



Bespoke  
Staircases

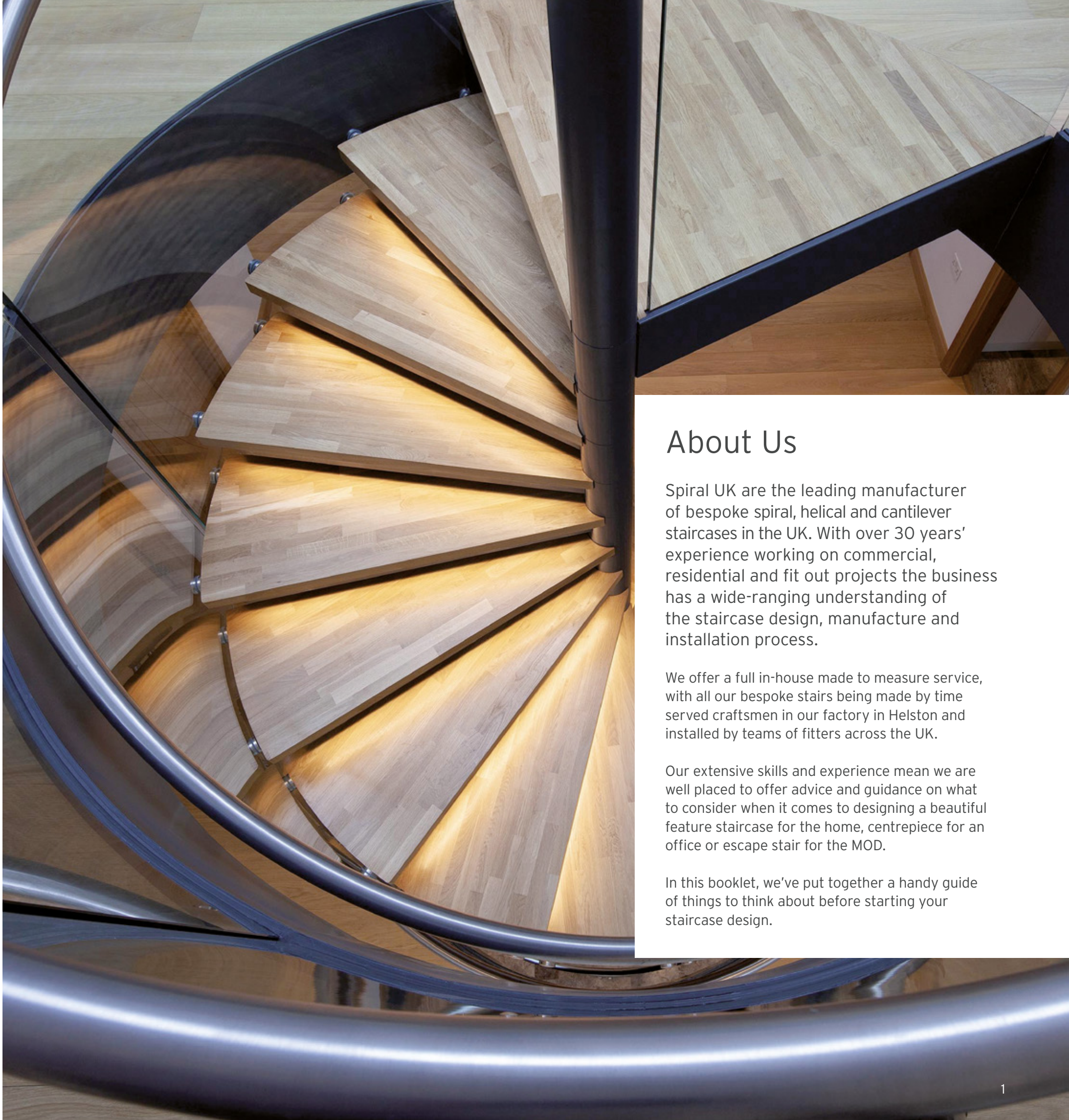


Staircase  
Design Guide



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## About Us

Spiral UK are the leading manufacturer of bespoke spiral, helical and cantilever staircases in the UK. With over 30 years' experience working on commercial, residential and fit out projects the business has a wide-ranging understanding of the staircase design, manufacture and installation process.

We offer a full in-house made to measure service, with all our bespoke stairs being made by time served craftsmen in our factory in Helston and installed by teams of fitters across the UK.

Our extensive skills and experience mean we are well placed to offer advice and guidance on what to consider when it comes to designing a beautiful feature staircase for the home, centrepiece for an office or escape stair for the MOD.

In this booklet, we've put together a handy guide of things to think about before starting your staircase design.



# Structural implications for different stair designs

We always recommend discussing your staircase design plans early in the planning process for any new build, renovation or refurbishment projects. This is because the type of staircase design you choose may impact the design of the building itself and have structural implications. Here are a few examples by staircase design type:



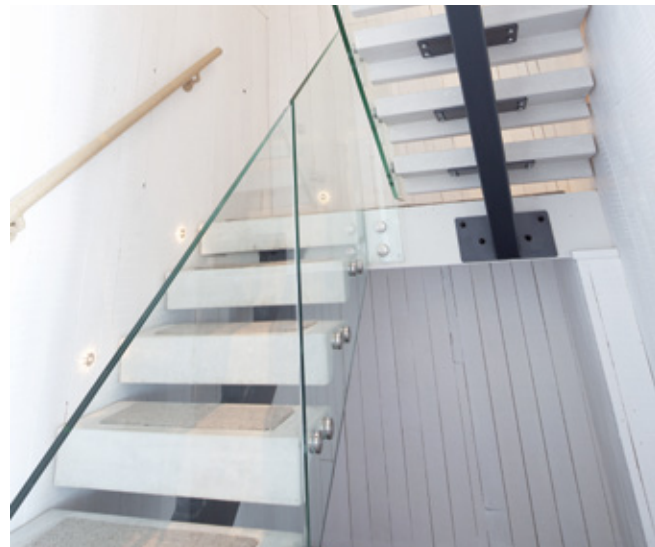
**Spiral staircases** - you need to consider the foundation the stair starts from and the lateral restraint required at the top of the stairs.



