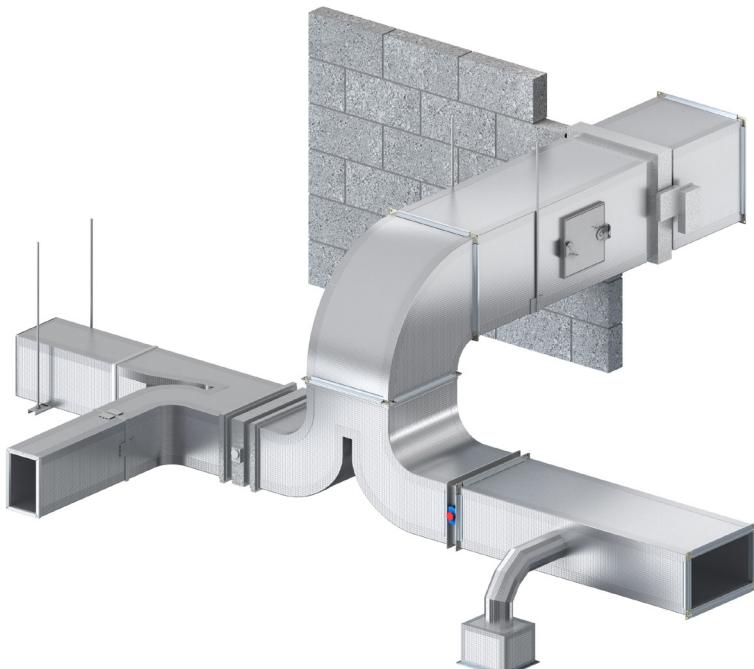


BRANZ Appraised

Appraisal No. 771 [2022]

KINGSPAN KOOLDUCT® SYSTEM



Appraisal No. 771 [2022]

This Appraisal replaces BRANZ
Appraisal No. 771 [2017]

BRANZ Appraisals

Technical Assessments of products
for building and construction.



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Product

- 1.1 The Kingspan KoolDuct® System is pre-insulated ductwork for heating, ventilation and air-conditioning [HVAC] ducting applications.
- 1.2 The Kingspan KoolDuct® System is used as ductwork without the need for sheet metal or other ducting substrates.

Scope

- 2.1 The Kingspan KoolDuct® System has been appraised for use as a pre-insulated ductwork system for HVAC systems for use in internal dry, protected environments.
- 2.2 The Kingspan KoolDuct® System has been appraised as ductwork where the design and construction is of specific design.

Building Regulations

New Zealand Building Code (NZBC)

- 3.1 In the opinion of BRANZ, the Kingspan KoolDuct® System, if designed, used, installed and maintained in accordance with the statements and conditions of this Appraisal, will meet or contribute to meeting the following provisions of the NZBC:

Clause B2 DURABILITY: Performance B2.3.1 (c) 5 years. The Kingspan KoolDuct® System meets this requirement. See Paragraph 8.1.

Clause C3 FIRE AFFECTING AREAS BEYOND THE FIRE SOURCE: Performance C3.4. The Kingspan KoolDuct® System meets this requirement. See Paragraphs 11.1-11.4.

Clause F2 HAZARDOUS BUILDING MATERIALS: Performance F2.3.1. The Kingspan KoolDuct® System meets this requirement.

Clause H1 ENERGY EFFICIENCY: Performance H1.3.6. The Kingspan KoolDuct® System contributes to meeting this requirement. See Paragraphs 13.1-13.3.



Technical Specification

Kingspan KoolDuct® System

- 4.1 The Kingspan KoolDuct® System comprises a CFC/HCFC free/Zero ODP rigid thermoset phenolic insulation core. KoolDuct® panels have a nominal density of 55–60 kg/m³. KoolDuct® panels are manufactured by a continuous lamination process, which produces a greater than 90% closed cell rigid phenolic insulation core that is auto-adhesively bonded both sides with a protective low vapour permeability 25 micron aluminium foil reinforced with a 5 mm x 5 mm glass scrim. The standard panel dimension is 3,930 mm x 1,200 mm. Thicknesses available are 22 mm and 30 mm.
- 4.2 The Kingspan KoolDuct® System is UL® Listed as a Class 1 Air Duct to UL® 181 Standard for Safety for Factory-Made Air Ducts and Air Connectors.
- 4.3 The compressive strength of the panel at 10% compression is 200 kPa.

