



BRANZ Appraised
Appraisal No. 529 [2012]

GAF ASPHALT ROOF SHINGLES

Appraisal No. 529 [2012]

This Appraisal replaces BRANZ Appraisal No. 529 [2006].

Amended 25 July 2013



BRANZ Appraisals

Technical Assessments of products for building and construction.



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Product

- 1.1 GAF Asphalt Roof Shingles are glass-fibre reinforced asphalt shingles surfaced with ceramic coated mineral chips. They are available in the following series types: Timberline, Timberline Lifetime, Camelot, Slateline, Grand Slate, Grand Sequoia, Country Mansion 2, Camelot 2 and Grand Slate 2.
- 1.2 The shingles and flashing accessories form a roofing system when installed over a plywood substrate and roofing underlayment.

Scope

- 2.1 GAF Asphalt Roof Shingles have been appraised as a roof cladding for buildings within the following scope:
 - the scope limitations of NZBC Acceptable Solution E2/AS1, Paragraph 1.1, with regard to floor plan area and building height; and,
 - constructed with timber roof framing and plywood sheathing complying with the NZBC; and,
 - where the roof slope is 9° or greater; and,
 - situated in NZS 3604 Wind Zones up to and including Extra High.
- 2.2 The system must be installed in accordance with the Technical Literature by a Roofing Logistics NZ Ltd trained and approved installer.

Building Regulations

New Zealand Building Code (NZBC)

- 3.1 **In the opinion of BRANZ, GAF Asphalt Roof Shingles, if designed, used, installed and maintained in accordance with the statements and conditions of this Appraisal, will meet the following provisions of the NZBC:**

Clause B1 STRUCTURE: Performance B1.3.1, B1.3.2 and B1.3.4. GAF Asphalt Roof Shingles meet the requirements for loads arising from self-weight, gravity loads, temperature, snow, wind, impact and creep [i.e. B1.3.3 (a), (b), (c), (g), (h), (j), and (q)]. See Paragraphs 8.1 – 8.7.

Clause B2 DURABILITY: Performance B2.3.1 (b), 15 years. GAF Asphalt Roof Shingles meet this requirement. See Paragraphs 9.1 and 9.2.

Clause E2 EXTERNAL MOISTURE: Performance E2.3.1 and E2.3.2. GAF Asphalt Roof Shingles meet these requirements. See Paragraphs 13.1 and 13.2.

Clause F2 HAZARDOUS BUILDING MATERIALS: Performance F2.3.1. GAF Asphalt Roof Shingles meet this requirement and will not present a health hazard to people.

- 3.2 This is an Appraisal of an **Alternative Solution** in terms of New Zealand Building Code compliance.

Technical Specification

- 4.1 GAF Asphalt Roof Shingles are glass-fibre reinforced asphalt shingles surfaced with ceramic coated mineral chips, available in four series types. The shingles are combined with plywood sheathing, a roofing underlayment and various flashing accessories to form a roofing system.
- 4.2 System components and accessories supplied by Roofing Logistics NZ Ltd are as follows:

Shingles

- GAF Asphalt Roof Shingles are based on the range of roofing shingles with profiles, sizes and weights as shown in Table 1.
- The shingles are composed of a fibre glass mat base within two layers of asphalt with chemically inert granules in the top layer of asphalt to provide protection from the elements. Two of these composites are then laminated into the finished shingle

Table 1: Shingle Profiles

Shingle	Timberline NS and HD 30	Timberline Lifetime	Country Mansion 2	Camelot 2	Grand Slate 2	Slateline	Grand Slate	Grand Sequoia	Camelot
Type	4.5 laminates	5 laminates	6 laminates	4 laminates	5 laminates	4 laminates	5 + 4 laminates	5 + 4 laminates	5 + 4 laminates
Size [mm]	335 x 1000	335 x 1000	370 x 1000	425 x 870	370 x 1000	432 x 1016	432 x 1016	432 x 1016	432 x 876
Weather Exposure [mm]	140	140	185	185	185	190	203	127	190
Approx. mass [kg/m ²]	10.75	16.6	11.0	11.0	11.0	11.75	20.75	17.6	22.0
Available colours	8	8 [Gallery 3]	5	5	5	6	6	7	9
Approx. total mass [shingle + 15 mm plywood]	19.05	24.9	19.3	19.3	19.3	20.05	29.05	25.9	30.3

