

Report to Health Facilities Scotland

**Queen Elizabeth University Hospital
Risk of Fire Spread on External Envelope and Performance in Large Scale Test**



School of Engineering and Built Environment

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Report to Health Facilities Scotland

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1 Introduction

There is significant concern, following the fire and loss of life at Grenfell Tower (London, 2017) about the potential for external/rainscreen ACM cladding panels to contribute to the rapid spread of fire on the outside of a building leading to rapid fire spread internally, through re-entry, on multiple levels of a building. The detailed analysis of the sequence of events, the dynamics of fire spread and the contributory factors at Grenfell Tower are under investigation.

Health Facilities Scotland (HFS) commissioned the University to review the design and construction of the external envelope of two hospitals and to evaluate the implications for fire spread of the use of combustible composite panels as the external cladding.

There is combustible external/rainscreen composite panel cladding at the Queen Elizabeth University Hospital on both the 'Adult' Building and the Royal Children's Hospital. The insulation behind this external cladding is also combustible.

This report is intended to inform decision-making associated with proposed changes to, 'upgrading' of, the construction of the envelope of the areas of the external envelope of the buildings that incorporate combustible cladding.

The report is informed by the 'Interim Report to Health Facilities Scotland Qualitative Review of Building Envelope Combustibility'¹, the Building Research Establishment (BRE) large scale tests on cladding systems² outputs, preliminary fire modelling results and evaluation of the proposed envelope constructions.

2 Queen Elizabeth University Hospital: Royal Children's Hospital

The Trespa external cladding panels on the Royal Children's Hospital, which do not meet the criteria for non-combustibility, are to be replaced.

The planned replacement product meets the current requirements of the Building Standards for use on a building not greater in height than 18m but does not meet the criteria for 'non-combustibility'. However, the review of the fire performance for external cladding systems on buildings post the Grenfell Tower tragedy is anticipated to specify guidance for non-combustibility of the external cladding and/or assessment of the performance of the overall construction.

The large scale external cladding panel system tests conducted by the Building Research Establishment evidence that the proposed construction at the Royal Children's Hospital of

¹ October 2017

² BRE are conducting a series of full scale fire tests on cladding panel systems under BS 8414-1 to assess performance in fire against the criteria in BR135

(replacement) Trespa Meteon FR cladding panels over combustible insulation will not pass a large scale test for fire performance in terms of contribution to fire growth and spread³.

In this context we support the case that the combustible insulation should be replaced at the same time as the external cladding panels are replaced with Trespa Meteon FR panels. This should ensure that the fire performance of building envelope of the Royal Children's Hospital continues to be at the standard appropriate for a critical national facility without further intervention⁴.

3 Queen Elizabeth University Hospital: Adult Hospital

There are ACM combustible panels on the Adult Hospital⁵:

- from level four to the roof, on two main facades and the corner of the 'angled out' leg below the helipad

There is combustible insulation behind the cladding.

The review of the fire performance for external cladding systems on buildings post the Grenfell Tower tragedy is anticipated to specify guidance for non-combustibility of the external cladding and/or assessment of the performance of the overall construction.

The large scale external cladding panel system tests conducted by the Building Research Establishment evidence that combustible cladding panels over combustible insulation will not pass a large scale test for fire performance in terms of contribution to fire growth and spread.

In this context we support the case that the combustible external cladding panels are replaced with non-combustible cladding panels. This should ensure that the fire performance of building envelope of the Royal Children's Hospital continues to be at the standard appropriate for a critical national facility without further intervention⁶.

³ the Building Research Establishment (BRE) are conducting a series of large scale fire tests on cladding panel systems under BS 8414-1 to assess performance in fire against the criteria in BR135. The tests are intended to provide '...information that building owners and their professional advisers can use to take decisions about any further action needed (*for buildings with combustible cladding*) – including whether or not cladding and / or insulation needs to be removed'

⁴ the effectiveness of all fire protection measures is dependant on the quality/workmanship and detail meeting the design specification/criteria, including cavity barriers, which also underpin fire modelling scenarios

⁵ The panels do not meet the criteria for non-combustibility

⁶ the effectiveness of all fire protection measures is dependant on the quality/workmanship and detail meeting the design specification/criteria, including cavity barriers, which also underpin fire modelling scenarios