KINGSPAN INSULATION LIMITED

CLOSING STATEMENT, PHASE 2, MODULE 1 (THE PRIMARY REFURBISHMENT)

A. ISSUES

1 The Inquiry have confirmed that Module 1 of Phase 2 will address issues 2(a) and 4 (a) – (d) and (g) – (o) of the Inquiry's Updated List of Issues[1]. The following submissions focus, in particular, on:

1.1 2(a)(v): "Did Grenfell Tower, as modified, comply with all such relevant contemporaneous regulations, legislation, British Standards, guidance and industry practice?;

1.2 2(a)(vi): "What assessments and decisions were made about such compliance and by whom?;

1.3 4(d): "Was the exterior of the building… compliant with relevant building regulations…?";

1.4 4(g): "Who was responsible for such failures?";

1.5 4(h): "What advice or information was available, and what assessments were made about the components that comprised the exterior of the building, their fire safety, fire resistance and compliance with safety standards (including information or advice from manufacturers of relevant components)?"

B. EXECUTIVE SUMMARY

2 The renovation of Grenfell Tower did not comply with the contemporaneous building regulations, legislation, British Standards, guidance and industry practice. Kingspan

[1] Grenfell Tower Inquiry letters dated 22 July 2019, in particular 30 October 2019, updated List of Issues dated September 2019 and Counsel to the Inquiry Opening Statement Phase 2 Day 1, 27 January 2020, page 22 line 12 to page 23 line 10.

Insulation Limited[2] (**"Kingspan Insulation"**) agrees with the Inquiry Phase 1 Report which found that *"I accept that the construction of the Building Regulations is ultimately a question of law and there is compelling evidence that requirement B4 (1) was not met in this case. It would be an affront to common sense to hold otherwise"*[3]. The Report also says "*I think it is right therefore that I should say at this stage that on completion of the main refurbishment the external walls of the building did not comply with requirement B4(1) of Schedule 1 to the Building Regulations"*[4]

3 The evidence has shown that there were multiple failings on the part of multiple separate duty holders in respect to each of the design, procurement, planning, compliance and installation processes that were causative of the design and construction of the flawed cladding system which led to the subsequent tragic events that occurred at Grenfell Tower.

4 In particular, the evidence has established that "*the principal reason why the flames spread so rapidly up, down and around the building was the presence of the aluminium composite material (ACM) rainscreen panels with polyethylene cores, which acted as a source of fuel*."[5] Put simply, the use of Arconic's Reynobond PE-cored ACM cladding on Grenfell Tower rendered the tower unsafe. It would have been unsafe regardless of the type of insulation (combustible or non-combustible) used in combination with this cladding. Kingspan Insulation is not aware of any BS 8414 test incorporating the type of Arconic Reynobond PE-cored ACM cladding used on the Tower that has ever satisfied the relevant criteria set by BR 135.

5 Arconic claimed an incorrect reaction to fire classification for its Reynobond PE-cored ACM cladding. The BBA Certificate at the time stated that "*A standard sample of the product, with a grey/green Duraglass 5000 coating, when tested for reaction to fire, achieved a B-s2, d0 in accordance with EN1351011:2002"- ie* a Euroclass B

[2] Kingspan Insulation Limited (company number 1882722) is the company within Kingspan Group responsible for sales of K15 in Great Britain. There are other companies within Kingspan Group with similar names which undertake similar operations in other jurisdictions and are not involved in the Grenfell Tower Inquiry

[3] Grenfell Tower Inquiry Phase 1 Report para 26.4

[4] Grenfell Tower Inquiry Phase 1 Report, paragraph 26.6

[5] Grenfell Tower Inquiry Phase 1 report, paragraph 2.13 a

classification[6], whereas in reality tests undertaken by Arconic in 2013[7] evidenced that the product had only achieved Euroclass E in hook-on cassette form (the type used on Grenfell Tower). This erroneous classification would, in principle, have allowed the ACM cassettes to be used on Grenfell Tower if combined with limited combustibility or non-combustible insulation via the Linear Route to Compliance. Had such a system been specified (which it was not), it would almost certainly not have passed a BS 8414 test. This is clear from the DCLG testing carried out following the fire: both cladding systems using PE-cored ACM failed BS 8414 tests very quickly irrespective of whether non-combustible synthetic mineral fibre insulation or PIR insulation was used.

6 Those responsible for the design of the cladding system also specified PIR insulation on the external walls of the Tower as part of the rainscreen façade system. PIR provided a thinner, lighter insulation solution than would have been possible had synthetic mineral fibre been specified, but PIR was not classified as being of limited combustibility or non-combustible. The PIR insulation specified (Celotex RS5000) held a Class 0 certification, but this does not mean that it was of limited combustibility or non-combustible. There appears to have been a fundamental misunderstanding by the designers if they equated Class 0 classification of PIR with limited combustibility.