Accessories

- **Plywood sheathing** - Minimum 15 mm thick, grade DD or better plywood complying with AS/NZS 2269. Minimum treatment requirements are untreated plywood for ventilated truss roof cavities above 12° and H3 treated plywood for all closed cavity roofs, skillion roofs, and roofs 12° and below. H3 treated plywood must also be used where the plywood edge is unprotected at the eaves. Concealed plywood edges at the eaves do not need to be treated. *[Note: Using plywood sheathing as structural bracing should be avoided as there may be additional requirements.]*
- **Z Ridge & Hip and Seal 'A' Ridge & Timbertex Hip and Ridge** - These products are complimentary to the GAF shingle range and supplement hip and ridge capping. The Z Ridge & Hip and Timbertex Hip and Ridge are supplied as a 335 x 250 mm shingle and Seal 'A' Ridge & Hip are supplied as 305 x 305 mm shingle.
- **Trimline, GAF High Point Ridge and Cobra Ridge Vents** - Sectional ridge vents 10 mm to 15 mm wide installed continuously along the ridge. Used to create a cross flow with the 10 mm air gap at the gutter fascia point. They are supplied in approximately 1.2 m to 6 m lengths.
- **Adhesive** - A modified bitumen based adhesive/sealant used for additional bonding of the shingles at the gutterline and barge, where wind uplift is the most severe. Also used for supplementary bonding/sealing around valley intersections, chimney and vent penetrations, skylights etc. It is supplied in a 325 ml cartridge.
- **#15 and #30 Underlayment** - Standard bitumen impregnated roofing felt complying with ASTM:D226 standards for use under the shingles. The underlayment is installed directly onto the plywood substrate and is supplied in approximately 40 m² rolls. #30 underlayment is a thicker grade installed on lower pitched roofs.

- **D226+ Roofing Wrap** - Is a non-woven polyolefin underlayment. It is used as an alternative to #15 and #30 underlayment under the asphalt tiles when appropriate. It is supplied as a charcoal grey or red sheet material in rolls 1.060 m wide x 87 m long.
- **GAF Self Adhering Underlayment** - A flexible, elastic, self adhesive membrane used to provide extra waterproofing in High wind zones and above and on roofs where the pitch is between 9° and 12°.
- **Plywood Nails** - Ring shanked, galvanized, flooring grade nails 64 mm long having a minimum 3 mm diameter shank with 7 mm x 5 mm 'D' head.
- **Shingling Nails** - Stainless steel or compliant hot-dip galvanized gun nails for nailing roof shingles, semi ring shanked, in lengths of 32 mm or 25 mm and having a minimum 3 mm diameter shank with a 9 mm diameter head.
- **Step Flashing, Apron Flashings and Terminations** - Butyl rubber membrane flashings (Butylclad, EPDM) or TPO or metal in accordance with NZBC E2/AS1, Table 20 for flashing raking sides of chimneys or dormer roof penetration. They are 300 mm x 200 mm and 1 mm thick.
- **Drip Edge and Barge fascia drip flashings** - Folded metal flashings made from pre-painted steel coil. The flashings are 70 mm wide with a right angle bend 50 mm from one edge and a deflector bend 5 mm from the other. These are supplied in 2.4 to 4 m lengths.
- **Boot Flashing** - Rubber, metal or lead boots installed over vent pipes, chimneys or penetrations. They seal between the shingle surface and the penetration. They are installed using stainless steel screws and an adhesive/sealant or exterior grade silicone sealant. They are available in a range of sizes to match requirements.

