

Timber stairs
An architect's guide
www.bwfstairscheme.org.uk

About this Guide

Staircases are one of the most important elements of a building. For any construction project, the correct specification, manufacture and installation of the staircase has enormous impact not just on the aesthetics of a building, but for the safety of the user too.

Timber remains the most commonly specified staircase material, combining high material performance and structural properties with an extensive and varied range of finishes.

Living with timber provides environmental and well-being benefits; a truly amazing and totally versatile material, and an almost infinite range of design variations to suit any customer brief.



This guide has been developed by the British Woodworking Federation Stair Scheme to explain the process of designing and specifying a timber staircase. Understanding the process in its entirety will help an architect to liaise successfully with their staircase manufacturer throughout the design and build process to deliver a safe, compliant and beautiful timber staircase solution.



As part of the stringent standards of the BWF Stair Scheme, all staircases manufactured by members are fitted with a fully traceable badge.

About BWF Timber Stair Scheme

The BWF Stair Scheme is the only accreditation and certification scheme of its kind in the UK.

Ranging from domestic, common and fire protected staircases, the standard expected of members of the scheme in regard to their work practices is extremely high to ensure quality and safety.



Accredited staircase manufacturers

It is recommended that you contact an accredited staircase manufacturer at the earliest possible point in the design stages of the project.

Staircase manufacturers who are members of BWF Stair Scheme are highly skilled and trained in all the details that will ensure the staircase is safe, compliant with regulations and will be able to provide recommendation to ensure the staircase is installed correctly.

A list of BWF Stair Scheme members can be found on the BWF Stair Scheme website:

<http://www.bwfstairscheme.org.uk/find-a-member/>

Working with your staircase manufacturer

The relationship between architect and staircase manufacturer is a journey together through every element of staircase design and build to ensure that the finished product exceeds your client's expectation, and it is a relationship that is important to get right.

BWF Stair Scheme members are audited to ensure that they meet standards of manufacturing control and product performance.



Using accredited staircase manufacturers gives peace of mind to the client, who knows that every element of the intricate process from initial design to final sign off will be undertaken in a professional, knowledgeable and competent fashion.

It's all in the badge



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Considering specification

Timber staircases are available in a number of standard sizes and styles but often a design brief requires totally bespoke or non-standard elements, in order for the design to meet all requirements. It is imperative to remember that specification isn't just about the visual aesthetic finish of the staircase, there are a number of critical elements to a successful and compliant design:

- Staircase safety
- Fire safety
- Building regulation compliance
- Loading requirement
- Material selection
- Design detailing
- Surrounding building fabric
- Scheduling for delivery and installation
- Robust installation



Staircase safety

Safety on the stairs has many contributing factors that impact on the design.

Dimensional layout, material specification, contrasting surface finishes and even seemingly small details such as handrail profile (and hence graspability) will play an enormous role in helping the user move up and down the staircase safely.

Staircases are often used as the critical means of escape in the event of a fire or can even form part of the fire compartmentation of a building.

Consideration of the user and their specific needs should be made at initial design and concept stage. Understanding the user classification of the staircase and the building classification will help to ensure that the design accounts for all of these factors.

- Is the staircase within a public or private building?
- Is the staircase fire protected or contributing to the fire compartmentation of the building?
- Is the staircase used for fire means of escape?
- What specialist needs might the user have?
- Is the staircase used by young children or the elderly or those with other specific needs?