**Helical stairs** - these impose an upload and download torsion as simultaneous forces can cause the stair to twist, resisting the structure, and for instance causing the floor to come up.

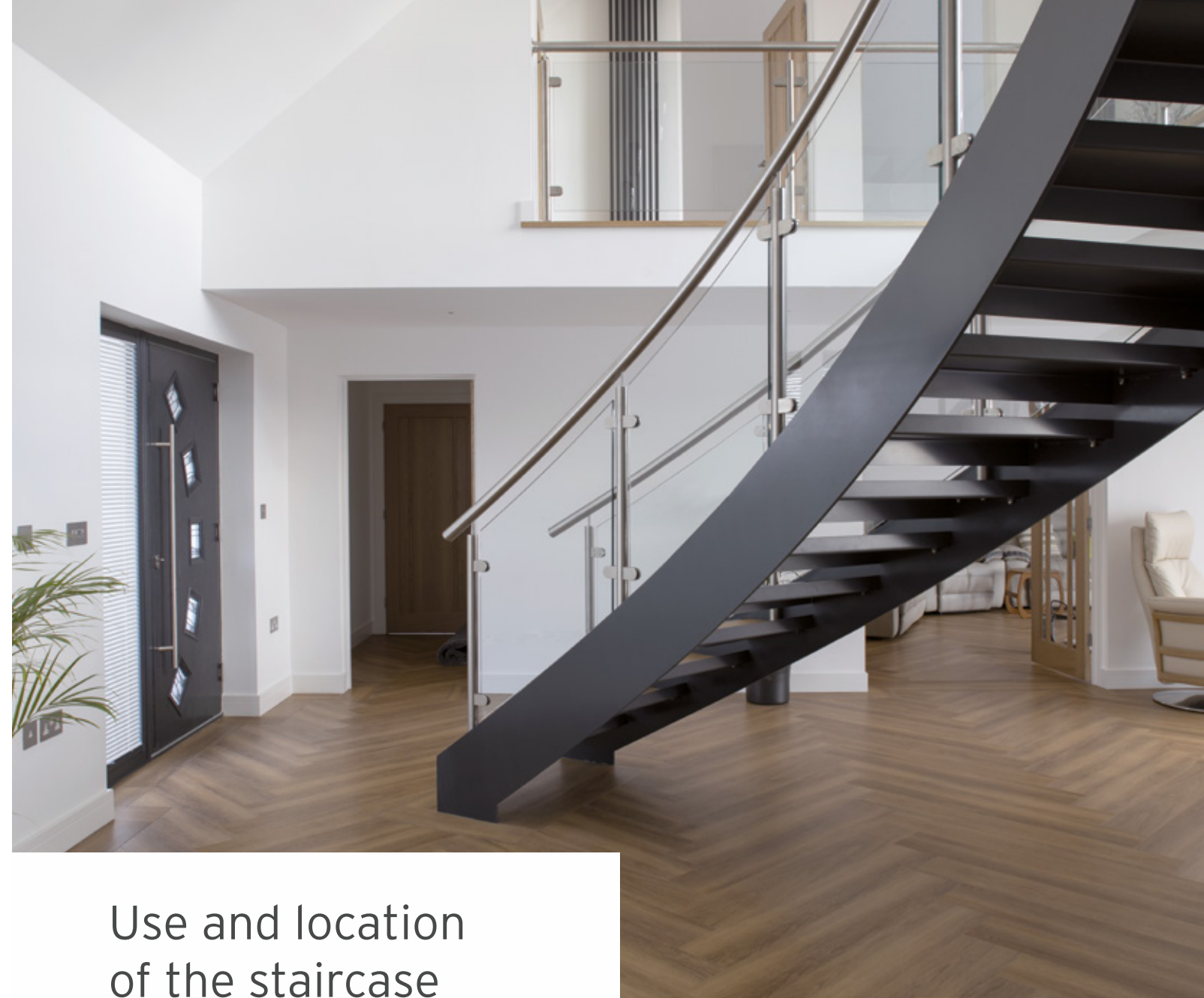


**Cantilever staircases** - as these are often fixed to a wall structure that is part of the structural design of the building, you will need to ensure the wall can support and connect with the staircase.



**Spine beam staircases** - like spiral stairs you need to consider the foundations for these stairs and the fixing detail for the top of the stair.

Spiral UK can advise on the loadings that the staircase generates so you can design the structure to suit. We recommend speaking to your structural engineer to ensure the design and build works effectively.



## Use and location of the staircase

Another point to consider before designing a staircase is the location and use of the stair as this will have an impact on building regulations.

You will need to know the dimensions of the space the staircase is to be installed in and have an idea of how you would like it to look when standing in other areas of the property. When we design stairs we also need to know who and how many people will be using it to ensure it is designed to the relevant section of regulations for that usage.

### Budget

Know your budget and allocate a specific cost to the staircase element of your build this will help define the type of stair design and materials. Spiral UK's bespoke staircases start at £10,000 and a helical staircase design is likely to cost more than a spiral staircase so it's good to know the parameters that you can work to.

### Time

As we have already mentioned getting a staircase expert involved early in a project can be really helpful so you can understand the length of time the staircase will take to design, manufacture and install. A bespoke staircase will take longer than a standard design and discussing price, design options and materials early on will save time later in the build.