Handling and Storage

- 5.1 GAF Asphalt Roof Shingles must be transported and handled with care to avoid damaging the pre-finished surfaces.
- 5.2 Long term storage of shingles and accessories must be under dry, ventilated cover. For short term storage on site, shingles must be stored flat, no more than two pallets high, and off the ground.
- 5.3 Handling and storage of all materials supplied by Roofing Logistics NZ Ltd, whether on or off site, are under the control of the Roofing Logistics NZ Ltd approved installer. Materials must be handled and stored in accordance with the relevant manufacturer's instructions.

Technical Literature

- 6.1 Refer to the Appraisals listing on the BRANZ website for details of the current Technical Literature for GAF Asphalt Roof Shingles. The Technical Literature must be read in conjunction with this Appraisal. All aspects of design, use, installation and maintenance contained in the Technical Literature and within the scope of this Appraisal must be followed.

Design Information

General

- 7.1 Roof framing must comply with NZS 3604, or be to a specific design in accordance with NZS 3603 and AS/NZS 1170.
- 7.2 Timber roof framing must be treated as required by NZS 3602 for the building design application.
- 7.3 Roof design must take into account any requirements for areas subject to regular snowfalls as per the requirements of NZBC Acceptable Solution E2/AS1, Paragraph 1.3.
- 7.4 Where the roof slope is between 9° and 12° the shingle underlayment must be GAF Self Adhering Underlayment, 2 layers of #15 underlayment or 2 layers of D226+ roof wrap offset by 50% or 1 layer of #30 underlayment. #15 Underlayment or D226+ roof wrap at roof pitches greater than 12°. See Paragraphs 16.4 and 16.5 for further information.
- 7.5 The collection of potable water has not been assessed and is outside the scope of this Appraisal.

Structure

Mass

- 8.1 The approximate mass of the GAF Asphalt Roof Shingles is given in Table 1. A light roof is defined in NZS 3604 as a roof with a roofing material [cladding and any sarking] having a mass not exceeding 20 kg/m². A heavy roof is defined in NZS 3604 as a roof with a roofing material [cladding and any sarking] having a mass in excess of 20 kg/m², but not exceeding 60 kg/m².

Snow

- 8.2 GAF Asphalt Roof Shingles are suitable for use in areas where buildings are designed for a 1 kPa snow loading. Refer to Roofing Logistics NZ Ltd for installation details for snow-prone areas.

Wind Zones

- 8.3 When fixed in accordance with the manufacturer's instructions and this Appraisal, GAF Asphalt Roof Shingles are suitable for use in all NZS 3604 Wind Zones, up to, and including Extra High. See Paragraph 16.8.

Plywood Sheathing

- 8.4 Where LOSP treated plywood is used, the solvents must be allowed to evaporate off for at least one week before installation of the shingle underlayment.
- 8.5 Rafters or trusses must be at maximum 900 mm centres for 15 and 17 mm thick plywood. *[Note: Plywood manufacturer's Technical Literature must be referred to for confirmation of minimum plywood thickness and grades relative to roof pitch and framing centres.]*
- 8.6 The plywood face grain must be laid at right angles to supports. The sheets must be laid with staggered joints in a brick bond pattern.
- 8.7 Tongue and groove plywood edges must be butt-jointed with no gaps between the sheet edges. Square plywood edges must have a 2 - 3 mm gap between the sheet edges.

Durability

Serviceable Life

- 9.1 GAF Asphalt Roof Shingles are expected to have a minimum serviceable life of at least 15 years provided maintenance is carried out in accordance with this Appraisal and the Technical Literature.

Weathering

- 9.2 GAF Asphalt Roof Shingles may lose some stone granules over a period of time. On aging, some surface cracking may appear. These cracks will not affect the weathertightness of the roof covering within the minimum 15 years requirement.