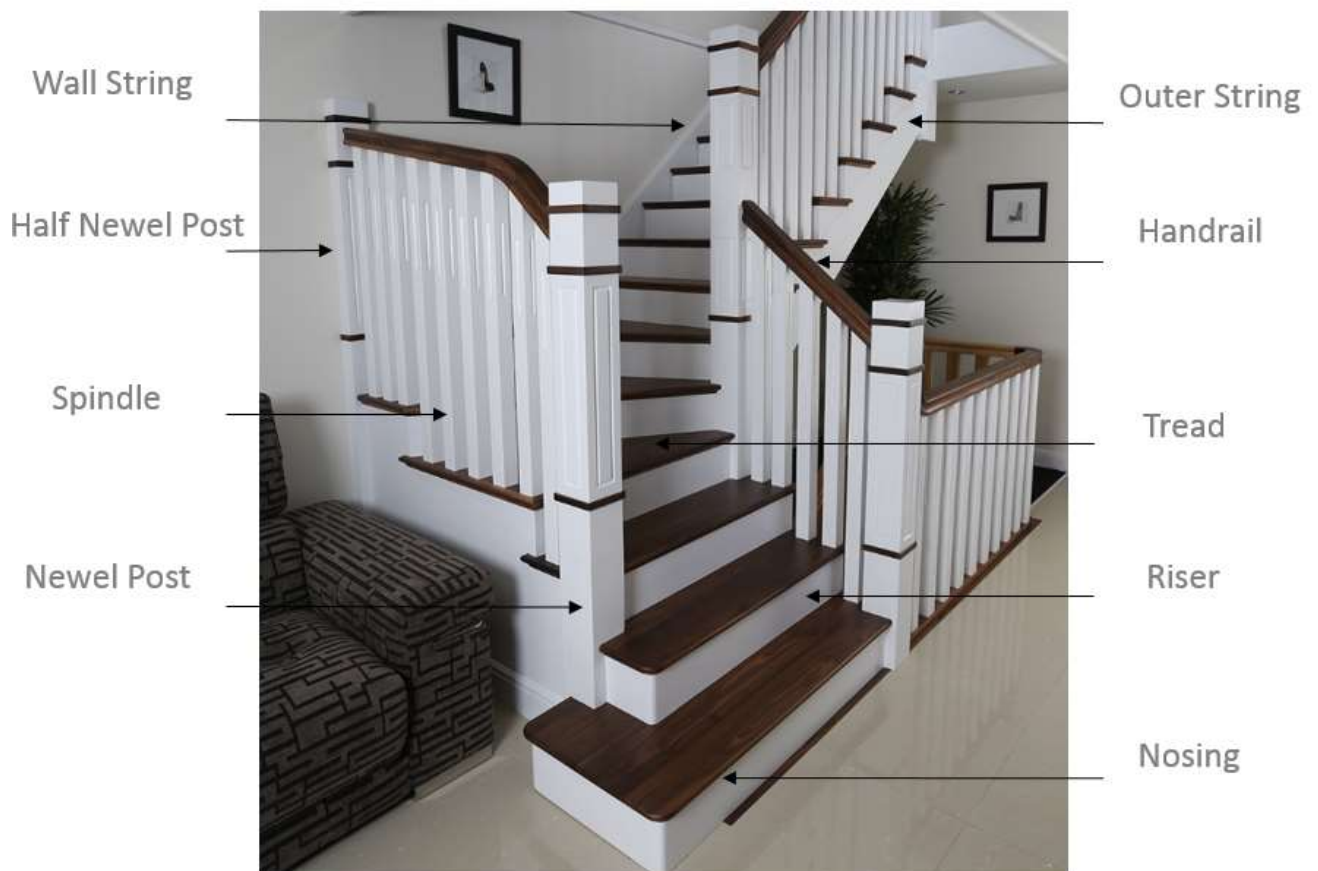


DID YOU KNOW

Stairs are the part of a building where an accident is most likely to happen. Every year 450,000 injuries and 550 deaths occur on staircases in the UK.

The anatomy of a timber staircase

There are specific terminologies associated with timber staircase design. In a system that contains so many different components, it is important to use the correct definitions as this will help you communicate effectively with your staircase manufacturer. The diagram below highlights some of the more common parts of a timber staircase. Appendix B contains examples of common staircase layouts.



DID YOU KNOW

A simple timber staircase can contain over one hundred different components and fixings, a complex timber staircase can have many thousands!

