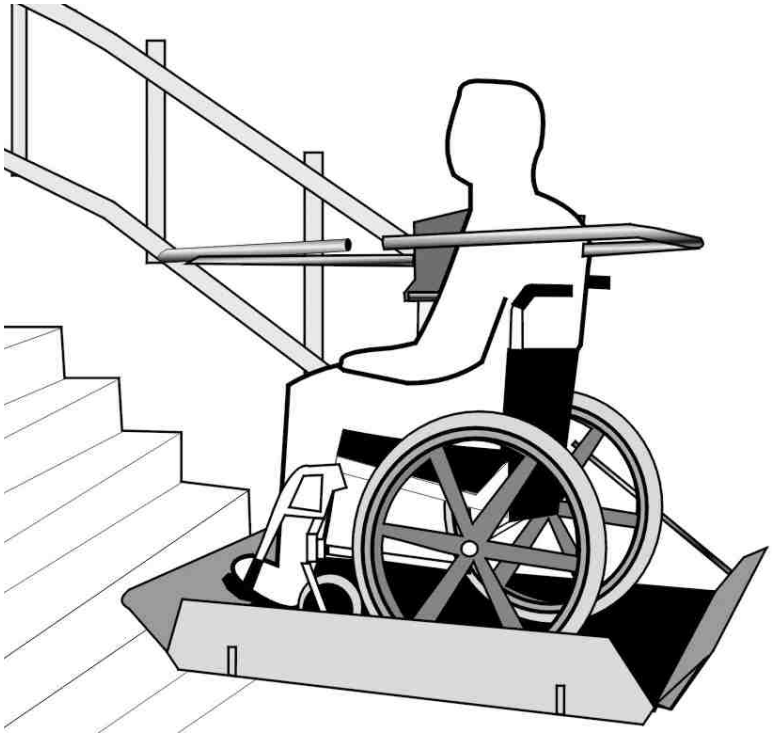
Stair-Lift Stairway Measuring Guide



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This stairway measuring guide is designed to assist the dealer in producing accurate and complete Garaventa Stair-Lift order packages. Ensuring the order package is accurate and complete eliminates the need to return to the stairway to obtain missing dimensions and details. This saves valuable time, and money and speeds up processing of the order and prevents design errors.

Since there are many stairway configurations, this Guide covers the most common designs. If you encounter a stairway configuration that you are not sure how to measure, please contact Garaventa.

Measuring Tools Required

Prior to measuring, you will need to assemble a Measuring Kit that contains the following items:

- Metric measuring tape (available from Garaventa if not available locally)
- Plumb bob and string
- Level (4 to 6 ft. long - 1200 to 1800mm)
- Steel, metric builders' square
- Camera and film
- Calculator with square root function (available from Garaventa if not available locally)
- Masking tape, or stick-on note paper
- Paper, pencil and eraser
- Garaventa Stair-Lift Order Form
- Stair-Lift Design and Planning Guide

Site Evaluation

The first step is to measure the actual stairway. Do **not** submit measurements from architectural drawings as a substitution for stairway measurements. Architectural measurements are not sufficient, since they rarely reflect what was actually built. If the stairway dimensions are being submitted from architectural plans, refer to the "To Be Built" section of this guide.

Before measuring the proposed stairway, it is important to consider the points below. For detailed answers to these questions, please refer to the Garaventa Stair-Lift Design and Planning Guide.

- Is this the most efficient and logical location for installation of a Garaventa Stair-Lift?
- Are the stair widths and overhead clearances adequate?
- Which Stair-Lift model is best suited for the particular stairway: GSL-1, GSL-3, Xpress or Artira?
- Keep appearances in mind.

  -Should the handrail be removed and replaced with an integrated Stair-Lift handrail?
  -What color or finish would be most appropriate for the lift? Depending on the location of the lift, certain colors and finishes are more appropriate than others.
  -Is an outdoor package required?

- Local building code authorities and the fire commissioner's office should be consulted early in the planning process. Often there are special requirements that must be dealt with, such as egress stair width, handrail height, or ramp size.
- How will the lift be supported? Be sure to check the wall, stair tread, stringer and landing construction.
- Will the lift need to travel horizontally? If so, stabilizers may be needed to support the lift.
- How many landings will the lift service? Be sure to indicate the appropriate number of landings on the Garaventa order form and sketches.
- Will the platform be stored at the upper landing or the lower landing? If upper landing storage is required, a stabilizer will be required.
- What drive configuration is most suitable? If installing a Compact Drive, is there a location for the control box to be positioned?
- Once the chosen drive box is installed, will there be enough room at the upper landing to comfortably maneuver a wheelchair?
- Is there enough room at the lower landing for passenger loading and unloading, or is additional room required? If not, consider whether a Side Load platform or a 45° drop-down will provide enough clearance. If you plan to install a Compact Drive, the tensioning device must have a minimum of 250mm clearance from the end of the tube system to the nearest obstruction, for tightening ability.
- When the lift arrives on site, will you be able to get it into the building and onto the stairway?

Once these points have been considered, you are ready to measure the stairway. Upon completion of measuring the stairway, ensure that the Garaventa Stair-Lift Order Form includes the necessary information and corresponding prices. If there are any difficulties in completing the order form, contact the Regional Sales Manager.

Attachment Method: Construction Details and Finishes

When measuring the stairway, it must be determined how the lift is to be supported. Can it be direct mounted, or are support towers required? What stairway components, such as columns, walls, windows, will affect the design of the lift? To help determine which attachment method is most suitable, refer to the Stair-Lift Design and Planning Guide.

Direct Mount

- To attach a lift using a direct wall mount installation, the wall must be constructed of 6” (152mm) minimum solid concrete, 8” minimum concrete block (hollow or filled), hollow structural steel (3” x 3” x ¼” (76mm x 76mm x 6.35mm) or larger), or vertical wood posts (4” x 6” (90mm x 140mm) or larger).
- When measuring, consider the thickness of the wall that the lift will be anchored to. Also take into account the thickness of any finishing on the wall (plaster, wallboard, marble, grout, wood paneling) and any offsets or permanent components (see *Permanent Components* section).
- If posts (wood or steel) are to be used as method of attachment, consult Garaventa for locations. We recommend that the spacing be verified after the posts are installed. To verify the vertical support spacing, measure between the posts, from centerline to centerline. One support post for each flight of stairs must be located at a stair nose (see *To Be Built Stairs* section).
- If you are unsure whether the walls can support the lift, a structural engineer should be consulted.

