GRENFELL TOWER PUBLIC INQUIRY

FIRST WITNESS STATEMENT

OF ADRIAN WESTLEY PARGETER

I, ADRIAN WESTLEY PARGETER, of Kingspan Insulation Ltd, Torvale Industrial Estate, Pembridge HR6 9LA, WILL SAY AS FOLLOWS:

1 INTRODUCTION

1.1 I am Head of Technical and Marketing GB at Kingspan Insulation Limited ("**Kingspan**"). I am authorised to make this witness statement on behalf of Kingspan.

1.2 The facts and matters set out in this statement are within my own knowledge unless otherwise stated, and I believe them to be true. Where I refer to information supplied by others, the source of the information is identified; facts and matters derived from other sources are true to the best of my knowledge, information and belief.

1.3 I am providing this witness statement for the purposes of the Grenfell Tower Public Inquiry (the "**Inquiry**") and in particular, in response to the Inquiry's letter of 5 June 2018 requesting the submission of evidence by Kingspan under rule 9 of the Inquiry Rules 2006.

1.4 Before turning to the detail of my statement, I would like to express my deepest sympathies to the bereaved families, survivors and everyone affected by the tragic events which occurred at Grenfell Tower.

1.5 In this witness statement, I address the following particular issues on which the Inquiry requested evidence[1]:

(a) Did Kingspan market its Kingspan K15 Rainscreen Board product as suitable for use in cladding systems in buildings over 18m in height? If so, on what basis?

(b) What information, product literature and/or technical guidance was available in the public domain (and/or to trade/construction professionals) about the Kingspan K15 Rainscreen Board product at the time of the refurbishment of the Tower?

(c) At the time of the refurbishment of Grenfell Tower, had the Kingspan K15 Rainscreen Board product been tested as part of a cladding system using ACM panels? If so, please provide full details.

(d) What further testing of Kingspan K15 Rainscreen Board has been carried out since the refurbishment work (including after the fire)? What has that further testing shown?

(e) Please answer questions [(b)-(d)] above with respect to:

(i) Kingspan Thermapitch TP10/Kingspan Thermawall TW55; and

(ii) Kooltherm FM Pipe Insulation.

1.6 I address these questions in sections 4-6 below, addressing them first as regards Kingspan Kooltherm K15 Rainscreen Board ("**K15**") (section 4), Thermpatich TP10 / Thermawall TW55 (section 5) and finally Kooltherm FM Pipe Insulation (section 6).

---

[1] In respect of the other issues on which the Inquiry requested evidence in its letter of 5 June 2018, I understand that these are being addressed in Richard Burnley's witness statement to the Inquiry dated 28 September 2018.

1.7 Whilst Kingspan had no involvement in the refurbishment of Grenfell Tower (which issue, I am informed, is addressed by Richard Burnley in his witness statement), the following questions raise matters of a more generic nature and I address these in paragraphs 4.42 to 4.43 below:

(a) What was the purpose of the cladding/insulation to the exterior of the building?

(b) How commonly used are: (i) these particular cladding panels; (ii) this type of insulation; (iii) any other relevant parts of the exterior e.g. fixings/windows in the UK and elsewhere and are there relevant lessons to be learned from the use/regulation of such matters elsewhere?

1.8 Where I refer to a document in support of my witness statement, I have exhibited the whole or part of the relevant document and/or refer to the Unique Reference Number ("**URN**") assigned by the Inquiry to a previously disclosed document, as prescribed in the Inquiry's Witness Statement Protocol. Documents exhibited to this witness statement are identified by the marker "AP" followed by the exhibit number and URN where available.

1.9 I understand that Kingspan's solicitors are continuing to conduct a document review exercise and to the extent further information relevant to these questions or the Inquiry more generally comes to light in due course, I will provide further evidence.

2 ROLE AND BACKGROUND

Education

2.1 I completed the Higher National Diploma in Mechanical and Production Engineering at Birmingham Polytechnic (later Birmingham City University) in 1991.

2.2 I graduated with a Bachelor of Science (BSc) Hons (First Class) degree focussing on Design and Innovation in 2002 from the Open University. The key modules within this degree related to the innovation and design of products, the learning outcomes from which could be applied to any type of product design.

2.3 I later obtained a professional diploma in management from the Open University in 2013 and obtained a Masters Degree from the Open University in 2016 in Business Administration and Management.

Career

2.4 I started my career in the automotive supply sector, working for several organisations and progressing from apprentice level to being a project engineer and then, to project director level.

2.5 I started working for Kingspan in December 2009. My initial role was in research and development. In this role I was accountable for the fundamental engineering knowledge to support the research and process development of a next generation insulation product which later became known as Optim-R. Optim-R is a vacuum insulation panel and has very high levels of thermal performance, meaning that its thickness to thermal performance ratio is very efficient and it has been developed for use in constricted places such as roofs, floors and balconies. In this role, I was responsible for the initial design and testing of the product including the design of the manufacturing line and all associated certification. I was also the key technical lead for the specification of all plant and equipment for an Optim-R production plant.

2.6 After just over four years in that role I was promoted to Product Development Manager. My responsibilities included ensuring that a robust development process was in place to allow cross functional teams to ensure all relevant legislation and regulatory requirements were fully taken into account during product development. The process I managed was also designed to ensure that appropriate testing and certification of new products was completed prior to product launch.

2.7 In November 2014 I was promoted to Head of Marketing at Kingspan. In this role, I was responsible for the day to day management of the marketing team whose function was the creation and delivery of marketing plans and campaigns. This included the design and production of all marketing materials such as product brochures and newsletters. The team was also responsible for the development of technical research

projects and Kingspan's fire safety compliance campaign regarding the use of K15 in rainscreen specifications.

2.8 In June 2015 I was appointed into the new role of Head of Technical and Marketing (Great Britain) for Kingspan which remains my current role. In addition to the responsibilities I held as Head of Marketing, I also now oversee the team responsible for ensuring that all relevant product testing is maintained to necessary standards across all brands. The same team is also responsible for ensuring the continued certification of relevant products by the BBA.

2.9 In my current role the Technical Manager GB reports to me. The Technical Manager is responsible for the day to day running of the technical services team which is made up primarily of technical advisers who will deal with initial queries from customers and the intemal sales teams. The majority of these queries relate to the provision of U-value calculations and condensation risk analysis values for project-specific specifications as well as providing information about product specifications and available certification. The technical advisers are able to provide this information following training by Kingspan. The Technical Projects team, which is made up of a manager and three project engineers, also sits under the Technical Manager. This team is responsible for ensuring that product testing and certification including BBA certificates and Declaration of Performance certificates remain up to date. This team is also responsible for commissioning large scale testing including BS 8414 tests. I have monthly-review meetings with the Marketing and Technical Managers. I will also be involved if any issues or exceptions arise.

2.10 I also represent Kingspan on the Solid Wall Insulation Guarantee Agency and Insulation Manufacturers Association boards.

3 REGULATORY REGIME

3.1 By way of context to my responses below in answer to the Inquiry's questions regarding the relevant Kingspan products, I provide in this section an overview of the Building Regulations 2010 (the "**Building Regulations**") as they relate to those products and as in force at the time of the refurbishment of Grenfell Tower.

3.2 The functional requirement of the Building Regulations as regards external fire spread is set out in Part B of Schedule 1 to the Building Regulations: "*The external walls of the building shall adequately resist the spread of fire over the walls and from one building to another, having regard to the height, use and position of the building*" (the "**Functional Requirement**").

3.3 B4 of Approved Document B provides guidance from the Secretary of State on how the Functional Requirement may be met. As regards insulation used as part of ventilated rainscreens, Approved Document B states it may either:

(a) comply with section 12.7 which requires any insulation product, filler material etc used in the external wall construction or a building with a storey 18m or more above ground level to be at least of limited combustibility when tested in accordance with the relevant BS 476 test or Class A2 when tested to the relevant test laid out in EN 13501-1 ("**Option** A"); or

(b) comply with the second paragraph of section 12.5 which provides the alternative of the ventilated rainscreen system as a whole complying with performance criteria set out in BR 135 using full scale test data from BS 8414-1:2002 or BS 8414-2:2005 (together "BS **8**414") ("**Option** B").

3.4 K15 is not of limited combustibility and therefore may only be used as part of a rainscreen cladding system in buildings over 18 metres if the cladding system as a whole satisfies the Functional Requirement via Option B.

3.5 Further industry guidance on how compliance via Option B may be achieved is provided by the Building Control Alliance Technical Guidance Note 18 "*Use of Combustible Cladding Materials on Buildings Exceeding 18m in height*" (the "**BCA Guidance**"), Issue 0 of which is dated June 2014[2] with a subsequent issue being published in June 2015.[3] The BCA Guidance provides two options for compliance with Option B:

---

[2] BCA Technical Guidance Note 18, Issue 0 dated June 2014: AP/1/[ ]

[3] BCA Technical Guidance Note 18, Issue 1 dated June 2015: AP/2/[ ]

(a) The submission of actual fire test data from BS 8414 testing of the specific external wall cladding system to be installed along with the associated BR 135 classification report; or

(b) Where no actual fire test data exists for a proposed system, "*the client may instead submit a desktop study report from a suitably qualified fire specialist stating whether, in their opinion, BR 135 criteria would be met with the proposed system*".

3.6 The BCA Guidance reflects Approved Document B by explaining a further route to compliance, being that "*if none of the above are suitable, the client may consider addressing this issue via a holistic fire engineered approach taking into account the building geometry, ignition risk, factors restricting fire spread etc*".

3.7 The NHBC note entitled "*The use of combustible materials within the external wall construction of buildings over 18m in height*" (the "NHBC Note") (which was released around March 2015 and issued by the NHBC in its capacity as an Approved Inspector)[4] endorses the BCA Guidance as setting out acceptable methods for demonstrating compliance with the Building Regulations as required by the NHBC Standards.