Building regulations and standards

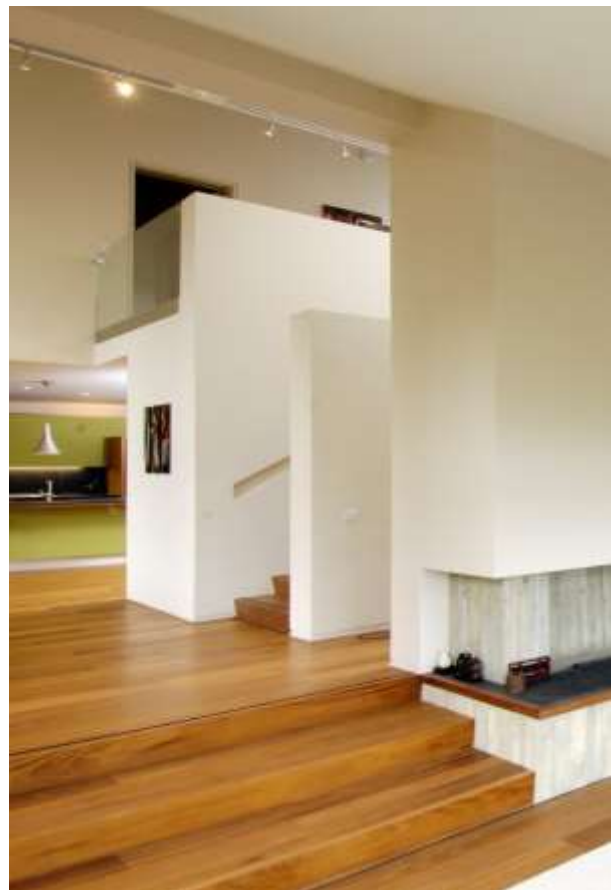
Building regulations are accompanied by a range of guidance documents, provided to assist stakeholders in fulfilling performance requirements and responsibilities. There are different guidance documents produced for different parts of the UK.

Elements of staircase design such as dimensional layout are included in these guidance documents and they are recognised as the minimum standard to be achieved.

Consideration should be given to the different aspects of performance, other than just layout of the staircase, including; **protection from falling, accessibility, fire or acoustic performance**, as these may have bearing on the final staircase design and specification.

In some cases, there are projects that are subject to a range of other voluntary building standards or client specifications that may impact further on the design, layout and material choice for the staircase.

- What is the relevant building regulations guidance? (e.g. England, N. Ireland, Scotland, Wales.)
- Is the project subject to additional building standards over and above the relevant building regulation guidance? (e.g. NHBC, conservation requirements)
- What is the user classification of the stair? (e.g. Private or general access)
- Does the stair need to provide means of escape, fire compartmentation, fire protection, or is it a fire fighting stair?
- What type of building is the stair in? (Domestic dwelling or other building)

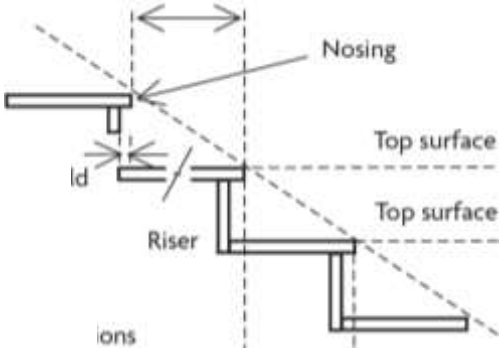
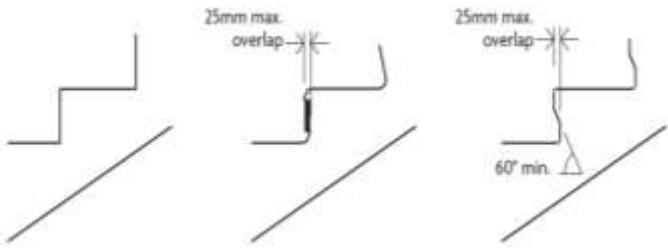
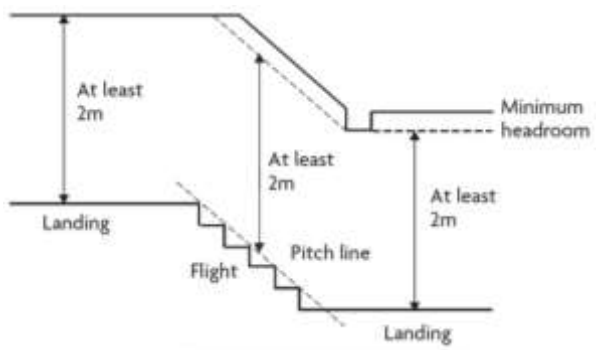