7 These fundamental failures in the design of the cladding system and the fact that it was impossible for this cladding system to comply with the Building Regulations were not identified by Rydon, Harley, Exova or Building Control. The failure to recognise the lack of safety in the cladding system for Grenfell Tower forms a chain of causation that led to the unsafe refurbishment of the Tower. Kingspan Insulation played no role in this unsafe design whatsoever.

8 Arconic's incorrect classification claim and marketing of its Reynobond PE-cored ACM cassettes, and the misunderstanding about the fire classification of the insulation,

[6] See BBA Certificate No.08/4510, issued on 14 January 2008: {BBA00000047/5}

[7] *{MET00053158_P04/135-138} CSTB EN 13501-1 Classification Report, reference RA13-0333, for Reynobond PE panels dated 31 January 2014.*

permitted errors to be made by others which led to the construction of the non-complaint system installed at Grenfell.

9 However it is important to note that the legislation at the time of the refurbishment would have allowed the cladding to be installed under the Linear Route to Compliance without a large scale BS 8414 test had it been combined with non-combustible/limited combustibility insulation under the Linear Route to Compliance. Yet we know, from the DCLG testing, that such a system would have failed a BS 8414 test. This problem with the Building Regulations – the omission of any requirement for a test of the whole cladding system – remains unaddressed even today. This is an issue for Module 6.

C. EXPERT EVIDENCE RELEVANT TO MODULE 1

10 In Module 1 the Inquiry heard expert evidence from Paul Hyett and Beryl Menzies which relate to these submissions. In Module 2, the Inquiry heard evidence from Jonathan Sakula. Mr Sakula's evidence is relevant to issues 2 (a) (vi), 4(d) and 4(g) identified above.

Paul Hyett

11 Paul Hyett gave evidence about the design work carried out in relation to the refurbishment project, in particular by the architects, Studio E and the façade contractor, Harley. The evidence covers the architectural design, the choice of materials, the development of the design, compliance with legislation and regulations, and the quality of the workmanship. Kingspan Insulation highlights the following points from his oral evidence:

11.1 a reasonably competent architect should be aware of the fire performance properties of ACM panels in general and would have obtained specific knowledge as part of their preparation for the initial design of a rainscreen cladding system that ACM panels were manufactured at the time with different cores, a PE and an FR core[8].

[8] Hyett Transcript day 64 3 November 2020 page 85, lines 3-15

11.2 Studio E should have considered whether it had the necessary experience to carry out the project and if not engage a specialist with the necessary experience in respect of the design of a high-rise project such as Grenfell.[9] Mr Hyett then says at lines 16 and 17 "*But I think that their first port of call would have been to see whether they could do that work on their own*";

11.3 a reasonably competent architect responsible for the initial design of the over-cladding ought to have been aware of Building Regulations B2, B3, B4[10];

11.4 a reasonably competent architect would have used the product certificates as part of their due diligence in ascertaining whether, for the purposes of the Linear Route to Compliance, a material was of limited combustibility within the meaning of Approved Document B (**"ADB"**)[11];

11.5 a reasonably competent architect would know that PIR and phenolic insulation products were not complaint with ADB"[12];

11.6 in the absence of any consideration of any of the other alternative routes to compliance, PIR insulation and phenolic insulation should not have been considered at all by the design team or specified by Studio E[13].

Beryl Menzies

12 Beryl Menzies gave evidence about the work of the Building Control Inspectors. Kingspan Insulation highlights the following points from her oral evidence:

[9] Hyett Transcript day 63 2 November 2020 Page 83, lines 4-15

[10] Hyett Transcript day 64 3 November 2020 page 41, lines 4-24 and page 55, lines 12-16

[11] Hyett Transcript day 64 3 November 2020 page 64, lines 19-25 and page 65, lines 1-13

[12] Hyett Transcript day 64 3 November 2020 page 171, lines 12-25

[13] Hyett Transcript day 64 3 November 2020 page 177, lines 14-23

12.1 a reasonably competent building control officer would have read BR 135 in full in circumstances where the specific project involved overcladding works which squarely requires them to consider B4[14];

12.2 a reasonably competent building control officer at the time would have been aware that Class 0 does not mean non-combustible or limited combustibility[15];

12.3 a reasonably competent building control department would have made sure that the contents of BCA Technical Guidance note 18 were properly disseminated down to building control officers[16];

12.4 a reasonably competent building control officer would have been aware of previous fires involving external cladding façades on high-rise residential buildings[17];

12.5 a reasonably competent building control officer would have been aware of international cladding fires , such as the spate of fires in the UAE in 2012/2013, and then in 2015, and that the occurrence of such fires would have prompted an awareness on the part of a building control officer about the dangers of ACM[18];

