APPENDIX 3

CWCT & BCA TECHNICAL NOTES

Technical Note No. 73

Fire performance of curtain walls and rainscreens

Curtain walls are normally used for areas of the building envelope that are not required to be fire resisting but they still require appropriate detailing to limit the spread of fire. This Technical Note reviews the aspects relating to fire performance that generally need to be considered in the design of facades that are not required to be fire resisting. Where the façade is required to be fire resisting additional requirements will apply.

Introduction

Some parts of the building envelope are required to be fire resisting and these areas must be determined by the designer of the building taking account of the proximity of other buildings and the location of escape routes. Where curtain walls are used in these areas they are required to provide fire resistance and there are fire resisting systems that can be used in such cases. Where fire resistance is required, the full wall comprising the frame and infill panels/glazing must be tested to demonstrate the required performance.

Curtain walls are normally used for areas of the building envelope that are not required to be fire resisting however they still require appropriate detailing to limit the spread of fire.

The scope of this Technical Note is limited to walls which are not required to be fire resisting.

The main requirement for curtain walls that are not required to provide fire resistance is provision of fire stopping between the external wall and compartment floors and walls. In some situations there may also be a requirement to provide fire protection to brackets supporting the wall and limit the combustibility of materials used in the wall.

Rainscreen walls are additionally required to limit the spread of fire in the rainscreen cavity.

Requirements are given in Building Regulations and recommendations on how these can be satisfied are given in supporting documents. Additional requirements are given in guidance documents relating to particular types of buildings such as hospitals and schools. Clients and Insurers may also have requirements.

Many of the requirements are open to interpretation and construction details that are deemed acceptable vary from project to project. It is therefore important to discuss the provisions for a particular building with all the interested parties at an early stage.

This Technical Note provides guidance on the following issues:

- Provision of fire stopping at junctions between external walls and compartment walls and floors
- Protection of curtain wall brackets
- Provision of cavity barriers in rainscreen walls
- Use of combustible insulation materials

Building Regulations

In England and Wales, guidance on ways of satisfying the requirements of the Building Regulations relating to fire performance are given in Approved Document B (AD B). In Scotland guidance is given in section 2 of the Technical Handbook and in Northern Ireland it is given in Technical Booklet E.

The guidance in the various documents is similar although the way the documents are set out is very different making comparison difficult. However there are some differences in the technical requirements that will be described under the relevant headings below. There is also a different terminology for fire performance of materials used in Scotland which is described in this section.

In England, Wales and Northern Ireland, materials may be described as non-combustible,

March 2011

of limited combustibility or Class 0 using definitions given in AD B. Materials may also be classified as Class 1, 2, 3 or 4 in accordance with BS 476 Parts 6 and 7. Equivalent European classifications are also used. The Scottish Technical Handbook does not differentiate between non-combustible materials and materials of limited combustibility and uses the term non-combustible to include materials classed as being of limited combustibility elsewhere in the UK. The Scottish Technical Handbook also uses the term 'low risk' to describe Class 0 materials. In this Technical Note 'non-combustible' will be used as defined in AD B except when referring specifically to the requirements of the Scottish Technical Handbook.

A further difference in approach is that AD B is split into Volume 1 which deals with dwellinghouses and Volume 2 which deals with buildings other than dwellinghouses. Thus flats are included in Volume 2. In Scotland, the Handbook is divided into 'Domestic' and 'Non Domestic' construction in which flats are included in the scope of the domestic construction document.

Definitions

Fire stop: A seal provided to close an imperfection of fit or design tolerance between elements or components to restrict the passage of fire and smoke. Performance is given in terms of:

- **Integrity (E):** The ability of an element of construction, that has a separating function, to withstand fire exposure on one side without the transmission of fire to the unexposed side as a result of the passage of flames or hot gases.
- **Insulation (I):** The ability of an element of construction to withstand fire exposure on one side, without the transmission of fire as a result of significant transfer of heat from the exposed side to the unexposed side. Transmission shall be limited so that neither the unexposed surface nor any material in close proximity to that surface is ignited. The element shall also provide a barrier to heat, sufficient to protect people near it.

Cavity barrier: A construction to close a concealed space against penetration or spread of smoke or flame. AD B and the Technical Booklet for Northern Ireland clarify this as 30 minutes integrity and 15 minutes insulation although steel 0.5mm thick is given as a suitable material. The Scottish Technical Handbook requires 30 minutes integrity with no requirement for insulation.