DID YOU KNOW

BWF Stair Scheme has produced a design guides for private staircases. Available from www.bwfstairscheme.org.uk

Dimensional layout of a timber staircase

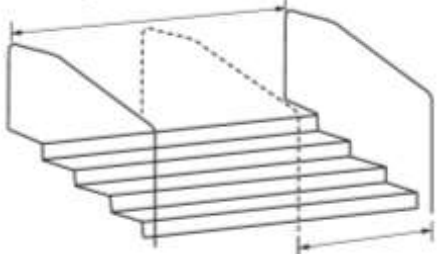
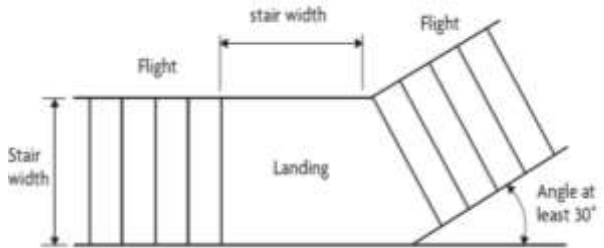
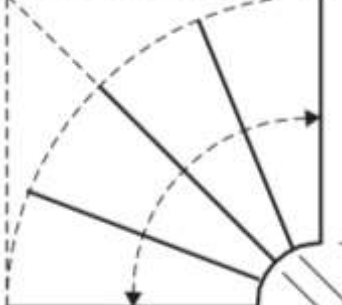
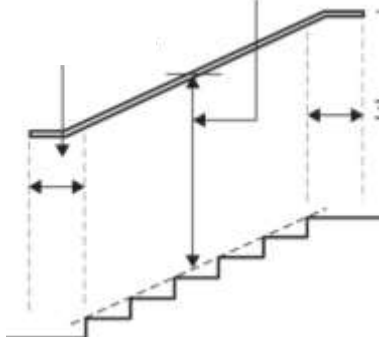
The following information highlights the main dimensional considerations relating to timber staircase design as detailed in the building regulation guidance. There is different guidance depending on user, building classification of the staircase and location of staircase. Annex A of this document provides a summary of the building regulations in different parts of the UK and where detailed guidance can be sourced. Additional information is also available in the BWF Stair Scheme Design Guide, that can be downloaded from the BWF Stair Scheme Website.

<p>Steepness of staircase</p> <p>Critical to focus on the height, depth and width of individual risers and treads and the overall angle of pitch of the staircase and nosing detail. These elements must all be within the tolerance detailed in the relevant Building Regulations for the relevant staircase classification.</p>	 <p>The diagram illustrates the geometry of a staircase step. It shows a dashed line representing the pitch of the staircase. Key components are labeled: 'Nosing' (the protruding edge of the tread), 'Top surface' (the horizontal surface of the tread), 'Riser' (the vertical height between treads), and 'Treads' (the horizontal surface between risers). A dimension 'ld' is shown for the depth of the tread.</p>
<p>Construction of steps</p> <p>Steps must be level and equal in rise and going, care should be taken with open risers and to ensure suitable/compliant tread nosing profiles are adopted.</p>	 <p>The diagram shows three different profiles for the nosing of a step. The first is a simple rectangular profile. The second and third show profiles with a '25mm max. overlap' between adjacent steps. The third profile also indicates a '60° min.' angle for the nosing edge.</p>
<p>Headroom</p> <p>It is critical to ensure that sufficient headroom is provided above the staircase, including allowances for gabled ceilings or loft conversions.</p>	 <p>The diagram illustrates the required headroom for a staircase. It shows a staircase between two 'Landing' levels. The 'Pitch line' is the imaginary line connecting the top of the flight to the top of the landing. 'Minimum headroom' is indicated as a vertical clearance above the pitch line. Specific requirements are shown as 'At least 2m' for the headroom above the landing and above the flight.</p>

