

Stairs

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[Spiral](#) ([double helix](#)) stairway in the [Vatican Museum](#)

Stairs, **staircase**, **stairway**, **stairwell**, and **flight of stairs** are connected [steps](#) leading up or down. Stairways may be straight, round, or may consist of two or more straight pieces connected at angles.

Special stairways include [escalators](#) and [ladders](#). Alternatives to stairways are [elevators](#) and inclined [moving sidewalks](#).

Components and terminology

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Step

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A straight stairway with tiled treads, a double railing and two landings.

The step is composed of the tread and riser.

- **tread**: The part of the step that is stepped on. It is constructed to the same [specifications](#) (thickness) as any other flooring. The tread "length" is measured from the outer edge of the step to the vertical "riser" between steps.
- **riser**: The vertical portion of the step between steps. This may be missing for an "open" stair effect.
- **nosing**: An edge part of the tread that protrudes from the riser beneath. If it is present, this means that [horizontally](#), the total "run" length of the stairs is not simply the sum of the tread lengths, the treads actually overlap each other slightly
- **bullnose**: Where stairs are open on one or both sides, the first step above the lower floor may be wider than the other steps and rounded. The rounded portion of the step is called a "bullnose". A **double bullnose** can be used when both sides of the stairs are open.
- **winders**: Winders are steps that are narrower on one side than the other. They are used to change the direction of the stairs without landings. A series of winders form a [circular](#) or [spiral](#) stairway. When three steps are used to turn a 90° corner, the middle step is called a **kite winder** due to its similarity to a diamond-shaped [kite](#).

- **stringer, stringer board** or sometimes just **string**: The structural member that supports the treads. There are typically two stringers, one on either side of the stairs; though the treads may be supported in many other ways.
- **trim**: Trim (e.g. [quarter-round](#) or [baseboard](#) trim) is normally applied where walls meet floors. Within a flight of stairs there is no trim as the trim thickness will significantly eat into the tread width. **Shoe moulding** may be used between the lower floor and the first riser. Trimming a bullnose is a special challenge as the last riser above the lower floor is rounded. Today, special flexible, plastic trim is available for this purpose. **Scotia** is concave moulding that is underneath the nosing between the riser and the tread above it.

The railing system

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The 142-metre-long [Potemkin Stairs](#) in [Odesa](#) (1834-41) was made famous by [Sergei Eisenstein](#) in his movie [Battleship Potemkin](#) (1925).

A spiral staircase with ornamental balusters.

The **balustrade** is the complete system of railings and pickets that prevents people from falling over the edge.

- **banister, railing** or **handrail**: The angled member for people to hold, as distinguished from the [vertical](#) pickets which hold up stairs that are open on one side. There is often a railing on both sides, sometimes only on one side or not at all, on wide staircases there is sometimes also one in the middle, or even more. The term "banister" is sometimes used to mean just the handrail, or sometimes the handrail and the balusters or sometimes just the balusters [\[1\] Archived 2007-03-11 at the Wayback Machine](#)
 - **volute**: A handrail for the bullnose step that is shaped like a [spiral](#). Volutes may be right or left-handed depending on which side of the stairs they occur when facing up the stairs.
 - **turnout**: Instead of a complete spiral volute, a turnout is a [quarter-turn](#) rounded end to the handrail.
 - **gooseneck**: The vertical handrail that joins a sloped handrail to a higher handrail on the balcony or landing is a gooseneck.
 - **rosette**: Where the handrail ends in the wall and a [half-newel](#) is not used, it may be trimmed by a [rosette](#).
 - **easings**: Wall handrails are mounted directly onto the wall with **wall brackets**. At the bottom of the stairs such railings flare to a horizontal railing and this horizontal portion is called a "starting easing". At the top of the stairs, the horizontal portion of the railing is called a "over easing".
 - **core rail**: Wood handrails often have a metal core to provide extra strength and stiffness, especially when the rail has to curve against the grain of the wood. The archaic term for the metal core is "core rail".

- **baluster**: A term for the vertical pickets that hold the handrail. Sometimes simply called **guards** or **spindles**. Treads often require two balusters. The second baluster is closer to the riser and is taller than the first. The extra height in the second baluster is typically in the middle between decorative elements on the baluster. That way the bottom decorative elements are aligned with the tread and the top elements are aligned with the railing angle. However, this means the first and second balusters are manufactured separately and cannot be interchanged. Balusters without decorative elements can be interchanged.
- **newel**: A large picket or post used to anchor the handrail. Since it is a structural element, it extends below the floor and subfloor to the bottom of the floor [joists](#) and is bolted right to the floor joist. A **half-newel** may be used where a railing ends in the wall. Visually, it looks like half the newel is embedded in the wall. For open landings, a newel may extend below the landing for a decorative **newel drop**.
- **baserail** or **shoerail**: For systems where the baluster does not start at the treads, they go to a baserail. This allows for identical balusters, avoiding the second baluster problem.
- **fillet**: A decorative filler piece on the floor between balusters on a [balcony](#) railing.

