



TECHNICAL MANUAL

VERSION 11

9: STAIRS

9. Stairs

Contents

Functional Requirements

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Limitations of Functional Requirements

1. These Functional Requirements do not and will not apply to create any policy liability for any remedial works carried out by the contractor or otherwise, nor to any materials used in those remedial works
2. The guidance provided in this Section, is guidance that provides a suggested solution to meeting the Functional Requirements. If an alternative solution is selected, then this must still meet the Functional Requirements.
3. Means of escape, passive and active systems are not covered by the Warranty unless specifically identified in the appropriate 'Building Part' section.

Workmanship

1. All work is to be carried out by a technically competent person in a workmanlike manner.
2. Concreting shall not take place during cold weather periods where the working temperature is below 2°C or where ground conditions are frozen.

Materials

1. All materials should be stored, installed and protected correctly in a manner that will not cause damage or deterioration of the product.
2. All materials, products and building systems shall be appropriately tested and approved for their intended purpose.
3. All load bearing structural elements providing support to the Home will have a service life of not less than 60 years, unless specifically agreed otherwise with us. All other parts of the Home will have a lesser durability and need planned maintenance, repair or replacement during that reduced period
4. Timber should be adequately treated or finished to resist insect attacks and be suitable for the position used within the structure. All timber treatment should be in accordance with relevant British standards and Codes of Practice.
5. Timber used in the building to provide support to the structure must be appropriately seasoned to prevent excessive shrinkage and movement.
6. All materials should be suitable for the relative exposure of the building in accordance with the relevant British Standards.
7. Reclaimed materials may only be reused with the prior agreement with the Warranty Surveyor. Independent certification and/or testing of the suitability may be required.

Design

1. Staircases, ramps and guards shall be designed and constructed so that they adequately protect the user from the risk of falling.
2. Access staircases in flats which form part of the separation between flats and between other parts of the same building shall:
 - a. Have adequate resistance to the spread of fire;
 - b. Have adequate resistance to the passage of sound.
3. Staircases must be adequately fixed in place to maintain stability.
4. The design and specifications of stairs and landings, shall provide a clear indication of the design intent and demonstrate a satisfactory level of performance.
5. The following additional elements shall be supported by structural calculations designed by an Engineer:
 - a. Structural elements outside the parameters of Building Regulations.
 - b. Specialist structural works.
 - c. Reinforced concrete elements.
 - d. Precast structural elements.
 - e. Any engineered beams/posts manufactured off-site.
6. Damp proofing works should prevent any external moisture passing into the internal environment of the building.

9. Stairs

9.1 General Requirements for all Stairs

Provision of information

A full set of design drawings and specifications shall be made available to the Warranty Provider and all other interested parties prior to the associated works starting on site. This may include:

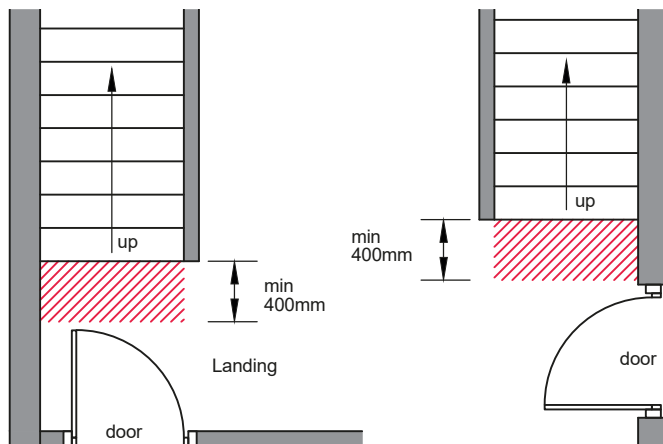
1. Detailed specification relating to the construction of the stairs.
2. Planned details indicating proposed dimensions of stairs (such as dimensions of rise, goings, pitch, headroom, etc).
3. Proposed fixing details of stairs at strings, top and bottom of flights.
4. Structural calculations for concrete and/or steel stairs.

The Warranty Surveyor, at their discretion, may also request supporting information that demonstrates suitability for use of any materials or systems contained within the above.

