forming into its final shape.

BODY OF THE ROOF means the remainder of any roof after edge zones have been deducted from it for the purpose of calculating the fastening requirement for the roof tiles.

EDGE ZONE means a zone 900 mm wide that borders each roof plane.

TILES means tiles and accessories.

*See list of related documents.

© The Crown in right of New Zealand, administered by the New Zealand Standards Executive. Access to this standard has been sponsored by the Ministry of Business, Innovation, and Employment under copyright license LN001319. You are not permitted to reproduce or distribute any part of this standard without prior written permission from Standards New Zealand, on behalf of New Zealand Standards Executive, unless your actions are covered by Part 3 of the Copyright Act 1994.

Copyright Standards New Zealand

© The Crown in right of New Zealand, administered by the New Zealand Standards Executive. Access to this standard has been sponsored by the Ministry of Business, Innovation, and Employment under copyright license LN001319. You are not permitted to reproduce or distribute any part of this standard without prior written permission from Standards New Zealand, on behalf of New Zealand Standards Executive, unless your actions are covered by Part 3 of the Copyright Act 1994.

PART 1 SPECIFICATION FOR ROOFING TILES AND THEIR ACCESSORIES

101 PRODUCT STANDARDS

C101 Manufacturer's literature should make reference to product quality. Some useful recommendations for the presentation of product information is contained in BS 4940.*

101.1 Steel

101.1.1 Steel used for tiles and accessories shall be hot-dipped galvanized steel complying with NZS 3441*.

101.2 Zinc coating

101.2.1 Zinc coating classes shall be as defined in NZS 3441*.

101.2.2 Where the tiles are to be laid without an applied finish, or with an applied finish only to surfaces exposed to the weather, coating on tiles shall be of coating class Z400.

101.2.3 Coating on tiles having an applied finish on all surfaces shall be of class ZM300.

101.3 Other metals

101.3.1 Tiles made from other metals, together with their applied finishes, shall be shown to be not less durable than tiles made from galvanized sheet steel as required by clause 101.1.1 together with their applied finishes. See also section 107.

102 APPLIED FINISH

102.1 Where tiles and accessories have an applied finish, it shall be applied in a manner that shall not diminish the corrosion resistance of the unfinished tile, and shall be applied either or both –

(a) On site in accordance with the manufacturer's instruction; *or*

(b) In a factory under the manufacturer's control.

102.2 Such finishes shall:

(a) Be shown to the satisfaction of the Engineer to have an established record of satisfactory performance in their intended use;

(b) Have provided by the manufacturer, to the satisfaction of the Engineer, relevant test information and assessments of their performance in their intended use, issued by an approved independent authority;

(c) Be capable of being touched up, both at the time of installation and during subsequent maintenance.

102.3 Tiles having an applied finish shall be sufficiently consistent in colour and texture on any roof plane not to detract from the appearance of the roof.

103 DIMENSIONAL TOLERANCES

103.1 Dimensional tolerances shall be such as to prevent weather penetration between tiles, and between tiles and accessories, and to ensure proper installation in accordance with section 203.

104 SHAPE

104.1 The shape of the tiles will be governed by the need to exclude weather and comply with the live load test requirements of NZS 4203* in the specific areas designated by the manufacturer.

104.2 Manufacturers shall upon request provide independent test evidence that the tiles comply with NZS 4203* in the areas defined in clause 104.1.

105 FASTENINGS

105.1 When necessary the manufacturer shall supply direct or through his agents the fastening devices needed for the fastening of tiles to comply with section 203.

106 HANDLING AND STORAGE

106.1 In the period between manufacture and fixing, tiles shall be kept dry and well ventilated.

107 OTHER MATERIALS AND PROPRIETARY PRODUCTS

107.1 Materials, components, and proprietary products not specifically covered by this standard may be used subject to the following conditions:

*See list of related documents.

Copyright Standards New Zealand

Either

(a) They shall be shown, to the satisfaction of the Engineer, to have an established record of satisfactory performance in their intended use over a considerable time:

or

(b) They shall satisfy the following conditions:

(1) The manufacturer has specifically designated them for the intended use;

(2) The manufacturer has supplied to their users clearly presented and adequate technical information on their relevant properties, methods of installation and the like for the intended use;

(3) The manufacturer has provided, to the satisfaction of the Engineer, relevant test information and assessments of their performance in the intended use issued by an approved authority.