3.8 In July 2016, the NHBC (in its capacity as an Approved Inspector) published a further guidance note titled "*Acceptability of common wall constructions containing combustible materials in high rise buildings*" which aimed to "*provide advice to builders on some of the most common wall and façade types encountered on tall buildings where NHBC would no longer require a desktop assessment in accordance with BCA GN 18 Option 3 to demonstrate compliance*".[5] In this note, the NHBC confirmed that, subject to strict adherence to predefined specified requirements, it would accept as compliant with the Functional Requirement without further specific assessment, systems incorporating K15, Celotex RS5000, and Xtratherm SR/RS in

---

[4] "*The use of combustible materials within the external wall construction of buildings over 18m in height*": AP/3/[ ]

[5] "*Acceptability of common wall constructions containing combustible materials in high rise buildings*": AP/4/[ ]

conjunction with brickwork facades, timber panelling and aluminium composite panels (all being of specified characteristics including Euoclass B minimum with a Class 0 surface spread of flame).[6]

4 KOOLTHERM K15 RAINSCREEN BOARD

4.1 K15 is an insulation board manufactured and marketed for use behind ventilated rainscreen or masonry façade systems. K15 is a highly efficient and lightweight insulation board which has a fibre-free rigid thermoset phenolic insulation core produced by the chemical reaction of its constituent chemicals. The product's rigid nature means it can be cut to a precise size to fit the relevant application. Being "thermoset" (a characteristic resulting from the chemical reaction through which the core material is produced) means that, when heated, the product will not melt or drip in the way that a thermoplastic would. Instead, the product will char when exposed to heat or fire and will self-extinguish when that fire or heat source is removed. K15 is referred to as having a "phenolic insulation core" because the phenolic (foam) part of the product is faced on either side by a composite foil facing material.

4.2 The key technical properties of K15, including its thermal performance (Lambda-values), condensation risk, behaviour in relation to fire, durability, behaviour in relation to fire, strength and stability, resistance to moisture and acoustic performance are set out in the product's BBA certificate among other documents[7]. The behaviour in relation to fire section of the BBA certificate dated 17 December 2013 and valid in May 2015 (when K15 was delivered for use in the refurbishment of Grenfell Tower), included the following information[8]:

> *8.1 The product is classified as Class 0 or 'low risk', as defined in the documents supporting the national Building Regulations.*

[6] Although the NHBC, as an Approved Inspector, may determine what does and does not comply with the Building Regulations in its opinion, different Approved Inspectors and Local Authority Building Control departments may take a different view regarding compliance.

[7] BBA Certificate 08/4582 dated 17 December 2013: AP/5/KIN00000454

[8] *Ibid.*

8.2 When tested[1] to BS 8414-1 : 2002, the following specific cladding construction met the criteria as stated in BRE Report BR 135: 2013:

Construction: – insulation board 60 mm by 1200 mm by 900 mm, mechanically fixed to a non-combustible substrate

- *6 mm cement particle boards mechanically fixed at 600 mm centres to an aluminium railing system onto the substrate*
- *40 mm deep ventilated cavity provided between the boards and the cement particle board*
- *fire stopping of 2.5 mm thick graphite-based intumescent strip bonded to a nominal 0.6 mm thick galvanized steel sheet, positioned 0.5 m and 4 m above the fire chamber on both the main face and the wing face*
- *the temperature measured during the stated test time did not exceed 600°C.*

[1]The test result relates only to this specific construction and a separate test would be required to establish the performance of any other combination of materials.

8.3 The product incorporated in the construction defined in section 8.2 can be used In buildings with a floor more than 18 m above ground level. Fire breaks should be used at every floor level after the first floor.

Inquiry question (a): Did Kingspan market its Kingspan K15 rainscreen board product as suitable for use in cladding systems in buildings over 18m in height? If so, on what basis?

4.3 I understand that the Inquiry is particularly interested in understanding the position as regards the marketing of K15 at the time of the refurbishment of Grenfell Tower. I understand that in his witness statement Richard Burnley explains Kingspan's knowledge (gained since the tragedy) as to the supply of K15 for use on Grenfell Tower. In summary, a small quantity of K15 was supplied for use on Grenfell Tower on a single date in May 2015 when Celotex RS5000 was unavailable (the "**Supply Date**"), and in the paragraphs below, I address on the position as at this date. Details of testing which has been conducted following the Supply Date are set out in paragraphs 4.29 and 4.41 below.

4.4 As at the Supply Date, K15 was marketed as suitable for use in buildings over 18 metres within certain cladding systems. In the following paragraphs, I provide details of the testing undertaken of systems incorporating K15 which forms the basis of such marketing.

4.5 With regard to its fire performance, K15 is suitable for such use because when used in specific cladding systems, those systems are capable of meeting the performance criteria set out in the BRE Report "*Fire performance of external thermal insulation for walls of multi storey buildings*" ("**BR 135**"), as demonstrated using full scale test data from BS 8414 tests. Such performance therefore achieves compliance with Option B in respect of those systems as explained in paragraph 3.3(b) above and in further detail in the following paragraphs.

4.6 Before I explain the specific BS 8414 tests of systems incorporating K15 which were available at the Supply Date, it may be helpful if I set out how BS 8414 tests are conducted and the process of commissioning BS 8414 tests. In my current role, I oversee the commissioning of BS 8414 tests although the day to day process is undertaken by members of my team.

4.7 BS 8414 tests are designed to replicate a fire starting inside a room, breaking out through a window of a multi-storey building and exposing the extemal cladding to fire. The tests are designed to evaluate the rate and extent of fire spread over a façade and ensure that the façade itself will not spread the fire faster than any fire spread caused by flames jumping between compartments and causing a sequence of flash-overs.

4.8 BS 8414 tests are generally commissioned by a product manufacturer (i.e. Kingspan or a manufacturer of rainscreen cladding). As explained in paragraphs 4.13 and 4.30 below, Kingspan has commissioned a number of BS 8414 tests itself and is aware of a number of further tests of systems incorporating K15 which have been commissioned by manufacturers of other products used in rainscreen cladding systems or organisations responsible for ensuring building project compliance. There may be further third party tests incorporating K15 of which Kingspan is unaware or in respect of which it has not received the test report.

4.9 Although a number of other test houses are now becoming certified to conduct BS 8414 tests, prior to the Grenfell Tower fire, BRE was the only accredited UK test house. The commissioning entity designs the system to be tested, the specified design often being driven by market demands and popular system make-ups into which the manufacturer would like to be able sell their product. The commissioning entity is also responsible for building and installing the test rig. Kingspan does not employ intemal façade designers or installation specialists and so these roles would be contracted out to third parties, although Kingspan would be involved in the design and observe the installation process. The test house would also observe the installation process, taking photographs and documenting the precise system installed. Once the system is installed, the test house installs the requisite thermocouples before setting fire to the crib and recording their observations of how the system reacted to fire. In order to satisfy the BR 135 classification criteria and effectively be a "pass", flame spread must not extend above the test apparatus at any time and the thermocouple data must comply with the specific criteria detailed in BR 135.

4.10 Following the test, the build-contractors retum to dismantle the system, layer by layer so each layer can be inspected and any observations noted for inclusion in the report.

4.11 Following completion of the test, the commissioning entity will confirm whether or not it wishes to commission (i) a BS 8414 Test Report; and/or (ii) a BR 135 Classification Report. The BS 8414 Test Report will set out details of the system tested, including product specifications, and the system's behaviour to the fire. It will include photographs, thermocouple data and observational data. As explained in paragraph 3.3(b) above, to comply with the Functional Requirement a system tested to BS 8414 must meet the requisite classification criteria set out in BR 135. This may be determined by a suitably qualified individual by analysing the information set out in the BS 8414 Test Report and/or other data collected during the test. To provide readily available and digestible evidence that a tested system complies with the BR 135 classification criteria, a commissioning entity may also commission a BR 135 classification report which details this analysis and confirms compliance.

4.12 Although the intended period for producing a report is 6-8 weeks, we have in reality waited for many months to receive the reports once commissioned, particularly following the Grenfell Tower fire as demand for testing has increased significantly. The reports would be provided to the commissioning entity in draft form for comments. The purpose of this review stage is to identify any factual errors regarding, for example, the description of the system tested or perhaps to request clarifications be included regarding the test results.

4.13 As at the Supply Date, Kingspan had commissioned BS 8414 test and classification reports for the following BS 8414 tests of systems incorporating K15:

(a) BS 8414 Part 1:2002 Test on a Phenolic Insulated Rainscreen system (Test Report Number 220876, dated 8 December 2005)[9]. The system tested included K15 with a UAC-manufactured cement particle board rainscreen fixed to an aluminium railing system. The tested system satisfied the BR 135 classification criteria; however, it appears that a formal report to certify this was not commissioned until 2015.[10]

[9] BS 8414 Test Report 220876: KIN00000137

[10] BR 135 Classification Report P101812-1000: KIN00000134

(b) BS 8414 Part 2:2005 Test on a Kingspan K15 insulated system with a ventilated Trespa rain screen (Test Report Number 293940, dated 26 June 2014)[11]. The system included K15 with a Trespa rainscreen board. Based on observational data alone, this system was deemed not to meet the BR 135 classification criteria as the flames appeared to have reached the top of the wall, however, the thermocouple data produced by the test did meet the classification criteria.

(c) BS 8414 Part 2:2005 Test on a Kingspan K15 insulated system with a ventilated Terracotta tile rainscreen (Test Report Number 297099)[12]. The system included K15 with a Taylor Maxwell Standard Classico tile rainscreen.

The associated BR 135 Classification Report is Report Number 291642[13]. Paragraph 5.2 of this Classification Report confirms that "*the system described in this classification report has been tested and met the performance criteria set in Annex B of BR 135:2013*".

4.14 The test results at (a) and (c) demonstrated that these rainscreen cladding systems incorporating K15 achieved compliance with BR 135 and therefore Option B in paragraph 3.3(b) above.

4.15 Each rainscreen cladding system is unique, given the wide choice of different materials and design elements. The variables include the external cladding panel, the way that it is fixed to the wall, the gaps between the panels, the cavity barriers used and their design and location, the insulating material and the various glues and mastics used in the system. This makes it impractical to perform a full scale test for every specified system. The BCA Guidance Note which was first published in June 2014

[11] BS 8414 Test Report 293940: KIN00000140

[12] The version of this report previously disclosed (KIN00000143) was Issue 2. This was withdrawn on 3 July 2018 with a revised version being reissued on that date (AP6/[ ]). This report was reissued following the identification of inaccuracies in the description of the system tested. The inaccuracies are not considered material.

[13] The version of this report previously disclosed (KIN00000133) was Issue 2. This was withdrawn on 3 July 2018 and a revised version was reissued on the same date to reflect the inaccuracies corrected in the associated test report: (AP/7/[ ]). The inaccuracies are not considered material.

addressed this practical issue by providing for the use of desktop studies as a suitable method for achieving compliance via Option B. This remained the position at the Supply Date.[14]

4.16 Desktop studies are system-specific and cannot be used for projects other than that for which they are commissioned. The majority of clients will commission desktop studies for their projects and Kingspan may facilitate such process by putting a client in contact with a suitable fire engineer. In such instances, Kingspan may or may not receive a copy of the desktop study. Altematively, Kingspan may have commissioned a desktop study on behalf of a client. There may also be instances of third parties commissioning desktop studies of systems incorporating K15 which Kingspan may not be aware of and in respect of which Kingspan may not receive copies.