Landings

Landings must be provided at the top and bottom of every flight and should be:

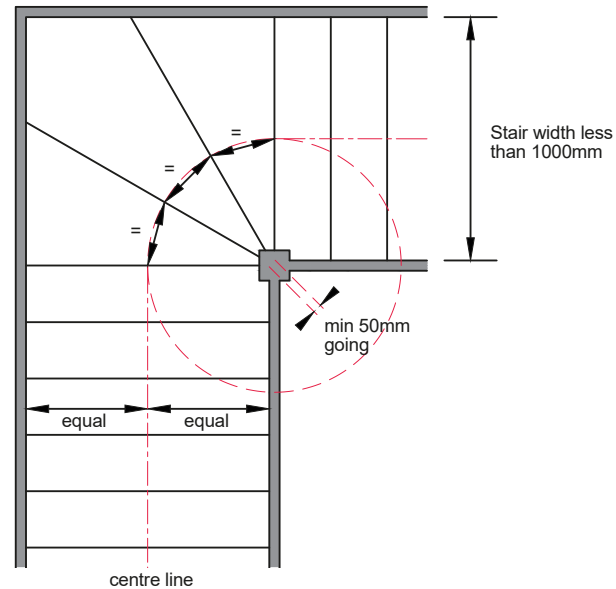
- The width and length at least as great as the smallest width of the flight. For Scotland, landings should have an effective width of not less than the effective width of the stair flight it serves. The minimum length of a stair landing, measured on the centreline of travel, should be either 1.2m or the effective width of the stair, whichever is less.
- Be kept clear of permanent obstructions including opening doors, except in a building where a door may swing across the landing at the bottom of a flight providing there is a clear unobstructed landing of at least 400mm deep maintained between the flight and the opening swing of the door.
- Inside the building, landings must be level.
- Landings are to be designed and constructed robustly and they are to provide full support, and secure fixings, for flights, nosing's, newels, apron linings etc.



Tapered treads and winders

This Technical Manual does not consider flights over 1000mm in width; please see BS 5395-2 directly for guidance on turning of flights for stairs 1000mm or greater.

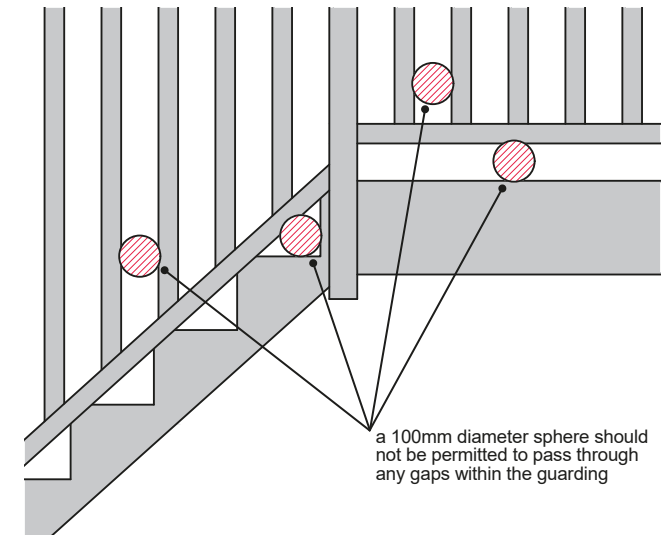
- The centre line arc from the newel around the winder must consist of consistent going dimensions.
- Goings to winders around the newel must be a minimum of 50mm.



Guarding

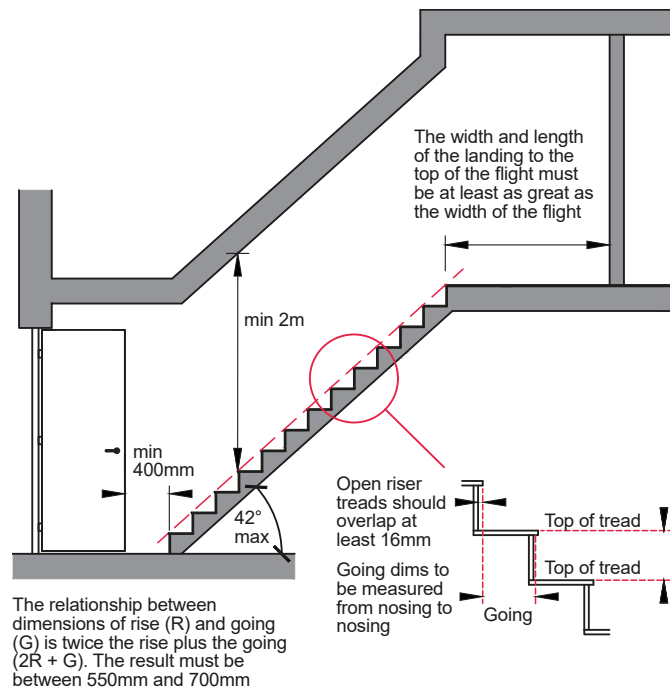
The following applies to dwellings only:

- Guarding to stairs, landings, ramps, and the edges of internal floors must be at least 900mm high (note, considerations for guarding heights at other locations, such as balconies will be covered within the appropriate sections).
- Guarding should be provided so as to prevent children climbing or being held fast; a 100mm diameter sphere should not be permitted to pass through any gaps within the guarding, including between the bottom of the guarding and the string of the stairs.
- Guarding will be required where there are changes in level greater than 600mm.



Rise and going

- Must be consistent throughout the flight of the stairs.
- Each tread is to be provided level.
- Open risers permissible in dwellings if the treads overlap by a minimum of 16mm and the steps are constructed in a manner so as to prevent a 100mm diameter sphere passing through them.
- Common stairs must have a visually contrasting material at nosings, and the tread profile must be appropriate (see diagram). Open risers are not permissible on common stairs.



England

	Rise	Going
Private Stair **	150mm to 220mm	220mm to 300mm
Utility Stair	150mm to 190mm	250mm to 400mm
General Access Stair	150mm to 170mm	250mm to 400mm

** For dwellings for external tapered steps and stairs that are part of the building the going for each step should be a minimum of 280mm.

Scotland

	Rise	Going
Private Stair	100mm to 220mm	225mm (minimum)
Other	100mm to 250mm	250mm (minimum)

Wales

	Rise	Going
Private Stair	155mm to 220mm	245mm to 260mm
	165mm to 200mm	223mm to 300mm
Institutional/Assembly **	135mm to 180mm	280mm to 340mm
Other **	100mm to 250mm	250mm (minimum)

** Maximum rise for stairs providing access for disabled people should give reference to Approved Document M (Wales)

Handrails

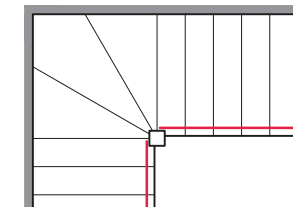
Dwellings

- Handrails should be provided at a height of between 900mm to 1000mm (or 840mm to 1000mm in Scotland), measured above the pitch line of the stairs.
- Handrails will need to be continuous across intermediate landings and around winders.
- They must be firmly secured and comfortable to grip, allowing the entire hand to grasp the rail.
- Where the staircase is greater than or equal to 1000mm width, then additional handrails will need to be provided on both sides.
- Handrails should be provided in a manner that reduces the risk of clothing being caught.

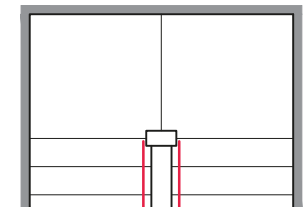
Common Stairs to Flats

- In addition to the above requirements, handrails in common stairs:
- Will need to be provided on each side of the flight, and continued a minimum of 300mm passed the top and bottom nosings of the flight with ends returned into the wall or down to prevent "catching".
 - Handrails must be continuously graspable along their length; the handrails must be 50mm to 75mm clearance from any outside walls, yet be no further than 50mm from the face of the inside string.
 - The handrail must have at least 50mm clearance under the bottom of the rail.
 - Circular handrails are to achieve a diameter of between 32mm and 50mm, whereas non-circular handrails must be 50mm wide and 39mm deep.
 - Should be provided in a manner that reduces the risk of clothing being caught.

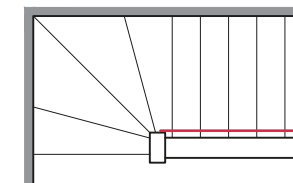
Please note, for the purposes of Warranty, common stairs are defined as a staircase serving more than one property.