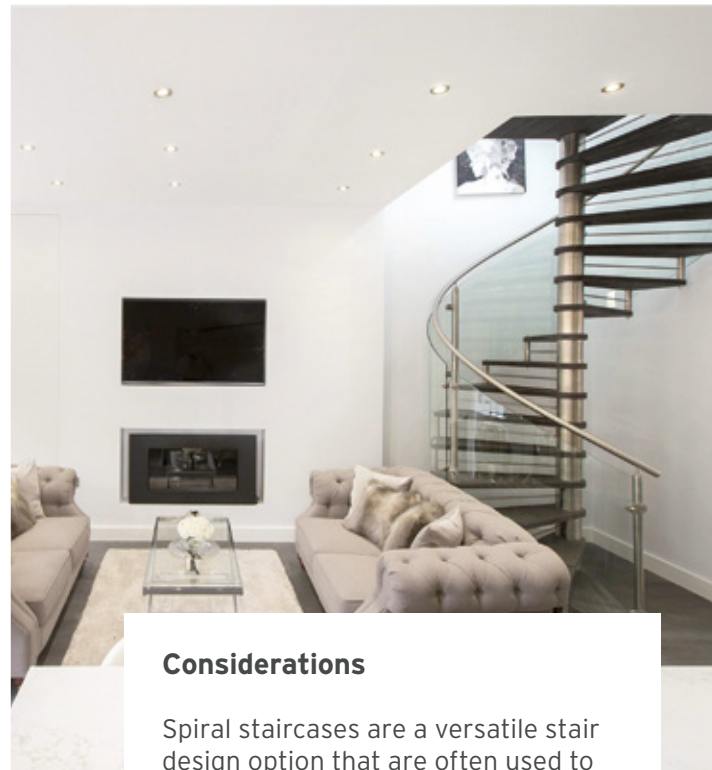
## Types of staircase design

### Spiral Staircases

The terms used for the different types of staircase designs vary so here we explain what we call them and give a few points to consider when deciding on a design for your project.

This type of stair is designed to rotate around a central core pole creating a circular or corkscrew effect as they turn through floors. Spiral stairs can turn in both a clockwise or anti-clockwise direction depending on where you want to enter and exit the stair.

Spiral UK have developed a spiral staircase design called an Elite. This component based system has treads that slot over the core pole creating an oversize effect in contrast to the spacers that slot in between the treads.



#### Considerations

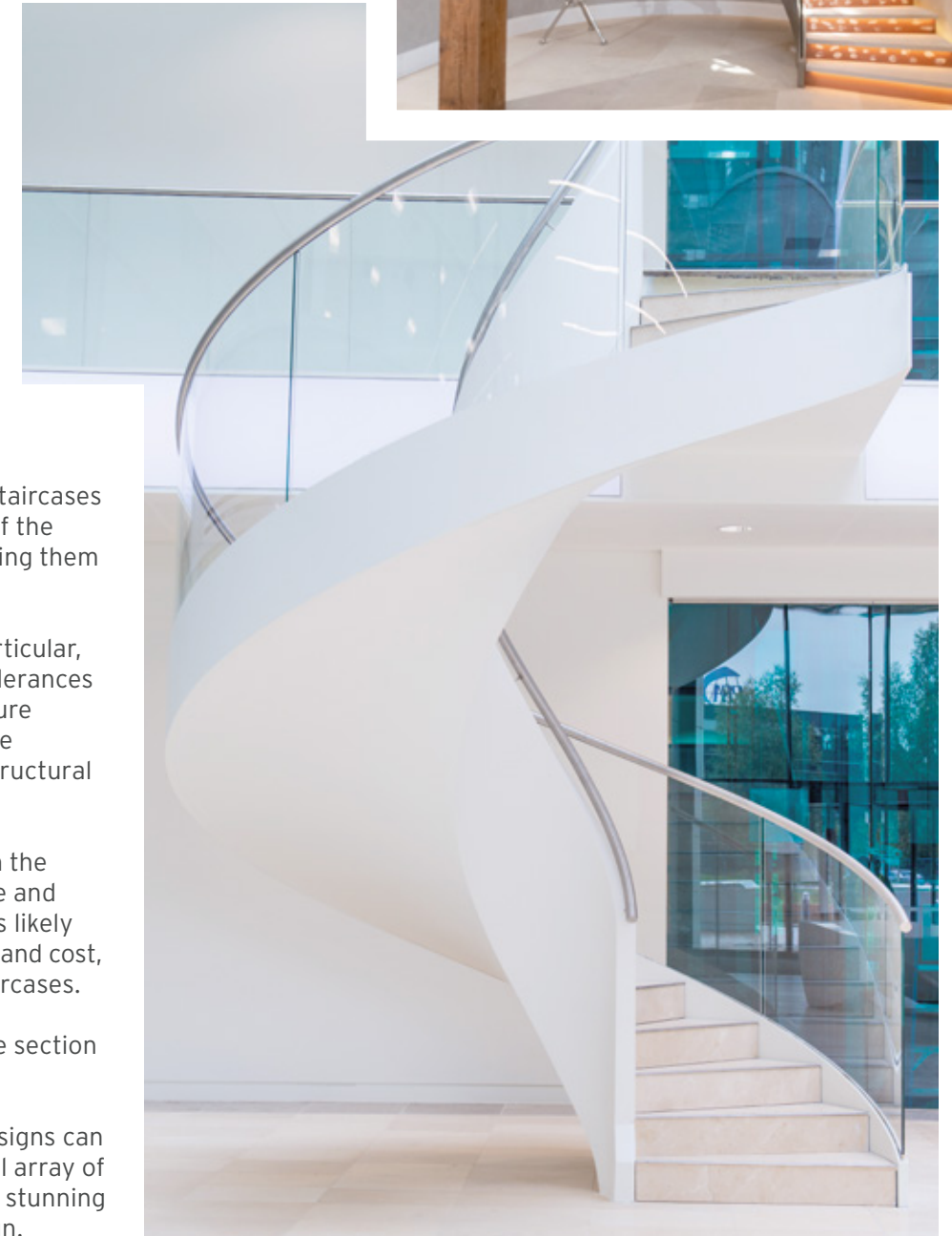
Spiral staircases are a versatile stair design option that are often used to save space. They tend to cost less than helical staircase designs. This compact style can mean that moving large furniture between floors is tricky and they can be less suitable for people with limited mobility.