4.17 Prior to the Supply Date, Kingspan had access to copies of the following desktop studies for rainscreen cladding systems incorporating K15 which were considered to be compliant with BR 135[15]:

(a) First Street North (31 July 2014): this was a report commissioned from Arup by Carillion and assessed a system incorporating K15 with either Euro Clad Architectural Alpolic ACM or CEP Petarch stone rainscreen[16];

---

[14] Although not directly relevant to the matters being explained here, I am aware that in 2015 NHBC advised their clients that they should seek advice from Kingspan as regards the use of K15 in certain systems, i.e in systems over 18 metres which were registered when the certificates in respect of K15 BBA 0845/82 dated 27 October 2008 (KIN00000489) and 6 April 2010 (KIN00000493) remained valid. In response to such requests, Kingspan offered information regarding the Option B route of compliance and the possible use of desktop studies in accordance with the BCA Guidance Note, in respect of such systems.

[15] I am also aware of the Riverlight project in respect of which Kingspan has disclosed a BRE report dated 26 June 2012 (KIN00000165). I have not included this in the list at paragraph 4.17 as it was not an assessment considering compliance with BR 135 as although K15 was specified in the fiame (installed between a building board and a plaster board), the insulation specified for use in the cavity was mineral fibre with a Class B Trespa cladding and the system therefore satisfied the requirements of Option A in paragraph 3.3(a) above.

[16] Arup Report regarding First Street North: KIN00000225

(b) The Nova Building (23 Sep 2014): this report was commissioned from Arup and assessed a system incorporating K15 and stone rainscreen[17];

(c) MP2 Building, West Grove, Elephant Park (16 January 2015): this draft report was commissioned from BRE by Kingspan and assessed a system incorporating K15 and brickwork rainscreen[18];

(d) The International Centre (11 Feb 2015): this report was commissioned from Exova Warrington by Lend Lease Construction Europe Ltd and assessed a system incorporating K15 and GRC rainscreen[19];

(e) Scottish Power Headquarters (28 April 2015): this report was commissioned from BRE by Kingspan and assessed a system incorporating K15 and a pre-cast concrete rainscreen[20]; and

(f) Limehouse Basin (26 May 2015): this report was commissioned from Exova Warrington by Kingpsan and assessed systems incorporating K15 with brickwork, Carea, and Aurubis peroxidised copper rainscreens.[21]

4.18 I confirm that none of these systems incorporated K15 with a PE-cored ACM rainscreen.

4.19 Kingspan also received copies of further desktop studies of systems incorporating K15 since the Supply Date which it was considered would comply with BR 135 if tested, copies of which have been disclosed to the Inquiry.

Discussions with NHBC

[17] Arup Report regarding The Nova Building: KIN00000226

[18] BRE Draft Report regarding MP2 Building: KIN00000157

[19] Exova Warrington Report regarding the International Centre (disclosed to the Inquiry on 16 February 2018)

[20] BRE Report regarding the Scottish Power Headquarters: KIN00000166

[21] Exova Warrington Report regarding Limehouse Basin: KIN00000184

4.20 Between about January 2014 and November 2015, Kingspan was in regular contact with the NHBC regarding the use of K15 in buildings over 18 metres high. I have been directly involved in these discussions only since February 2015 and the details I provide below of the discussions prior to that date are solely based on my review of relevant documentation. During these discussions, the NHBC provided its views on the fire performance sections of the K15 BBA certificates, particularly the versions of certificate 08/4582 issued on 17 December 2013[22] and certificate 14/5134 issued on 8 October 2015.[23]

4.21 In respect of the BBA certificate issued on 17 December 2013, I was not involved in these discussions at the time they took place. I understand that in early 2014 Kingspan and the NHBC discussed the revised terms of the "Behaviour in relation to fire" section of this certificate. In particular, the NHBC was interested in understanding the test evidence on which the statements in the certificate were based. Kingspan engaged with the NHBC's concems and agreed a further series of BS 8414 tests to be conducted on systems incorporating K15.

4.22 In 2015, Kingspan worked with the NHBC to agree the terms of the NHBC Note published in or about March 2015 in support of the BCA Guidance and which, as explained in paragraph 3.7 above, endorses the BCA Guidance as setting out acceptable methods for demonstrating compliance with the Building Regulations as required by the NHBC Standards.

4.23 A revised BBA certificate for K15 was subsequently published on 8 October 2015[24]. Following discussions with the NHBC, this was reissued on 16 November 2015[25] to incorporate a further revised "Behaviour in relation to fire" section which specified that although K15 achieves Class 0 rating, it is not a material of "limited combustibility". The same section was also revised to include further detail on the specific BS 8414 tests and BR 135 classifications listed in the certificate, including the

---

[22] K15 BBA Certificate 08/4582 dated 17 December 2013: KIN00000454

[23] K15 BBA Certificate 14/5134 dated 8 October 2015: KIN00000490

[24] *Ibid.*

[25] K15 BBA Certificate 14/5134 dated 16 November 2015: AP/8/KIN0000005419

associated dates of assessment. Following agreement of these amendments, the NHBC confirmed its endorsement of the section of the K15 BBA certificate stating that the "*NHBC accepts the use of Kooltherm K15 Rainscreen Insulation Board, provided it is installed, used and maintained in accordance with this Certificate, in relation to NHBC Standards, Chapter 6.1 External masonry walls and Chapter 6.9 Curtain walling and cladding. Current NHBC guidance precludes the use of façade systems not utilising a drained cavity*".[26]

4.24 Kingspan was not involved in or consulted in respect of, the detailed guidance note issued by the NHBC in July 2016, detail of which is provided in paragraph 3.8 above.

Inquiry question (b): What information, product literature and/or technical guidance was available in the public domain (and/or to trade/construction professionals) about the Kingspan K15 Rainscreen Board product at the time of the refurbishment of the Tower?

4.25 The categories of documents listed below relating to K15 were available in the public domain and/or to trade or construction professionals at the Supply Date.

4.26 To the extent that they provided information relating to the use of K15 in buildings over 18 metres, these documents were intended for consideration by the sophisticated users to whom Kingspan sold K15 for such applications. These users included large building contractors who were responsible for the development of high rise buildings, architects, engineers and fire consultants responsible for the design of such complex buildings. Such users would be skilled in the requirements of the Building Regulations as applicable to such applications.

<u>Kingspan-authored documents</u>

(a) Kingspan K15 product brochure: this is a brochure produced by Kingspan and made available on Kingspan's website. The version available at the Supply Date was the Ninth Issue dated March 2011.[27] It contains information

[26] *Ibid.*

[27] K15 product brochure, Ninth Issue, dated March 2011: AP/9/KIN00000063

regarding (i) typical constructions and U-values; (ii) design considerations; (iii) installation; (iv) product details (including fire performance and behaviour); and (v) contact details for further queries. The "Fire Performance" section of this brochure explained that: "*K15 Rainscreen Board* ***in the construction specified in the table below*** [emphasis added], *when subjected to the British Standard fire test BS 8414:2002 (Fire performance for external cladding systems. Test methods for non-load bearing external cladding systems applied to the face of the building), has achieved the result shown.*" It goes on to provide details of the construction tested and explains that "*The tested product meets the criteria stated within BRE 135 ... and is therefore acceptable for use above 18 metres in accordance with the Building Regulations / Standards. ... Further details of the fire performance of Kingspan Insulation products may be obtained from the Kingspan Insulation Technical Service Department*".

High level information about K15 was also included in a general quick guide brochure covering all Kingspan insulation products available for use in pitched roofs, walls and floors.[28]

(b) Product Safety Information or Material Safety Data Sheet: this document is produced in accordance with the REACH Regulation (EC) No 1907/2006 and contains information intended to assist the safe handling of the product by providing information regarding the product's properties, guidance on transportation and disposal as well as handling and storage. The version in place at the Supply Date and available on the Kingspan website was "*Product Safety Information / Kooltherm*", Fourth Issue, September 2012.[29]

(c) Kingspan Declaration of Performance: this document is required by the Construction Products Regulation which provides harmonised rules for the marketing of construction products in the EU. The content of a product's Declaration of Performance is specified by the relevant product standard which, in the case of K15 is the product standard relating to phenolic foam

[28] See for example the Ninth Issue of "*Kingspan Insulation: Quick Guide to Pitched Roofs, Walls & Floors*" dated July 2014, which was available at the Supply Date: AP/10/KIN00000081

[29] Product Safety Information / Kooltherm, Fourth Issue, September 2012: AP/11/[ ]

insulation products.[30] The product standard specifies the essential characteristics of the phenolic foam element of the product to be included in the Declaration of Performance. The specified essential characteristics do not include the product's performance in specific applications such as use in buildings over 18 metres or results when tested to BS 8414. The Declaration of Performance therefore does not include information relating to the suitability for use in this application or testing for this application. The version in place at the Supply Date and available on the Kingspan website was dated 1 July 2013.[31]

(d) Other Kingspan publications: From August 2015, Kingspan produced a guide entitled "*Routes to Compliance: Fire Safety: for facades incorporating Kingspan Kooltherm K15 Rainscreen Board on Buildings with a habitable storey 18m, or greater, above ground level*" which aimed to explain the various routes available to achieve compliance including Option B at paragraph 3.3(b) above and the use of desktop studies.[32] Kingspan also publishes occasional press releases relating to specific projects on which Kingspan products (including K15) have been used as well as non-product specific documents which address general topics such as the various testing regimes applicable to demonstrating the fire performance of products.[33]

(e) K15 Detailed Specification: this was a pro-forma form which at the Supply Date was used by the Kingspan sales team to record the U-value calculation for a particular project query before a copy of the project-specific completed form was sent to the client. This document included a list of K15 attributes. This

---

[30] The product standard applicable to phenolic foam products is EN13166 in which the essential characteristics of a product to be included in the product's Declaration of Performance are set out in Table ZA1.

[31] K15 Declaration of Performance dated 1 July 2013: AP/12/KIN00000130

[32] Routes to Compliance, August 2015: KIN00000086

[33] See for example the first issue of the "*Sure-Fire Performance: the fire performance of Kingspan insulation products*" leaflet dated June 2013 (KIN00000089) which was available at the Supply Date

document was not otherwise publicly available. The first issue of this document dated May 2014 was in use at the Supply Date.[34]

Third party documents

(f) British Board of Agrement ("BBA") certificate: a product may be certified by the BBA, an independent third party certification body.

A BBA certificate is not a regulatory requirement and a product such as K15 may be sold in the UK without holding a BBA certificate. The industry, however, considers BBA certificates to be a useful source of information and accreditation, and certain building control and warranty providers (such as the NHBC) will only approve buildings containing BBA-certified products. To obtain a BBA certificate, a product manufacturer will approach the BBA and provide details of the product to be certified. The BBA will then request copies of the further information and particularly test results which need to be provided prior to certification. In general, the BBA will not itself conduct testing of the product but review the information provided and confirm in the certificate whether or not, in its view, the product complies with relevant regulatory requirements.