Support Towers

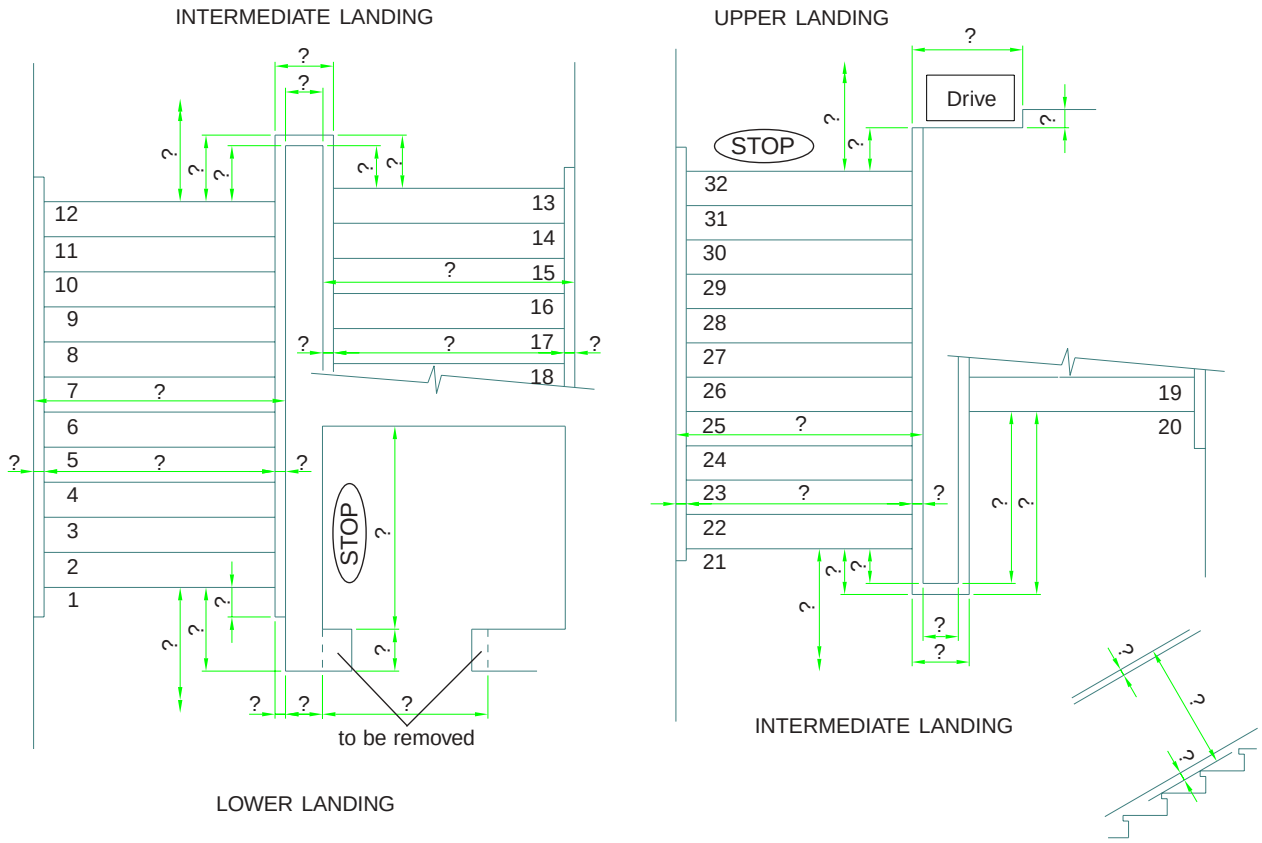
- Support towers are used when walls are not strong enough to support the lift (refer to the loading diagrams in the Stair-Lift Design and Planning Guide).
- Support towers must be used if the walls are made of brick, thin block, concrete (less than 6” (152mm)), wood, or metal studs.
- In cases where there are no walls, you may require tall towers mounted through the core of the stairwell. When measuring for an open-core stairway, consider the following points:
  - Measure from the open core side of the stringer towards where the lift will be positioned. Include all the dimensions and details between these points (stringer widths, handrail widths, posts, etc.) on the sketches (see *Intermediate Landings* section). Also take into account offsets or permanent components, as well as the thickness of any finishing over the treads or landings (i.e.: tile, terrazzo, marble, grout, carpet, metal tread nosing, etc.).

Sketches

Before measuring the stairs, you need to draw a rough sketch of the stairway. A final sketch must be submitted with the Garaventa order package.

- Sketch the stairs and landings in plan view, using one or two 8 1/2" X 11" sheets of paper. You may also choose to show certain details of the stairway in section or elevation views.
- Draw in the risers from the lower landing to the top landing. This makes it easier for designers to understand the sketch, and speeds up processing of the order.
- Mark “Stop” at each landing where the lift will be required to stop for loading and unloading. Remember to price in all extra stops on the pricing section of the order form.
- Mark “Park” for storing position, if storage beyond is required.
- At the upper landing, indicate the location of the drive box. (Refer to the Stair-Lift Design and Planning Guide for drive configurations).
- Indicate any variations from a flat, full-height wall (stringer width, mop curve, moulding, windows, offsets in wall, etc.)

The sketch should be neatly hand-drawn, or computer-generated. Easy-to-read sketches ensure that the Stair-Lift is designed to the exact specifications and also speeds up the review and design process.



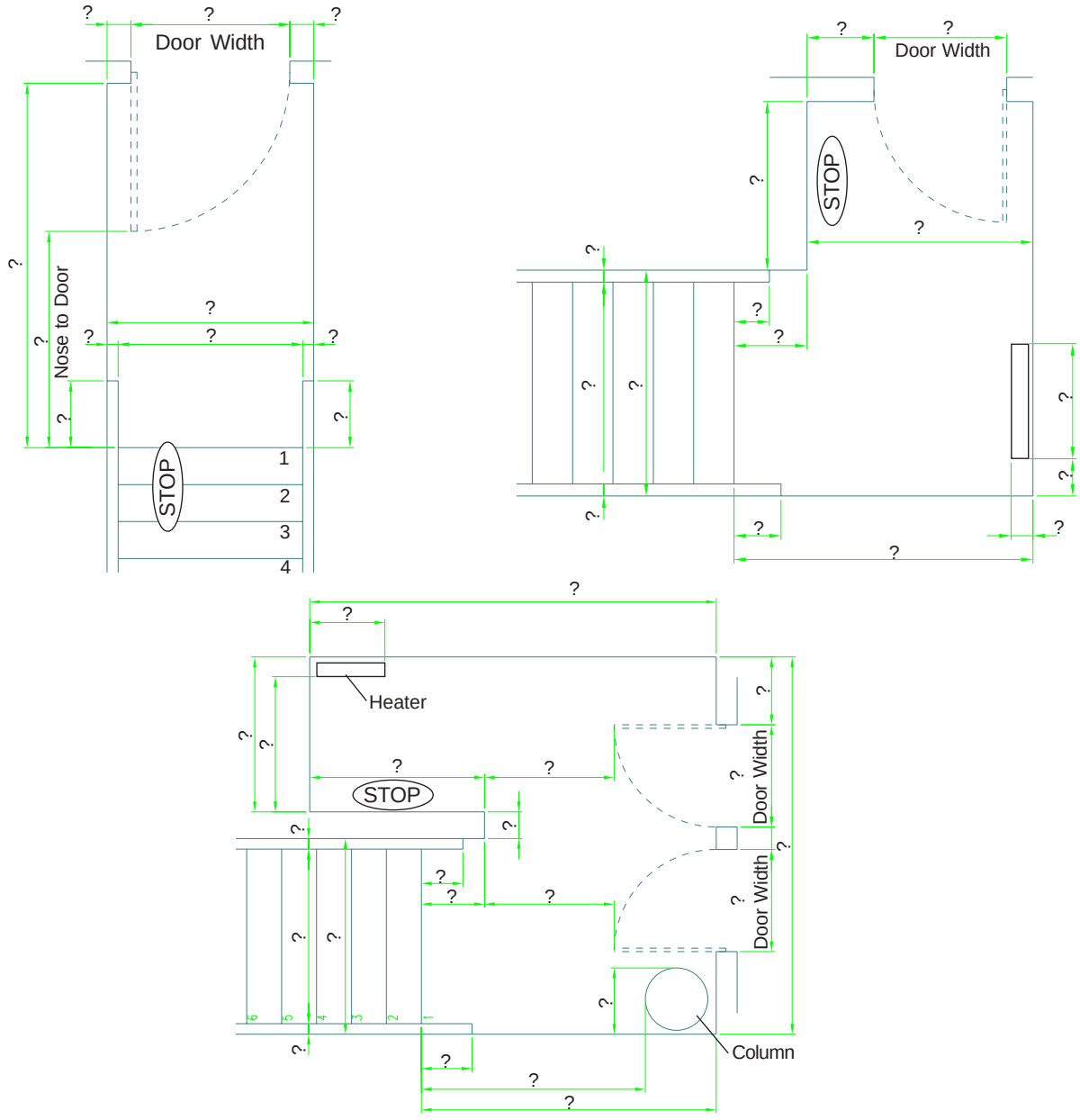
Sample sketch indicating intermediate, upper and lower landings

Metric Measurements

It is very important that the stairway is measured using a metric tape measure (available from Garaventa). When stairs are measured in imperial (feet and inches) and, then converted to metric (millimeters), there is an increased chance of a conversion error. All sketch and order form dimensions submitted to Garaventa must be in millimeters.

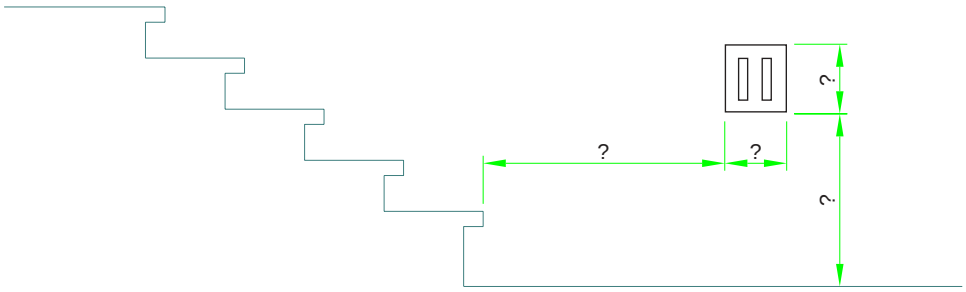
Measuring Lower Landings

- Designate the platform's landing position with a “Stop” and dimension of the landing area and clearance available.