Spiral stairs fall under BS5395 Part II, see our regulations section for more information.



## Curved (helical) staircases

Curved staircase designs are made up of helical, elliptical (oval) and helix styles, they do not have a core pole. A helical staircase follows a gentle arc in a continuous 'C', elliptical styles change radius part way down and form an oval or egg shape. Helix designs are the same as an elliptical staircase. The famous Leonardo da Vinci double helix staircase in Chateau de Chambord in France has been designed so that it can be ascended and descended at the same time without people meeting.



#### Considerations

The tread radius on curved staircases tends to be wider than that of the spiral staircase designs, making them easier to climb or descend.

With helical staircases, in particular, it is important to consider tolerances and the floor and wall structure around the stair to ensure the design does not cause any structural movement.

The requirements involved in the bespoke design, manufacture and installation of curved stairs is likely to mean increased build time and cost, when compared to spiral staircases.

Take a look at our price guide section for more information.

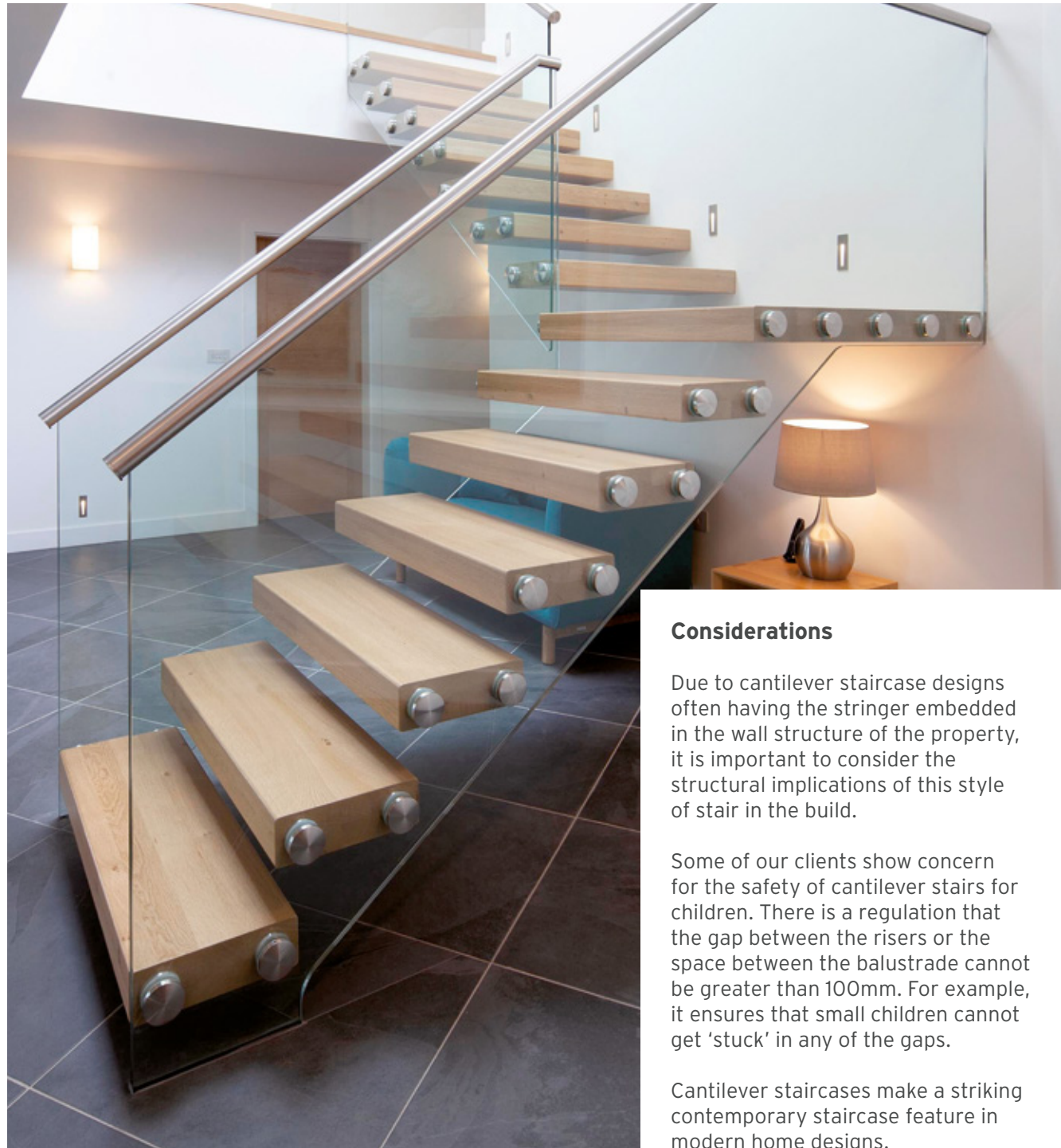
Because curved staircase designs can be created in such a beautiful array of styles they are often used as stunning centrepieces in interior design.