C107.1 Some general performance requirements for particular uses are given in the appropriate clauses of this standard.

Copyright Standards New Zealand

© The Crown in right of New Zealand, administered by the New Zealand Standards Executive. Access to this standard has been sponsored by the Ministry of Business, Innovation, and Employment under copyright license LN001319. You are not permitted to reproduce or distribute any part of this standard without prior written permission from Standards New Zealand, on behalf of New Zealand Standards Executive, unless your actions are covered by Part 3 of the Copyright Act 1994.

© The Crown in right of New Zealand, administered by the New Zealand Standards Executive. Access to this standard has been sponsored by the Ministry of Business, Innovation, and Employment under copyright license LN001319. You are not permitted to reproduce or distribute any part of this standard without prior written permission from Standards New Zealand, on behalf of New Zealand Standards Executive, unless your actions are covered by Part 3 of the Copyright Act 1994.

PART 2 CODE OF PRACTICE FOR PREPARATION OF THE STRUCTURE AND THE LAYING AND FIXING OF METAL ROOFING TILES

201 NEW ROOFS

201.1 Design requirements

201.1.1 *Roof slope.* Tiles shall not be laid on roof structures with a rafter slope less than 12°, except in accordance with a method approved in writing by the tile manufacturer for a particular job.

201.2 Roof framing

201.2.1 Roof framing shall be such as to provide adequate support and fixing for the tile battens.

201.3 Underlays

201.3.1 An approved underlay shall be provided to all new roofs in accordance with NZS 3604*, stretched tight over the fascia into the gutter.

201.4 Tiling battens

201.4.1 Tiling battens shall be of timber species, grade, quality and preservative treatment to comply with NZS 3602*.

201.4.2 Battens shall be not less than the sizes shown in table 1. Where batten size exceeds 50 mm in either dimension, the roofing system shall be subject to specific design.

C201.4.2 Use of battens exceeding 50 mm in either dimension implies widely spaced members, more heavily loaded and with fewer fastenings than provided for in this standard.

201.4.3 Battens shall be spaced along rafters or trusses to suit the tile pattern used and shall be fixed down over the underlay at every crossing by nails of the size shown in table 1 or by other fixings of equivalent performance.

C201.4.3 Battens are set out along trusses or rafters from the bottom with the first dimension above the fascia less than the normal batten spacing to allow adequate projection of the eaves course of tiles over spouting. Rafter lengths to suit full tiles are recommended but fixing techniques for cut tiles and top course cappings are available and described in clause 202.3.

Table 1

SIZE AND FIXING OF TILING BATTENS SPACED AT UP TO 400 mm

(new roofs)

Maximum batten span mm	*Size* mm	*Roof zone*	*Minimum nail size* mm
900	50 x 40	Body and edge	1/100 x 3.75
1200	50 x 50	Body	1/100 x 3.75
		Edge	1/100 x 3.75 plus 1/ 75 x 3.15 skewed

NOTE – Table 1 is constructed from information contained in Appendix A of NZS 3604*.

201.4.4 Battens shall have square cut ends and shall be butt jointed over the centre line of the rafter or truss, with one 75 mm x 3.15 mm nail skewed on each side of the joint. Adjacent rows of battens shall not be jointed on the same rafter.

201.4.5 Battens shall span at least three rafters or trusses at the edge of all roof planes.

201.4.6 Battens shall be mitre cut to fit accurately over the valley rafters and against the hip board or otherwise firmly supported at the batten ends and nailed as for clause 201.4.4.

201.4.7 A tile batten shall be fixed immediately behind the fascia as fixing for the eaves course of tiles.

202 RE-ROOFING

202.1 Alternative methods. Re-roofing may be by the overlay system, or by the removal and replacement of existing covering. If the latter course is followed, all work shall be carried out in accordance with section 201.

202.2 Design requirements

202.2.1 Re-roofing by overlay shall not be laid on roof structures with a rafter slope less than 12°, except in accordance with a method approved in writing by the tile manufacturer for a particular job.

*See list of related documents.