BBA certificates are produced using a pro-forma layout which includes sections addressing (i) Regulations; (ii) Additional Information; (iii) Technical Specification; and (iv) Assessment and Technical Investigations.

BBA certificates do not have a stated period of validity and I am not aware of there being any regular system of review by the BBA. In my experience, Kingspan has not been contacted by the BBA at specified intervals for certificate-reviews. Instead, amended certificates for K15 have been produced at Kingspan's instigation when it has further test evidence to include in the certificate or it is aware of other relevant information which should be included.

---

[34] K15 Detailed Specification dated May 2014: AP/13/[ ]

All current BBA certificates are available on the BBA website.

K15 was first certified by the BBA in its certificate dated 27 October 2008 (08/4582)[35] and the Second Issue of that certificate dated 17 December 2013[36] was valid at the Supply Date. The Second Issue of the certificate provided details of the specific cladding constructions tested to BS 8414 at section 8.2 and explained that "***the product incorporated in the construction defined in section 8.2*** [emphasis added] *can be used in buildings with a floor more than 18 m above ground level. Fire breaks should be used at every floor level after the first floor*".

(g) Local Authority Building Control ("**LABC**") Registered Details and Certificate: the LABC is another third party organisation which provides certification of products such as K15.

The process for obtaining LABC certification is similar to that which I have explained above in relation to BBA certificates: if Kingspan wishes to obtain LABC certification, we will contact the LABC to request a quote and then provide the requested relevant documentation. The LABC will consider the BBA certificate as part of their assessment of the product being certified and the LABC has not to date requested that further testing be conducted in support of any certification.

LABC certification for K15 was first obtained in August 2013 and in relation to use in buildings over 18 metres, the LABC Registered Details Drawing and Document List explained that "*The product can be used on buildings with storeys greater than 18m ground level provided it is used in combination with suitably non-combustible substrates and ancillary components (note – BS 8414 testing referenced in section 7.1 of the BBA certificate is noted as meeting*

[35] K15 BBA certificate 08/4582 dated 27 October 2008: KIN00000489

[36] K15 BBA certificate 08/4582 dated 17 December 2013: AP/5/KIN00000454

requirements of BR 135, i.e. alternative compliance route referenced in Approved document B of Scottish Technical Handbook".[37]

The LABC Certificate for K15 explained in respect of use in buildings over 18 metres stated that "*An appropriate classification report and/or supplementary report MUST evidence suitability of proposed makeup ... K15 has been successfully tested to BS 8414-1:2002 and BS 8414-2:2005, meeting the criteria set out in BR135:2013 and therefore is acceptable for use in buildings with storeys above 18m in height (**subject to matching the explicit criteria identified in the tested specifications*** [emphasis added] *held on the K15 Production Specification and Classification Report Index updated in conjunction with this Certificate*".[38]

(h) NBS National BIM Library

The National Building Information Model (BIM) Library is a system designed by the National Building Specification (NBS) to support architects in designing buildings using specific software. The software envisages that an architect may create a BIM for an entire building design and be able to download a BIM object file for certain construction products incorporated in the design. A product or object BIM file provides both a graphical representation of the product and information about the product in a specified format. Kingspan first commissioned a BIM object file for K15 in October 2012 and links to the NBS National BIM Library website are made available on Kingspan's website. Specialist software is required to download and view BIM object files.

A BIM object file is commissioned by the manufacturer from NBS which provides the manufacturer with a template to complete with the necessary information. The NBS then produces the requested file. There is no additional certification or testing required to commission a product BIM object file.

---

[37] LABC Registered Details, Drawing and Document List dated August 2013: AP/14/[ ]. I also exhibit copies of the LABC Registered System: AP/15/[ ] and LABC Registered Company AP/16/[ ] certificates

[38] LABC K15 Certificate: AP/17/KIN00000077. I also refer to the LABC fact sheet AP/18/KIN00000076 and product specification index AP/19/KIN00000075 which were also publicly available.

Other sources of information

4.27 In addition to the documents made available in the public domain, Kingspan's technical team provides guidance and further information to those entities using or considering using K15 in a building project. The technical team will also be contacted by fire engineers and others performing desktop studies who may ask for further information about testing undertaken for K15 and the results of those tests. Although until recently test reports and classification reports were not publicly available[39], Kingspan would provide copies of relevant reports to such parties to allow them to conduct desktop studies.

Inquiry Question (c): At the time of the refurbishment of Grenfell Tower, had the Kingspan K15 Rainscreen Board product been tested as part of a cladding system using ACM panels? If so, please provide full details.

4.28 At the date of the refurbishment of Grenfell Tower, I am not aware of K15 having been tested as part of a cladding system using ACM panels. The only BS 8414 testing incorporating K15 conducted by the time of the refurbishment of which I am aware is detailed in paragraph 4.13 above.

Inquiry Question (d): What further testing of Kingspan K15 Rainscreen Board has been carried out since the refurbishment work (including after the fire)? What has that further testing shown?

4.29 Kingspan has conducted further product testing of K15 to British and European standards since the Supply Date. Details of these tests are set out in Appendix A of my witness statement.

4.30 Kingspan has also conducted a number of further BS 8414 tests of systems incorporating K15 since the Supply Date, both before and after the fire at Grenfell Tower. Kingspan is also aware of third-party and Government testing of systems incorporating K15 which have been conducted since the time of the refurbishment

[39] I note that as of 26 June 2018 Kingspan has published and will continue to publish on its website BS 8414 test reports and BR 135 classification reports it has commissioned for K15.

work. A full list of BS 8414 test reports of systems incorporating K15 of which I hold a copy (including those conducted since the refurbishment work) is set out in Appendix B to this witness statement. As may be observed from that list, Kingspan conducted a number of BS 8414 tests between the Supply Date and the fire on 17 June 2017 and Kingspan's testing regime has continued following the fire.[40]

4.31 Following the fire, Kingspan has also conducted a number of full system tests incorporating K15 pursuant to ISO 13785, a standard specifying a full system test similar to BS 8414 but on a smaller scale. These tests were conducted with the aim of analysing whether ISO 13785 tests could provide a middle ground between desktop studies of systems which have not been tested and BS 8414 tests. These tests were undertaken in the context of post-Grenfell criticism of desktop studies and suggestions that BS 8414 testing should be commissioned for any systems diverging from those already tested rather than being able to rely on desktop analysis. Kingspan's ISO 13785 testing aimed to analyse whether the results of these medium scale tests could be used to provide empirical evidence to support assumptions made in desktop studies regarding the behaviour of materials inserted in place of those tested in the BS 8414 tests. In order to conduct this analysis, we commissioned ISO 13785 tests of systems already tested to BS 8414 to understand if the two tests produced comparable results. Based on the tests conducted to date, it appears that a reasonable correlation exists. The details of these tests are listed in Appendix C to my witness statement. As Appendix C shows, the systems tested reflected a similar combination of systems subjected to the Government BS 8414 testing in August 2017, i.e. possible combinations of the following cladding panels: Alpolic A2 (limited combustibility), Alpolic/FR and Reynobond PE-cored standard cladding; with the following insulation Kooltherm K15, Celotex RS5000 (PIR) and Rockwool Duoslab.

4.32 As regards what the further testing has shown, I set out below certain preliminary conclusions arising from the BS 8414 testing Kingspan has conducted of systems incorporating K15 and the Government testing conducted in August 2017. My observations aim to consider the observed impact of certain elements of a ventilated

[40] Kingspan has recently conducted further BS 8414 tests in respect of which we have not yet received the reports. Kingspan will provide copies of these reports to the Inquiry once available.

rainscreen cladding system on the fire performance of the system and these preliminary conclusions would benefit from further testing, consideration and analysis.

4.33 The impact of the cladding panel:

(a) A key observation is that the material used in the rainscreen cladding panel significantly impacts the fire performance of the tested system. In particular, systems incorporating ACM panels have resulted in a large area of damage, often with complete consumption of the insulation layer in the area directly above the crib. All of the systems using PE-cored ACMs tested by the Government failed BS 8414 regardless of the other elements of the system tested. Based on the test evidence I have reviewed, I believe that the flammability of PE-cored ACM panels means that it is highly unlikely that any system incorporating PE-cored ACM panels would pass any BS 8414 test, regardless of the insulation used in the system. Any rainscreen cladding system for use over 18 metres and incorporating PE-cored ACM panels is therefore highly unlikely of being capable of compliance with the Building Regulations.

I note for completeness that Kingspan has neither completed testing nor commissioned a desktop study of the rainscreen cladding system installed on Grenfell Tower.

(b) While A2 or limited combustibility ACM panels have lower calorific potential, they appear quickly to lose their integrity as a result of the core falling away. Non-combustible cladding panels such as terracotta tiles are generally more robust and more resistant to decay during the test. This type of panel also generates lower temperatures at the insulation level 2 thermocouples.

(c) As well as the material used in a panel, the design of a panel may also impact fire performance: although systems incorporating cassette panel designs are capable of passing BS 8414 testing, they do tend to generate hotter temperatures. The creation of a flush surface for the intumescent cavity barriers to push against can improve the system performance of cassette style designs.

(d) I have also observed that the size of the gaps installed between panels can impact the system's performance. For example, the Government testing showed that an FR-ACM flat panel installed with a nominal 20 mm gap in a system incorporating phenolic insulation narrowly failed the test by burning at the top of the rig at 28 mins. Subsequent Kingspan testing of systems identical to that tested by the Government other than the size of gap installed between panels, satisfied the BR 135 classification requirements. The Government-tested system was re-tested in two tests using a 4mm nominal gap and a 10mm nominal gap.

4.34 The impact of the insulation used:

(a) The thickness of K15, when installed in a system with a terracotta façade, appears to have only a limited bearing on the test performance. Two tests conducted on similar systems but for insulation thickness (one used 80 mm and the other used 140mm) showed little difference in the temperatures at the insulation levels.

(b) The Government testing, particularly test 1 and 2 (PE-cored ACM), seem to show that when most of the key elements of a system remain constant, the influence of the insulation products used in the test whether mineral fibre, PIR or phenolic is relatively small and the single biggest impact on the system performance is the type of cladding used.

(c) Even when one system did satisfy the BR 135 classification criteria and the other did not (as in the case of phenolic and mineral fibre insulation in the FR-ACM test (Government test 7 and 4 respectively)), the margin of difference was small. Both of these systems recorded very similar temperature traces throughout the test.