Maintenance

- 10.1 Little maintenance should be required apart from the removal of lichen, moss and organic growth that may become established and the removal of accumulations of the stone granules in spouting.
- 10.2 Annual inspections must be made to ensure that all aspects of the roof cladding, including the pre-finished coating, the flashings and any joints remain in a weatherproof condition. Any damaged areas or areas showing signs of deterioration which would allow water ingress must be repaired immediately.
- 10.3 A water-based chemical treatment recommended by Roofing Logistics NZ Ltd as being suitable for use with bitumen-based products must be used for the removal of organic material. Petroleum-based solvents or cleaners must not be used.

Prevention of Fire Occurring

- 11.1 Separation or protection must be provided to GAF Asphalt Roof Shingles from heat sources such as fire places, heating appliances, flues and chimneys. Part 7 of NZBC Acceptable Solutions C/AS1 - C/AS6 and NZBC Verification Method C/VM1 provide methods for separation and protection of combustible materials from heat sources.

Control of External Fire Spread

- 12.1 Fire rated roof construction systems using the GAF Asphalt Roof Shingles have not been assessed and are outside the scope of this Appraisal.

External Moisture

- 13.1 GAF Asphalt Roof Shingles, when installed in accordance with this Appraisal, will shed precipitated moisture and therefore meet the performance requirements of NZBC Clause E2.3.1. They will also prevent the penetration of water that could cause undue dampness, or damage to building elements, therefore meeting the performance requirements of NZBC Clause E2.3.2.

Construction Moisture

- 13.2 Roofs clad with GAF Asphalt Roof Shingles, if ventilation requirements are met as in the Technical Literature, allow excess moisture present at the completion of construction to be dissipated without permanent damage to building elements and therefore meet the performance requirements of NZBC Clause E2.3.6. This is achieved by ensuring the construction moisture levels are no higher than 18% when the shingles are laid and before the ceiling is closed-in, as well as providing an adequate level of roof cavity ventilation.

Internal Moisture

- 14.1 Adequate roof space ventilation is necessary to ensure roof space internal moisture levels and temperatures are controlled. Roof space ventilation requirements are given in the Technical Literature.
- 14.2 Ideally, air should be allowed to flow from the bottom to the top of the roof. In skillion-type roofs, a clear, uninterrupted, ventilated air gap of at least 25 mm must be present. Plywood with tongue-and-groove joints should be used on skillion roofs to minimise the restrictions caused by timber blocking. If required by the roof design or occupancy, perforated soffit linings, soffits and ridge vents should be used to minimise the quantity of moisture and heat accumulating in the roof space.
- 14.3 Roofing Logistics NZ Ltd should be consulted for further advice and information on roof ventilation and moisture control, especially when the roof design is unusual.

Installation Information

Installation Skill Level Requirements

- 15.1 Installation of all components and accessories supplied by Roofing Logistics NZ Ltd must be completed by installers trained and approved by Roofing Logistics NZ Ltd.
- 15.2 Installation of the components supplied by the building contractor must be completed by tradespersons with an understanding of roofing installation, in accordance with the instructions given within the Technical Literature and this Appraisal.
- 15.3 Technical Literature must be referred to during all inspections of the GAF Asphalt Roof Shingles installations.

System Installation

Plywood Sheathing

- 16.1 Plywood and framing must have a maximum moisture content of 18% at the time of the installation of the shingles.
- 16.2 Nails must be fixed according to Table 2 and Table 3. Fixings must be positioned no closer than 10 mm from the sheet edges. All sheet edges must be supported by framing or blocking, except that blocking is not required under the joints where tongue and grooved sheets are used.