## Cantilever Staircases

The contemporary cantilever or floating staircase design, as the name suggests, gives the impression that the open riser treads are floating. The structure holding the stair is normally hidden in a wall from which the treads cantilever. We have created stairs where the treads are attached to a glass stringer on either side rather than using a wall, and we can also produce spiral staircases that cantilever from the core pole.

With floating stairs there is a clear gap between the risers so all floating stairs can also be described as open-tread staircases. (It is also possible to build conventional staircases that have open treads). Because floating stairs appear to have no support on one side, they are sometimes also referred to as hanging stairs - a term that appears to be more common in the USA.



### Considerations

Due to cantilever staircase designs often having the stringer embedded in the wall structure of the property, it is important to consider the structural implications of this style of stair in the build.

Some of our clients show concern for the safety of cantilever stairs for children. There is a regulation that the gap between the risers or the space between the balustrade cannot be greater than 100mm. For example, it ensures that small children cannot get 'stuck' in any of the gaps.

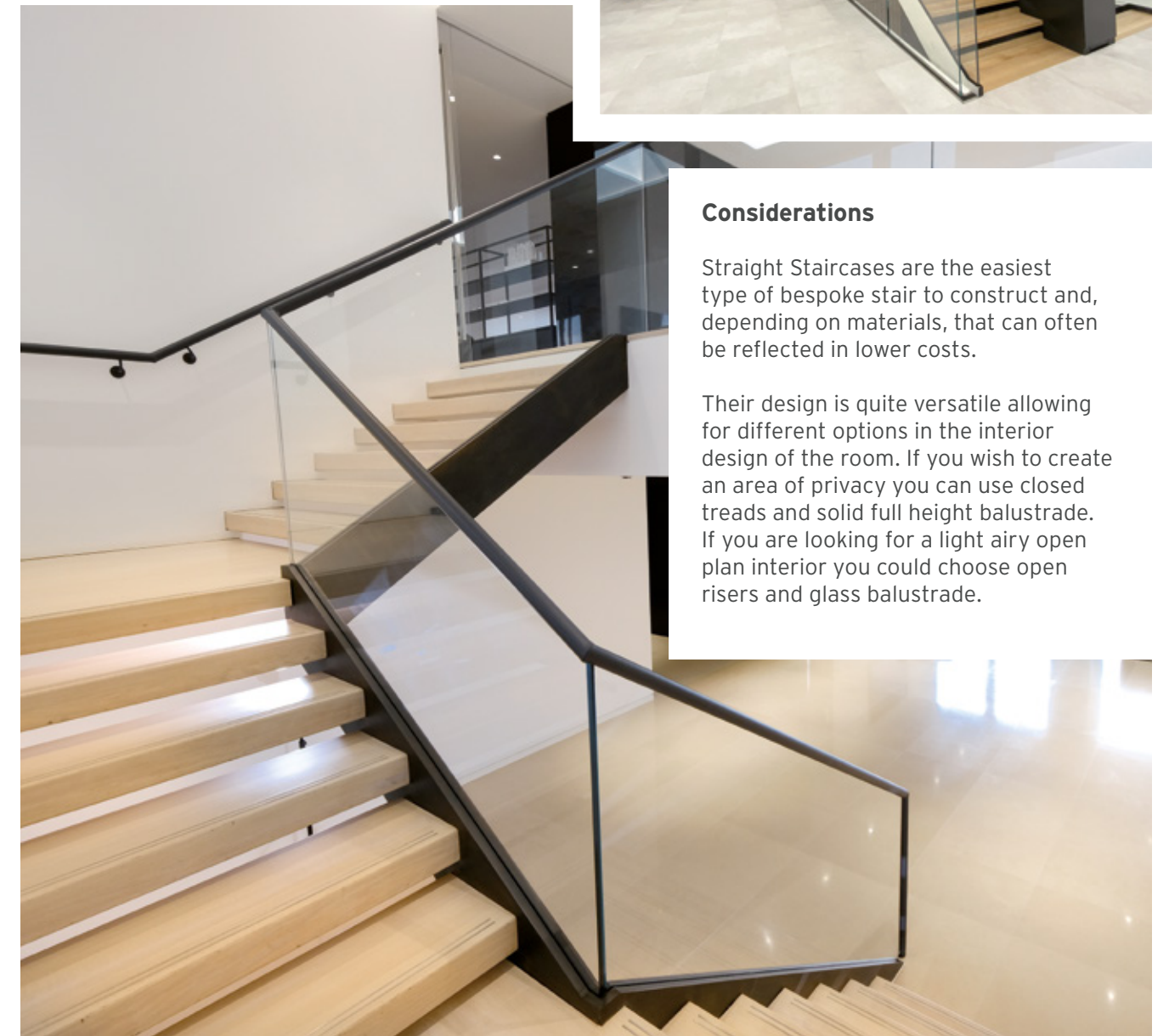
Cantilever staircases make a striking contemporary staircase feature in modern home designs.

## Straight stairs design options

Straight staircases are very flexible in terms of the design ideas you can apply to them. Dog legged staircases and L shape stairs are great ways of adapting straight stairs to suit the layout of a property.

An L-shaped or dog-leg stair is a straight staircase which includes a space to change direction with a 90° or 180° bend. This is usually at a landing halfway between floors. This can be helpful where space is limited as it is more compact than a completely straight staircase.

Other terms used in the design of straight stairs are quarter turn stairs that refer to a 90° angle and U-shaped and half turn stairs which are alternative names for a straight staircase that turns back on itself in a 180° bend.