Accessories

- 4.4 Accessories provided by Kingspan Insulation Pty Ltd, but are not limited to:
 - Kingspan KoolDuct® Phenolic Adhesive
 - Tiger Aluminium Closures and Connectors
 - Self-adhesive joint sealing gaskets
 - Self-adhesive aluminium foil tape
 - Kingspan High Performance Silicone Sealant for Pre-insulated Ductwork
 - Selection of aluminium and galvanised steel flanges and reinforcements
 - Nylon angles and end caps
 - Fabrication tools
 - Other ancillaries as detailed in the Technical Literature

Handling and Storage

- 5.1 The Kingspan KoolDuct® panels' original packaging should not be considered adequate for long term outdoor protection. KoolDuct® panels and fabricated ducts should be stored inside a building, clear of the ground to prevent damage. If, however, outdoor storage cannot be avoided, then the KoolDuct® panels and fabricated ducts should be stacked clear of the ground and covered with a secured opaque weatherproof layer. Care shall be exercised in the handling and transport of KoolDuct® sections in order to prevent damage to the duct and its surfaces.

Technical Literature

- 6.1 Refer to the Appraisals listing on the BRANZ website for details of the current Kingspan Insulation Pty Ltd Technical Literature for the Kingspan KoolDuct® System. The Technical Literature must be read in conjunction with this Appraisal. All aspects of design, fabrication, installation, use and maintenance contained in the Technical Literature and within the scope of this Appraisal must be followed.

Design Information

General

- 7.1 The Kingspan KoolDuct® panels are formed into ducts in a factory either by automated machinery or by hand. Kingspan Insulation Pty Ltd supply various hand tools for the fabrication of KoolDuct® ductworks.
- 7.2 The Kingspan KoolDuct® System is designed for use as HVAC pre-insulated ductwork to assist in meeting the energy efficiency requirements of the NZBC.
- 7.3 The thickness of Kingspan KoolDuct® panels must be selected to achieve the minimum system R-values as specified for the energy efficiency requirements of the NZBC. The manufacturer's Technical Literature must be used to design the ducting insulation system R-value and take into account the following:
 - Kingspan KoolDuct® panels material R-value given in Table 1 of this Appraisal.
 - Heating or cooling system
 - Heating or cooling capacity
 - Ambient air temperature and relative humidity
 - Kingspan KoolDuct® System service temperature [-20°C to +80°C]
 - Ducting placement location inside a building
- 7.4 Where the Kingspan KoolDuct® System is used as a specifically designed ductwork system, the designer is responsible for ensuring all NZBC code requirements are satisfied including the testing of the system as specified by Kingspan Insulation Pty Ltd and their Technical Literature.
- 7.5 It is recommended that ductwork fabricated from the Kingspan KoolDuct® panels, as a system, be used for operation within the following limits:
 - Mean Air Velocity: 25.4 m/s maximum.
 - Total Pressure: Positive: 1,000 Pa maximum.
 - Total Pressure: Negative: 750 Pa maximum.

Durability

Serviceable Life

- 8.1 The Kingspan KoolDuct® System is expected to have a minimum 10 year service life, provided the system is maintained in accordance with this Appraisal and the Kingspan Insulation Pty Ltd Technical Literature, and is installed in a dry, protected environment within its temperature service limits.

Maintenance

- 9.1 The building must be maintained weatherproof at all times. Any damage to the vapour barrier [foil facing] must be repaired with aluminium self-adhesive foil tape. Damage to duct walls can be repaired in accordance with the Kingspan Insulation Pty Ltd Technical Literature.
- 9.2 Regular inspection and cleaning of the KoolDuct® pre-insulated ductwork system must be carried out.

Prevention of Fire Occurring

- 10.1 Separation or protection must be provided to the Kingspan KoolDuct® System from heat sources such as fireplaces, heating appliances, flues and chimneys. Part 7 of NZBC Verification Method C/VM1 and Acceptable Solution C/AS1, and NZBC Acceptable Solution C/AS2 provide methods for separation and protection of combustible materials from heat sources.

Fire Affecting Areas Beyond the Fire Source

- 11.1 Kingspan KoolDuct® panels have a Material Group Number of 1-S for the internal and external surfaces of ducts for HVAC systems in accordance with AS 4254, and comply with the flame propagation requirements of AS 1366.
- 11.2 The Kingspan KoolDuct® System includes combustible materials and therefore cannot be used in an exitway.
- 11.3 The Kingspan KoolDuct® System must not be used as a ductwork system where it either penetrates or forms part of a building element that is required to be fire resistant. KoolDuct® may be connected to approved fire dampers, or KoolDuct® may be totally encased in fire resistant material.
- 11.4 Where smoke control in air handling systems is required to prevent the recirculation of smoke through an air-handling system to other firecells in a building, these systems shall be as specified in NZBC Acceptable Solution C/AS1 or C/AS2, Appendix A, Paragraph A2.1.

Ventilation

- 12.1 The Kingspan KoolDuct® System can be used to meet the Performance Requirements of NZBC Clauses G4.3.1 and G4.3.2.
- 12.2 Ventilation rates and air purity can be verified by NZBC Verification Method G4/VM1.
- 12.3 NZBC Acceptable Solution G4/AS1, Paragraph 1.5 can be used for designing and installing the mechanical ventilation system to satisfy the NZBC Performance Requirements G4.3.1 and G4.3.2.