DON'T FORGET

The overall safety and performance of a timber staircase is not just about dimensional layout. Other characteristics such as **acoustic**, **fire protection** or **fire compartmentation** and **accessibility** have enormous bearing on specification to ensure a compliant design.

Dimensional layout of a timber staircase continued...

<p>Width of staircase</p> <p>It is vital to ensure that effective width is achieved on the staircase and provision of additional handrail is compliant for excessively wide stairs.</p>	
<p>Length of a flight of stairs and the use of landings</p> <p>The Building Regulations detail when a landing is required and the dimensional constraints of a landing layout.</p>	
<p>Special staircases</p> <p>Where a winder flight or dancing steps are used the designer must ensure effective width and safety is achieved when changing direction on a staircase.</p>	
<p>Handrail and guarding height and profile</p> <p>Provision must be made for suitable height, location and profile of handrail to enable users to safely traverse the stair. Location of wall handrail and projecting handrail.</p>	

DON'T FORGET

Non-compliance with the **Building Regulations** is effectively breaking the law and can attract fines, it can also negate any building and content insurance and create real problems when selling the property - that is apart from the additional costs and delays rectification can add to a project if spotted.

Material selection

The natural beauty of timber as a material for stair building provides limitless possibilities in regard to colour, grain pattern, profile and overall surface finish.

Using contrasting yet complementary timbers and design features can make a unique and jaw-dropping feature of the staircase within the overall building environment.

Liaising with a competent staircase manufacturer at the earliest stages of building design will enable you to experience the full range of timbers and surface finishes available.

The staircase manufacturer will take this specification and compose it into the overall design of the staircase.

Common points for consideration:

- What materials are available and are they responsibly sourced?
- Does the material need to be supplied with any certification or documentation? (e.g. environmental product data, fire, responsible sourcing, strength grade)
- Does the material selection have bearing on the structural capacity of the staircase?
- A combination of different materials and finishes?
- Does the chosen material complement the interior of the building?
- What are the surrounding chosen floor and wall coverings?



Loading requirements

A timber staircase looks exquisite, but they are also finely engineered structural systems.

The material selection, dimensions of profiles and components, the fixings between the different parts and installation methods all contribute to the overall structural stability and performance of the timber staircase.

Timber stairs in use are subject to a wide variation of different loadings and dynamic forces, dependant on their environment and user classification. An accredited staircase manufacturer will be able to advise you as to whether a proposed design or material selection is suitable for the staircase to withstand the forces that will be exerted upon it in service.

- Is the stair for general access use?
- Is the stair likely to be used by multiple people at once such as in a school or auditorium?
- Is the stair used for means of escape?
- Is it a fire fighting stair?



Design detailing

BWF Stair Scheme believe that even the smallest detail counts.

The beauty of design detailing within a timber staircase is that it combines aesthetic styling with elements that will aid the user to traverse safely.

Detailing such as handrail profile and size to aid graspability, or nosing profile to reduce trip hazard are incorporated, making not just a beautiful showcase staircase, but one that is safe as well.

Attention to every element of the staircase will be considered by a competent staircase manufacturer, whether you want to make a feature of the staircase, or blend seamlessly with the overall design and surroundings.

These tiny details can make the mundane magical when it comes to architectural styling of the staircase and its surroundings.



DID YOU KNOW

Some clients of BWF Stair Scheme members commission their own unique timber profiles or embellishments to make their timber staircase stand out from the crowd.