### Considerations

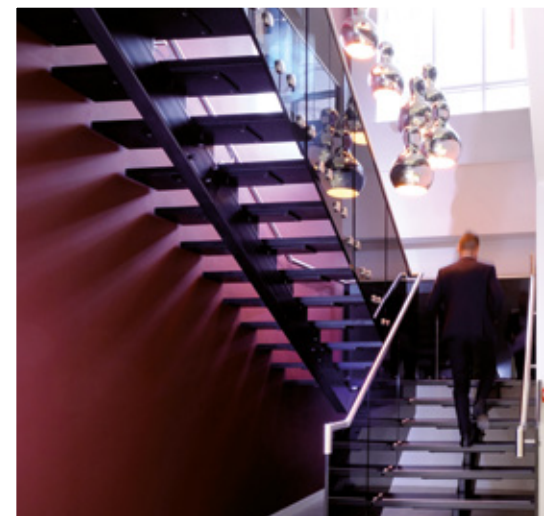
Straight Staircases are the easiest type of bespoke stair to construct and, depending on materials, that can often be reflected in lower costs.

Their design is quite versatile allowing for different options in the interior design of the room. If you wish to create an area of privacy you can use closed treads and solid full height balustrade. If you are looking for a light airy open plan interior you could choose open risers and glass balustrade.



## Spine beam staircases

A spine beam staircase has a long beam running underneath the centre of the staircase with treads on both sides. This can create an open airy feel. A spine beam style can be used in helical and straight staircase designs and lends itself to modern interiors as well as being highly flexible in terms of the materials used.



**Take a look at our glossary of staircase terms for clarification on what we're talking about.**

**Riser**  
the near vertical spaces between one step and the next on the staircase

**Stringer**  
is the housing on either side of a flight of stairs, into which the treads and risers are fixed

**Balusters or Uprights**  
vertical posts comprising the barrier in guards and railings

**Balustrade**  
a railing or wall on a balcony or staircase

**Handrail**  
'the bit you hold' to give stability and support whilst using a staircase

**Going**  
the horizontal distance between one step and the next measured from nosing to nosing

**Nosing**  
the edge of the tread that protrudes over the riser beneath it

**Tread**  
the horizontal part of a stair upon which people walk



## Style options, materials and finishes

There are a wide variety of staircase styles and materials on the market especially within bespoke staircase design. From contemporary cantilever stairs with glass balustrade to more traditional Georgian and art deco designs. The main elements to consider are treads, balustrade, handrails and materials.



### Stringers

The stringers, the sides of the staircase that the treads and risers fit into, can be shaped in different ways. Saw tooth effect stringers are cut out to reflect the shape of the tread and riser on one side and closed underneath so they run parallel to the pitch line. A design that lends itself well to receiving a plasterboard soffit giving the look of the stair structure, depth and volume.

Zig zag stringers are cut in a 'zig zag' following the tread and riser on both the top and bottom of the stringer. This replicating of the top edge profile with the bottom stringer is often used to create a striking modern stair design.

If you prefer a more traditional style you could choose a stringer where the tread and riser shape isn't cut out. A versatile option that can create both contemporary and vintage looks depending on materials and colours.



### Treads

Treads can be designed with open and closed risers, can be tapered on the rise or splay as you descend them. At Spiral UK we can fabricate them in steel and clad or inlay them in a material of your choice like timber, vinyl, tiles or stone.

We can make solid bespoke treads in concrete, timber or stone which are often suited to cantilever designs. Glass treads are also possible.

### Balustrade

Balustrade is the structure of vertical uprights, balusters, or spindles that make up the railing of the staircase. Options can be modern full height steel sheet balustrade, structured glass (straight or curved) ornate spindles in vintage styles or timber cladding. Often, we find that the inner and outer balustrade are styled differently. For example, this might mean that the inner balustrade is glass and the outer full height plaster with handrails added in a parapet design.



### Handrails

Inset, oval, circular, square there is a lot to choose from when it comes to handrails - which normally connect to the balustrade or wall. In the case of spiral staircases, they also fit to the core pole.

Satin polished stainless steel is a popular option with glass and spiral staircases, as the material can be fabricated in a curve. In addition to this there are beautiful timber handrail options that can have stylish finishes like scrolls or monkey tails.

Our handrails can be made in a range of hardwoods, mild or stainless steel. We can powder coat them or wrap them in materials like rope or leather.





## Materials

There are a multitude of different colours and materials available for the different components of a staircase. Our most popular choices are timber, stone, glass and concrete.

Some people choose a vinyl or carpet overlay on treads but the beauty of natural stone and concrete, in particular, is that we can colour match to walls and flooring.

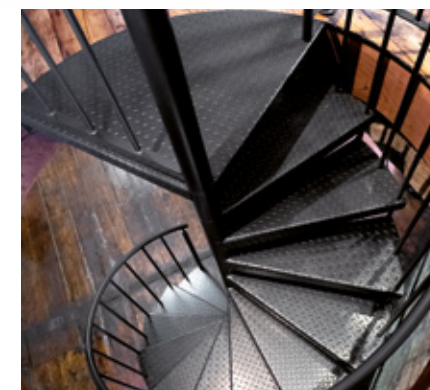
**We can provide samples of all materials and in most cases colour match to flooring.**



## Finishes

One of the final decisions when designing a staircase is how you would like the finish. Our finishes include powder coating, site sprayed, lacquered or polished metalwork. We can supply our bespoke staircases pre-finished with a primer ready to receive final in situ spraying or we can carry out final finish work for you.

As a bespoke staircase manufacturer, we work with clients and contractors to meet any level of requirement for finishes so if you would prefer someone else to do the spraying at site or plaster the soffit then our tailored approach can work with that.





## Staircase design price guides

We have included a selection of staircase designs here with guidance on what you would be looking at price wise to help you decide what staircase design will suit your budget.