Fire stopping of junctions between curtain walls and compartment floors and walls

Many buildings are divided into compartments to restrict fire spread. Where an external wall abuts a compartment wall or floor, it is necessary to provide fire stopping between the external wall and the compartment wall or floor to restrict fire spread through the junction. In some countries there is a requirement to provide a band of fire resisting construction approximately a metre high in the external wall in these areas. This is not generally required by UK Building Regulations but there are specific requirements relating to hospitals which are described below.

Regulations

AD B requires that a junction of a compartment floor or compartment wall with an external wall should maintain the fire resistance of the compartmentation. Requirements given in Part 2 of the Scottish Technical Handbook and the Technical Booklet E for Northern Ireland are similar.

The Scottish Technical Handbook also requires a 1m wide vertical strip of fire resisting construction in external walls of hospitals which abut compartment walls. The fire resisting construction is required to give the same period of fire resistance as the compartment wall and does not have to be centred on the compartment wall.

HTM 05-02 which applies to all NHS buildings also has this requirement but it does not apply where the areas on both sides of the compartment wall are provided with sprinklers.

The Building Regulations are primarily designed for life safety. The LPC Design Guide for the fire protection of buildings is concerned with the limitation of property damage. It recommends the provision of a strip of fire resisting

construction in external walls which abut compartment walls. It also recommends similar measures to limit fire spread where external walls abut compartment floors, however, it accepts that these measures may not be fully effective and may not be practical as they may conflict with architectural design.

Fire stop materials
Fire stops are required to prevent transfer of heat and smoke. Proprietary materials are available which are generally based on rock fibre to control the passage of heat and aluminium foil or a liquid applied membrane to control the passage of smoke.

Fire stops should be tested to demonstrate performance. Fire stops are often tested to BS 476-20 or BS EN 1366-4 with the fire stop positioned between fire resisting construction. BS EN 1364-4 and BS EN 1364-3 give test procedures which can be used to assess the performance of fire stops in conjunction with a sample of curtain wall but the curtain wall must be fire resisting to carry out the test. The fire stop may behave differently when used in conjunction with a non fire resisting curtain wall.

Curtain wall interface with fire stop
Although the curtain wall is not required to be fire resisting, the effectiveness of the fire stop will depend on the performance of the curtain wall.

Some facades adopt a rigid foam insulation such as polyisocyanurate (PIR) or similar within the spandrel area; these materials have no integrity against fire or hot smoke which may therefore simply bypass the barrier. It is worth noting that relatively early in a fire, the temperature of hot smoke can be as high as 500°C. Solutions include removing a strip of the insulation to allow the fire stop to continue to the back of the glazing or metal spandrel panel, a fire resisting lining on the back of the insulation against which the fire stop can interface or a fire resisting insulation for the whole of the spandrel panel. This would normally be a rock fibre insulation as glass fibre can melt and form voids which allow the fire to bypass the fire stop.

If the interface of the fire stop with the curtain wall is aligned with the transom location, the transoms may require protection by fire resisting boards to extend the fire resisting construction to the glazing.

Metal components of the curtain wall which pass through the fire stop will provide a means of heat transfer past the fire stop by conduction. Metal components may include curtain wall brackets, metal facings on the back of spandrel panels and curtain wall mullions. In some cases the metal on the protected side of the fire stop may become sufficiently hot to ignite adjacent materials allowing the fire to spread. It may be necessary to take measures to prevent this happening and this could require insulation of brackets or the provision of mineral fire resisting boards on the back of spandrel panels.

To form a good seal, fire stops generally need to be compressed. The amount of compression required depends on the nature of the fire stop materials and should be as required by the fire stop manufacturer. Compression of the fire stop may be reduced by;

- Tolerances, either because the gap between the façade and the structure is greater than anticipated or the fire stop is cut smaller than required.
- The back of the façade is not sufficiently dense and is compressed in preference to the fire stop.
- The façade bows away from the structure. Movement of the mullions should be prevented by brackets but the curtain wall may bow between mullions. Potential movements should be evaluated and due allowance made.