Copyright Standards New Zealand

© The Crown in right of New Zealand, administered by the New Zealand Standards Executive. Access to this standard has been sponsored by the Ministry of Business, Innovation, and Employment under copyright license LN001319. You are not permitted to reproduce or distribute any part of this standard without prior written permission from Standards New Zealand, on behalf of New Zealand Standards Executive, unless your actions are covered by Part 3 of the Copyright Act 1994.

202.2.2 The existing roof shall be studied as to the condition of roof materials, size, condition and spacing of rafters, and other roof framing timbers. Purlins shall be inspected from inside the roof to establish their soundness. If any unsound purlins are found, the roof cladding shall be stripped and a thorough examination made. Damaged and decayed timbers shall be replaced.

C202.2.2 Purlins should be tested by nail or punch as close to the purlin top face as possible, to ascertain if dry rot exists. This may not be evident by visual inspection.

202.2.3 All existing roofing materials other than corrugated galvanized steel, membrane roofing, shingles, slates and similar products, shall be removed before re-roofing is carried out.

202.2.4 Where the existing roof is sarked, sufficient of the existing roof cladding shall be removed to reveal the rafter positions for nailing.

202.2.5 Roof framing shall be such as to provide adequate support and fixing for the tile battens. If heavy roofing is removed prior to re-roofing, then rafter fixings must be checked and improved where necessary to ensure compliance with NZS 3604*, so that risk of damage due to wind uplift is minimized.

202.2.6 Where existing rafters are of kauri, rimu, or matai and are spaced between 900 mm to 1200 mm centres, additional under-purlins and purlin struts shall be added to the roof structure to reduce the rafter spans to not greater than those listed in table 2.

Table 2

ALLOWABLE RAFTER SPANS SUPPORTING METAL TILE ROOF OVERLAYS

Nominal rafter size mm	*Span* m
100 x 50	2.7
125 x 50	3.4
150 x 50	4.0
175 x 50	4.7
200 x 50	5.4
225 x 50	6.0
250 x 50	6.75

202.3 Preparation of roof

202.3.1 *Existing roof covering at the perimeter of the roof.* Ridge, hip, and barge flashings shall be removed and the existing roof covering shall be cut back to behind the barge board and the nearest purlin to the fascia.

202.3.2 *Preparation at fascia*

202.3.2.1 *Existing fascia.* A continuous 25 mm batten shall be nailed to the top of the purlin behind the fascia as fixing for the eaves course of tiles.

202.3.2.2 *New fascia.* When it is considered necessary, the existing fascia shall be removed and replaced with one of sufficient height to line with the top of the tile battens. A tile batten shall be fixed immediately behind the fascia as fixing for the eaves course of tiles.

202.3.3 *Preparation at ridge, hips.* Existing ridge and hip boards shall be built up or new members installed to project above the counter battens to a dimension suitable for the tile pattern used.

202.3.4 *New valley gutters.* Valley gutters not less than 150 mm wide and 25 mm deep and with 25 mm flanges shall be provided and shall be painted on both sides before installation.

202.3.5 *New flashings.* All roof flashings shall be renewed.

202.4 Counter battens

C202.4 In some circumstances, for example, membrane roofs, shingles, or slates, counter battens may not be required.

202.4.1 Counter battens shall be 50 mm x 25 mm of identical timber to that specified for tiling battens in clause 201.4.

202.4.2 Counter battens shall be laid in the corrugations of the existing roof cladding, and shall extend between the edges of the roof plane.

202.4.3 The maximum spacing for counter battens in various parts of the roof shall be as set out in table 3. Additional short counter battens, bridging purlins not less than 750 mm apart, are required between normal counter battens at edge zones to resist wind forces.

Table 3

SPACING OF 50 mm x 25 mm COUNTER BATTENS

	Maximum spacing of purlins (mm)			
	750	900	750	900
Wind areas	*At edge zones*		*Main body of roof*	
Low and medium	600	600	900	600
High	300	300	900	600

NOTE – Wind areas are as defined in Appendix A.

*See list of related documents.

Copyright Standards New Zealand

© The Crown in right of New Zealand, administered by the New Zealand Standards Executive. Access to this standard has been sponsored by the Ministry of Business, Innovation, and Employment under copyright license LN001319. You are not permitted to reproduce or distribute any part of this standard without prior written permission from Standards New Zealand, on behalf of New Zealand Standards Executive, unless your actions are covered by Part 3 of the Copyright Act 1994.