Table 2: Fixing Centres for 15 mm and 17 mm Plywood – All sheet edges supported

NZS 3604 Wind Zone	Fixing Centres (mm), Sheet Edges, Intermediate Supports		
	Roof Slope 10 – 20°		Roof Slope 20 – 60°
	0.2w* from roof edge**	Beyond 0.2w* i.e. remainder of roof	
Low	150	300	300
Med	125	225	225
High	75	150	150
Very High	75	125	125
Extra High	55	100	100

* Where w = width of building

** Roof edge = eaves, barge, hips, ridges, fascia, gables

Table 3: Fixing Centres for 15 mm and 17 mm Plywood – Tongue and Grooved Plywood

NZS 3604 Wind Zone	Fixing Centres (mm), at Supports		
	Roof Slope 10 – 20°		Roof Slope 20 – 60°
	0.2w* from roof edge**	Beyond 0.2w* i.e. remainder of roof	
Low	100	200	200
Med	75	150	150
High	50	100	100
Very High	75	150	150
Extra High	35	65	65

* Where w = width of building

** Roof edge = eaves, barge, hips, ridges, fascia, gables

Shingle Underlayment

- 16.3 The shingle underlayment must be tightly laid horizontally across the roof, and completely cover hips, ridges [except where ridge vents are used], and valleys.
- 16.4 When the roof pitch is greater than 12°, one layer of underlayment is required. The upper sheets must be lapped by at least 100 mm over the lower sheets.
- 16.5 When the roof pitch is between 9° and 12°, either one layer of GAF Self Adhering Underlayment or two layers of underlayment lapped by half the width of the roll plus 25 mm [resulting effectively in a double thickness of underlayment] is required. End laps must be at least 200 mm.
- 16.6 Only sufficient fasteners to temporarily hold the underlayment in place need be used.

Fixing Shingles

- 16.7 Shingles are fixed in Low and Medium Wind Zones by four evenly spaced stainless steel nails per shingle, one of which is located 25 mm in from each edge. In High, Very High and Extra High Wind Zones this is increased to six evenly spaced stainless steel or hot-dip galvanized nails. Fixing methods other than stainless steel and hot-dip galvanized nails have not been assessed and are outside the scope of this Appraisal. Care must be taken to ensure the fasteners are driven in straight and are finished flush with the shingle surface.
- 16.8 Adhesive must be laid in spots on top of all 'drip edges' or eaves where present. The spots of sealant should be approximately 20 mm from the edge of the roof. Where required, Adhesive must also be used to seal under or hold down shingles at ridges, hips, upstands, and around penetrations.

Health and Safety

- 17.1 Safe use and handling procedures for GAF Asphalt Roof Shingles are provided in the manufacturer's Technical Literature.

Basis of Appraisal

The following is a summary of the technical investigations carried out:

Tests

- 18.1 The following tests have been carried out by overseas laboratories, by or on behalf of Underwriters Laboratories Inc. in order to show compliance with ASTM D3462-1992 behaviour on heating; tear strength; fire resistance; fastener pull-through resistance; pliability; wind resistance; penetration of asphalt; asphalt softening point; compatibility; minimum net mass and average net mass; and mass of glass mat-asphalt and mineral matter.

Other Investigations

- 19.1 Weathertightness, structural and durability opinions have been provided by BRANZ technical experts.
- 19.2 The manufacturer's Technical Literature has been examined by BRANZ and found to be satisfactory.
- 19.3 GAF Asphalt Roof Shingles are the subject of ICC Evaluation Service, Inc. Report No. ESR 1475.
- 19.4 Site inspections have been undertaken by BRANZ to assess the practicability of installation.
- 19.5 The long-term performance of properly installed mastic-bonded and self-adhesive roofing shingles in New Zealand and many countries overseas, along with the durability and non-hazardous nature of the materials used has been noted. The overseas and New Zealand experience of asphalt roofing shingles forms the basis of the durability opinion.