Installation of fire stops
The width of fire stop must be sufficient to ensure adequate compression allowing for construction tolerances and movements as discussed above. Fire stops may be supplied as pre-cut strips of specified width or may be site cut from slabs. If pre-cut strips are used it may be necessary to have a range of sizes available to allow for variation in the gap width between the floor edge and the facade. Alternatively strips can be supplied at the upper end of the range likely to be required and trimmed where necessary. If site cut strips are used, allowance for cutting tolerances must be made.

Fire stops need to be continuous along the façade. Joints may be tight butt joints or half lap

joints according to the system used. Joints in foil facings may require taping to ensure a good smoke seal.

Once in position, fire stops need to be fixed so that they do not drop out and they need to allow for movements that may occur both during the service life of the façade and in a fire. Metal strips which can be bent on site and fixed to the top surface of the floor slab are commonly used to fix fire stops and fire stop suppliers give guidance on frequency of fixings. An alternative method is to support the fire stop from below with a galvanised steel sheet fixed to the underside of the floor slab. Where this is done the sheet should not be fixed to the curtain wall as well as the floor as this can restrict movement of the wall. If the galvanised sheet is required to provide a smoke stop, an appropriate sealant can be used at the interface with the back of the curtain wall. A metal support below the fire stop will be exposed to the heat of the fire and may require additional protection.

Filling around fixing brackets can be awkward and is a regular scene of bad workmanship. If small infill sections of fire stop are used they must be securely fixed so that they cannot drop out. Intumescent sealant may be used to fill small gaps. Fire stop suppliers can provide guidance on appropriate techniques for their products.

Insulation in spandrel panels may be protected by a fire resisting casing or lining. This can either be part of the spandrel panel and held in the rebate of the curtain wall system but may sometimes be fixed separately to the curtain wall framing members, usually by aluminium angles. When the latter method is used, the fixing of the lining must not interfere with movement accommodation mechanisms of the curtain wall. For example if there is a mullion movement joint, a fire resisting board rigidly fixed to the transoms above and below the joint would prevent movement of the joint.

Fire protection of brackets

Traditionally there has been no requirement for brackets supporting curtain walls to be fire resisting. The 2006 edition of AD B introduced a requirement for non-loadbearing walls that have no fire resistance (such as curtain walls) to be restrained to compartment floors. This requirement was introduced to prevent the external wall moving away from the compartment floor during a fire and compromising the effectiveness of the fire stopping.

There is no specific requirement in the Scottish Handbook but the effectiveness of the fire stopping indirectly requires the provision of this restraint.

The minimum requirement is that the brackets are required to retain their integrity for as long as the fire stopping is functioning. This could be taken as the same duration as the compartment floor, however, in most cases the curtain wall will fail long before this and the brackets will only be required for as long as the curtain wall requires support.

The performance of curtain wall brackets in fire depends on their location and construction. In some cases brackets are positioned above the fire stopping and will be protected from the effects of a fire spreading from below. Fire is less likely to spread downwards other than by falling burning materials.

Brackets made of steel are likely to last longer in a fire than the framing members of an aluminium curtain wall and aluminium brackets may also have greater fire resistance than framing members due to the use of heavier gauge metal.

If brackets are fixed to the floor slab by bolts drilled through the full thickness of the floor and anchored by spreader plates on the soffit, it may be necessary to seal the holes with intumescent material and to insulate the brackets to restrict the transfer of heat.

Cavity barriers in rainscreen construction

Fire and smoke spread in rainscreen cavities is particularly dangerous as it may be more rapid than on the outside face of the cladding, due to the creation of a flue, and it may be undetected by building users or firefighters. It is therefore often necessary to incorporate cavity barriers in rainscreen cavities to limit the spread of fire and smoke.

Regulations

For rainscreen walls, AD B requires that cavity barriers are provided:

- To close the edges of cavities including around window openings.
- At the junction of the wall with a compartment wall or floor.
- To limit the maximum dimension of the cavity to 20m where the surfaces of the cavity are Class 0 or 1 and 10m in other cases. Where a rainscreen wall has a masonry or concrete inner wall at least 75mm thick, the cavity does not contain combustible insulation and the building is not used for residential or institutional purposes, this requirement does not apply.

The Scottish Technical Handbook has similar requirements but the requirement for cavity barriers on the line of compartment walls and floors is relaxed where the inner wall is of masonry or concrete construction and the surfaces of both the rainscreen and any insulation in the cavity are Class 0 or the materials are of limited combustibility.