202.4.4 Counter battens shall be nailed through to the purlins with one 90 mm x 3.55 mm spiral rolled nail at each crossing, except that where the counter batten sits directly on to the purlin behind the fascia, two 75 mm x 3.15 mm skew driven nails may be used.

202.4.5 Counter battens shall also be laid across the top of the corrugations along each side of the valley and nailed through to the purlins with one 90 mm x 3.55 mm spiral rolled nail at not more than 600 mm centres. These shall be not less than 150 mm apart and placed to provide continuous support for the flanges on each side of the new valley.

202.5 Tiling battens

202.5.1 Tiling battens shall be as clause 201.4 except that size and fixing shall be as set out in table 4.

Table 4

SIZE AND FIXING OF TILING BATTENS SPACED AT UP TO 400 mm

(re-roofing)

Maximum batten span *mm*	*Size* *mm*	*Nail size* *mm*
600	50 x 25	55 x 2.8 annular threaded
900	50 x 40 or splay cut from 75 x 50	100 x 3.75

202.5.2 Tiling battens laid on sarking shall be fixed direct to sarking and nailed through sarking to rafters using 90 mm x 3.55 mm spiral rolled nails in accordance with table 1.

203 LAYING AND FIXING

203.1 Preparatory work

203.1.1 All chasing and raking for overflashings, all preparatory work of underflashing, fixing of eaves, gutters and valley gutters shall be completed and all tiling battens shall be fixed in position before laying the tiles.

203.1.2 Laps of unfinished galvanized tile shall be primed with a suitable metal primer on both faces of the contact area.

203.2 Workmanship

203.2.1 *General.* Persons working on the roof shall wear flat, soft rubber-soled shoes to prevent damage to tiles, and shall walk only where recommended by the tile manufacturers.

203.2.2 *Cutting tiles.* Cutting tiles for installation at ridges, hips, valleys and verges shall be neatly done using metal shears or a guillotine with all care taken to avoid damaging the finish. When cutting lengthwise, it is recommended to bend the tile before cutting.

203.2.3 *Bending tiles.* Straightening and bending tiles for installation at ridges, hips, valleys, and barges shall be neatly done using a custom designed bender approved by the manufacturer. Tiles shall be turned up after cutting at ridges and hips by a minimum of 40 mm and down into valleys in accordance with clause 203.3.7.1.

C203.2.3 The effect of temperature on the coating should be considered when cutting and bending. Some coatings become brittle at low temperatures. Care must be taken when cutting and bending not to crack the surface coating and underlying galvanizing thus encouraging premature corrosion.

203.2.4 *Tile selection*

203.2.4.1 Deformed tiles or tiles with damage to the finish or corrosion of the zinc coating shall be rejected.

203.2.4.2 Tiles shall be checked for evenness of colour. Tiles showing significant variations should be discarded.

203.2.4.3 Tiles flattened or otherwise deformed during installation shall be removed from the roof and discarded.

203.2.5 *Making good and touching up*

203.2.5.1 Damage caused during installation by hammer impact, abrasion or scuffing shall be made good in accordance with the manufacturer's instructions.

203.2.5.2 Heads of nails fixed vertically shall be sealed in situ, with material compatible with the finish.

203.2.6 *Cleaning up*

203.2.6.1 All gutters, valleys, roof channels and the roof itself shall be cleared of all debris on completion of the work.

203.3 Laying of tiles

203.3.1 *General*

203.3.1.1 Tiles and accessories shall be laid and fixed to exclude water from the structure and lead it safely off the roof to a water dispersal system.

Copyright Standards New Zealand

© The Crown in right of New Zealand, administered by the New Zealand Standards Executive. Access to this standard has been sponsored by the Ministry of Business, Innovation, and Employment under copyright license LN001319. You are not permitted to reproduce or distribute any part of this standard without prior written permission from Standards New Zealand, on behalf of New Zealand Standards Executive, unless your actions are covered by Part 3 of the Copyright Act 1994.

203.3.2 *Laying procedure*

203.3.2.1 Tiles shall be laid from the ridge area down, with the eaves course of tiles finishing with a projection into the gutter.