The surrounding building fabric

As well as a timber staircase complementing its environment seamlessly, it must have a suitable building construction surrounding it to provide robust fixing points when the staircase is installed.

The internal construction and structural capacity of the surrounding walls and floors needs to be considered in regard to ensuring that suitable materials and methods are used that will support the static and dynamic forces that a staircase will experience in service.

By working closely with your accredited staircase manufacturer, you will be able to review together the specification of the surrounding building construction to ensure that it is suitable. In some instances, your staircase manufacturer will advise of any additional allowances needed.

By undertaking this review at the earliest stages of the project, adequate provision will allow for a seamless installation when the staircase arrives on site.



Site survey

A detailed site survey should be made in order to prepare documentation and tender accurately for the specification of staircase required. It is advisable to consult the staircase manufacturer in the process as some will offer this service or be able to advise requirements.

This process will happen at the early stages of design to take accurate measurements and survey other elements that will impact of the staircase design.

The staircase will be designed to arrive on site either as factory assembled parts or in component form. This allows for access of parts to the stairwell as the staircase is being installed.

Your staircase design should also allow for tolerances in order to enable accurate positioning in the exact location.

The type of information that the staircase builder will need to confirm to prepare for a seamless build and installation will be:

- Floor to floor finished height
- Stairwell opening dimensions
- Additional floor covering thickness and specification
- Construction of supporting wall and floor to ensure suitable of loading requirements are met
- Health and Safety protocols on site
- Provision for temporary guarding on stairwell during installation
- Other services (electrical, water, gas, ventilation) that may be within the surrounding walls and floors
- Schedule of installation
- Availability of fixing locations
- Suitable storage area if components are not to be installed immediately
- Access to site and fitting location



Scheduling of delivery and installation

Once specification is agreed and manufacture has started, attention is drawn towards installation of the timber staircase.

Consideration is needed at this stage to the suitable scheduling of timber staircase product arriving on site for installation. Once a product has been delivered to site, installation delays can result in damage to staircase components or assemblies, and additional cost to client.

Managing the environment for storage and installation is important to factor into scheduling of installation, as rapid changes to temperature or humidity can affect moisture content, size or durability of timber components.



Guidance can be provided by your accredited staircase manufacturer in regard to protecting the installed staircase from damage on site that may occur caused by other trades, heavy traffic or moving of materials in the construction process.

Your accredited staircase manufacturer can advise of lead time and methods for delivery and protection of an installed staircase.

Further installation guidance and specification detail is provided in the BWF Stair Scheme Installation Guide, available from www.bwfstairscheme.org.uk

Robust installation

Installation of the timber staircase is as important as the design, and consideration of all the relevant factors will have been made by your accredited staircase manufacturer in the early stages of consultation.

You may seek advice from your staircase manufacturer regarding location of fixings and point loadings on elements of the surrounding building construction to ensure that the fixing environment is prepared for when the staircase arrives on site.

Detailed installation guidance and specification detail is provided in the BWF Stair Scheme Installation guide, available from www.bwfstairscheme.org.uk/stair-installation/

- Competency of installers
- Access for installation
- Manual handling on site
- Temporary protection required to prevent falling through stairwell
- Installation location to be free and clear of any debris or other building trades
- Suitable fixings
- Method statement
- Insurances



The secret of a timber staircase

Timber, nature's stroke of genius

Wood is naturally beautiful and adds character and warmth, but more than this it offers exceptional value for money.

Wood is tough, it will take hard knocks in its stride. As it ages, it develops a patina which is part of its character

Wood is durable. A good quality wood product should, with a little care and maintenance, last a lifetime.

Wood is a material that's simple to use, to maintain and to repair.

Wood is also the most sustainable of all mainstream construction materials, a natural and totally renewable product.



Wood and the environment

Wood is the only naturally renewable mainstream building material. Over 90% of the wood we use comes from Europe's forests, which are growing by 661,000 hectares every year - that's an area the size of three football pitches every hour of the day and night.