Design of cavity barriers

The provision of cavity barriers in a rainscreen wall presents a number of conflicts. The obvious conflict is between the need to seal the cavity to prevent the spread of smoke and fire and the need for ventilation and drainage. Clause 3.4.4.4 of the CWCT Standard for systemised building envelopes requires that the cavity width is not reduced by more than 50% at fire barriers or support rails. This should be interpreted as 50% of the minimum width required by the Standard rather than 50% of the actual width where the latter is greater. This will require a residual gap of 13 to 25mm depending the type of joints between the rainscreen panels.

This conflict can be overcome by the use of intumescent materials which allow a cavity to be maintained under normal circumstances but seal the cavity in the event of a fire. Proprietary cavity barriers are available which partially block the cavity and have a strip of intumescent material at the front that can expand to block the cavity in a fire. There are also cavity barriers available with slotted metal plates coated with intumescent materials.

Cavity barriers may be tested following the principles of BS 476-20 or BS EN 1366-4. Tests are generally conducted with the barrier in a cavity between walls of fire resisting construction and performance with rainscreen panels may be different. Intumescent materials react at approximately 150°C thus allowing passage of cool smoke. When the temperature does rise they may take a significant time to form a seal. This time delay may not be significant in a test where the cavity is empty but may be significant in practice if there is combustible insulation in the cavity which could be ignited in the time taken to seal the cavity. The Association for Specialist Fire Protection (www.asfp.org.uk) is currently investigating the development of a test procedure specifically for rainscreen cavity barriers which will address these issues.

Research at BRE using large scale tests on rainscreen walls (BR135) has found that cavity barriers with a continuous strip of intumescent material are more effective than those with perforated plates and that to make barriers effective it may be necessary to break vertical cladding rails so that the cavity barrier can be continuous.

The other issue is the practicality of sealing the edges of the cavity. Most rainscreen systems have numerous joints and sealing the edge of the cavity may be of little practical effect if there are open joints a short distance away. For example terracotta systems often have horizontal joints at 300mm intervals.

A practical approach is to detail flashings at the base of the cavity, including above windows, to inhibit the entry of rising flames and smoke. This will generally require galvanised steel flashings which extend to the outer face of the rainscreen. Flames emerging from the top of a cavity are of concern if they can cause fire spread to other parts of the building or other buildings. If the flames cannot be contained within the cavity the areas at risk could be protected.

Installation

Cavity barriers should be securely fixed to the back wall both to form a good fire seal with the back wall and prevent movement of the barrier which could block the drainage and ventilation of the cavity. Spikes which penetrate the full width of the fire barrier with tails that can be bent over are likely to be more effective than spikes that only penetrate part way through the barrier. A break in any thermal insulation in the cavity will be required at the location of the cavity barrier.

Cavity barriers must be continuous along the length of the cavity and any joints appropriately sealed as recommended by the barrier supplier. Joints may be tight butt joints or lap joints and joints in foil faced barriers should be sealed with foil tape.

Use of combustible material

The combustibility of materials used in wall construction may be limited to reduce the potential fire load. The requirements for combustibility of materials relate to distance of the wall from the boundary, the height of the building and building use. Requirements are slightly different in England and Wales and in Scotland.

To satisfy the recommendations in AD B, insulation and filler materials in walls of a building with a floor more than 18m above ground level are required to be of limited combustibility. This requirement does not apply to sealants and gaskets and there is an exception for insulation in the cavity of masonry walls. Similar requirements apply in Scotland and Northern Ireland.

The Scottish Handbook also requires every part of an external wall not more than 1m from a boundary to be constructed of non-combustible products.

The Scottish Handbook requires compartment walls and floors in hospitals to be constructed of non-combustible materials. This requirement is sometimes extended to materials in external walls abutting the compartment wall or floor. This requirement is not included in HTM 05-02 for health care premises.

The only commonly used insulation material that will satisfy the definition of limited combustibility is mineral wool. It is sometimes argued that thermoset insulation materials with non combustible facings may be regarded as satisfying the requirement, noting that their decomposition in fire will release smoke.

Alternative approaches

For rainscreen walls, AD B allows fire testing in accordance with BS 8414 to be used instead of providing cavity barriers and non-combustible insulation as described above.