4.35 Framing design material

Two of the tests Kingspan conducted using a terracotta panel were essentially the same with the main difference being the removal of aluminium horizontal bracing

elements (known as top hats) and the steel T rails being switched for aluminium ones. Although both systems were compliant with BR135, the system without the top hats and with aluminium T rails, recorded a higher peak temperature in the cavity and a greater degree of system decay was observed post-test.

4.36 Building Type

The two main types of building construction, solid wall and steel frame are catered for in the BS 8414 testing program. BS8414 part 1 has a solid wall rig for which the cladding system is installed and BS8414 part 2 has a steel frame. Kingspan has tested a similar system using an A2 ACM on both rigs and there appears to be little discernible difference on this system between the part 1 and part 2 tests.

Other testing

4.37 In addition to the testing of systems incorporating K15 explained above, I am aware of a number of further BS 8414 tests of rainscreen cladding systems comprising insulation and rainscreen materials of limited combustibility or better. The details of these tests are set out in Appendix D to this witness statement.[41] For further information on these tests, I draw the Inquiry's attention to Kingspan's letter dated 6 July 2018 to the Select Committee.[42]

4.38 I draw these tests to the Inquiry's attention because these systems did not satisfy the BR 135 classification criteria (Option B in paragraph 3.3(b) above) but would automatically have been deemed to comply with the Building Regulations pursuant to Option A above because the insulation and rainscreen panels were certified as being of limited combustibility or better.

---

[41] As regards the classification of the Vitracore G2 cladding panel, although it is classified as limited combustibility, I draw the Inquiry's attention to the Rt Hon James Brokenshire MP's letter to Clive Betts MP (Chair of Housing, Communities and Local Government Committee) dated 13 September 2018 which explains that when tested by the Government, the Vitracore G2 cladding panel (as available on the market) contained more combustible adhesive than specified in the product's classification report and may not achieve the fire safety standard it has been classified to: AP/19A/[ ].

[42] This document was disclosed to the Inquiry on 12 July 2018: KIN[ ]

4.39 In the context of consideration of the fitness for purpose of the regulatory regime and possible regulatory reform, and based on the test results referenced in the above paragraph, I feel that it is appropriate to express some concern as to potential over-reliance on the "combustibility" classification of single products. The tests referenced in paragraph 4.37 above were of systems containing insulation and rainscreen panels certified as non-combustible or being of limited combustibility but, when tested to BS 8414, they failed. To my mind, this illustrates that the most rigorous way of ensuring that cladding systems do not promote fire spread is to assess how materials perform when they are combined in a cladding system (as they would be on a building) through empirical testing of the relevant system, that is by a large scale fire test, rather than relying on classifications of individual products comprising that system.

4.40 The reliance already placed in Option A (paragraph 3.3(a) above) on the "non combustible" and "limited combustibility" classifications of materials is potentially problematic and proposals that such classification should be the sole basis of any suitability assessment strike me as concerning. These classifications are determined solely through small scale tests on isolated product samples[43], without taking into account how those materials react together once combined in a complete system. Furthermore, it is important to keep in mind the fact that classification as "non-combustible" and "limited-combustibility" relies predominantly on the determination of the gross calorific value of a product, not on its flammability.[44]

4.41 I therefore believe that these simplistic classifications do not provide adequate evidence to determine that a material is necessarily safe when used as part of a complete cladding system for a high-rise building. It seems to me that the evidence clearly supports a conclusion that large scale testing of complete systems (such as the BS 8414 test) is a far more rigorous and realistic approach to ensuring fire safety.

---

[43] These small scale tests are set out in BS 476-4, -6, -7 & -11 / BS EN ISO 1182, 1716 & 11925-2 / BS EN 1382 and involved burning a small sample of material (less than 5cm cubed or 50g); they provide no evidence as to how that product performs in combination with other materials used on the façade.

[44] "Combustibility" and "flammability" denote significantly different reactions, as explained by Professor Luke Bisby in his presentation to the Inquiry on 20 June 2018 (Inquiry Transcript of 20 June 2018, pages 19 to 21).

Inquiry Question 1.7(a): what was the purpose of the cladding/insulation to the exterior of the building?

4.42 As explained in Richard Burnley's witness statement. Kingspan had no direct involvement specifically with the refurbishment of Grenfell Tower. I am therefore only able to comment on this question from a more general standpoint as regards the purpose of adding a rainscreen cladding system to existing buildings such as Grenfell Tower. The reasons for adding rainscreen cladding to a building will always be case specific but generally, the intention is to improve the thermal efficiency of a building in an efficient and cost-effective manner without requiring significant work to the interior of the building. Rainscreen cladding systems also allow the appearance of an existing building to be modernised.

Inquiry Question 1.7(b): How commonly used are: (i) these particular cladding panels; (ii) this type of insulation; (iii) any other relevant parts of the exterior e.g. fixings/windows in the UK and elsewhere and are there relevant lessons to be learned/from the use/regulation of such matters elsewhere?

4.43 I understand from Government investigations that the PE-cored ACM panels have been used on a number of other buildings in the United Kingdom. I refer to paragraph 4.33(a) above where I explain that I am not aware of any PE-cored system ever having passed a BS 8414 test or a desktop study (regardless of the insulation type, i.e. whether used in conjunction with K15 or another insulation product, such as mineral wool). As regards the use of K15 in buildings over 18 metres, it is, as explained above, marketed for use above 18 metres in certain cladding systems as a result of compliance via Option B set out in paragraph 3.3(b) above. I do not have sufficient knowledge to address the remaining parts of this question.

5 THERMAPITCH TP10 / THERMAWALL TW55

Inquiry Question (e)(i): What information, product literature and/or technical guidance was available in the public domain (and/or to trade/construction professionals) about the Thermapitch TP10/Thermawall TW55 product at the time of the refurbishment of the Tower?

5.1 Thermapitch TP10 and Thermawall TW55 are a single insulation product which comes off the manufacturing line labelled as TP10, TW55 and TF70 (Thermafloor 70). The insulation is marketed for use in differing applications with each application being marketed separately to facilitate the provision of accurate guidance for use and installation in each application. I will deal with them as a single product for the purposes of this witness statement.

5.2 A similar range of information was publicly available for TP10 and TW55 as for K15. In particular, the following documents were available at the time of the refurbishment:

(a) Product Brochures: For each of TW55 and TP10, the product brochure available at the Supply Date was the sixth issue dated March 2011.[45] These brochures provided information on (i) typical constructions and U-values; (ii) design considerations; (iii) installation; and (iv) product details.

(b) Product Safety Information sheet: the nature and purpose of this document is explained in relation to K15 at paragraph 4.26(b) above. The Product Safety Information sheet in place at the time of the refurbishment for TW55 and TP10 was Fifth Issue, dated April 2014.[46]

(c) Declaration of Performance: the scope and purpose of this document is explained in relation to the K15 Declaration of Performance in paragraph 4.26(c) above. The Declarations of Performance for TW55 and TP10 in place at the time of the refurbishment were the versions dated 1 July 2013.[47]

(d) BBA certificates: I refer to my explanation in paragraph 4.26(f) above regarding BBA certificates generally, the process for obtaining them and the nature of the information contained in them. The BBA certificates available at

---

[45] TW55 Product Brochure dated March 2011: KIN00000290; and TP10 Product Brochure dated March 2011: KIN00000314

[46] TP10 and TW55 Product Safety Information sheet dated April 2014: AP/19B/[ ]

[47] TW55 Declaration of Performance dated 1 July 2013: KIN00000297; and TP10 Declaration of Performance dated 1 July 2013: KIN00000277

the time of the refurbishment were Certificate 08/4590 dated 3 October 2008 for TW55 and Certificate 96/3126 dated 30 January 2009 for TP10.[48]

5.3 As with K15, the technical team at Kingspan received enquiries relating to use of the TW55 and TP10 in specific projects. Copies of test reports would be made available to those requiring that information to consider the suitability of the product from a fire safety perspective.

Inquiry Question (e)(i): At the time of the refurbishment of Grenfell Tower, had the Thermapitch TP10/Thermawll TW55 product been tested as part of a cladding system using ACM panels? If so, please provide full details.

5.4 Neither TW55 nor TP10 were (and have never been) designed or marketed for use in ventilated rainscreen systems. The products have therefore not been tested by Kingspan and insofar as I know, by others, as part of a system using ACM panels or any other type of ventilated rainscreen panel.

Inquiry Question (e)(i): What further testing of Thermapitch TP10/Thermawll TW55 has been carried out since the refurbishment work (including after the fire)? What has that further testing shown?

5.5 I have provided details at Appendix E of testing of TP10 and TW55 as applicable at the time of the refurbishment. Since the refurbishment, the further testing undertaken of TP10 and TW55 has been conducted to extend the scope of tested products (i.e. to test additional thicknesses and new products in the range). These further tests are also detailed in Appendix E. Further testing arising specifically as a result of Grenfell Tower has not been conducted as these products are not marketed for use in ventilated rainscreen systems.

[48] TW55 BBA Certificate 08/4590 dated 3 October 2008: KIN00000293; TP10 BBA Certificate 96/3126 dated 30 January 2009: KIN00000276

6 KINGSPAN KOOLTHERM FM PIPE INSULATION[49]

Inquiry question (e)(ii): What information, product literature and/or technical guidance was available in the public domain (and/or to trade/construction professionals) about the Kooltherm FM Pipe Insulation product at the time of the refurbishment of the Tower?

6.1 Two main processes are used to manufacture Kooltherm FM Pipe Insulation, resulting in a "cut and cover" insulation and a "continuous pipe lamination" (CPL) insulation. To produce insulation for particularly wide pipes, a third manufacturing process is used. As I understand is explained in Richard Burnley's witness statement, Kingspan did not supply any Kooltherm FM Pipe Insulation directly for use on Grenfell Tower and I therefore cannot be certain which variety of the product was installed. I therefore provide responsive information on all product types in this witness statement.[50] A similar range of information was publicly available for FM Pipe Insulation as for K15 and TW55 / TP10 products. In particular, the following documents were available at the time of the refurbishment:

(a) Usage and Insulation Guides: Kingspan published a "Quick Guide"[51], a "Project Specification"[52] and an "Installation Guide"[53] for Kooltherm FM Pipe Insulation. These documents provided information regarding correct usage, technical properties, the thermal properties of different thicknesses of the pipe insulation, fire performance of the insulation and details on correct installation.

---

[49] I understand that in paragraph 4.18 of his witness statement, Richard Burnley explains that Kingspan Kooltherm FM Pipe Insulation is produced by Kingspan Industrial Insulation Limited. I confirm that I have authority to provide the evidence in section 6 of my witness statement on behalf of Kingspan Industrial Insulation Limited.