For added reassurance, look for certified timber. FSC, PEFC, SFI or CSA are the schemes recognized by the government's Central Point of Expertise on Timber (CPET) as evidence of sustainability and legality. For more information contact www.bwf.org.uk/choose-wood

Annex A - Building regulation guidance

Building regulations guidance varies in different parts of the UK. All documents are available freely to download from the website links below.

Region	Document Name	Download link
England	Approved Documents	http://www.planningportal.gov.uk
Scotland	Technical Handbook Non Domestic / Domestic	http://www.gov.scot
Wales	Approved Document	http://gov.wales
N. Ireland	Technical Handbooks	http://www.dfpni.gov.uk

The tables below highlight some of the more pertinent guidance documents relating to timber staircase design and the website links where they can be accessed from.

The Building Regulations – Protection from Falling

The building regulations guidance varies depending on part of the UK, relating to protection from falling and common staircase design.

Region	Document Name	Download link
England	The Building Regulations 2013 Approved Document K Protection from falling Collision and impact	http://www.planningportal.gov.uk/uploads/br/BR_PDF_AD_K_2013.pdf
Scotland	Technical Handbook Non Domestic Section 4.3	http://www.gov.scot/Resource/0048/00486496.pdf
Wales	The Building Regulations 2010 Approved Document K Protection from falling Collision and impact	http://gov.wales/docs/desh/publications/130205building-regs-approved-document-k-falling-en.pdf
N. Ireland	Technical Handbook H Stairs, ramps, guarding and protection from impact	http://www.dfpni.gov.uk/tbh_online_version_pdf.pdf

The Building Regulations - Accessibility

Building Regulation guidance relating to accessibility of buildings also impacts on timber staircase design.

General guidance for accessibility can be found in the different building regulations guidance, as shown in the table below.

Region	Document Name	Download link
England	Approved Document M (2015) Volume 1 and 2 Access to and use of buildings.	http://www.planningportal.gov.uk/uploads/br/BR_PDF_AD_M_2013.pdf
Scotland	Technical Handbook (2015) non domestic / domestic Section 4	http://www.gov.scot/Topics/Built-Environment/Building/Building-standards/publications/pubtech/th2013nondomcomp
Wales	Approved Document M (2010) Access to and use of buildings.	http://gov.wales/docs/desh/publications/130205building-regs-approved-document-m-access-en.pdf
Northern Ireland	Technical Booklet R (2012) Access to and use of buildings.	http://www.buildingcontrol-ni.com/assets/pdf/TechnicalBookletR2012.pdf

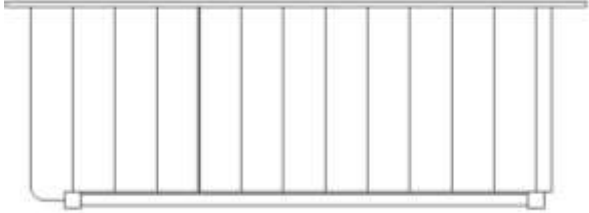
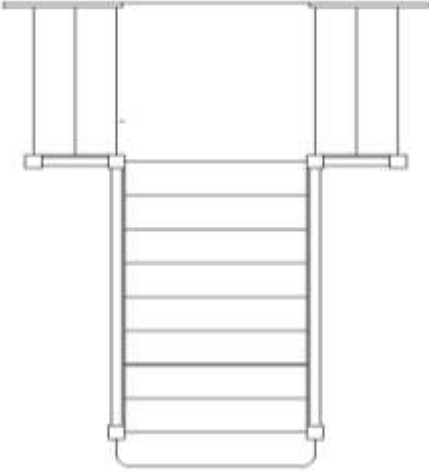
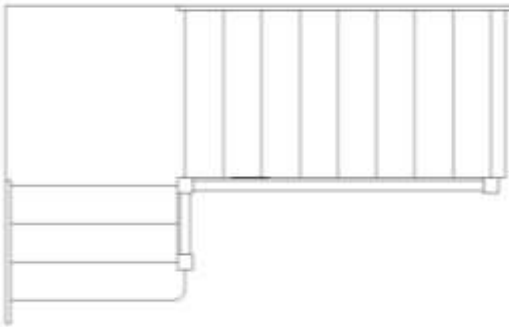
The Building Regulations – Fire Safety