12.6 if not provided with a BBA Certificate or something like it, a reasonably competent building control officer would have satisfied themselves that a system complied with the Building Regulations by asking for "*a test certificate of that particular construction, or an assessment by an accredited body or some other competent person who would take that test certificate and give an*

[14] Menzies Transcript day 60 27 October 2020 page 81, lines 16-25, page 82, lines1-4

[15] Menzies Transcript day 60 27 October 2020 page 85 lines 1-4

[16] Menzies Transcript day 60 27 October 2020 page 85, lines 10-21

[17]Menzies Transcript day 60, 27 October 2020 page 91 lines 21-24

[18]Menzies Transcript day 60, 27 October 2020 page 92, lines 18-25 and page 93, lines 1-3

assessment as to what they think would be the outcome if that particular system was involved in a fire"[19];

12.7 in respect of insulation, a reasonably competent building control officer would have required some supporting test evidence or other certificate that suggested that that insulation was compliant with the requirements, either of ADB and the Linear Route, if that was what was being followed, or a BR 135 certification if system testing was the route to compliance[20];

12.8 a reasonably competent building control officer would have understood what National Class 0 meant and that for some products, the surface achieves National Class 0, but they nonetheless contain combustible material inside. A reasonably competent building control officer would also have an appreciation of the risk in terms of external flame spread that that limited testing to National Class 0 might pose[21]; and

13 Ms Menzies also stated that "*everything I've seen indicated that the building did not comply [to Building Regulations including B4]*" despite a completion certificate being issued.[22]

Jonathan Sakula

14 Jonathan Sakula gave evidence to the Inquiry about the state of knowledge within the cladding industry in the period between January 2012 and June 2017. Kingspan Insulation highlights the following points from his oral evidence:

14.1 a reasonably competent cladding contractor would have known and understood the fundamental importance of complying with the fire safety

[19] Menzies Transcript day 60, 27 October 2020 page 100, lines 21-25, and page 101, lines 1-5

[20] Menzies Transcript day 60, 27 October 2020 page 143, lines 4-25

[21] Menzies Transcript day 60, 27 October 2020 page 171 lines 13-24

[22] Menzies Transcript day 60 27 October 2020 page 216, lines 1-10

requirements concerning the design and construction of an external cladding façade as set out in the Building Regulations and ADB[23];

14.2 a reasonably competent cladding contractor ought to have been familiar with section 9 of Approved Document B, which deals with concealed spaces/cavities, as well as section 12 of ADB[24];

14.3 a reasonably competent cladding contractor in the period in question would have been aware of both the Linear Route to Compliance and the BR 135/ BS 8414 testing route in section 12 of ADB, and, in respect of the Linear Route, would have understood that assessing whether an external cladding system would adequately resist the spread of fire over the walls required consideration of the fire performance of each of the components of the cladding system, including the particular type of panel and the insulation specified for the system[25];

14.4 notwithstanding whether there were any differences in the detail of those cladding systems, a reasonably competent cladding contractor ought to have been aware of the fire dangers inherent in using ACM cladding. These dangers would have probably included the knowledge that metal cladding has a propensity to melt and deform, thereby exposing the core of any composite panel[26];

14.5 a reasonably competent cladding contractor ought also to have known that PE-cored ACM would "*be gone rather quickly in a fire*[27]" because it contained a combustible polyethylene core[28];

14.6 a reasonably competent cladding contractor would ensure that somebody with technical or design responsibility had read any relevant BBA Certificate in

[23] Sakula Transcript day 125 5 May 2021 page 29, line 25 and page 30 lines 1-19

[24]Sakula Transcript day 125 5 May 2021 day 125 page 34, lines 1-7

[25] Sakula Transcript day 125 5 May 2021 page 37, line 25, and page 38 1-13

[26]Sakula Transcript day 125 5 May 2021 page 98, line 16-21

[27] Harley internal email dated 27 March 2015 {HAR00006585}

[28]Sakula Transcript day 125 5 May 2021 page 102, lines 18-23

detail to ensure that the product was appropriate for its intended use on a project, which would involve reading the Certificate in its entirety[29];

14.7 It was for all parties involved in the design and construction of the refurbishment, including the reasonably competent cladding contractor, to consider whether ACM PE-cored cladding cassettes were suitable for use on a high-rise residential building, given the combustibility of such panels and their propensity to propagate the spread of fire[30]; and

14.8 A reasonably competent cladding contractor carrying out a project which required compliance with this particular standard would have appreciated that PE-cored ACM should not be specified or used on that project given that it was apparent to the cladding industry that PE-cored ACM cladding panels readily supported combustion and would add significantly to the fire load in any fire involving a cladding façade constructed of such panels.[31]