**When Spiral UK quote a staircase, we always cover the total cost for the complete service: design, manufacture and installation. It is worth bearing this in mind when comparing prices.**



## Spiral staircases



### Venton Gassic

Type of stair: spiral double flight  
Treads: timber treads and closed risers  
Balustrade: toughened curved glass  
Handrail: satin polished stainless steel  
Guide Price: £50 - 60,000



### Nanfan Farm

Type of stair: spiral  
Treads: concrete with open riser  
Balustrade: toughened curved glass  
Handrail: satin polished stainless steel  
Guide Price: £10 - 15,000



### Highmead

Type of stair: spiral  
Treads: timber  
Balustrade: steel framework clad in plaster  
Handrail: stainless steel  
Guide Price: £15 - 20,000

## Spiral staircases



### The Piggery

Type of stair: cantilever spiral  
Treads: natural stone (Botticino Italian marble)  
Balustrade: toughened curved glass  
Handrail: satin polished stainless steel  
Guide Price: £20 - 25,000



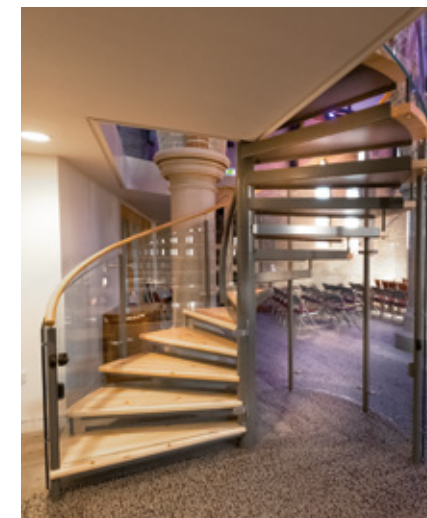
### The Siding

Type of stair: spiral  
Treads: powder coated steel durbar plate  
Balustrade: steel uprights  
Handrail: tubular steel, black powder coat  
Guide Price: £8 - 10,000



### Halesowen College

Type of stair: spiral  
Treads: steel with carpet overlay  
Balustrade: solid steel plate, powder coated orange  
Handrail: mild steel fixed to balustrade and core  
Guide Price: £25 - 30,000



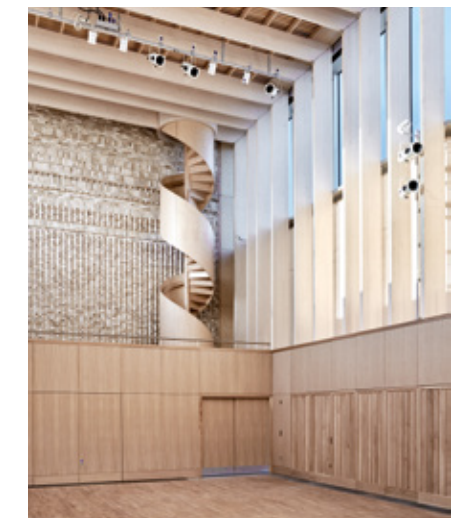
### Christ Church, Ware

Type of stair: spiral  
Treads: pine  
Balustrade: toughened curved glass  
Handrail: pine  
Guide Price: £20 - 30,000



### Maker Industrial, Bury

Type of stair: Elite spiral stairs  
Treads: composite hardwood  
Balustrade: stainless-steel uprights with curved glass  
Handrail: satin polished stainless steel  
Guide Price: £22 - 25,000



### Storey's Field, Cambridge

Type of stair: spiral  
Treads: steel plate with ash overlay  
Balustrade: full height ash veneered plywood  
Handrail: ash  
Guide Price: £105 - 125,000



## Helical (curved) staircases



### Park Gwyn

Type of stair: helical  
Treads: steel with vinyl overlay  
Balustrade: toughened curved glass  
Handrail: satin polished stainless steel  
Guide Price: £20 - 25,000



### Fort Road

Type of stair: double flight, elliptical  
Treads: honed Pietra Plana stone  
Balustrade: toughened curved glass  
Handrail: stainless steel tubular capping  
Guide Price: £95 - 110,000



### Dunhill Wood

Type of stair: helical  
Treads: steel plate with stone overlay  
Balustrade: toughened curved glass  
Handrail: timber, wrapped in leather  
Guide Price: £40 - 60,000



### Falmouth University

Type of stair: helical  
Treads: steel with porcelain tile inlay  
Balustrade: curved glass and plasterboard  
Handrail: satin polished stainless steel  
Guide Price: £85 - 100,000



### Centenary Lounge

Type of stair: helical  
Treads: steel plate with vinyl overlay  
Balustrade: 'parapet style' with walnut veneer  
Handrail: satin polished stainless steel  
Guide Price: £70 - 80,000



### Swansea University

Type of stair: helical  
Treads: steel with closed risers  
Balustrade: steel panels with sculptural fin  
Handrail: satin polished stainless steel  
Guide Price: £60 - 70,000

## Straight staircases



### Carbis Bay, Cornwall

Type of stair: spine beam  
Treads: concrete  
Balustrade: toughened frameless glass  
Handrail: satin polished stainless steel  
Guide Price: £25 - 30,000



### Portland Estates, London

Type of stair: large dog-legged straight  
Treads: timber  
Balustrade: toughened frameless glass  
Handrail: stainless steel, leather wrapped  
Guide Price: £175 - 200,000



### 2 London Wall Place

Type of stair: dog-legged straight  
Treads: timber clad  
Balustrade: timber to outer toughened glass inner  
Handrail: groove inset into balustrade  
Guide Price: £150 - 160,000