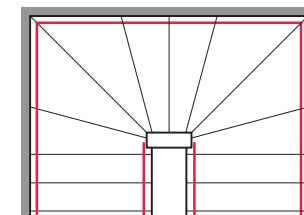
Additional handrail not needed



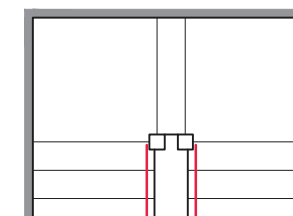
Additional handrail not needed



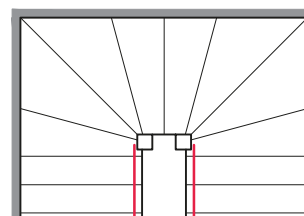
Additional handrail not needed



Additional handrail needed



Additional handrail not needed



Additional handrail not needed

Pitch

Staircases should be accurately located and fixed with the string at the correct angle, so that all treads are horizontal. The pitch should be suitable for the intended use in accordance with the relevant Building Regulations.

The maximum angle of pitch of a stairway should not exceed 42° for private stairs.

Headroom

The overall floor opening is to be checked for the size required to accept the stairs and allow for sufficient headroom.

- The minimum headroom above the stairs is to be measured vertically from the pitch line.
- The clear headroom should be 2m over the entire length and width of a stairway, including landings.

Lighting

Artificial light sources should be provided to all internal staircases and landings. Within a building, lighting to stairs should be controlled by two-way switching.

Automatic light-sensitive controls may be used in common areas, provided lights can also be two-way switched manually.

Where staircases are lit by glazing, any glass immediately adjacent to the stair should be:

- Protected by a balustrade or railing, or
- Toughened or laminated glass, non-openable, or
- Constructed of glass blocks.

Acoustics sound resistance

- Stairs should have the appropriate sound resistance to meet the relevant Building Regulations.
- Stairs should be designed and constructed so far as possible to ensure that they do not vibrate and cause excessive noise. They should be fixed accordingly to minimise creaking or squeaking within the joints.

External stairs

In addition to the guidance covering internal stairs:

- All external stairs must be constructed from masonry, concrete or metal.
- All external stairs must have suitable tread nosings to meet the requirements of relevant Building Regulations.
- External lighting requirements must meet relevant Building Regulations.

Standards

- BS 5395-1: Code of practice for the design of stairs with straight flights and winders.
- BS 585-1: Specification for stairs with closed risers for domestic use, including straight and winder flights and quarter or half landings.
- BS 8000-5:1990 Workmanship on building sites – Code of practice for carpentry, joinery and general fixings.

9.

Stairs

9.2 Timber

Provision of information

A full set of design drawings and specifications shall be made available to the Warranty Provider and all other interested parties prior to the associated works starting on site. This may include:

1. Detailed specification relating to the construction of the stairs.
2. Planned details indicating proposed dimensions of stairs (such as dimensions of rise, goings, pitch, headroom, etc). The rise of the steps must be equal throughout the flight.
3. Proposed fixing details of stairs at strings, top and bottom of flights. See guidance within this section.
4. Details of balustrades and handrails to be used which must be securely fixed and robust.
5. Drawings to show headroom and depth of landings meet Building Regulation requirements.

The Warranty Surveyor, at their discretion, may also request supporting information that demonstrates suitability for use of any materials or systems contained within the above.

Wall string fixings

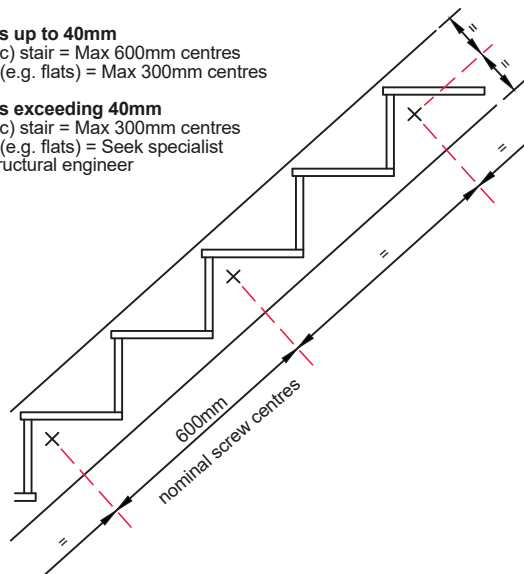
- Structural screws, UKCA/CE marked to EN 14592 should be used to secure wall strings to both timber stud and masonry walls. The screws should be nominal diameter of 5mm and should be either self-drilling or into pre-drilled holes. Each screw should achieve a minimum bearing of 50mm into the timber stud/noggin, or the masonry wall.
- Wall plugs used in masonry walls should also be at least 50mm long. Timber packing of adequate width to prevent the possibility of splitting should be fixed the full length of the string.
- Stair string fixing should begin with screws being provided beneath the top and bottom treads.
- Working from these top and bottom fixings, additional screws should be inserted at centres no greater than those noted below, working toward the centre of the string. Note: this will often result in two fixings being closer than the given centres toward the centre of the string.