Where testing is carried out in accordance with BS 8414, the test applies to the complete cladding system including insulation, rainscreen, flashings and cavity barriers. Changing any of these components may affect the ability of the wall to resist the spread of fire.

Summary

Curtain walls are normally used for areas of the building envelope that are not required to be fire resisting however they still require appropriate detailing to limit the spread of fire.

The main requirement for curtain walls that are not required to provide fire resistance is provision of fire stopping between the external wall and compartment floors and walls. For the firestopping to be effective it may be necessary to use fire resisting materials for that part of the curtain wall in contact with the firestop.

In some situations there may also be a requirement to provide fire protection to brackets supporting the wall and limit the combustibility of materials used in the wall.

In rainscreen walls, cavity barriers are required to limit the spread of fire in the rainscreen cavity.

Many of the requirements are open to interpretation and construction details that are deemed acceptable vary from project to project. It is therefore important to discuss the provisions for a particular project with all the interested parties at an early stage.

References

Building Regulations (England and Wales), Approved Document B Fire Safety, http://www.planningportal.gov.uk/england/professionals/buildingregs

Building (Scotland) Regulations, Building Standards Technical Handbook Section 2 Fire http://www.scotland.gov.uk/Topics/Built-Environment/Building/Building-standards

Building Regulations (Northern Ireland) DFP Technical Booklet E Fire Safety, http://www.dfpni.gov.uk/index/buildings-energy-efficiency-buildings/building-regulations.htm

Firecode – Fire safety in the NHS Health Technical Memorandum 05-02: Guidance in support of functional provisions for healthcare premises, ISBN 978-0-11-322767-9

Fire Protection Association The LPC design guide for the fire protection of buildings, ISBN 1 902790 02-2

Department for children schools and families, Building Bulletin 100 Design for fire safety in schools.

BR 135 Fire performance of external thermal insulation for walls of multi-storey buildings. 2nd edition

BRE Digest 501 BR135 Annex B Performance criteria and classification method for BS 8414-2:2005

BS 476-20 Fire tests on building materials and structures. Method for determination of the fire resistance of elements of construction (general principles)

BS EN 1366-4 Fire resistance tests for service installations. Linear joint seals

BS EN 1364-4 Fire resistance tests for non-loadbearing elements. Curtain walling. Part configuration

BS 8414-1 Fire performance of external cladding systems. Test methods for non-loadbearing external cladding systems applied to the face of a building

BS 8414-2 Fire performance of external cladding systems. Test method for non-loadbearing external cladding systems fixed to and supported by a structural steel frame

Note: The CWCT Technical Note 73 has now been superseded by TN98 April 2017.

BCA Technical Guidance Note 18	Issue 0 Jun 2014

Use of Combustible Cladding Materials on Residential Buildings

Building Control Alliance

Purpose

BCA technical guidance notes are for the benefit of its members and the construction industry, to provide information, promote good practice and encourage consistency of interpretation for the benefit of our clients. They are advisory in nature, and in all cases the responsibility for determining compliance with the Building Regulations remains with the building control body concerned.

This guidance note is based upon information available at the time of issue and may be subject to change. The Approved Documents should be consulted for full details in any particular case.

Introduction

Section 12 of Approved Document B2 gives guidance on the acceptable use of combustible materials within the external cladding system.

Where a building exceeds 18m in height, AD B2 recommends (for the entire wall area both below and above 18m) either the use of materials of limited combustibility for all key components or to submit evidence that the complete proposed external cladding system has been assessed according to the acceptance criteria in *BR135 - Fire Performance of External Thermal Insulation for Walls of Multistorey Buildings*. This guidance note outlines both procedures in more detail and addresses common misconceptions relating to combustibility and surface spreads of flame ratings.

Key Issues

Fire spread via the external wall medium is exacerbated by the use of combustible materials and extensive cavities. The speed by which a flame rises vertically up the external face of a building leads to potentially rapid fire spread from lower floors to higher ones. Within the confines of a cavity, the flame will also elongate up to ten times its length as it searches for oxygen. Hence, the need for robust cavity barriers, restricted combustibility of key components and the use of materials with a low spread of flame rating is necessary, particularly given the delamination and spalling nature of some of the components when heated.

Statutory guidance addresses these issues for the initial stages of a fire, after which time it is assumed that the fire brigade have arrived to deal with the incident. However, even with the fire brigade's arrival, a fire which cannot be reached within 18m of the street level is unlikely to be adequately tackled using current fire brigade apparatus and so additional safeguards are necessary for taller buildings.