C203.3.2.1 Tiles are usually laid by lifting the leading edge of the tile above and slipping the upstand of the tile below underneath so that it butts against the batten on which the flange rests. Nailing follows, as described in clause 203.4. Depending on the barge detail it may be necessary to adjust the tile side lap to create equal overhangs at both ends. The tolerance available by this method is +2 mm per tile. Other methods involve cutting the tile edge.

203.3.2.2 Tiles shall be laid in running bond or stack bond to suit the manufacturer's recommendations.

203.3.2.3 The top tile course shall abut the ridge board as either:

(a) A full tile; *or*

(b) A cut tile bent to an upstand; *or*

(c) A capping tile accessory

depending on the length of the rafter. Cut tiles shall be set to the same slope as uncut tiles. The upstand shall be finished by a ridge cap accessory fixed through the upstand as for the body of the roof in table 5 and which also provides a 75 mm minimum weathering lap to barge moulds and hip caps.

203.3.3 *Head laps.* Tiles shall be laid as tightly as the configuration of the tile will permit and nailed through the lap into the batten as described in clause 203.4.

203.3.4 *Side laps.* Tiles shall be laid to a corrugation side lap or in accordance with the manufacturer's recommendations.

C203.3.4 Tiles can usually be laid either from left or right depending on the site. Factors to be taken into account include appearance and prevailing wind exposure.

203.3.5 *Gable ends*

203.3.5.1 Tiles shall be finished at gable ends with either:

(a) A sawtooth edge barge mould accessory lapped over the barge board; *or*

(b) A lead edged barge mould accessory lapped over the barge board with lead of sufficient weight to withstand deformation by wind; *or*

(c) An overflashed barge board with secret gutter behind.

203.3.5.2 Barge moulds shall be lapped over the barge board and dressed on to the tiles which shall be bent up to provide weathering beneath the moulding. Barge moulds shall be fastened to every batten in accordance with table 5.

Table 5

NAIL SIZE, TYPE, AND SPACING

Wind areas	*Minimum nail size mm*	*Location on roof*	*Maximum spacing mm*
Low and medium	50 x 2.5 or 45 x 2.8 hot-dip galvanized flat head	Body	600
		Edge	400
		Fascia (into batten)	400
High	50 x 2.5 or 45 x 2.8 hot-dip galvanized flat head	Body	400
		Edge	400
		Fascia (into batten)	400

203.3.5.3 The tile edge shall be bent down into the secret gutter.

203.3.6 *Hips*

203.3.6.1 Hip tile courses shall be finished against hip boards with tiles custom cut on the mitre and provided with upstands along the cut edge and fixed in accordance with clause 203.4.2.2 (c).

C203.3.6.1 Opposing hip tiles can usually be cut from one whole tile with a minimum of waste.

203.3.6.2 Tiles shall be finished at hip boards with hip caps that provide a minimum weathering lap of 75 mm and are fastened through the site-formed upstands by two fixings per cap on each side. At the junction between ridge and hips, hip caps shall be lapped by ridge caps or the joint weathered with a lead soaker or preformed apex cap finished to match the tiles.

203.3.7 *Valleys*

203.3.7.1 Valley tile courses shall be finished over the valley with tiles cut on the mitre with the cut edge bent down to between 5 mm and 10 mm of the valley floor.

C203.3.7.1 Valley gutters should be lined with corrosion resistant metal of a type compatible with the materials used as agreed between manufacturer and purchaser. Valleys should be formed with the maximum possible upstands and set to discharge over the back of the eaves gutter.

Copyright Standards New Zealand

© The Crown in right of New Zealand, administered by the New Zealand Standards Executive. Access to this standard has been sponsored by the Ministry of Business, Innovation, and Employment under copyright license LN001319. You are not permitted to reproduce or distribute any part of this standard without prior written permission from Standards New Zealand, on behalf of New Zealand Standards Executive, unless your actions are covered by Part 3 of the Copyright Act 1994.

203.3.8 *Changes of plane.* Tiles to be finished against vertical and inclined faces shall be provided with a 40 mm upstand, fixed in accordance with table 5 and finished with overflashings dressed down on to the tiles and taken up behind the wall or roof coverings above.

203.3.9 *Penetrations.* Tiles cut for penetrations through the roof shall be provided with upstands and flashed and overflashed in accordance with good trade practice. The flashing shall be of sufficient size to finish in the tile head-lap above the penetration, and shall be wide enough to be dressed down over the nearest tile rib or upstand.