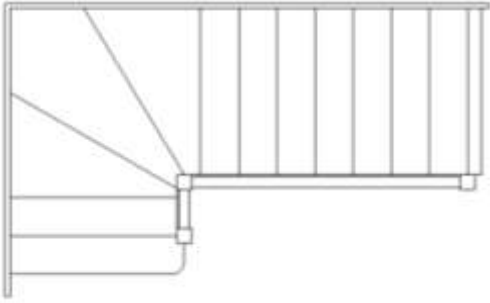
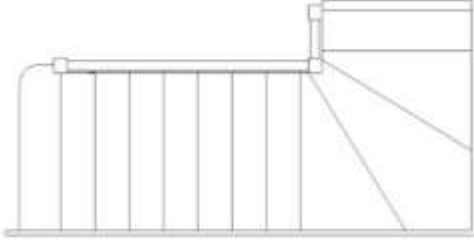
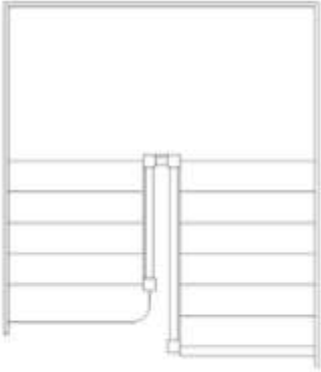
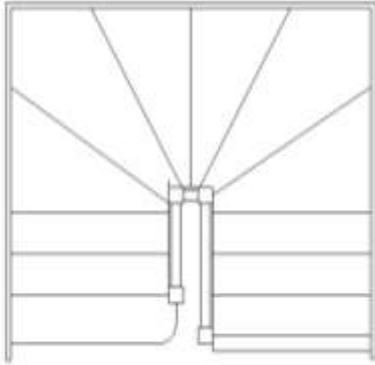
There is building regulation guidance for different parts of the UK relating to Fire Safety as shown in the table below. Section 3 discusses the fire protected timber stair in more detail.

Region	Document Name	Download link
England	Approved Document B Part 2 – Fire Safety - Buildings other than dwellinghouses (2013).	http://www.planningportal.gov.uk/uploads/br/BR_PDF_AD_B2_2013.pdf
Scotland	Technical Handbooks 2015 domestic / non domestic Section 2	http://www.gov.scot/Topics/Built-Environment/Building/Building-standards/techbooks/techhandbooks/th2015nondom2
Wales	Approved Document B Part 2 – Fire Safety - Buildings other than dwellinghouses (2010)	http://gov.wales/docs/desh/publications/150827building-regs-approved-document-b2-fire-en.pdf
N. Ireland	Technical Booklet E (2012).	http://www.buildingcontrol-ni.com/assets/pdf/TechnicalBookletE2012.pdf

Annex B - Common staircase layouts

The diagrams below illustrate some of the more common staircase layouts, however to ensure compliance to all dimensional constraints, an accredited stair manufacturer will perform checks at the design stages.

<p>Straight flight with bullnose bottom step</p>	
<p>Straight flight leading to 90° landing turn with double access straight flights, with bullnose bottom tread Bottom flight is self-supporting, top flights are wall fixed.</p>	
<p>90° turn with landing</p>	

<p>90° turn with winder at bottom of stair</p>	
<p>90° turn with winder at top of stair</p>	
<p>180° turn with flat landing</p>	
<p>180° turn with winders</p>	

Accompanying publications by BWF Stair Scheme

Available from www.bwfstairscheme.org.uk

BWF Stair Scheme Design Guide – Private Stairs
BWF Stair Scheme Installation Guide
BWF Top tips for Installation

It's all in the badge





The British Woodworking Federation Stair Scheme

The Building Centre

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London

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