[50] Certain documents disclosed are branded as "Kingspan Tarec". By way of background, Kingspan Kooltherm FM Pipe Insulation was, until February 2015, manufactured and sold by a joint venture company called Kingspan Tarec Industrial Insulation. In February 2015, Kingspan bought out the 50% of the entity owned by Tarec and significant rebranding of the FM Pipe Insulation was undertaken in April and May 2015.

[51] Kooltherm FM Pipe Insulation "Quick Guide": AP/20/[ ]

[52] Kooltherm FM Pipe Insulation "Project Specification": AP/21/[ ]

[53] Kooltherm FM Pipe Insulation "Installation Guide": AP/22/[ ]

(b) Technical Data Sheet: the data sheet for Kooltherm FM Pipe Insulation contains on a single sheet details of technical properties and fire classifications for the product. The version available at the Supply Date is dated May 2015[54].

(c) Declaration of Performance: The Declarations of Performance valid during the refurbishment period for CPL Kooltherm FM Pipe Insulation are dated 28 June 2013 and 2 June 2015.[55] The Declarations of Performance valid during the refurbishment for "Cut and Cover" Kooltherm FM Pipe Insulation are also dated 28 June 2013 and 2 June 2015.[56] The Declarations of Performance valid during the refurbishment for the Kooltherm FM Pipe Insulation manufactured for particularly wide pipes are dated 3 January 2014 and 2 June 2015.[57]

(d) Product Safety Information: I refer to paragraph 4.26(b) above for an explanation of the type of information provided in this document. The version in place during the refurbishment was published in May 2015.[58]

(e) Technical bulletins and other information sheets: a number of technical bulletins and other information sheets relevant to FM Pipe Insulation were available during the refurbishment.[59]

---

[54] Kooltherm FM Pipe Insulation Technical Data Sheet dated May 2015: AP/23[ ]

[55] Kooltherm FM Pipe Insulation Declaration of Performance (CPL) dated 28 June 2013: AP/24/[ ]; and 2 June 2015: AP/25[ ]

[56] Kooltherm FM Pipe Insulation Declaration of Performance (Cut and Cover) dated 28 June 2013: AP/26/[ ]; and 2 June 2015 AP/27/[ ]

[57] Kooltherm FM Pipe Insulation Declaration of Performance (Wide) dated 3 January 2014: AP/28/[ ] ; and 2 June 2015: AP/29/[ ]

[58] Kooltherm FM Pipe Insulation Product Safety Information dated May 2015: AP/30/[ ]

[59] Technical Bulletin: Construction Production Regulations dated May 2015: AP/31/[ ]; Technical Bulletin: Kooltherm dated May 2015: AP/32/[ ]; Technical Bulletin: Kooltherm Pipe Insulation (Undated): AP/33/[ ]; Technical Bulletin: Kooltherm Pipe Insulation A+ Green Guide Rating dated May 2013: AP/34/[ ]; Technical Bulletin: Construction Products Regulations dated May 2012: AP/35/[ ]; Technical Bulletin: Enhanced Capital Allowance Scheme dated December 2013: AP/36/[ ]; Technical Bulletin: Factory Mutual Global (FM Global) &

(f) LABC certificate: FM Pipe Insulation was registered with the LABC (see paragraph 4.26(g) above for details of the process for such registration) and the certificate in place during the refurbishment was issued in on 4 October 2013[60].

(g) KIWA BDA certification: BBA certification is generally not recognised or required by the industry for pipe insulation products and given that, as explained in paragraph 4.26(f) above, BBA certificates are not required for compliance with the Building Regulations, Kingspan has not commissioned a BBA certificate for FM Pipe Insulation. FM Pipe Insulation was certified by the KIWA BDA (a European organisation similar to the BBA) in October 2015.[61]

Inquiry question (e)(ii): At the time of the refurbishment of Grenfell Tower, had the Kooltherm FM Pipe Insulation product been tested as part of a cladding system using ACM panels? If so, please provide full details.

6.2 Kooltherm FM Pipe Insulation was not and has never been designed or marketed for use in rainscreen cladding systems. The product has therefore not been tested by Kingspan as so far as I am aware, by others, as part of a cladding system using ACM panels or any other type of rainscreen cladding panel.

Inquiry question (e)(ii): What further testing of Kooltherm FM Pipe Insulation has been carried out since the refurbishment work (including after the fire)? What has that further testing shown?

Factory Mutual Approvals: AP/37/[ ]; Technical Bulletin: Next Generation Kooltherm Pipe Insulation (Undated): AP/38/[ ].

[60] Kooltherm FM Pipe Insulation LABC certificate dated 4 October 2013:AP/39/[ ]

[61] Kooltherm FM Pipe Insulation KIWA BDA certificate dated October 2015: AP/40/[ ]

6.3 I have provided details at Appendix F of testing of the Kooltherm FM Pipe Insulation as applicable at time of the refurbishment and further testing which has been carried out since the refurbishment work.[62]

STATEMENT OF TRUTH

I believe that the facts stated in this witness statement are true.

I confirm that I am willing for this statement to form part of the evidence before the Inquiry and for it to be published on the Inquiry's web site.

Signed .....

Adrian Westley Pargeter

Date: 1 October 2018

[62] The testing conducted on Kooltherm FM Pipe Insulation since the refurbishment work has related to product development with the aim of improving the adhesion characteristics of the aluminium foil finish used on the "cut and cover" insulation only. The fire performance of Kooltherm FM Pipe Insulation in accordance with BS EN 13501-1 (BL-s1,d0) remains as demonstrated by testing conducted prior to the Supply Date as detailed in Appendix F.

Appendix A: Witness Statement of Adrian Pargeter: K15 Product Testing

	Title of Test	Date of Test	Test House	Product	Report Number and Date	Classification	Relativity Number
EN 13501-1:2007+A1:2009							
1	EN 13501-1: 2007+A1:2009	Unknown	Exova Warringtonfire	K15	WF 349131 3 March 2015	Fire Behaviour: C Smoke Production: s1 Flaming Droplets d0	KIN00000235
2	EN 13501-1: 2007+A1:2009	Unknown	BRE Global Ltd	K15	P100160-1000-4 Issue 1 1 October 2015	Fire Behaviour: C Smoke Production: s1 Flaming Droplets d0	KIN00000234
3	EN 13501-1:2007+A1:2009	Unknown	Exova Warringtonfire	K15	WF 364937 13 May 2016	Fire Behaviour: C Smoke Production: s1	KIN00000240

	Title of Test	Date of Test	Test House	Product	Report Number and Date	Classification	Relativity Number
						Flaming Droplets d0	
4	EN 13501-1:2007+A1:2009	Unknown	Exova Warringtonfire	K15	WF 380591 27 February 2017	Fire Behaviour: C Smoke Production: s1 Flaming Droplets d0	KIN00000231
BS 13823:2010							
5	BS EN 13823:2010	28-29 May 2013	Exova Warringtonfire	K15	329583 12 February 2015	Fire Growth rate (w/s): • 0.2MJ - 393.25 • 0.4MJ – 231.76 Culmative Heat Release 600s (MJ): 3.72 Smoke Growth Rate	KIN00000237

	Title of Test	Date of Test	Test House	Product	Report Number and Date	Classification	Relativity Number
						(m^2/s^2): 0.00 Culmative Smoke Production 600s (m^2): • Original - 42.20 • Recalculated - 25.06	
6	EN 13823 Single Burning Item (SBI) test	28-29 May 2015	BRE Global Ltd	K15	P100160-1000-3 Issue 1 1 October 2015	Fire Growth rate (w/s): • 0.2MJ - 318.3 • 0.4MJ – 220.0 Culmative Heat Release 600s (MJ): 3.4 Smoke Growth Rate	KIN00000236

	Title of Test	Date of Test	Test House	Product	Report Number and Date	Classification	Relativity Number
						(m^2/s^2): 0.9 Culmative Smoke Production 600s (m^2): 33.9	
7	BS EN 13823:2010+A1:2014	16 February 2017	Exova Warringtonfire	K15	379562 2 March 2017	Fire Growth rate (w/s): • 0.2MJ - 256.91 • 0.4MJ – 137.32 Culmative Heat Release 600s (MJ): 3.56 Smoke Growth Rate (m^2/s^2): 18.50 Culmative Smoke	KIN00000229

	Title of Test	Date of Test	Test House	Product	Report Number and Date	Classification	Relativity Number
						Production 600s (m^2): 45.68	
8	BS EN 13823:2010+A1:2014	16 February 2017	Exova Warringtonfire	K15	379561 2 March 2017	Fire Growth rate (w/s): • 0.2MJ - 279.38 • 0.4MJ – 119.55 Culmative Heat Release 600s (MJ): 2.26 Smoke Growth Rate (m^2/s^2): 27.10 Culmative Smoke Production 600s (m^2): 39.88	KIN00000230

	Title of Test	Date of Test	Test House	Product	Report Number and Date	Classification	Relativity Number
BS EN 1364-1:1999 and BS EN 1365-1:1999							
9	BS EN 1364-1: 1999	15 September 2004	BRE Global Ltd	K15 as part of a construction	218611 26 October 2004	Fire Resistance: 53 minutes	KIN00000243
10	BS EN 1364-1: 1999	26 June 2006	BRE Global Ltd	K15 as part of a construction	230054 20 December 2006	Fire Resistance: 180 minutes	KIN00000244
11	BS EN 1365-1: 1999	2 October 2006	BRE Global Ltd	K15 as part of a construction	232565 26 February 2007	Fire Resistance: 91 minutes	KIN00000245

	Title of Test	Date of Test	Test House	Product	Report Number and Date	Classification	Relativity Number
12	BS EN 1365-1: 1999	29 January 2007	BRE Global Ltd	K15 as part of a construction	234162 7 September 2007	Fire resistance: 163 minutes	KIN00000242
13	EN 1365-1: 1999 BS 476: Part 21: 1987	Multiple tests: 26 June 2006 to 27 April 2007	BRE Global Ltd	K15 as part of a construction	CC 252772 Review 1 Issue 1 10 March 2016	Fire resistance: 60 minutes	KIN00000241
14	BS EN 1365-1: 1999	27 April 2007	BRE Global Ltd	K15 as part of a construction	236510 12 September 2007	Fire resistance: 78 minutes	KIN00000246

	Title of Test	Date of Test	Test House	Product	Report Number and Date	Classification	Relativity Number
15	BS EN 1365-1: 1999	19 November 2012	Exova Warrington fire	K15 as part of a construction	WF 323655 27 February 2013	Fire resistance: 66 minutes	KIN00000247
BS EN ISO 11925-2: 2010							
16	BS EN ISO 11925-2: 2010	4 June 2013	Exova Warringtonfire	K15	329591 12 February 2015	On each set of six specimens which were tested, the flame tip did not reach of distance of 150mm before the end of the test	KIN00000233
17	BS EN ISO 11925-2: 2010	10 August 2015	BRE Global Ltd	K15	P100160-1000-1 Issue 1 1 October 2015	On each set of three specimens which were tested, the flame tip did not reach of distance of 150mm before the end	KIN00000238