D. WERE THE GRENFELL TOWER REFURBISHMENT WORKS COMPLIANT WITH THE BUILDING REGULATIONS?

15 As Kingspan Insulation made clear in its Phase 1 Closing Submissions[32], it agrees with the Inquiry's findings that the cladding system constructed on the Grenfell Tower did not comply with the Building Regulations. At the relevant time, the Building Regulations required the external walls of a building to "adequately resist the spread of fire[33]". ADB provided guidance on how this requirement could be met. In particular, the Linear Route to Compliance required that "External walls should meet the guidance given in paragraphs 12.6 to 12.9" which required the external surface of a cladding panel used in the external wall to have either a National Class 0 or Euroclass B classification or better and the insulation to be of limited combustibility or better (the "Linear Route to Compliance"); or alternatively if the products could not

[29] Sakula Transcript day 125 5 May 2021 page 165, lines 9-19

[30] Sakula Transcript day 125 5 May 2021 page 199, lines 12-20

[31] Sakula Transcript day 125 5 May 2021 page 204, lines 1 -12

[32] Kingspan Insulation Phase 1 Closing submissions {INQ00000565} pages 3-4 section 2.1

[33] Part B4(1) Schedule 1 Building Regulations

individually meet these classification requirements, then the whole system would have to "meet the performance criteria given in BR 135 for cladding systems using full-scale test data from BS 8414-1:2002 or BS 8414-2:2005"[34]. Finally, the proposed system could achieve compliance via the desktop study route set out in BCA Technical Guidance note 18, or via the holistic fire engineering route.

16 The Chairman concluded in his Phase 1 report, there was *"compelling evidence"*[35] that requirement B4 (1) of the Building Regulations was not met at Grenfell Tower and the "*principal reason why the flames spread so rapidly up, down and around the building was the presence of the aluminium composite (ACM) rainscreen panels with polyethylene cores, which acted as a source of fuel."*[36]

E. FAILINGS IN THE CLADDING SYSTEM USED AT GRENFELL TOWER

17 Kingspan Insulation was not involved in any aspect of the design, planning or installation of the ACM cladding system at Grenfell Tower[37]. Save for a U-value calculation (undertaken without any information being provided as to the type of cladding proposed) it was not asked to provide (and did not provide) any other information, advice or technical guidance about its products to those responsible for the design, planning or installation of the cladding system. It did not know at any point until after the fire that K15 had been used and did not know what other materials were used in the cladding system. It delivered no product direct to site. Kingspan Insulation's K15 product accounted for only approximately 5% of the rainscreen insulation (by area) purchased for use on Grenfell Tower, and it was only used because of supply issues in respect of the chosen insulation, Celotex RS5000.

Arconic Reynobond PE-cored ACM cladding

[34]The BCA Technical Guidance Note 18 (introduced in June 2015) allowed Desktop Studies as a route to compliance. The fire safety engineering approach was also an available route to compliance.

[35] Inquiry Phase 1 report page 13, paragraph 2.16

[36] Inquiry Phase 1 report page 12 paragraph 12.13 a

[37] As explained more fully at footnote 37 of Kingspan Insulation's Opening Statement for Phase 2 Module 2 {KIN0023794/9}, A generic u-value calculation was provided at a very early design stage.

18 The key failing was the use of Arconic Reynobond PE-cored ACM cassettes in the cladding system on Grenfell Tower. This issue must be considered in the relevant context, the refurbishment of Grenfell Tower was not a "complex"[38] project, it was "relatively routine"[39].

19 Arconic's Reynobond PE-Cored ACM was incorrectly marketed as achieving a Euroclass B reaction to fire classification, regardless of whether it was installed as rivet-fixed flat panels or hook-on cassettes, whereas in reality by January 2014, Arconic knew from its own testing that the product had only achieved Euroclass E in hook-on cassette form (the type used on Grenfell Tower).[40] If the true classification of the product had been known, it could not properly have been considered suitable for use under the Linear Route to Compliance. If the designers and contractors had been able to identify that this cladding was combustible it would have meant that in order for this to be used on a building the whole system would need to have (i) passed a large scale BS 8414 test, or (ii) been assessed as compliant by a fire engineer in a desktop study, or (iii) by the fire engineering route. In practice had any fire engineer had knowledge of the correct classification of the cladding panels then they would have been extremely unlikely to allow compliance via either of these alternative routes to compliance.

20 After the Grenfell Tower fire, the Government commissioned two BS 8414 tests on cladding systems incorporating the type of PE-cored ACM which had been used at Grenfell. One system incorporated PIR insulation. The other incorporated synthetic mineral fibre insulation. Both systems failed to achieve the criteria set by BR 135, failing the test in under 8 minutes. These tests indicate that any cladding system incorporating PE-cored ACM is unlikely to pass the BR135 criteria in a BS 8414 test regardless of the type of insulation with which it is combined.