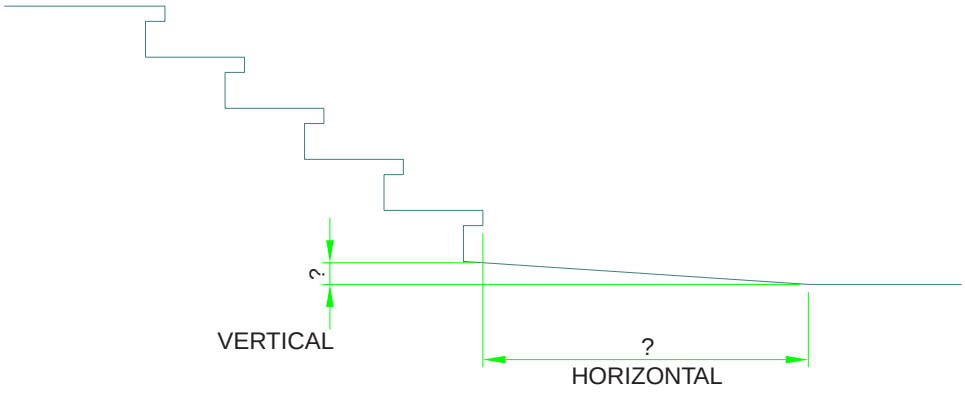
Straight, 90° & 180° Lower Landings

- Detail any obstructions and permanent fixtures such as doorways, heaters, light switches, etc. (See *Permanent Components* section).



How to measure and sketch Permanent Components

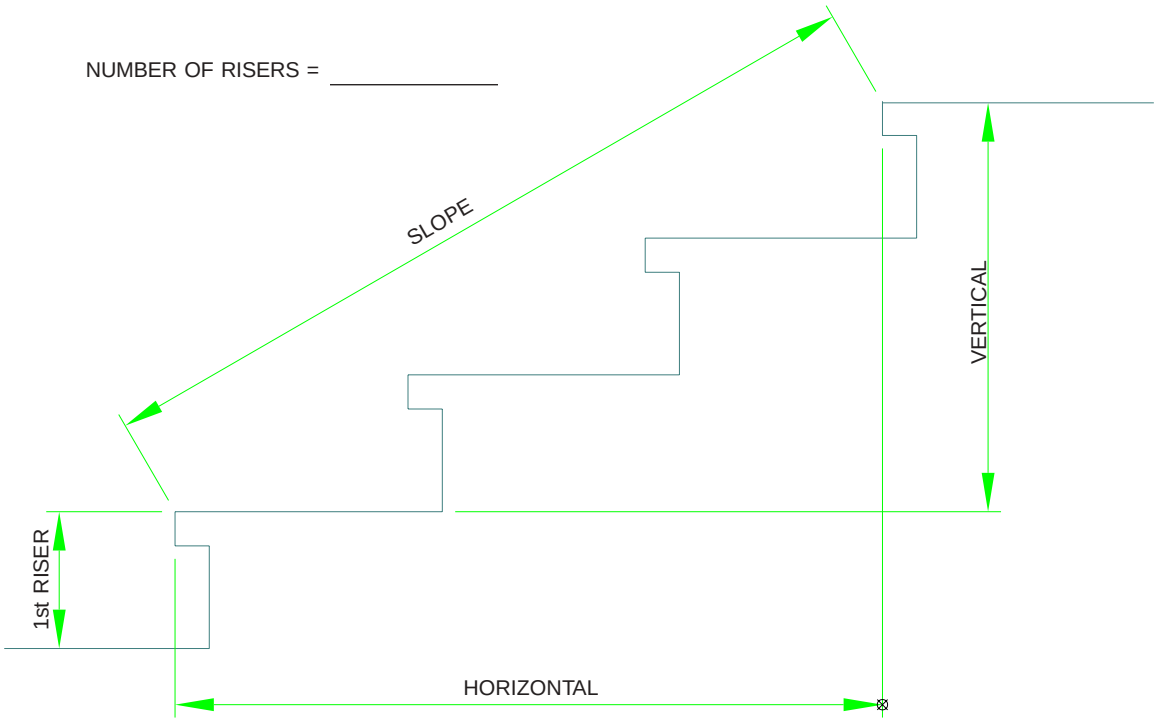
- If landing area slopes, indicate the slope amount and direction on your sketch.



How to measure and sketch sample showing Sloping Landings

Measuring Stairs

To ensure complete stair flight information, the measurement of the first riser height, the vertical, the horizontal and the slope of the stairs must first be determined.

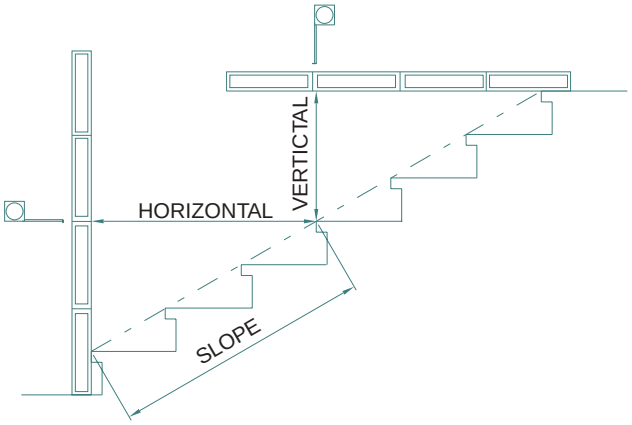


How to measure Stair Flight Information

Note: Vertical, horizontal and slope measurements are taken from the nose of the risers.

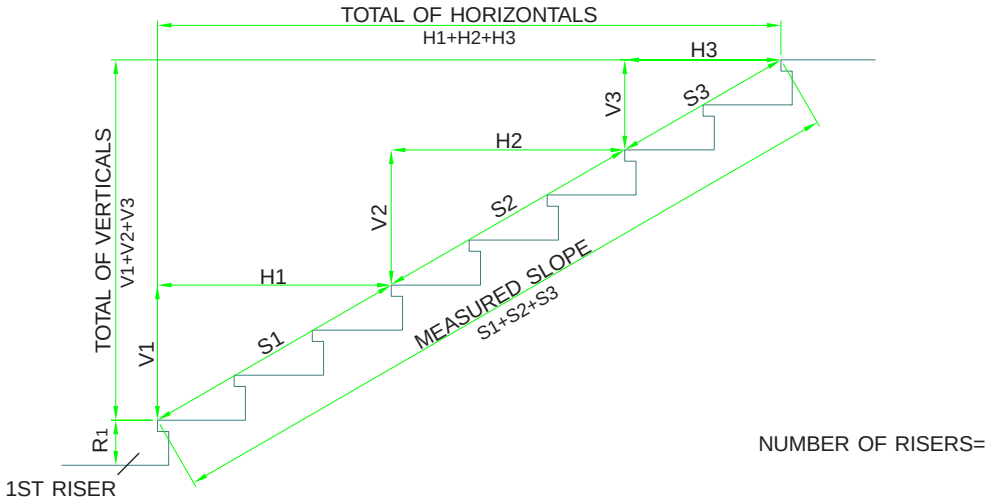
For larger staircases, the stair flight information can be obtained by dividing the staircase into manageable triangles, depending on the length of the measuring level used.

- Mark the first stair nose of each triangle with masking tape, to indicate where one triangle starts and ends.
- To measure the vertical, place one end of the level on the top of the stair nose. With the level positioned straight out horizontally, measure the height from the top of the marked stair nose to the bottom of the level.
- To measure the horizontal, place the level against the lower marked stair nose. When it is plumb, measure from the top of the upper marked stair nose, to the edge of the level.
- To obtain the slope, measure from the lower marked stair nose to the upper marked stair nose to complete the triangle. Check each triangle using the Pythagorean Theorem ($V=\sqrt{S2-H2}$).