Energy Efficiency

- 13.1 The Ministry of Business, Innovation and Employment Guidelines for energy efficient heating, ventilation and air-conditioning (HVAC) systems may be used to design the HVAC system. The Building Control Authority (BCA) must decide if the design meets NZBC Performance Requirement H1.3.6.
- 13.2 The suggested minimum required system R-value for ductwork ranges between 0.6 and 1.5 and is dependent on the heating and or cooling capacity of the HVAC system and the location in the building where the system is installed. The thermal performance of the Kingspan KoolDuct® panels is given in Table 1.

Material R-value

- 13.3 The manufacturer declared minimum material R-values for Kingspan KoolDuct® panels are as set out in Table 1.

Table 1: Material R-values*

Kingspan KoolDuct® Thickness [mm]	Material R-value [$\text{m}^2\text{K}/\text{W}$]
22	1.1
30	1.5

*At nominal thickness

Installation Information

Fabrication and Installation Skill Level Requirements

- 14.1 Fabrication and installation of the Kingspan KoolDuct® System must be completed by trained fabricators and installers, approved by Kingspan Insulation Pty Ltd, in accordance with the Technical Literature of Kingspan Insulation Pty Ltd and this Appraisal.

Inspections

- 15.1 The Kingspan Insulation Pty Ltd Technical Literature must be referred to during the inspection of the Kingspan KoolDuct® System.

Health and Safety

- 16.1 The Kingspan KoolDuct® System is safe to use, easy to handle, fabricate and install. All health and safety requirements such as personal protective clothing and installation hazard assessments must be complied with. Product Safety Data Sheets are available from Kingspan Insulation Pty Ltd.

Basis of Appraisal

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

Tests

- 17.1 The following testing of the Kingspan KoolDuct® System has been undertaken by the following organisations:
- AWTA, Australia – Testing to the requirements of ASTM C518-2010 for thermal resistance, testing to UL 181.11 burning test, testing to AS/NZS 1530.3 for determination of ignitability, flame propagation, heat release and smoke release, and testing to AS 2122.1 for determination of flame propagation.
- 17.2 The results have been reviewed by BRANZ and found to be satisfactory.

Other Investigations

- 18.1 An assessment of the durability of Kingspan KoolDuct® panels has been made by BRANZ technical experts.
- 18.2 The manufacturer's Technical Literature have been reviewed by BRANZ and found to be satisfactory.

Quality

- 19.1 The manufacture of the Kingspan KoolDuct® System 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.
- 19.2 Kingspan KoolDuct® System is UL® Listed as a Class 1 Air Duct to UL® 181 Standard for Safety for Factory-Made Air Ducts and Air Connectors.
- 19.3 The quality of supply to the market is the responsibility of Kingspan Insulation Pty Ltd.
- 19.4 Specific design using the Kingspan KoolDuct® System is the responsibility of the designer following the instructions of Kingspan Insulation Pty Ltd.
- 19.5 Quality of fabrication and installation of the product on-site is the responsibility of the trained fabricator/installer, approved by Kingspan Insulation Pty Ltd.
- 19.6 Quality of maintenance of the building to ensure the insulation material remains dry, undamaged and fit for purpose is the responsibility of the building owner.

Sources of Information

- AS 1366 Rigid cellular plastics sheets for thermal insulation.
- AS 2122.1:1993 Combustion characteristics of plastics. Method 1: Determination of flame propagation - surface ignition of vertically oriented specimens of cellular plastics.
- AS 4254.2:2012 Ductwork for air-handling systems in buildings - Rigid duct.
- AS/NZS 1530:1999 Part 3: Simultaneous determination of ignitability, flame propagation, heat release, and smoke release.
- Guidelines for energy efficient heating, ventilation and air-conditioning (HVAC) systems, Ministry of Business, Innovation and Employment, published on 1 August 2011.
- Ministry of Business, Innovation and Employment Record of amendments – Acceptable Solutions, Verification Methods and handbooks.
- The Building Regulations 1992.
- UL® Underwriters Laboratories Inc. UL 181 Standard for factory-made air ducts and air connectors, Edition 11.



In the opinion of BRANZ, **Kingspan KoolDuct® System** is fit for purpose and will comply with the Building Code to the extent specified in this Appraisal provided it is used, designed, installed and maintained as set out in this Appraisal.

The Appraisal is issued only to **Kingspan Insulation Pty 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. **Kingspan Insulation Pty 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 **Kingspan Insulation Pty 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 **Kingspan Insulation Pty Ltd** or any third party.

For BRANZ

Chelydra Percy

Chief Executive

Date of Issue:

23 March 2022