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[38] Menzies Transcript day 60, 27 October 2020, page185, lines 7-13. And [Sakula] Transcript day 125, 5 May 2021, p18, lines 19-20

[39] Sakula – Transcript, day 125, 5 May 2021, page 19, lines 17-22

[40] *{MET00053158_P04/135-138} CSTB EN 13501-1 Classification Report, reference RA13-0333, for Reynobond PE panels dated 31 January 2014.*

21 The independent Expert Panel concluded that: *"ACM cladding (and other metal composite material cladding) with unmodified polyethylene filler (category 3) presents **a significant fire hazard** on residential buildings at any height **with any form of insulation**"*[41] (emphasis added).

22 In addition, Efectis has published peer reviewed scientific research which has demonstrated that the fire at Grenfell Tower would have behaved in materially the same way if synthetic mineral fibre insulation had been used instead of PIR insulation.[42]

Misunderstanding of Limited Combustibility and Class 0

23 Some of those working on the project have claimed that they incorrectly understood that a Class 0 classification meant that a product was of limited combustibility and safe to use on any building over 18metres[43], and therefore thought that it could be combined with a Euroclass B/Class 0 cladding panel in compliance with the Linear Route to Compliance. That was wrong – Class 0 does not mean that a product is of limited combustibility, so neither RS5000 nor Kingspan Insulation's K15 could have properly been installed in *any* cladding system in a manner which was compliant with the Linear Route. This misunderstanding is the responsibility of the designers and contractors responsible for the design and construction of the system.[44] It is not the responsibility of Kingspan Insulation.

[41] *Advice for Building Owners of Multi-storey, Multi-occupied Residential Buildings* – Ministry of Housing, Communities and Local Government, January 2020, p 1.15

[42] See paragraphs 67 to 75 of Kingspan Insulation's Opening Statement and in particular the following Efectis papers: "Reconstruction of Grenfell Tower fire. Part 3—Numerical simulation of the Grenfell Tower disaster: Contribution to the understanding of the fire propagation and behaviour during the vertical fire spread." Fire and Materials 2020; 44; 35-57; Reconstruction of the Grenfell Tower Fire — Part 4: Contribution to the Understanding of fire propagation and behaviour during horizontal fire spread' Fire and Materials, 2020; 1-27;

[43] See for example [Bailey] Transcript 9 September 2020, day 33 page 6: "*Q. What was the significance of a material having a class 0 certification, did you think? A. That it was safe to use on a building. Q. Safe to use on any building? A. Over 18 metres. Q. Safe to use on any building over 18 metres in any part of that building? A. Yes*"

[44] Hyett Transcript day 64 3 November 2020page 64, lines 19-25 and page 65 lines 1-13 and Menzies Transcript day 60 27 October 2020 page 85 lines 1-4 and Sakula Transcript day 125 5 May 2021 page 37, line 25, and page 38 1-13

24 In fact, at the time it was supplied for use on the Tower, K15 had (correctly) been classified as achieving Class 0, and none of the contemporaneous product literature or information about K15 described it as being of limited combustibility in any event.

Insufficient investigation of and consideration given to the compliance of the external wall with the Building Regulations[45]

25 The evidence indicates that those working on the refurbishment should have carried out an investigation into the classification of the specific type and form of Reynobond ACM being proposed for use in the refurbishment. The following evidence is relevant to this issue:

a) Mr Sakula, confirmed that a cladding contractor with responsibility for the design of the façade: *"had a duty of care to satisfy itself that the products met the specification and regulations"*[46] and that he would expect the contractor to consider the *"fire performance of each of the components of the cladding system"*[47] in order to determine compliance with the Building Regulations.

b) Mr Sakula also noted that he would expect a reasonably competent cladding contractor to question the literature or certification of a product if *"they were proposing something that was different, or even slightly different, from that being proposed for which the technical information applied.* [48]

c) In addition, Mr Hyett explained in his evidence that looking at section 6 of the BBA Certificate for the Reynobond panels, Studio E: "*should have reverted to the manufacturer in pursuit of an assurance that the panel colour selected for Grenfell would meet the test requirement necessary and, in the absence of any satisfactory assurance, should have insisted on a dedicated test being carried out on the preferred*

[45] This issue is of particular relevance to Issue 4(h) of the Updated List of Issues: "What advice or information was available, and what assessments were made about the components that comprised the exterior of the building, their fire safety, fire-resistance and compliance with safety standards (including information or advice from manufacturers…)?"