Example of Manageable Measuring

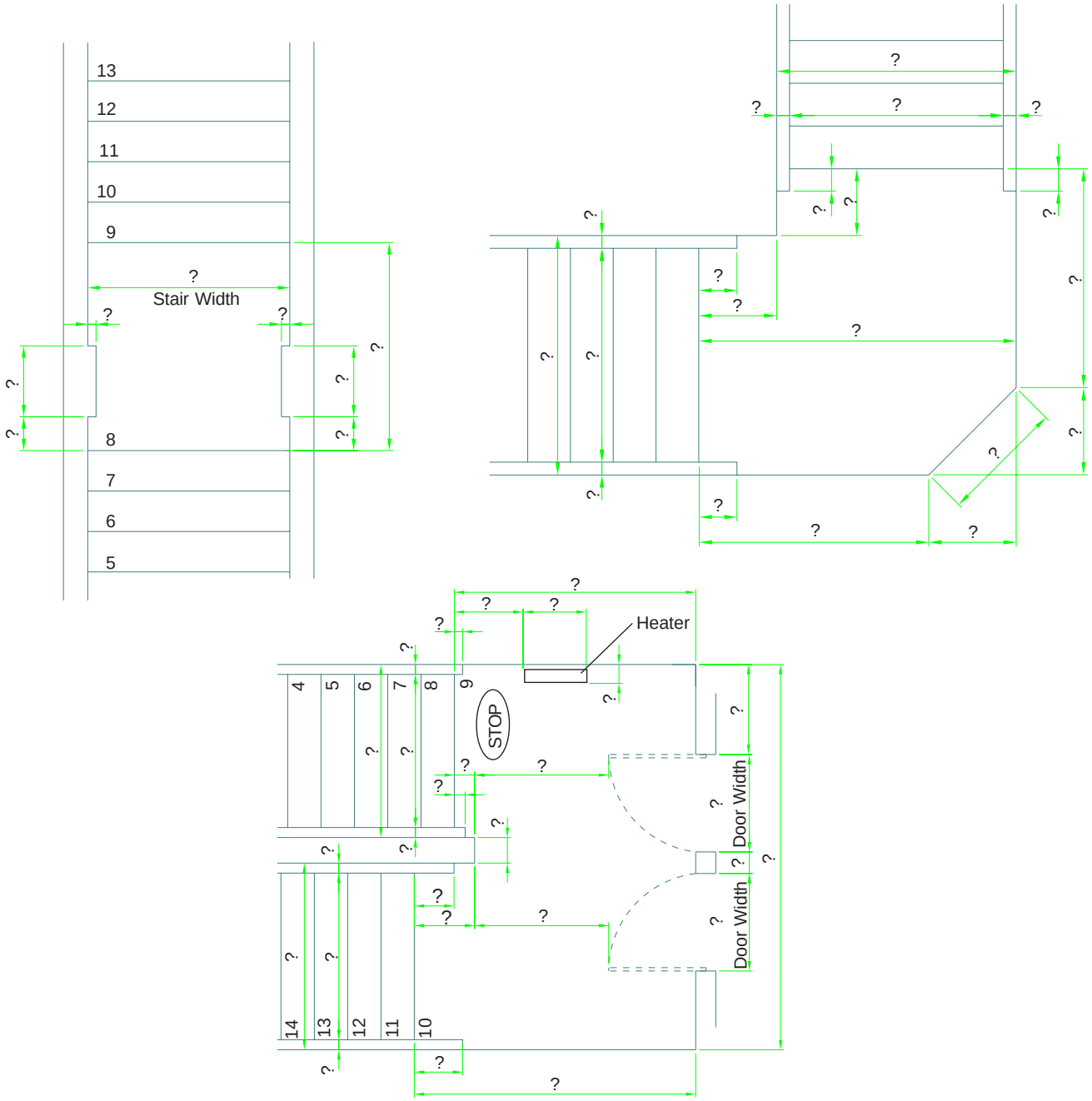
- When all triangles have been measured for that stair flight, add all verticals, horizontals and slopes. As a double check, measure the slope of the entire stair flight and compare to the added slope. Check the total stair measurement using the Pythagorean Theorem ($V=\sqrt{S2-H2}$). When the stair information squares to within +/- 10mm, transfer the dimensions to the Garaventa Order Form.
- Repeat this process for each flight of stairs.



Adding it together for Completed Stair Flight Information

Measuring Intermediate Landings

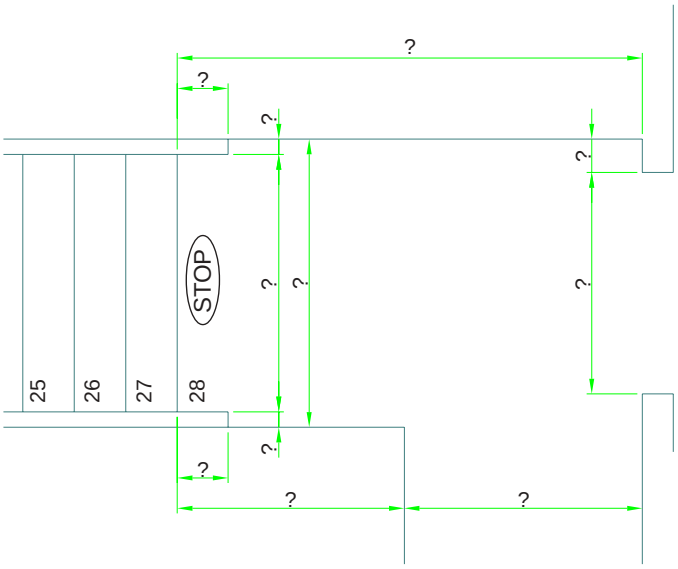
Designate the platform's landing position (if applicable) with a “Stop” and dimension of the landing area and clearance available. Detail any obstructions and permanent fixtures: doorways, heaters, light switches, etc... (see Permanent Components). Be sure to clearly detail the distance from the top of the last flight, to the bottom of the next flight. All components between flights should be drawn and dimensioned on the sketch. If the landing slopes, please indicate by how much and in which direction.



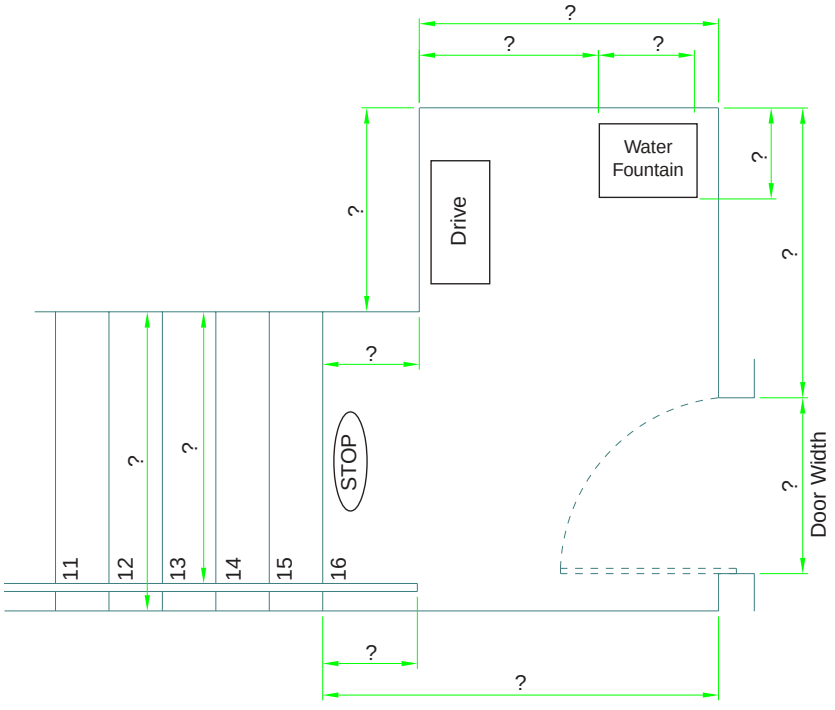
How to measure and sketch a Straight, 90° or 180° Intermediate Landing