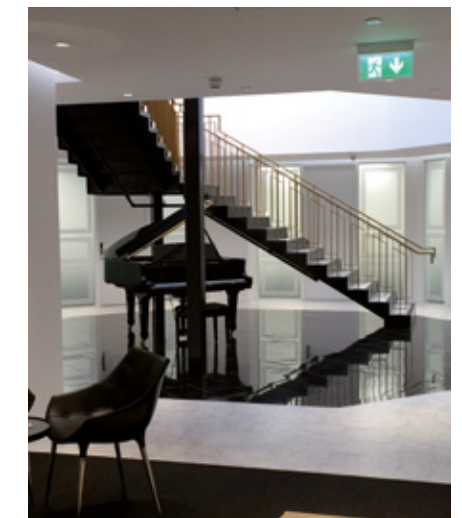
### Carter Lane, London

Type of stair: dog-legged spine beam  
Treads: American black walnut  
Balustrade: grey tinted frameless toughened glass  
Handrail: satin polished stainless steel  
Guide Price: £45 - 50,000



### Ancora, Cornwall

Type of stair: cantilever  
Treads: solid oak  
Balustrade: laminated toughened glass  
Handrail: satin polished stainless steel  
Guide Price: £25 - 30,000



### Brick Street

Type of stair: straight  
Treads: closed risers with false zig zag stringer  
Balustrade: art deco style powder coated bronze  
Handrail: steel with oval profile powder coated bronze  
Guide Price: £95 - 120,000





## Regulations

### UK staircase regulations

There are three main building regulations that relate to staircases, generally referred to as Part K, M & B.

**Approved Document K**  
Protection from falling  
collision and impact.  
(Section 1: Stairs)

**Approved Document B**  
Fire Safety  
(means of escape)

**Approved Document M**  
Access to and use of  
buildings (Disabled  
Access)

All Spiral UK's custom-made spiral and helical staircases comply with BS5395 Part II

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### Spiral and helical stairs regulations

Part K of the Building Regulations provides the guidelines for ensuring occupants or visitors to a house are protected against falling, collision or impact.

In Approved Document K 1.28 it says:

**"Design spiral and helical stairs in accordance with BS 5395-2"**

All the spiral and helical staircases that we manufacture at Spiral UK are compliant with British Standards Document BS 5395 Part II.





## Spiral staircase or helical stairs regulations for residential properties

The staircase categories relating to residential spiral or helical staircases tend to be A small private stair or B private stair. Part B & M of the Building Regulations for staircases don't tend to apply to residential properties.

### Category A - small private stair

This type of spiral or helical stairs is intended for use by a limited number of people who are generally familiar with the staircase. For example, an internal stair in a dwelling serving one room not being a living room or a kitchen, an access stair to an office not used by the public, or spiral fire escape stairs for a small number of people.

- Minimum and maximum rise per tread: 170-220mm
- Minimum clear width\* between core pole & handrails: 600mm
- Minimum going from the centre of the tread: 145mm

### Category B - private stair

In addition to a category A stair, this private stair can also provide the main access to the upper floor of a private dwelling.

- Minimum and maximum rise per tread: 170-220mm
- Minimum clear width between core pole & handrails: 800mm (900 in Scotland)
- Minimum going from the centre of the tread: 190mm



## Spiral staircase regulations for commercial and public use

Category C small semi-public, D semi-public or E public stairs tend to be for staircase projects in commercial and public spaces.

It is important to note that where there is a contradiction between BS 5395 Part II and Part B and M of the Building Regulations, Part B and M take precedence.

### Category C - Small Semi-Public stair

This type of stair is intended for use by a limited number of people some of whom maybe unfamiliar with it. Typical examples are stairs in offices, a factory or for a stair serving more than one dwelling.

- Minimum and maximum rise per tread: 170-220mm
- Minimum clear width between core pole & handrails: 800mm (900 in Scotland)
- Minimum going from the centre of the tread: 230mm

### Category D - Semi-Public stair

This category of stair is intended for use by larger numbers of people some of whom maybe unfamiliar with it. It suits larger floor areas in a factory, shop or office or can be a common stair serving more than one dwelling

- Minimum and maximum rise per tread: 150-190mm
- Minimum clear width between core pole & handrails: 900mm (900 in Scotland)
- Minimum going from the centre of the tread: 250mm

### Category E - Public stair

Public stairs are for use by large numbers of people at one time and used in places of public assembly.

- Minimum and maximum rise per tread: 150-190mm
- Minimum clear width between core pole & handrails: 1000mm (900 in Scotland)
- Minimum going from the centre of the tread: 250mm



## General considerations

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### Risers

The maximum number of risers in a single flight should be 16 except where this is not practicable then the number of risers can be increased to 22.

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### Headroom

Normally the clear headroom\*\* should be 2000mm it may be reduced to 1900mm where this is not practicable

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### Balustrade

In areas used by children the widest gap between balusters should not allow a sphere of 100mm to pass through. We call this the 100mm rule and apply it to most of our helical and spiral staircases.

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## Download our technical specification sheets

Spiral UK have developed guidance on the standards for helical and spiral stairs in the form of British Standard specification sheets for the different categories of spiral and helical staircases. You can download them on our website at: <https://www.spiral.uk.com/technical-information>

\* clear width is the unobstructed walking area throughout the spiral stair's rise

\*\* clear headroom is the distance measured vertically from the pitch line of the stair or from a floor or landing to any obstruction overhead

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## Get in touch

If you would like to discuss your staircase design ideas with someone, to get a quote or just seek clarification on a regulation. Please do get in touch we would be happy to talk through any designs or queries.

Tel: 0330 123 2447

Email: [info@spiral.uk.com](mailto:info@spiral.uk.com)

Visit: [www.spiral.uk.com](http://www.spiral.uk.com)