[46] [Sakula] Transcript, day 125, 5 May 2021, p146, lines 10-11

[47] [Sakula] Transcript, day 125, 5 May 2021, page 38, lines 5-13

[48] [Sakula] Transcript day 125, 5 May 2021 page 26 lines 18-22

panel colour and refused to specify it without satisfactory certification"[49]*. He also added that* a reasonably competent architect should have considered the *"precise build-up of the external wall structure and its elements in order to understand whether it, as a system, could resist the spread of fire for a reasonable period"*[50] and *"is expected to be capable of interpreting and applying the guidance in ADB as far as it relates to an overcladding system"*[51]

d) Furthermore, as Mr Sakula has confirmed the use of a PE-cored ACM system should have rung alarm bells with any reasonably competent designer of a cladding system at the material time given the fact of various other serious fires involving such systems.[52]

26 Thus, there should have been particularly careful scrutiny of the information available in respect of a system incorporating PE-cored ACM and in respect of any component parts of such a system.

27 In fact there is no clear evidence trail to show what steps were taken by those working on the project to satisfy themselves that the proposed cladding system complied with the Building Regulations.

28 In addition, the evidence indicates that those responsible for the design and build did not carry out any adequate investigation into whether it was appropriate or permissible from a fire safety perspective under the Building Regulations to combine the Celotex RS5000 insulation product specified for use on the Tower with Arconic's Reynobond PE-cored ACM panels.

The Linear Route to compliance permitted under the Building Regulations

29 Due to the incorrect classification claim made by Arconic, their Reynobond PE-cored ACM cladding was immediately deemed to be compliant under the Linear Route to

[49] [See paragraph 4.4.60 of Hyett's Phase 2 Report {PHYR0000004_0118}]

[50] Hyett Transcript, day 64, 3 November 2020, page 41, lines 19-24

[51] Hyett Transcript, day 64, 3 November 2020, page 58, lines 5-9

[52][Sakula] Transcript day 125, 5 May 2021 page 118 lines 10-14, and page 203, line 25 and page 204 lines 1-12

Compliance if used with insulation which was non-combustible or of limited combustibility and therefore automatically able to be used on a building over 18m, regardless of the fact that such a system would be unsafe and extremely unlikely to pass a BS 8414 test.[53]

30 When it comes to safety, reliance should not be placed on individual product classifications. The best means of achieving safe cladding systems is to require all proposed cladding systems to be subjected to large-scale system testing to ensure that the system as a whole is demonstrated to be safe.

Failure of Building Control

31 As is clear from the evidence Building Control should have acted as an external and independent safeguard on the refurbishment project to ensure that the specified cladding system was compliant with the Building Regulations.

32 The Inquiry's appointed Building Control expert, Ms Menzies, confirmed in her report that she had not "*seen any documents or exchange of emails between any party and Building Control that refers to the compliance (or non-compliance) of the cladding system / external wall construction*[54]*.*" Ms Menzies saw no evidence to suggest the Building Control body requested details of the cladding system and its ability to resist fire spread and described this as a "*fundamental failing*"[55].

F. WHO WAS RESPONSIBLE FOR THESE FAILINGS

33 Issue 4(g) of the Updated List of Issues raises the question as to: "*Who was responsible for such failures?*"

[53] https://www.gov.uk/government/publications/fire-test-report-dclg-bs-8414-test-no1; https://www.gov.uk/government/publications/fire-test-report-dclg-bs-8414-test-no2

[54] Transcript, day 60, 27 October 2020, p137, lines 14-18 and , page 138 lines 1-10 – quoting from Menzies Report: page 96 {BMER0000004/96}]

[55] Menzies Transcript, day 60, 27 October 2020, p195, lines 7-22. Quoting from Menzies Report paragraph 42, page 11 {BMER0000004/11}].

34 In summary, primary responsibility lies with Arconic for permitting its unsafe Reynobond PE-cored ACM cladding system to be marketed and used in tall buildings in the knowledge that the reaction to fire classification claimed was incorrect.

35 In addition the Inquiry has heard evidence of failings on the part of (i) those involved in advising on, designing and installing the cladding system which used Arconic's Reynobond PE-cored ACM cassettes; and (ii) those involved in the Building Control process, which failed to give any, or any adequate consideration, to the safety issues posed by the use of Arconic's Reynobond PE-cored ACM cassettes regardless of the insulation type specified, and who failed to challenge the incorrect belief that a Class 0 classification meant that a product was of limited combustibility or better.