A Surface Spread of Flame Classification does not infer any resistance to combustibility, it is solely a measure of the spread of a flame across the surface.

- Thermosetting insulants (rigid polyurethane foam boards) do not meet the limited combustibility requirements of AD B2 Table A7 and so should not be accepted as meeting AD B2 paragraph 12.7. However, if they are included as part of a cladding system being tested to BR135 & BS8414, the complete assembly may ultimately prove to be acceptable
- The BR135 / BS8414 tests deal solely with the spread of fire once it has entered the cavity. Hence, the requirements for cavity barriers in accordance with Section 9 of AD B2 are required in all cases including around openings in the façade

Guidance

Where the building doesn't exceed 18m in height, there is no restriction on the combustibility of the components of the cladding system. However, cavity barriers in accordance with Section 9 and Diagram 30 will still be needed

Where the building exceeds 18m in height, the BCA recommends three options for showing compliance with paragraph 12.7 of AD B2 -

Option 1
The use of materials of limited combustibility for all elements of the cladding system both above and below 18m. This includes the insulation, internal lining board and the external facing material. Smaller gasket parts and similar low-risk items can be excluded from this requirement. The definition of a MOLC is stated in Table A7 of AD B2.

Option 2
An acceptable alternative approach (see AD B2 paragraph 12.5) is for the client to submit evidence to the Building Control Body that the complete proposed external cladding system has been assessed according to the acceptance criteria in *BR135 - Fire Performance of External Thermal Insulation for Walls of Multistorey Buildings.* The preferred method of demonstrating compliance is via a fire test carried out in accordance with BS8414:1 *Fire performance of external cladding systems – Part 1: Test method for non-loadbearing external cladding systems applied to the face of the building* or BS8414-2 *Fire performance of external cladding systems – Part 2: Test method for non-loadbearing external cladding systems fixed to and supported by a structural steel frame*. The test should be carried out by an independent UKAS accredited testing body. The BS8414 tests do not give a PASS / FAIL answer because the data obtained is used by different bodies with different minimum requirements. Hence, for Building Regulation purposes, any test using this method needs to be supported by proof that the acceptance criteria of BR135 have been met. These acceptance criteria are listed in Annex A or Annex B of BR135 and include the following:

- External fire spread—determined by a 600°C rise in temperature on the external face of the building (measured at a point approximately one storey above the fire floor) for thirty seconds or more during the initial fifteen minutes of the test.
- Internal fire spread— determined by a 600°C rise in temperature on the internal face of the building (measured at a point approximately one storey above the fire floor) for thirty seconds or more during the initial fifteen minutes of the test.
- Mechanical performance—determined by an assessment of system collapse, spalling, delamination, flaming debris or pool fires.

Option 3
If no actual fire test data exists for a particular system, the client may instead submit a desktop study report from a suitable independent UKAS accredited testing body (BRE, Chiltern Fire or Warrington Fire) stating whether, in their opinion, BR135 criteria would be met with the proposed system. The report should be supported by test data which the test-house already has in its possession and so this option may not be of benefit if the products have not already been tested in multiple situations / arrangements. The report should also specifically reference the tests which they have carried out on the product.

Key Notes

- Surface Spread of Flame Classification does not infer any resistance to combustibility, it is solely a measure of the spread of a flame across the surface.
- Thermosetting insulants (rigid polyurethane foam boards) do not meet the limited combustibility requirements of AD B2 Table A7 and so should not be accepted as meeting AD B2 paragraph 12.7. However, if they are included as part of a cladding system being tested to BR135 & BS8414, the complete assembly may ultimately prove to be acceptable
- The BR135 / BS8414 tests deal solely with the spread of fire once it has entered the cavity. Hence, the requirements for cavity barriers in accordance with Section 9 of AD B2 are required in all cases including around openings in the façade
- Issues of the fire-resistance performance of external cladding systems, eg in relation to boundary conditions and space separation still need to be addressed. The recommendations in Section 13 of Approved Document B2 and BRE guide *BR 187 – External fire spread: building separation and boundary distances* should be followed.

Note: This BCA Guidance Note 18 was issued in 204, then as Issue 1 June 2015 and as of October 2019 has been superseded by Guidance Note 18 Issue 01.01.