	Title of Test	Date of Test	Test House	Product	Report Number and Date	Classification	Relativity Number
						of the test	
18	BS EN ISO 11925-2: 2010	14 February 2017	Exova Warringtonfire	K15	379564 2 March 2017	Maximum Flame Height results: • Surface application: 50 + 0.9mm • Edge application: 30 + 0.9mm • Foam edge exposed: 45 + 0.9mm	KIN00000227
19	BS EN ISO 11925-2: 2010	14 February 2017	Exova Warringtonfire	K15	379563 2 March 2017	Maximum Flame Height results: • Surface application:	KIN00000228

	Title of Test	Date of Test	Test House	Product	Report Number and Date	Classification	Relativity Number
						60 + 0.9mm • Edge application: 40 + 0.9mm • Foam edge exposed: 50 + 0.9mm	
BS EN ISO 1716:2010							
20	BS EN ISO 1716:2010	3 March 2016	Exova Warringtonfire	K15 (ground core)	362315 15 May 2017	Gross Calorific Value = 26.4462MJ/kg	KIN00000250
EN/TS 15117:2005							
21	EN/TS 15117:2005	Unknown	Exova Warringtonfire	K15	WF 364936 13 May 2016	Fire Behaviour: C Smoke Production: s1	KIN00000239

	Title of Test	Date of Test	Test House	Product	Report Number and Date	Classification	Relativity Number
						Flaming Droplets d0	
22	EN/TS 15117	Unknown	Exova Warringtonfire	K15	380604 27 February 2017	EN ISO 19925-2: results were well within limits for a classification B-D. EN 13823: • Fire Growth Rate: C • Smoke Growrth Rate and Production: s1 Product variations show consistent behaviour in	KIN00000232

	Title of Test	Date of Test	Test House	Product	Report Number and Date	Classification	Relativity Number
						this test.	
BS 476							
23	BS 476: Part 7: 1997	10 May 2007	Bodycote Warringtonfire	Kooltherm products including K15	WF 164170 24 August 2009	Class 1	KIN00000256

	Title of Test	Date of Test	Test House	Product	Report Number and Date	Classification	Relativity Number
24	BS 476 Part 6: 1989	10-11 May 2007	Bodycote Warringtonfire	Kooltherm products including K15	WF 164169 24 August 2009	Fire Propagation index (I) = 3.5 Sub-index (i_1) = 2.2 Sub-index (i_2) = 1.1 Sub-index (i_3) = 0.2	KIN00000261
25	Class 0 Classification	25-27 November 2008	BRE Global	Kooltherm products including K15	248640 248638 1 December 2008	Class 1 Fire Propagation index: I = 4.2 Sub-indices: i_1 = 1.0	KIN00000252

	Title of Test	Date of Test	Test House	Product	Report Number and Date	Classification	Relativity Number
26	BS 476: Part 7: 1997	6 May 2011	Exova Warringtonfire	Kooltherm products including K15	306833 8 July 2011	Class 1	KIN00000258
27	BS 476-6: 1989+A1:2009	9 May 2012	BRE Global Ltd	Kooltherm products including K15	279315 3 July 2012	Fire Propagation index: I = 3.9 Sub-indices: i_1 = 1.0 i_2 = 2.7 i_3 = 0.2	KIN00000255

	Title of Test	Date of Test	Test House	Product	Report Number and Date	Classification	Relativity Number
28	BS 476-6: 1989+A1:2009	9 July 2012	BRE Global Ltd	Kooltherm products including K15 (core only)	280455 12 July 2012	Fire Propagation index: I = 9.1 Sub-indices: i_1 = 3.3 i_2 = 4.3 i_3 = 1.5	KIN00000254
29	Class 0 classification	12 July 2012	BRE Global Ltd	Kooltherm products including K15 (core only)	280722 280721 280455 12 July 2012	Class 1 Fire Propagation index: I = 9.1 Sub-indices:	KIN00000259

	Title of Test	Date of Test	Test House	Product	Report Number and Date	Classification	Relativity Number
						i_1 = 3.3	
30	Class 0 classification	22 May 2013 17 June 2013	BRE Global Ltd	Kooltherm products including K15	287966 287649 285085 18 June 2013	Class 1 Fire Propagation index: I = 3.9 Sub-index: i_1 = 2.6	KIN00000251
31	BS 476 Part 6: 1989+A1; 2009	29 October 2015	Exova Warringtonfire	K15	357955 3 November 2015	Fire Propagation index Total index of performance= 18.03 Sub-index s1 = 6.69 Sub-index s2 = 9.05	KIN00000264

	Title of Test	Date of Test	Test House	Product	Report Number and Date	Classification	Relativity Number
						Sub-index s3 = 2.28	
32	BS 476 Part 6: 1989+A1; 2009	11 and 14 January 2016	BRE Global Ltd	Kooltherm products including K15 (core only)	P100160-1001-1 Issue: 1 18 January 2016	Fire Propagation index (I) = 15.0 Sub-index (i_1) = 5.1 Sub-index (i_2) = 7.3 Sub-index (i_3) = 2.6	KIN00000262
33	BS 476-7: 1997	10 February 2016	BRE Global Ltd	K15 (facing only)	P100160-1002-1 Issue 1 29 February 2016	Class 1	AP/47/[ ]

	Title of Test	Date of Test	Test House	Product	Report Number and Date	Classification	Relativity Number
34	Class 0 Classification	10 February 2016 18-19 February 2016	BRE Global Ltd	Kooltherm products including K15 (facing only)	P100160-1002-3 19 February 2016	Class 1 Fire Propagation index (I) = 1.8 Sub-index (i_1) = 1.7	AP/48/[ ]
35	BS 476 Part 6: 1989+A1; 2009	18-19 February 2016	BRE Global Ltd	Kooltherm products including K15 (facing only)	P100160-1002-2 Issue: 1 19 February 2016	Fire Propagation index (I) = 1.8 Sub-index (i_1) = 1.7 Sub-index (i_2) = 0.1 Sub-index (i_3) = 0.0	KIN00000253

	Title of Test	Date of Test	Test House	Product	Report Number and Date	Classification	Relativity Number
36	BS 476 Part 6: 1989+A1; 2009	23 August 2016	Exova Warringtonfire	K15	370678 12 September 2016	Fire Propagation index Total index of performance= 15.25 Sub-index s1 = 10.90 Sub-index s2 = 3.85 Sub-index s3 = 0.49	KIN00000260
37	BS 476 Part 7: 1997	22-23 August 2016	Exova Warringtonfire	K15	370679 12 September 2016	Class 1	KIN00000257
38	BS 476 Part 6: 1989+A1; 2009	5 October 2017	Exova Warringtonfire	K15 (core only)	389621 (Draft)	Fire Propagation index Specimen 1	KIN00000263

	Title of Test	Date of Test	Test House	Product	Report Number and Date	Classification	Relativity Number
					5 October 2017	Total index of performance= 18.39 Sub-index s1 = 6.85 Sub-index s2 = 8.81 Sub-index s3 = 2.73 <u>Specimen 2</u> Total index of performance= 16.37 Sub-index s1 = 6.06 Sub-index s2 = 7.93 Sub-index s3 = 2.37	

	Title of Test	Date of Test	Test House	Product	Report Number and Date	Classification	Relativity Number
						<u>Specimen 3</u> Total index of performance= 14.57 Sub-index s1 = 5.63 Sub-index s2 = 6.51 Sub-index s3 = 2.43	

Appendix B: Witness Statement of Adrian Pargeter: BS 8414 Test Reports of systems incorporating K15

1 BS 8414 TEST REPORTS AS AT SUPPLY DATE

	Date of test	Test house	Commissioned by	Cladding Panel tested	Insulation tested	BS 8414 Report number and Date	BR 135 Classification Report number and Date	BS 8414 Report Relativity number	BR 135 Classification Report Relativity number
1	31 May 2005	BRE Global Ltd	Kingspan Insulation Ltd	Cement particle board	K15	220876 8 Dec 2005	P101812-1000 Issue 1 28 Sep 2015	KIN00000137	KIN00000134
2	19 Mar 2014	BRE Global Ltd	Kingspan Insulation Ltd	Trespa decorative rain screen board	K15	293940 Issue 1 26 Jun 2014	Not commissioned	KIN00000140	N/A
3	7 Jul 2014	BRE Global Ltd	Kingspan Insulation Ltd	Taylor Maxwell Standard Classico tile	K15	297099 Issue 2 14 Apr 2015	291642 Issue 2 14 Apr 2015	KIN00000143	KIN00000131

	Date of test	Test house	Commissioned by	Cladding Panel tested	Insulation tested	BS 8414 Report number and Date	BR 135 Classification Report number and Date	BS 8414 Report Relativity number	BR 135 Classification Report Relativity number
4	23 Mar 2015	BRE Global Ltd	Carea Façade	Mineral composite grooved panels	K15	302995 Issue 1 14 May 2015	P100769-1000 8 Jun 2015	KIN0000014 7	KIN00000144
5	21 Apr 2015	BRE Global Ltd	Kingspan Insulation Ltd	Taylor Maxwell Tampa terracotta tiles	K15	303930 Issue: 2[1] (withdrawn) 17 Sep 2015	297211 Issue 1 (withdrawn) 21 Sep 2015	KIN0000013 8	KIN00000133
						303930 Issue 3 3 Jul 2018	297211 Issue 2 3 Jul 2018	AP/6/[ ]	AP/7/[ ]

[1] The first issue of this test report was dated 25 August 2015 and was available at the Supply Date. It was subsequently reissued following identification of inaccuracies. Issue 2 was later withdrawn on 3 July 2018 with a revised version being reissued on that date. This report was reissued following the identification of inaccuracies in the description of the system tested.