Arconic

36 Arconic knew that the PE-cored ACM cladding it was marketing was unsafe for use on tall buildings. The Inquiry has heard that in September 2007, an Arconic employee called Gerard Sonntag (Marketing Manager) attended a site visit in Norway to a company called Astrup. During the visit, a presentation was given by Mr Fred-Roderich Pohl in which he compared the fuel power of a 5000 square metres of PE-cored ACM cladding with a truck of 19000 litres of oil.[56] Mr Sonntag prepared a site visit report[57] in which the presentation is described. Mr Sonntag states in the report that he found this comparison to be a "shock"[58]and "true"[59]. In the conclusion of the report, Mr Sonntag referred to one of the arguments put by Mr Pohl, who asked "what will happen if only one building made out of PE core is in [sic] fire and will kill 60 or 70 persons, what is the responsibility of the ACM supplier?"[60] It is also apparent that Mr Pohl's presentation had been seen by Mr Claude Wehrle of Arconic earlier in 2007.[61]

[56] Millett presentation Transcript day 104 10 March 2021 page 92 - 97

[57] {META00001953}

[58] Transcript day 104 10 March 2021 page 94 line 23

[59] Transcript day 104 10 March 2021 page 95 line 3

[60] Transcript day 104 10 March 2021 page 96 lines 5-8

[61] Transcript day 104 10 March 2021 page 95 lines 19-21

37 Despite this Arconic took no action to prevent the sale and use of its unsafe Reynobond PE-cored ACM cladding cassettes on tall buildings.

38 In summary, it appears clear from the totality of the evidence that Arconic knew[62], or certainly should have known, that their Reynobond PE cored ACM panels product was unsafe and not suitable for use as a cladding panel on tall buildings regardless of the type of insulation with which it was combined and regardless of whether a Class 0 classification could ever be justified in respect of the surface of the panels. Had the panels been subjected to any sort of large scale testing as part of a cladding system then that system would have failed regardless of whether it incorporated combustible or non-combustible insulation. That is clear from the DCLG BS 8414 tests carried out following Grenfell Tower fire.

Those responsible for the design, implementation and build of the refurbishment

39 The evidence heard by the Inquiry indicates that those responsible for designing the cladding system should have been aware of the guidance given in ADB and precisely what needed to be done to ensure that they followed one of the routes to compliance in order to design a compliant system.

40 As set out above, Building Control also bears responsibility for failing to ensure that the refurbishment complied with the Building Regulations, particularly failing to correct the fundamental misunderstanding in relation to the difference between Class 0 and limited combustibility.

G. WHAT WERE THE REASONS FOR THESE FAILURES?

41 The following paragraphs highlight certain aspects of the extensive evidence heard by the Inquiry in relation to this complex issue.

(a) **Lack of Experience**

[62] Indeed, the Inquiry has heard how, by 31 January 2014, both the rivet and cassette PE panels were classified as Euroclass E by the CSTB, see Day 104, page 102, lines 19

42 The evidence of Mr Hyett indicates that the architects chosen to work on the project, whose role was to design the cladding system had no previous experience of high-rise residential overcladding projects[63] or high-rise residential projects in general[64]. Mr Hyett noted that he would expect Studio E to have recognised that their levels of knowledge and skill would need to be expanded to work on the project, although he did not believe that their lack of experience in these areas provided a reason for them to decline the commission.[65]

43 Specifically looking at compliance with the Building Regulations, Mr Hyett explained that given Studio E's limited experience they should have taken decisions on routes to compliance on the basis of *"advice and confirmation from the fire consultant "*[66]

(b) Ignorance of the risks of PE-Cored ACM Cladding

44 The evidence indicates that each of the numerous parties involved in the design, implementation and build should have been aware *"of the fire dangers inherent in using ACM cladding"*[67].

45 For example, Mr Sakula provided evidence that a reasonably competent cladding contractor would or should have understood the following in respect of the PE-cored ACM cladding panels:

45.1 ACM would be "*gone rather* quickly in a fire"[68] because it contained a combustible PE core[69];

45.2 ACM cladding may render cavity barriers ineffective[70];

[63] Hyett Transcript, day 63, 2 November 2020, page 82, lines 5-10

[64] Kuszell Transcript day 6 2 March 2020 page 20 lines 6-17

[65] Hyett Transcript, day 63, 2 November 2020, page 81 lines 6-25 and page 82, lines 1-13

[66] Hyett Transcript, day 64, 3 November 2020, page 63, lines 6-22.

[67] Sakula Transcript, day 125, 5 May 2021, page 98, lines 16-21

[68] Harley internal email dated 27 March 2015 {HAR00006585}

[69]Sakula Transcript, Day 125, 5 May 2021, page 102, lines 18-23;

[70] Sakula Transcript, Day 125, 5 May 2021, page 99, line 25, page 100 lines 1-12

45.3 The need to make others aware of the hazards of PE-cored ACM, particularly in circumstances where they were proposing the use of the product[71]; and

45.4 The need to consider whether the PE-cored ACM cladding was suitable *"given the combustibility of such panels and their propensity to propagate the spread of fire"[72].*

46 Overall, Mr Sakula agreed in oral evidence that a reasonably competent cladding contractor, should have concluded that ACM PE was unsafe to use on high rise buildings.[73]

(c) Decisions on cladding were driven by cost rather than safety:

47 As detailed at paragraphs 18 to 22 above, the danger of using PE-cored ACM should have been abundantly clear to those designing the cladding system at Grenfell Tower. However, the decision made by Rydon to change the cladding panel from zinc cladding to PE-cored ACM cassettes appears to have been driven by cost savings, rather than any consideration of safety[74]. The change to PE-cored ACM led to a saving of £454,000.[75]

48 In making the decision to change the cladding panel, it appears no adequate consideration was given to the suitability of the substitute product. Mr Hyett explained that, following the change, there should have been a *"major investigation of the Reynobond system"[76]* and how the PE-cored ACM would work with the other products in the system. However, *"such a review appears either never to have been carried out, or if so, not to have been carried out properly"[77].*

(d) Errors in design of the cladding system:

[71] Sakula Transcript, Day 125, 5 May 2021, page 199, line 25, page 200 lines 1-12

[72] Sakula Transcript, day 125, 5 May 2021, page 199, lines 12-20.

[73] Sakula Transcript, day 125 5 May 2021 page 207 liners 19-25 and page 208 lines 1-10

[74] {RYD00004142}

[75] {HAR00005683}

[76] [Hyett] Transcript, day 64, 3 November 2020 page 123, line 15 – quoting from Report {PHYR0000029/94}, 4.4.45

[77] Hyett Transcript, Day 64, 3 November 2020 p123, lines 19-21 - quoting from Report {PHYR0000029/94}, 4.4.45

49 There were also *"fundamental errors"*[78] with the design of the system beyond the critical factor of the use of the unsafe PE-cored cladding cassettes.

50 Mr Hyett points specifically to the design of the cavity barriers around the windows and noted, in his opinion, that the *"the design provided no protection against the passage of fire anywhere around the window opening directly into the cavity zone behind the rainscreen"*[79]

51 There was also a "*rapid loss of compartmentation"*[80]because *"a number of key fire protection measures, both active and passive, failed to operate as effectively as could reasonably have been expected…."*[81] These are matters which the Inquiry is currently exploring in Module 3.

52 Mr Hyett confirmed during oral evidence to the Inquiry that there was "no reasonable basis, upon which Studio E could reasonably have concluded that the rainscreen cladding system as specified and installed at Grenfell Tower was compliant"[82]

H. CONCLUSIONS

53 The designers of the cladding system at Grenfell Tower specified PIR insulation because they wanted a lighter and thinner insulant.[83] They incorrectly believed that its Class 0 classification meant that it was limited combustibility. They agreed to use Arconic Reynobond PE-cored ACM because it was cheaper and because they relied on Arconic's incorrect Euroclass B / Class 0 classification, seemingly validated by the product's BBA Certificate. The evidence indicates that Arconic knew, or should have known, that Reynobond PE-cored ACM panels were unsafe for use on tall buildings.

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[78] Report of Mr Hyett [PHYR0000005} 5.4.57 or {PHYR0000005}4.4.9 or {PHYR0000005}4.4.134]

[79] Hyett {PHYR0000004} 4.4.136

[80] Grenfell Tower Inquiry Phase 1 report paragraph 2.14

[81] Grenfell Tower Inquiry Phase 1 report paragraph 24.28

[82] Hyett Transcript, Day 65, 4 November 2020 p22, lines 17-23.

[83] Rockwool emailed Studio E on 24 July 2012 to say that "due to the low specified U-value the thickness needed would be exceptionally high, probably beyond the point of sensible building practice" {SEA00005276/2}

54 Building Control should also have picked up on the mistaken belief in relation to the PIR fire classification but failed to do so.

55 Given the specification of PIR insulation, the cladding system could not satisfy the Linear Route to Compliance and so a BS 8414 test (or a Desktop Study once allowed) would have had to have been conducted in order to demonstrate compliance with the Building Regulations. It is beyond reasonable doubt that the proposed cladding system would have failed to meet the BR 135 criteria if subjected to a BS 8414 test and thus that the proposed system was not fit for purpose. A BS 8414 test may also have revealed doubt about Arconic's claim that Reynobond PE-cored ACM cassettes achieved a Euroclass B/Class 0 rating.

56 If, instead of conducting a BS 8414 test (or Desktop study) Studio E had switched the specification to non-combustible synthetic mineral fibre insulation the proposed system would have been superficially compliant with the Linear Route. Building Control would likely have given approval based on the classifications of the individual products. However, the evidence clearly indicates that the use of synthetic mineral fibre insulation instead of PIR would have made no material difference to the nature and speed of the spread of the fire, as evidenced by the BS 8414 testing carried out after Grenfell Tower fire by DCLG and Efectis' ISO 13785 testing and CFD modelling.

57 It is submitted that one of the inescapable conclusions to be drawn from the evidence is that large scale system testing is the most robust way of assessing the safety of cladding systems as a whole, rather than making assumptions as to safety based on small scale testing of individual components.

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28 June 2021