Handrails may be **continuous** (sometimes called **over-the-post**) or **post-to-post** (or more accurately ""newel-to-newel""). For continuous handrails on long balconies, there may be multiple newels and **tandem caps** to cover the newels. At corners, there are **quarter-turn caps**. For post-to-post systems, the newels project above the handrails.

Another, more classical, form of handrailing which is still in use is the Tangent method. A variant of the Cylindric method of layout, it allows for continuous climbing and twisting rails and easings. It was originally defined from principles set down by architect [Peter Nicholson](#) in the 18th century.

Other terminology

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- **balcony**: For stairs with an [open concept](#) upper floor or landing, the upper floor is functionally a balcony.
- **flight**: A flight is an uninterrupted series of steps.
- **floating stairs**: A flight of stairs is said to be "floating" if there is nothing underneath. The risers are typically missing as well to emphasize the open effect. There may be only one stringer or the stringers otherwise minimized. Where building codes allow, there may not even be handrails.
- **landing** or **platform**: A landing is, structurally, an intermediate floor between flights of stairs. It is typically used to allow stairs to change directions, or to allow the user a rest. As landings consume floor space and are structurally floors, they can be quite expensive to build. However, changing the direction of the stairs allows stairs to fit where they would not otherwise, or provides privacy to the upper level as

visitors downstairs cannot simply look up the stairs to the upper level due to the change in direction.

- **runner**: [Carpeting](#) that runs down the middle of the stairs. Runners may be directly stapled or nailed to the stairs, or may be secured by specialized bar that holds the carpet in place where the tread meets the riser.
- **spandrel**: If there is not another flight of stairs immediately underneath, the triangular space underneath the stairs is called a "spandrel". It is frequently used as a [closet](#).
- **stairwell**: This is the space in the building where the stairs are constructed. This may need special structural design so that the floors around the stairwell do not require structural walls so that the stairs themselves are open to the floors.
- **staircase**: This term is often used for the stairs themselves: the steps, railings and landings; though often it is used interchangeably with "stairs" and "stairway".
- **stairway**: This term is often used for the entire stairwell and staircase in combination; though often it is used interchangeably with "stairs" and "staircase".

Measurements

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Stair measurements:

- The **rise height** of each step is measured from the top of one tread to the next. It is not the physical height of the riser; the latter excludes the thickness of the tread.
- The **tread depth** or length is measured from the edge of the nosing to the vertical riser. It is sometimes called the **going**.
- The total **run** of the stairs is the horizontal distance from the first riser to the last riser. It is often not simply the sum of the individual tread lengths due to the nosing overlapping between treads.
- The total **rise** of the stairs is the height between floors (or landings) that the flight of stairs is [spanning](#).
- The **slope** of the stairs is the total rise divided by the total run (not the individual riser and treads due to the nosing). It is sometimes called the **rake** or **pitch** of the stairs. The **pitch line** is the imaginary line along the tip of the nosing of the treads.
- **Headroom** is the height above the nosing of a tread to the ceiling above it.
- **Walkline**: For curved stairs, the inner radius of the curve may result in very narrow treads. The "walkline" is the imaginary line some distance away from the inner edge on which people are expected to walk. Building code will specify the distance. Building codes will then specify the minimum tread size at the walkline.
- To avoid confusion, the number of steps in a set of stairs is always the number of risers, not the number of treads.

Examples of notable stairways

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- The longest stairway is listed by [Guinness Book of Records](#) is the service stairway for the [Niesenbahn funicular](#) railway near [Spiez, Switzerland](#), with 11,674 steps and a height of 1669 [m](#) (5476 [ft](#)).^[2] The stairs are strictly employee-only.
- The [Haiku Stairs](#), on the island of [Oahu, Hawaii](#), are approximately 4,000 steps which climb nearly 1/2 of a [mile](#). Originally used to access longwire radio [antennas](#) which were strung high above the Haiku Valley, between [Honolulu](#) and [Kaneohe](#), they are currently closed to hikers.
- The [Penrose stairs](#), devised by [Lionel](#) and [Roger Penrose](#), are a famous [impossible object](#). The image distorts perspective in such a manner that the stairs appear to be never-ending, a physical impossibility. The image was adopted by [M. C. Escher](#) in his iconic [lithograph *Ascending and Descending*](#).

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