Upper Landings

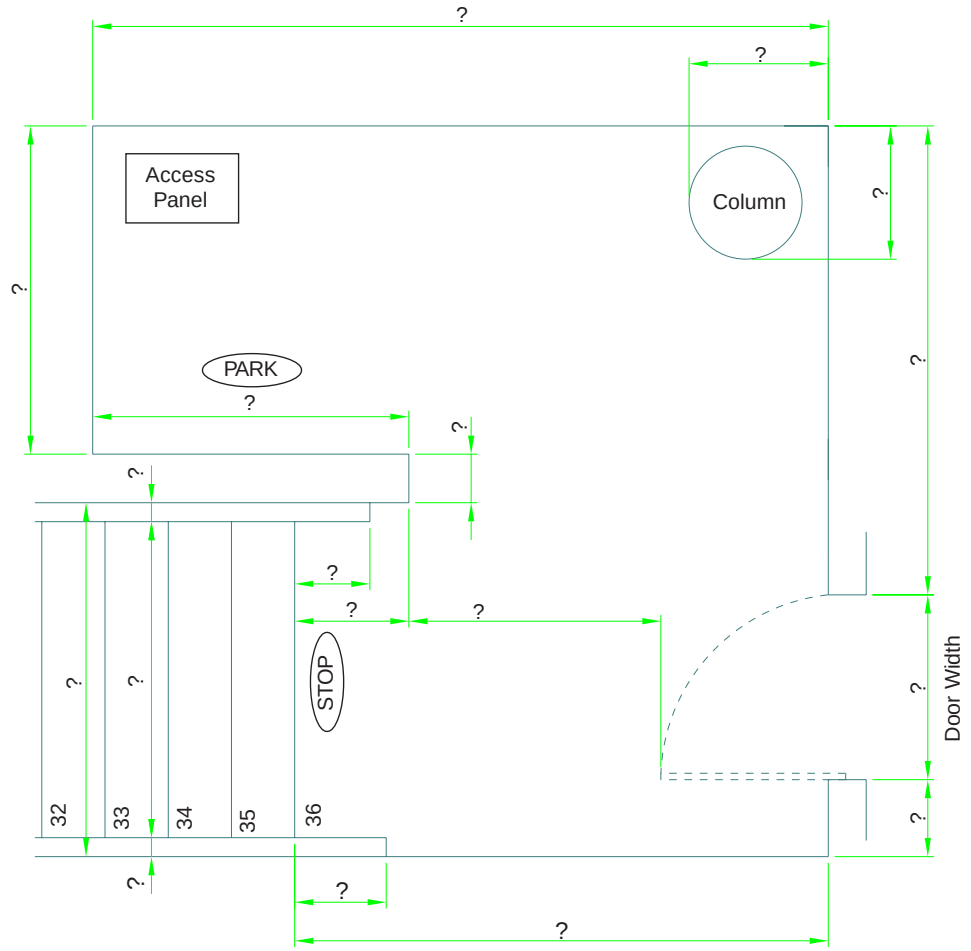
The total clearance available at the upper landing should be measured and then dimensioned on the sketches. The drive box location should also be indicated on the sketches. If storage beyond is required indicate the platforms storage position with “Park”. If the landing is sloping please indicate by how much and in which direction. All permanent components must be clearly drawn on the sketches and dimensioned.



How to measure and sketch a Straight Upper Landing



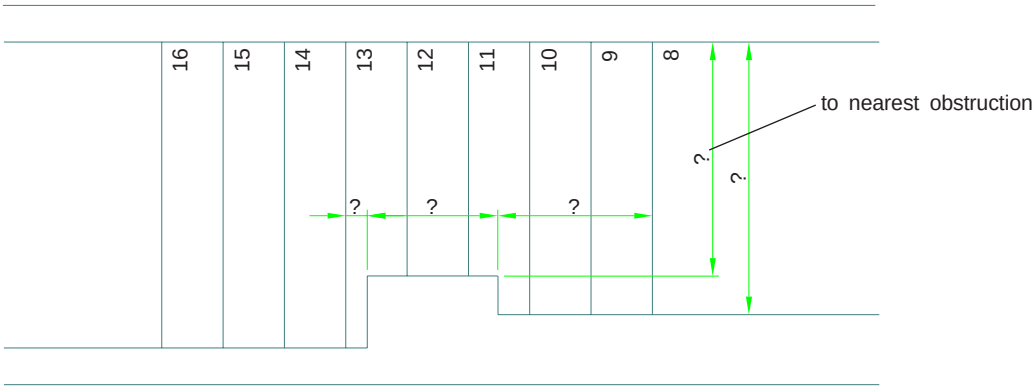
How to measure and sketch a 90° Upper Landing



How to measure and sketch a 180° Upper Landing

Stair Widths

The width of a stairway often determines the size of the platform that can be used. Measure the stair width from the wall or stringer that the lift will be up against to the nearest obstruction on the other side of the stairs (handrail, stringer, wall, etc...).



How to measure and sketch Stair Widths

Permanent Components

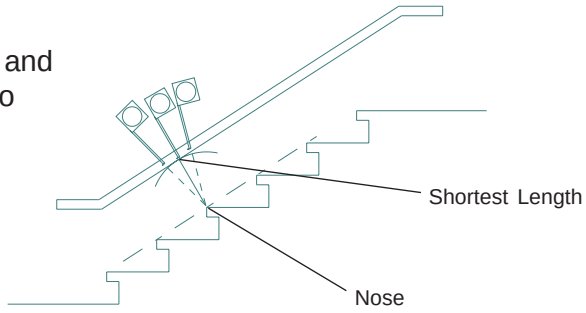
Components that follow the line of the stairs:

There are many components of a stairway that must be taken into consideration when measuring. It is important that the location of any items along the stairway are indicated, dimensioned and detailed on the sketches. These components could include:

- handrails
- wainscots
- baseboard
- moulding
- kick plates
- mop curves
- stringers

All of these components should be measured on the slope of the stairs.

Place the zero end of the measuring tape on a stair nose and extend the tape at an angle approximately perpendicular to the slope of the stairs. Measure the distance from the stair nose to the component by moving the tape measure side to side until you find the shortest length. The tape measure should be at a 90º angle to the slope of the stairs. Repeat this procedure at two other locations along each flight to ensure that it does not vary. If it does vary along the flight, provide all three dimensions and where they were measured.

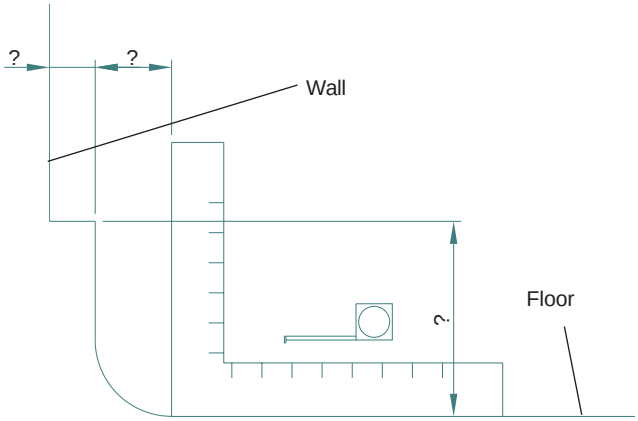


Measuring Permanent Components Along the Stairs

Mop Curves or Sanitary Coves

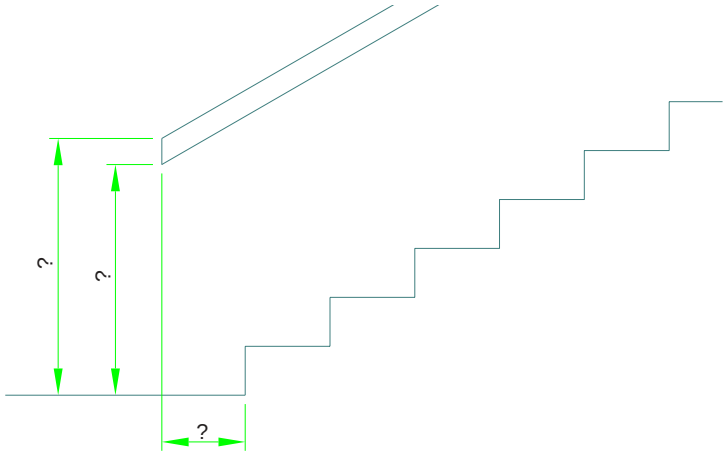
Many buildings have mop curves or sanitary coves built into the baseboards or formed into pre-cast stairs. These must be detailed since they affect the design and /or location of the towers.