Quality

- 20.1 The manufacture of GAF Asphalt Roof Shingles has not been examined by BRANZ, but details regarding the quality and composition of the materials used were obtained by BRANZ and found to be satisfactory.
- 20.2 The quality management system of the GAF Asphalt Roof Shingles manufacturer, GAF Corp., has been assessed by ICC Evaluation Service Inc. and is covered in ES Report ESR-1475.
- 20.3 The quality of the supply of materials and accessories is the responsibility of Roofing Logistics NZ Ltd.
- 20.4 Quality on site is the responsibility of the Roofing Logistics NZ Ltd trained and approved installer.
- 20.5 Designers are responsible for the building design, and the building contractor is responsible for the quality of installation of the roof framing and plywood sheathing in accordance with Roofing Logistics NZ Ltd's instructions.
- 20.6 Building owners are responsible for the maintenance of GAF Asphalt Roof Shingles in accordance with the instructions of Roofing Logistics NZ Ltd.

Sources of Information

- AS/NZS 1170: 2002 Structural design actions.
- AS/NZS 2269:2004 Plywood – Structural.
- AS/NZS 4680: 2006 Hot-dip galvanised [zinc] coatings on fabricated ferrous articles.
- ASTM D226 / D226M - 09 Standard Specification for Asphalt-Saturated Organic Felt Used in Roofing and Waterproofing.
- ASTM D3462 - 92 Standard Specification for asphalt shingles made from glass felt and surfaced with mineral granules.
- NZS 3602:2003 Timber and wood-based products for use in building.
- NZS 3603:1993 Timber structures standard.
- NZS 3604:2011 Timber-framed buildings.
- Compliance Document for New Zealand Building Code External Moisture Clause E2, Department of Building and Housing, Third Edition July 2005 [including Amendment 5, 1 August 2011].
- Ministry of Business, Innovation and Employment Record of Amendments for Compliance Documents and Handbooks.
- The Building Regulations 1992.

Amendments

Amendment No. 1, dated 19 June 2013.

This Appraisal has been amended to update clause changes as required by the introduction of NZBC Fire Clauses C1 – C6 Protection from Fire and A3 Building Importance Levels.

Amendment No. 2, dated 25 July 2013.

This Appraisal has been amended to include D226+ roof wrap.



In the opinion of BRANZ, **GAF Asphalt Roof Shingles** are fit for purpose and will comply with the Building Code to the extent specified in this Appraisal provided they are used, designed, installed and maintained as set out in this Appraisal.

The Appraisal is issued only to **Roofing Logistics NZ Ltd**, and is valid until further notice, subject to the Conditions of Appraisal.

Conditions of Appraisal

1. This Appraisal:
 - a) relates only to the product as described herein;
 - b) must be read, considered and used in full together with the Technical Literature;
 - c) does not address any Legislation, Regulations, Codes or Standards, not specifically named herein;
 - d) is copyright of BRANZ.
2. **Roofing Logistics NZ Ltd:**
 - a) continues to have the product reviewed by BRANZ;
 - b) shall notify BRANZ of any changes in product specification or quality assurance measures prior to the product being marketed;
 - c) abides by the BRANZ Appraisals Services Terms and Conditions.
 - d) Warrants that the product and the manufacturing process for the product are maintained at or above the standards, levels and quality assessed and found satisfactory by BRANZ pursuant to BRANZ's Appraisal of the product.
3. BRANZ makes no representation or warranty as to:
 - a) the nature of individual examples of, batches of, or individual installations of the product, including methods and workmanship;
 - b) the presence or absence of any patent or similar rights subsisting in the product or any other product;
 - c) any guarantee or warranty offered by **Roofing Logistics NZ Ltd**.
4. Any reference in this Appraisal to any other publication shall be read as a reference to the version of the publication specified in this Appraisal.
5. BRANZ provides no certification, guarantee, indemnity or warranty, to **Roofing Logistics NZ Ltd** or any third party.

For BRANZ



Pieter Burghout

Chief Executive

Date of Issue:

18 July 2012