String-wall gaps up to 40mm

Private (domestic) stair = Max 600mm centres
General access (e.g. flats) = Max 300mm centres

String-wall gaps exceeding 40mm

Private (domestic) stair = Max 300mm centres
General access (e.g. flats) = Seek specialist advice from a structural engineer

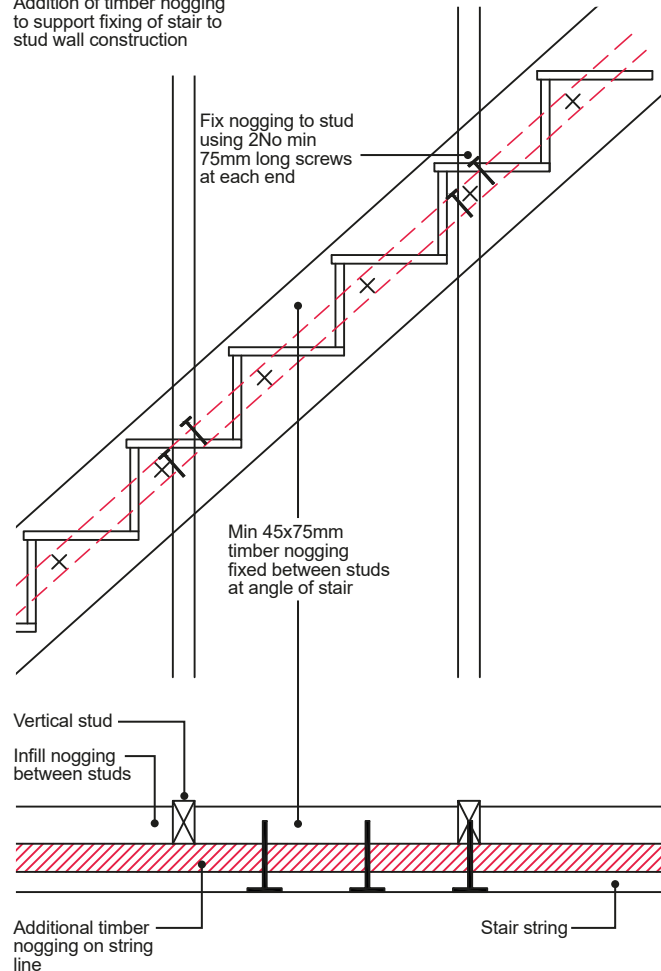


Additional requirements for fixing to timber studs

When fixing timber stairs to timber studs, either:

- Provide timber infill pieces between the studs following the intended line of fixings (nogginns should be at least 45x75mm and double fixed at each end using 75mm long screws); or,
- Alternatively, provide additional vertical studs at 300mm centres to enable direct fixing of strings into the studs.

Addition of timber nogging to support fixing of stair to stud wall construction

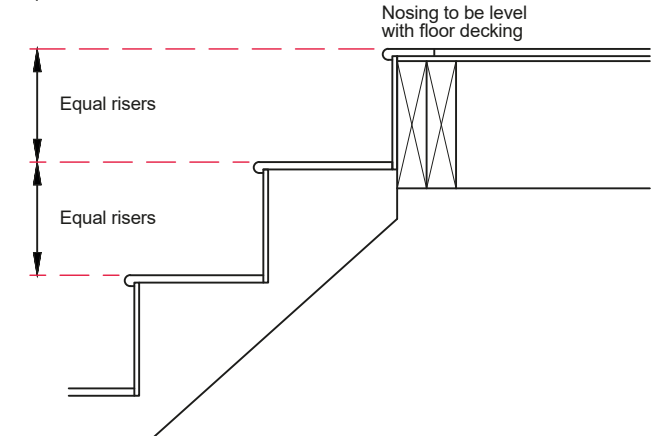


Additional requirements for fixing to steel stud partitions

Fixing of stairs into steel partitions is not generally permissible unless confirmed by the steelwork designer – please refer to the 'External Walls - Light Gauge Steel Frame' section for further guidance.