203.4 Fastening of tiles

203.4.1 *General*

203.4.1.1 Tiles, including cut tiles, shall be fastened to battens through the upstand and downstand of the tile lap, and down into the batten immediately behind the fascia at the eaves in accordance with table 5.

C203.4.1.1 In practice the exact frequency will depend on the size of the tile and its configuration. Manufacturers should state in their literature both the number and precise location of the nails.

203.4.1.2 The wind area referred to in table 5 means the value for the town or district in which the building is situated. The wind area for a specific location may be either:

(a) Obtained from table 6 or the map of wind areas, which appear as Appendix A and are derived from NZS 3604*, *or*

(b) Specified by the Engineer for design purposes.

203.4.1.3 The fixings nominated in table 5 have been determined for buildings of up to 10 m high in exposed flat sites on the outskirts of town (ground roughness 2). Where buildings occur on sites that experience severe wind effects, for example, the top of an exposed bluff, or in valleys that funnel wind, additional fixings will be required at roof edges.

203.4.1.4 Fixings shall not penetrate through more than three thicknesses of tile if 45 mm nails are used. If a lap involves four thicknesses, the 45 mm nail fixing shall be situated a minimum of 25 mm from the lap area, or 50 mm nails shall be used.

203.4.2 *Nails*

203.4.2.1 Nails shall be cleanly driven, parallel to the slope of the surface of the tile and positioned on the face in accordance with the manufacturer's recommendations.

C203.4.2.1 To avoid surface damage nails may be hammer driven to within 5 mm of face and driven home with a nail punch.

203.4.2.2 Nails for eaves, ridge, hip and valley situations shall be as used in the body of the roof, selected in accordance with table 5, and placed as follows:

(a) *At eaves:* The eaves course of tiles shall be fastened down into the fascia batten at positions away from the bottom of the corrugations.

(b) *At ridge:* The ridge course of tiles and accessories shall be fastened to the ridge board through the upstand as for the body of the roof, with nails not longer than 30 mm.

(c) *At hips:* Hip tiles and accessories shall be fastened to the hip board by two 30 mm x 2.5 mm nails placed through the site-formed upstand, and to battens by at least one 30 mm x 2.5 mm nail placed through the tile lap.

(d) *At valley:* Valley tiles shall be fastened to battens as for the edge of the roof except that an extra nail close to the valley shall be placed through the tile lap. DO NOT NAIL THE DOWN TURN WITHIN THE VALLEY.

203.5 Concentrated rainwater discharge

203.5.1 Gutters and downpipes shall not discharge a concentrated water flow directly on to a tiled roof, except from areas such as small dormers.

Copyright Standards New Zealand

* See list of related documents.

© The Crown in right of New Zealand, administered by the New Zealand Standards Executive. Access to this standard has been sponsored by the Ministry of Business, Innovation, and Employment under copyright license LN001319. You are not permitted to reproduce or distribute any part of this standard without prior written permission from Standards New Zealand, on behalf of New Zealand Standards Executive, unless your actions are covered by Part 3 of the Copyright Act 1994.

APPENDIX A

BASIC WIND SPEEDS

Table 6 WIND AREA FOR VARIOUS LOCALITIES

Locality	*Wind area*
North Island	
Kaitaia	H
Whangarei	H
Dargaville	M
Kaiwaka	M
Auckland	L
Albany	L
East Coast Bays	M
North Shore	L
Howick	M
Clevedon	M
Thames	M
Paeroa	L
Coromandel	M
Whitianga	H
Tairua	H
Hamilton	L
Waihi	M
Tauranga	L
Rotorua	L
Taupo	L
Gisborne	L
Napier	M
Hastings	M
New Plymouth	H
Wanganui	H
Marton	H
Palmerston North	M
Dannevirke	M
Wellington	H
South Island	
Nelson	M
Blenheim	L
Amberley	M
Christchurch	M
Port Hills	H
Banks Peninsula	H
Lyttelton	H
Timaru	M
Oamaru	M
Westport	M
Hokitika	M
Dunedin	M
Milton	M
Gore	M
Winton	M
Invercargill	H
Alexandra	L

H = High wind area
M = Medium wind area
L = Low wind area

Copyright Standards New Zealand

© The Crown in right of New Zealand, administered by the New Zealand Standards Executive. Access to this standard has been sponsored by the Ministry of Business, Innovation, and Employment under copyright license LN001319. You are not permitted to reproduce or distribute any part of this standard without prior written permission from Standards New Zealand, on behalf of New Zealand Standards Executive, unless your actions are covered by Part 3 of the Copyright Act 1994.