- Place a square, level or straight-edge on the level part of the floor or tread.
- Move the square, level or straight-edge towards the wall until it starts to lift off the floor.
- Measure from the square, level or straight-edge to the base of the moulding or the wall.



How to measure and sketch Mop Curves

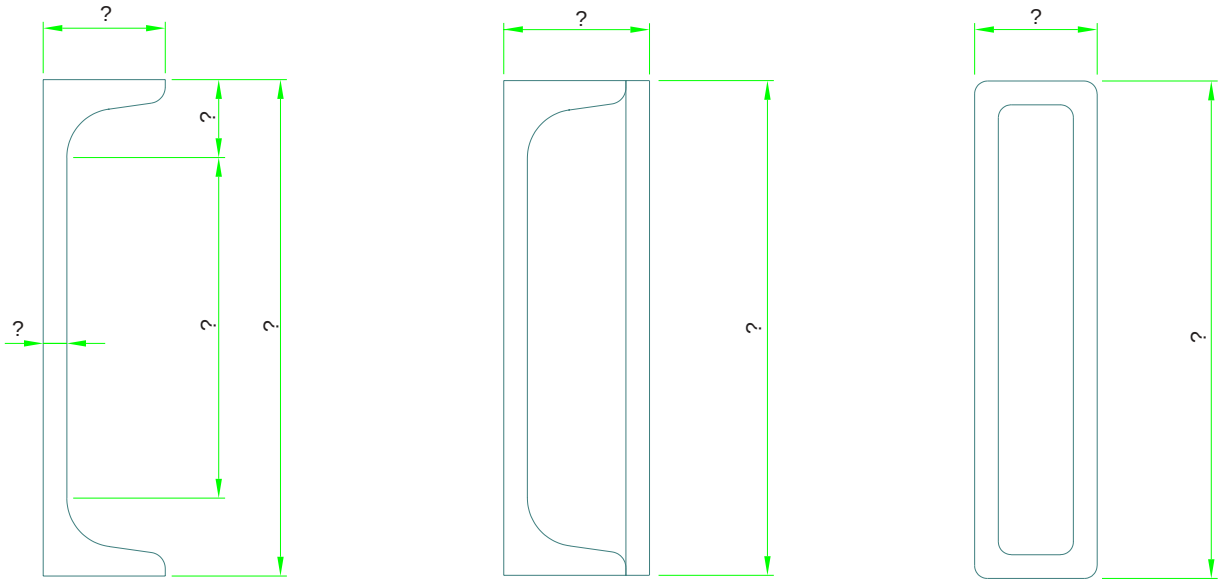
Note: If any of these components continue beyond the top or bottom of the flight, the extension must be dimensioned on the sketches. It is also important to detail their height off of the landing.



How to measure and sketch Permanent Components on the Landings

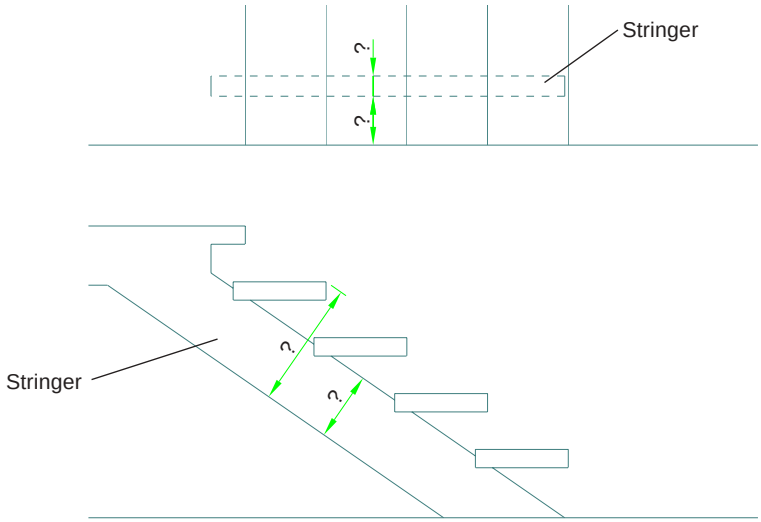
Stringers

If the stair is supported by a steel stringer, it is necessary to detail all of the characteristics of the stringer. If the stringer is a C channel the details would include the width, depth, web and flange thickness. If the stringer is a box shape, first determine if it is a C channel with a plate welded to the side or hollow structural steel (HSS). Generally C channels have very square edges where as HSS have rounded edges. If the stringer is HSS supply the width, the depth and the material thickness if possible. Always measure a channel stringer on the slope as though it were laying flat.



How to measure and sketch Stringer

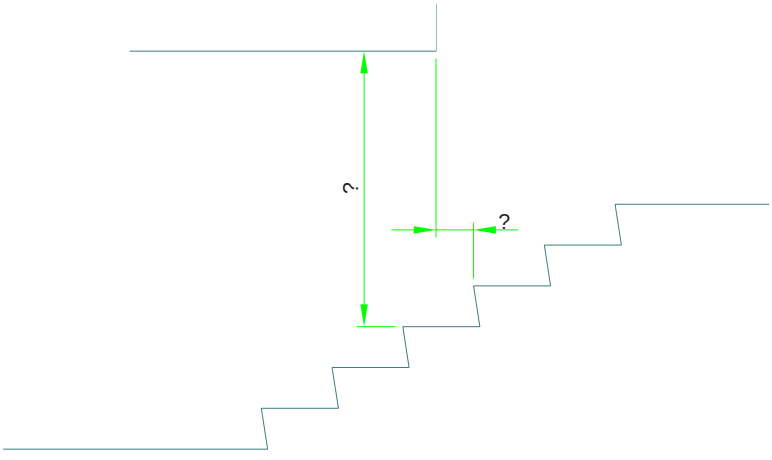
Note: If the stringers are located under the treads, support towers through the core maybe required. Provide location and details of the stringer under the stairs. If the treads are cantilevered, give the distance from the side of the stringer to the side of the tread as well as the stringer details.



How to measure and sketch an Unusual Stringer Arrangement

Overheads

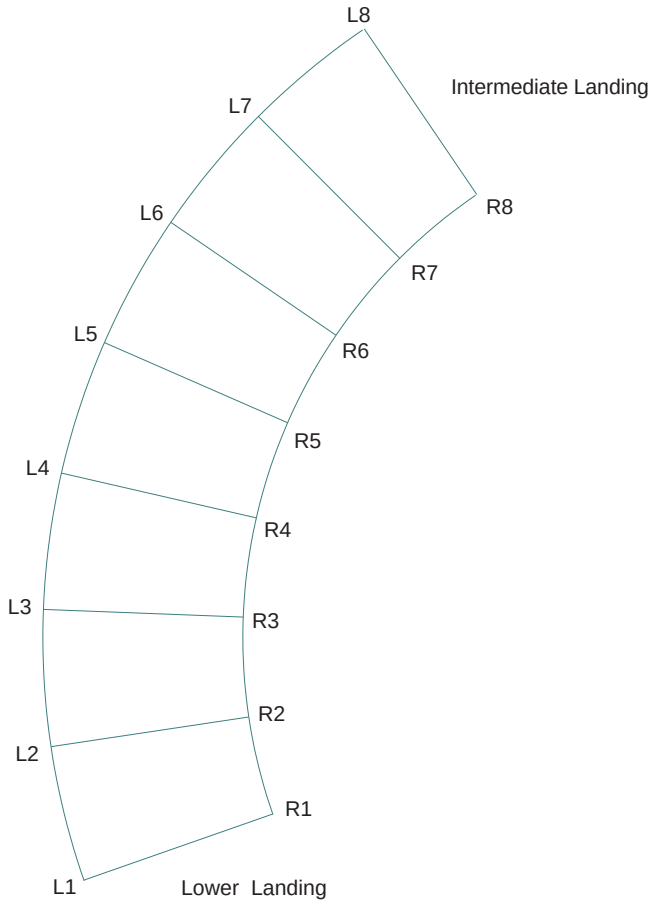
It is very important that the overhead clearances be measured throughout the platform travel. The overhead clearance may determine the options and the platform size that can be used. When measuring the overhead clearance it is very important to measure the vertical dimension as well as horizontally locating it to a corresponding stair nose. If the overhead clearance is over 3000mm the overhead need not be detailed on the order form; all that is required is to indicate 3000mm+ on the order form, to verify that the overhead clearance has been considered.