Floor finishes

Allowance should be made for stair and floor finishes, ensuring that all risers are equal.



Construction of stairs

- If stairs are supplied in kit form for construction on site then fixing instructions will need to be provided.
- The top nosing of the flight should finish flush with the surface of the flooring and adequately secured into place.
- The underside of the string can be cut so that the measurement from the top of the tread to the underside of the string is equal to the overall rise.
- Consideration should be given to differential movement within the setting-out, levels, and finishes (e.g. in timber framed buildings).
- The first rise of the staircase must be positioned so as to allow for any floor screed or other hard finish to ensure the rise is equal throughout the flight.

Protection

- Staircases should be protected during the construction phase to prevent damage and marking.
- When storing staircases they must be stacked on bearers and suitably protected from the weather.
- Timber stairs should only be incorporated into the build once the unit is suitably weather-tight.

9.

Stairs

9.3

Concrete and Steel

Provision of information

A full set of design drawings and specifications shall be made available to the Warranty Provider and all other interested parties prior to the associated works starting on site. This may include:

1. Detailed specification relating to the construction of the stairs.
2. Planned details indicating proposed dimensions of stairs (such as dimensions of rise, goings, pitch, headroom, etc). The rise of the steps must be equal throughout the flight.
3. Structural calculations for concrete and/or steel stairs.
4. Details of balustrades and handrails to be used which must be securely fixed and robust.
5. Drawings to show headroom and depth of landings meet Building Regulation requirements.

The Warranty Surveyor, at their discretion, may also request supporting information that demonstrates suitability for use of any materials or systems contained within the above.

Additional requirements for precast concrete staircases

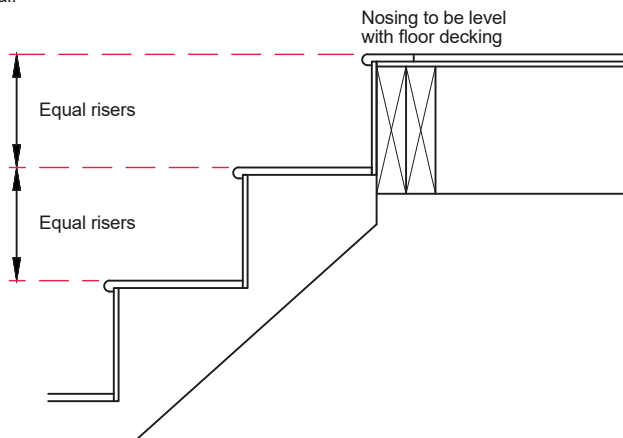
- Manufacturer's design and calculations will be required for pre-cast concrete stairs taking consideration of the relevant standards listed within this section.
- Engineers design and calculations will be required prior to construction.
- Design should include depth of cover to proposed steelwork within the stair.
- Design should include proposed concrete mix design outlining strength and slump.
- In-situ concrete must be allowed to cure appropriately prior to shuttering being struck.
- Weather and working conditions must be consistent with guidance for working with in-situ concrete provided in the 'Appendix C' section.
- Balustrading and guarding associated with the stair must either be grouted into preformed holes, or bolted to brackets cast into the stair.

Additional requirements for steel staircases

Engineers design and calculation will be required for the proposed element.

Floor finishes

Allowance should be made for stair and floor finishes, ensuring that all risers are equal.



Construction of stairs

- If stairs are supplied for construction on site then fixing instructions will need to be provided.
- The top nosing of the flight should finish flush with the surface of the flooring and adequately secured into place.
- The underside of the string can be cut so that the measurement from the top of the tread to the underside of the string is equal to the overall rise.
- Consideration should be given to differential movement within the setting-out, levels, and finishes.
- The first rise of the staircase must be positioned so as to allow for any floor screed or other hard finish to ensure the rise is equal throughout the flight.

Protection

- Staircases should be protected during the construction phase to prevent damage and marking.
- When storing staircases they must be stacked on bearers and suitably protected from the weather.

Standards

- BS EN 1992-1-1 Design of Concrete Structures
- BS EN 14843 Precast Concrete Products. Stairs
- BS EN 1992-1-1 Design of Concrete Structures
- BS EN 14843 Precast Concrete Products. Stairs

T 0800 183 1755 **E** enquiries@labcwarranty.co.uk **labcwarranty.co.uk**



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