2 BS 8414 TEST REPORTS OF TESTS CONDUCTED FOLLOWING SUPPLY DATE

	Date of test	Test house	Commissioned by	Cladding Panel tested	Insulation tested	BS 8414 Report number and Date	BR 135 Classification Report number and Date	BS 8414 Report Relativity number	BR 135 Classification Report Relativity number
1	7 Jul 2015	BRE Global Ltd	Stofix Oy	Brick slip panels	K15	303931 Issue 1 5 Nov 2015	P100576-1000 13 Nov 2015	KIN00000150	KIN00000146
2	15 Jul 2015	BRE Global Ltd	Isosystems & Aquarian Cladding Systems	Gebrik panels	K15	P100838-1000 Issue 2 21 Sep 2015	P100838-1001 Issue 2 21 Sep 2015	KIN00000148	KIN00000145
3	26 Jan 2016	BRE Global Ltd	Kingspan Insulation Ltd	ArGe Ton Tampa terracotta tiles	K15	P100184-1000 Issue 3 28 Nov 2016	P100184-1001 Issue 3 2 Dec 2016	KIN00000139	KIN00000132

	Date of test	Test house	Commissioned by	Cladding Panel tested	Insulation tested	BS 8414 Report number and Date	BR 135 Classification Report number and Date	BS 8414 Report Relativity number	BR 135 Classification Report Relativity number
4	13 Aug 2018	BRE Global Ltd	Department for Communities and Local Government	"ACM panel with a core filler of fire retardant polyethylene"	"Insulation material of rigid phenolic foam"[2]	B137611-1037 (DCLG test 7) Issue 2.1 12 September 2017	Unavailable	AP/41/[ ]	N/A
5	9 Oct 2017	BRE Global Ltd	Kingspan Insulation Ltd	Mitsubishi Alpolic/fr ACM panels	K15	P107017-1000 Issue 1 14 Dec 2017	P107017-1001 Issue 2 11 Jan 2018	KIN0000014 1	KIN00000135
6	9 Oct	BRE Global	Mitsubishi Chemical	Booth Muirie BML 400 rivet	K15	P109971-1000	P109771-1001	KIN0000014	KIN00000473

[2] I understand that although not specified, the insulation used in this test was K15.

	Date of test	Test house	Commissioned by	Cladding Panel tested	Insulation tested	BS 8414 Report number and Date	BR 135 Classification Report number and Date	BS 8414 Report Relativity number	BR 135 Classification Report Relativity number
	2017	Ltd	Corporation	fixed ACM panels (Alpolic/A2)		Issue 1.0 18 Jan 2018	Issue: 1.0 4 Apr 2018	9	
7	27 Oct 2017	BRE Global Ltd	Mitsubishi Chemical Corporation	Booth Muirie BML 100 Hook On ACM panels (Alpolic/A2)	K15	P109973-1000 Issue 1.0 1 Mar 2018	P109973-1001 Issue 1.0 4 Apr 2018	KIN0000047 2	KIN00000470
8	7 Nov 2017	BRE Global Ltd	Kingspan Insulation Ltd	Mitsubishi Alpolic/fr ACM panels	K15	P109939-1000 Issue 1 11 Jan 2018	P109939-1001 Issue 1 11 Jan 2018	KIN0000014 2	KIN00000136

	Date of test	Test house	Commissioned by	Cladding Panel tested	Insulation tested	BS 8414 Report number and Date	BR 135 Classification Report number and Date	BS 8414 Report Relativity number	BR 135 Classification Report Relativity number
9	3 Dec 2017	Exova	Kingspan Insulation Ltd	Booth Muirie BML 100-HP cassette panels	K15	DLR1448 Rev.0 13 Mar 2018	SR0810 Rev.0 15 Mar 2018	KIN0000047 7	KIN00000471
10	12 Dec 2017	Exova	Kingspan Insulation Ltd	Alpolic/fr-BML100	K15	DLR1453 Rev.0 30 May 2018	SR0811 Rev.0 30 May 2018	KIN0000046 5	KIN00000464
11	5 Feb 2018	BRE Global Ltd	Kingspan Insulation Ltd	Booth Muirie BML 100-HP cassette panels	K15	P109938-1000 Issue 1[3] 25 Jul 2018	P109938-1001 Issue 1 14 August 2018	KIN0000049 2	AP/43/[ ]
						P109938-1000		AP/42/[	

[3] Issue 1 of this report was withdrawn by BRE and re-issued to correct certain details of the recorded specification.

	Date of test	Test house	Commissioned by	Cladding Panel tested	Insulation tested	BS 8414 Report number and Date	BR 135 Classification Report number and Date	BS 8414 Report Relativity number	BR 135 Classification Report Relativity number
						Issue 2 14 Aug 2018		]	

Appendix C: Witness Statement of Adrian Pargeter: ISO 13785-1 tests

	Date of Test	Report Reference	Report Date and Revision	Test house	Commissioned by	Cladding Panel Tested	Insulation Tested	Relativity Number
1	September 28 to October 6 2017	17-002392/EGU	19 December 2017 Revision A	Efectis	Kingspan BV	1. Alpolic A2 Non combustible 2.Alpolic/fr-RF Reduced-combustibility 3.Reynobond PE standard cladding with polyethylene core	1. K15 2. Celotex RS5000 PIR 3.Mineral wood Rockwood Duoslab	KIN00000248
			1 February 2018 Revision B					KIN00000249

Appendix D: Witness Statement of Adrian Pargeter: Failed BS 8414 tests of A1/A2 rainscreen cladding systems

Date	Test House	Cladding	Insulation	Note	Relativity Ref[1]
27 Oct 2016	BRE	Alucopanel Solid Core ACM (A2 Euroclass)	Fujairah Rockwool foil faced mineral fibre / stone wool (A1 Euroclass)	No test report commissioned.	
6 Mar 2018	Australia	Alpolic Solid Core Panel (A2 Euroclass)	Rockwool mineral fibre / stone wool (A1 Euroclass)	Tested to AS5113 (identical method of BS8414)	
2 July 2018	Exova (Dubai)	Vitracore G2 (A2 Euroclass)	Rockwool DuoSlab (A1 Euroclass)	Test rig constructed as replica of MHCLG tests conducted after Grenfell Tower fire.	

[1] Documents relating to these tests were disclosed to the Inquiry on 12 July 2018

Appendix E: Witness Statement of Adrian Pargeter: TP10 and TW55 product testing

	Title of Test	Date of Test	Test House	Product	Report Number and Date	Classification	Relativity/Exhibit Number
EN-13501-1:2002							
1	EN 13501-1:2002 Clause 10	Unknown	Warrington Fire Research Centre Ltd	TW55 as part of a construction	E133638 30 July 2003	Euroclass B Smoke production: s2 Flaming droplets: d0	KIN00000287
2	EN13501-1:2007+A1: 2009	Unknown	Exova Warringtonfire	Kingspan products including TW55 and TP10	WF 349135 3 March 2015	E	KIN00000284
3	EN13501-1:2007+A1: 2009	Unknown	Exova Warringtonfire	Kingspan products including TW55	WF 367450 20 July 2016	E	KIN00000285

	Title of Test	Date of Test	Test House	Product	Report Number and Date	Classification	Relativity/Exhibit Number
				and TP10			
Other European / International testing							
4	EN 1365-1:1999	6 April 2005	BRE	TP10 as part of a construction test	222203 22 April 2005	Fire resistance: 76 minutes	KIN00000288
5	EN/TS 15117:2005	Unknown	Exova Warringtonfire	Kingspan products including TW55 and TP10	WF 367449 20 July 2016	E	KIN00000286
6	BS EN ISO 1716: 2010	28 April 2017	Exova Warringtonfire	Kingspan products including TW55 and TP10	382915 15 May 2017	Gross calorific value per Unit Mass MJ/kg 27.6897	KIN00000312
BS 476							

	Title of Test	Date of Test	Test House	Product	Report Number and Date	Classification	Relativity/Exhibit Number
7	BS 476: Part 21: 1987: Clause 8	1 February 2001	Warrington Fire Research Centre Ltd	TW55 as part of a construction	117360 7 March 2001	Fire resistance: 36 minutes.	KIN00000309
8	BS 476: Part 21: 1987: Clause 8	30 May 2001	Warrington Fire Research Centre Ltd	TW55 as part of a construction	118137 3 July 2001	Fire resistance: 73 minutes.	KIN00000310
9	BS 476: Part 22: 1987: Clause 5	4 July 2001	The Building Test Centre	TW55 as part of a construction	BTC 11602F Unknown	Fire resistance: 66 minutes.	KIN00000311
10	BS 476: Part 21: 1987: Clause 8	17 September 2001	Warrington Fire Research Centre Ltd	TW55 as part of a construction	120560 28 November 2001	Fire resistance: 36 minutes.	KIN00000307
11	BS 476: Part 21: 1987: Clause 8	18 September 2001	Warrington Fire Research Centre Ltd	TW55 as part of a construction	120561 18 December 2001	Fire resistance: 34 minutes	KIN00000306

	Title of Test	Date of Test	Test House	Product	Report Number and Date	Classification	Relativity/Exhibit Number
12	BS 476: Part 21: Clause 8	21 October 2003	Warrington Fire Research Centre Ltd	TW55 as part of a construction	135139 12 December 2003	Fire resistance: 36 minutes.	KIN00000305
13	BS 476: Part 21: 1987: Clause 8	7 April 2011	Exova Warringtonfire	TW55 as part of a construction	305848 9 June 2011	Fire resistance: 38 minutes.	KIN00000308
14	BS476: Part 7: 1997	29 May 2014	Exova Warrington Fire	Kingspan products including TP10 and TW55	341207 24 July 2017	Class 1	KIN00000282
15	BS476: Part 7: 1997	29 May 2014 and 9 March 2017	Exova Warringtonfire	Kingspan products including TP10 and TW55	381173 15 March 2017	Class 1	KIN00000283

	Title of Test	Date of Test	Test House	Product	Report Number and Date	Classification	Relativity/Exhibit Number
16	BS476: Part 7: 1997	9 March 2017	Exova Warrington Fire	Kingspan products including TP10 and TW55	378317 15 March 2017	Class 1	KIN00000281 (Test Report dated 15 March 2017) KIN00000298 (Classification Report dated 15 March 2017)

Appendix F: Witness Statement of Adrian Pargeter: Kooltherm FM Pipe Insulation Product Tests

	Title of Test	Date of Report	Test House	Product	Report Number	Classification	Relativity/Exhibit Number
1	EN 13501-1:2007+A1: 2009	22 January 2014	Exova Warringtonfire	Kooltherm Pipe Insulation	336867	Fire behaviour: B_L Smoke production: s1 Flaming droplets: d0	AP/44/[ ]
2	EN 13501-1:2007+A1: 2009	21 March 2016	Exova Warringtonfire	Kooltherm Pipe Insulation	361596	Fire behaviour: B_L Smoke production: s1 Flaming droplets: d0	AP/45/[ ]

	Title of Test	Date of Report	Test House	Product	Report Number	Classification	Relativity/Exhibit Number
3	EN 13501-1:2007+A1: 2009	5 December 2016	Exova Warringtonfire	Kooltherm Pipe Insulation	370711	Fire behaviour: B_L Smoke production: s1 Flaming droplets: d0	AP/46/[ ]