How to measure and sketch Dimensioning Overheads

Curving or Spiral Stairways

Measuring a curving or spiral staircase is very different from measuring a straight stairway. Before begining to measure, draw a sketch of the stairway and label the stairs starting at the bottom with L1 for the first riser on the left side and R1 for the first riser on the right side. Continue labelling the risers up R2, L2, R3, L3 etc. Please see the example drawing below.



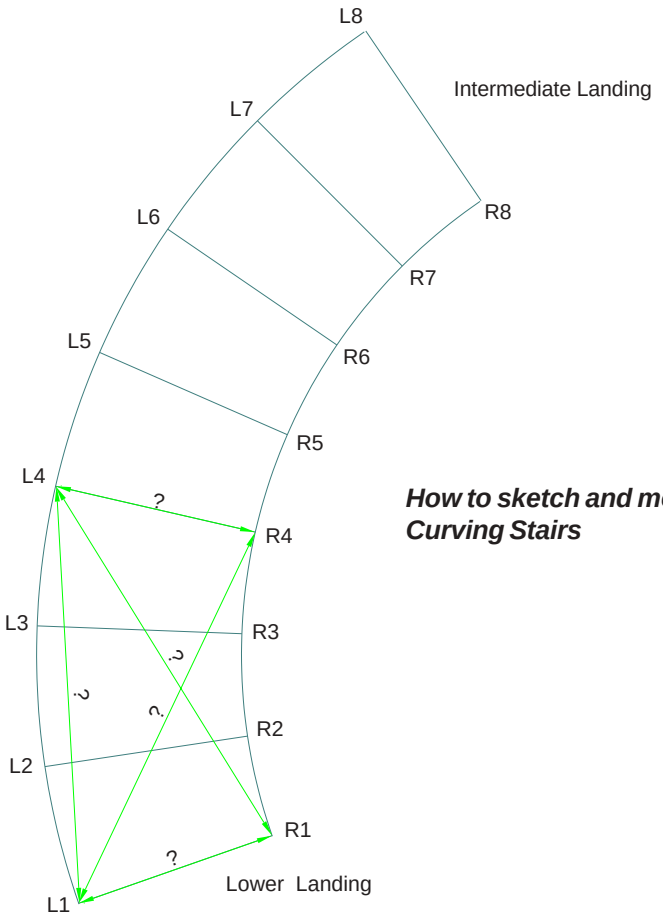
How to sketch and label Curved Stairs

- Measure the total vertical height of the stairs, from the bottom landing to the top landing.
- Measure the diameter, radius, or thickness of the inside core of the stairway (if possible).
- Measure the width of the stairway, along the nose of the treads for each tread, from the inside core of the stairway to the outside edge. (eg. L1 to L2, R1 to R2 etc.)
- When measuring the length of the slope, have someone hold the measuring tape at the bottom tread, while placing the other end at the top tread. The Stair Lift model (GSL-1 or GSL-3) must be considered when measuring this type of stairway. If the GSL-1 is to be used, measure your slope on the inside core of the stairway. The GSL-3 should be measured on the outside core of the stairway. Always indicate where on the stairs you took this measurement.

- Using a plumb bob, begin with the bottom tread and measure triangles around the staircase. Your base line for each triangle will be the width of the tread. You will measure various different types of triangles for each tread until you have finished the stairway. The example below indicates how the triangles are measured.

Note: the key to measuring curved or spiral staircases is to measure triangles across the horizontal plane.

In this example, the fourth tread nose is being measured. Your starting point is the first tread (L1 to R1). Remember, measurements must be taken horizontally.



How to sketch and measure Curving Stairs

- Using a plumb bob, start at L1 and measure to R4 .This is the furthest point you can reach along a straight line, on the opposite side of the stairway.
- Measure horizontally along the width of the tread (R4 to L4). This completes your first triangle: L1 to L4 to R1 and back to L1.
- For the second triangle, move the plumb bob to R1 and measure from L1 to L4. This is the furthest point you can reach along a straight line, on the opposite side of the stairway. This completes the second triangle: L1 to L4 to R4 and back to L1.
- Continue this process until you have reached the top of the stairway.

When measuring spiral staircases there are several other measurments required:

- The following sketch includes the other triangles that must be measured. This continues until the entire stairway has been completed.
- A chart can be made to insert the information.

Tread Widths

L1 to R1 = _____

L2 to R2 = _____

L3 to R3 = _____

Etc.

Tread Depth

L1 to L2 = _____

L2 to L3 = _____

L3 to L4 = _____

Etc.

Cross Lengths

L1 to R2 = _____ R1 to L2 = _____

L2 to R3 = _____ R1 to L3 = _____

L3 to R4 = _____ R1 to L4 = _____

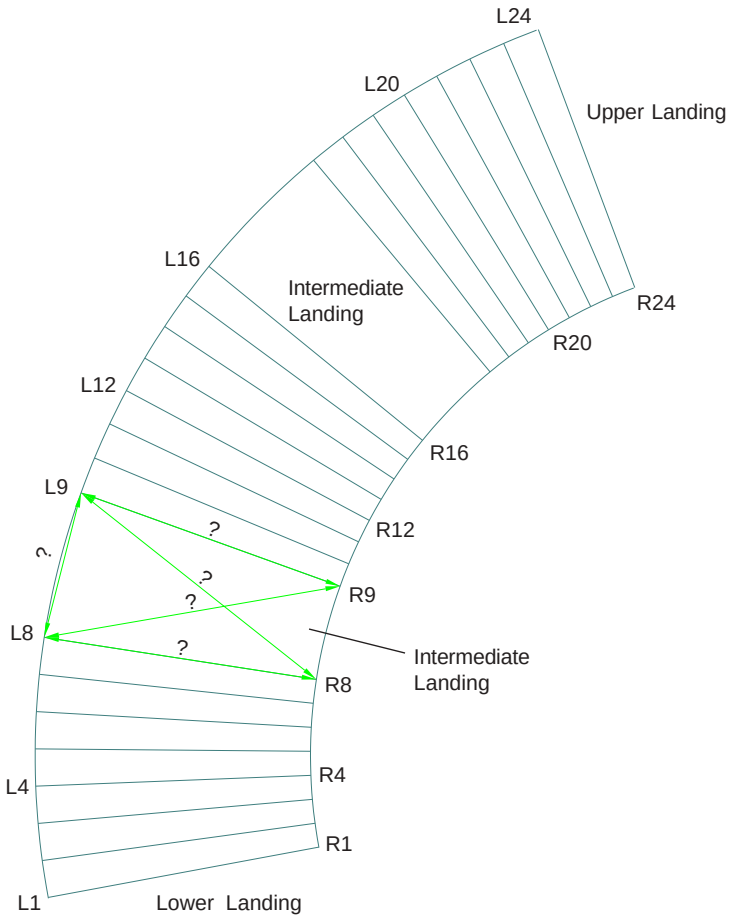
Etc. Etc.