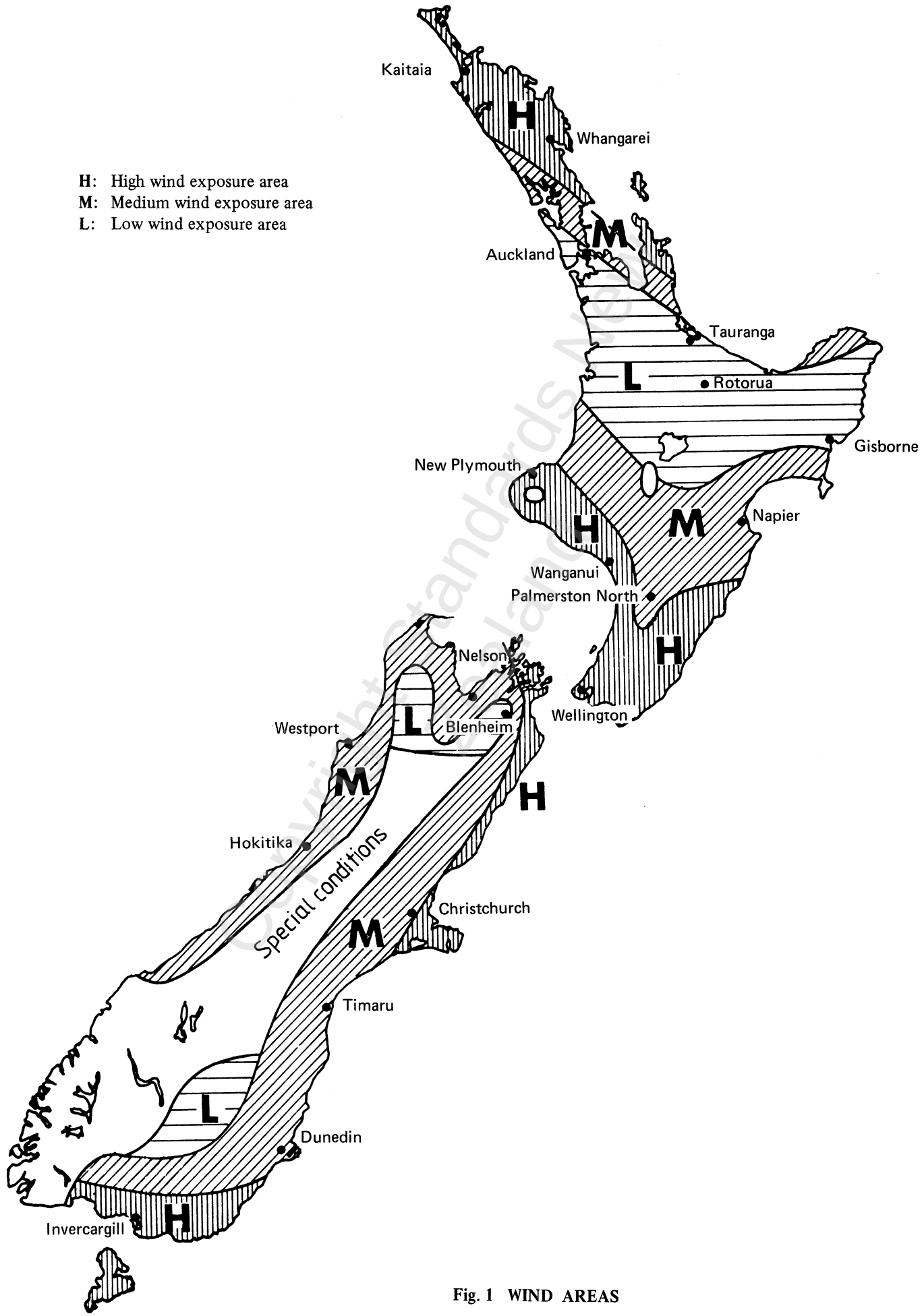


Fig. 1 WIND AREAS