Tread Depth

R1 to R2 = _____

R2 to R3 = _____

R3 to R4 = _____



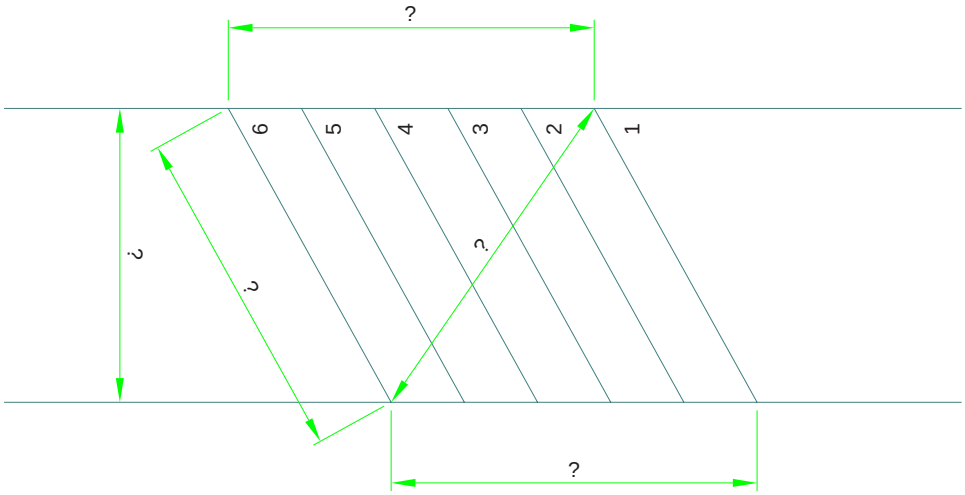
How to sketch and measure the Landings of Curving Stairs

- If the stairway is too wide to reach across easily, lay a piece of string up along the flight and use this as a point of reference.
- If the stair treads are curved, place a piece of string across the tread nose as the base line. In this case, it is necessary to measure the curve of the stair nose as well. Measure from the center of the string line at 90°, back to the stair nose (shortest distance on tape measurement).
- After measuring the triangles on the stairway, then measure the triangles at the lower, upper and intermediate (if applicable) landings. Once again, start at the base line and draw triangles to each corner. These measurements will determine the landing clearance.

Unusual Stairways

Stairs are typically built at right angles to the wall, with treads parallel to one another. If this is not the case, the stairs must be measured differently:

- Measure the horizontal, vertical and slope along the side of the stairs that the lift will be mounted on.
- Make a triangle using the tread length, the flight horizontal and a horizontal measurement from the opposite side of the stairs at the top nose, to the first nose of the lift side.



How to measure and sketch unusual stairs

To Be Built Stairs

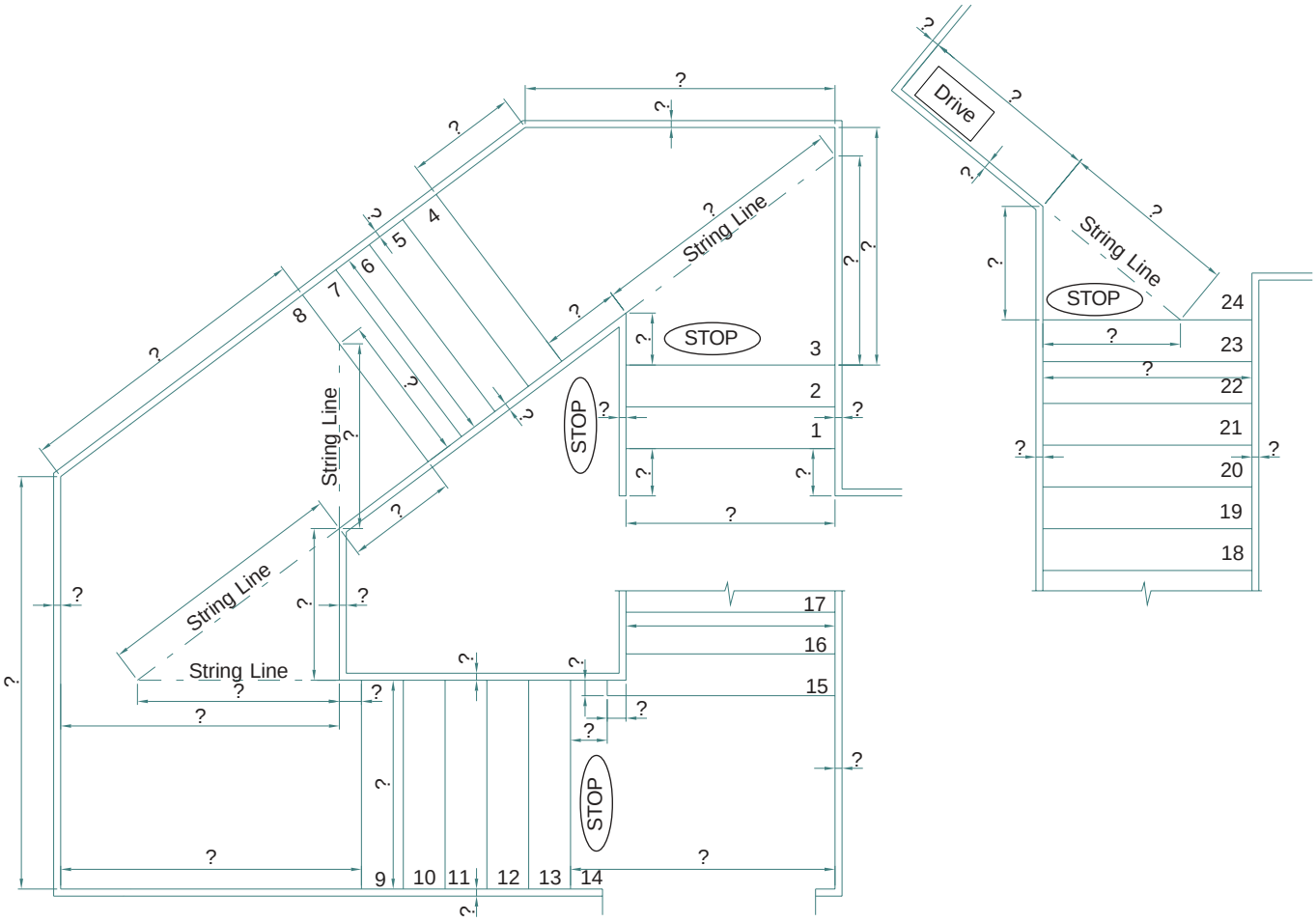
Garaventa strongly recommends that the stairs be existing and that they be measured before the lift is designed. However, this is not always possible. If the lift must be ordered before the stairs are built, please take the following steps:

- Obtain architectural and/or stair fabrication drawings that include all stairway details. Review the drawings for general lift configuration and feasibility, sufficient stair widths, landing clearances, drive location, etc.
- When submitting the order to Garaventa, your package should include a fully completed order form, including stair details and flight dimensions copied from the architectural and stair fabrication drawings. Details on the finishing of the stairs and walls must also be included.
- It is suggested that a written confirmation from the customer be obtained, stating that the stairs will be built exactly as the drawings indicate. Should the stairs not reflect the drawings after they are built, the customer takes responsibility for the repercussions.

In certain cases the walls may require additional strengthening to support the lift. When this is required, support post (wood 4” x 6” or 3” x 3” x ¼” HSS steel) locations can be supplied by the Garaventa Design Team. In order for these locations to be supplied, a Garaventa Designer must design the entire lift. Therefore, the same amount of information is required as for a regular order. It is strongly recommended position of the posts be verified after they are installed by the Contractor, along with stair dimensions and details. Should alterations be required due to final post positioning, stair dimensions or details, additional engineering charges will be applied.

Finished Drawings

Once all stair measurements and details have been collected from the site, a finished drawing should be created. This drawing should be a legible and concise sketch of the staircase. It should also include all the details that have been collected. This sketch is submitted with the Garaventa Order Form, so that a Garaventa Designer is able to design the lift. Therefore, if a sketch is difficult to read, or incomplete, the designer will not be able to finish the shop drawings, this will add to the turn around time, possibly delaying the order.



Sample sketch of finished drawing

Order Forms

Garaventa Order Forms for the GSL-1 & GSL-3 are specifically designed to document critical information. Garaventa requires accurate information to produce a lift that will install and operate to the customers satisfaction. The required details on the order forms include customer information, staircase construction and dimensions, requested lift configuration and pricing. The order forms should be filled out completely and clearly to prevent confusion and possible return trips to the job site.

Photographs

Photographs are required to assist in the design of the Stair-Lift. It helps the Garaventa Design Technicians gain a better understanding of the complexities of the stairway. This is a vital part of ensuring that the Stair-Lift is the best possible design for the stairway.

When taking the photographs, the photographer should consider themselves the eyes of the designer, try to include as many details as possible to convey the total layout of the site.

For the lower and upper landings two photographs should be taken.

It is suggested that two photographs be taken per set of stairs, one looking up and one looking down. The pictures should show all of the risers, so the Designer can count them as a double check. If the flight is too long to get in one picture, place an object half way up the stairs and take the picture showing from the bottom of the stairs to the object. Then take a picture from the object to the top of the stairs. This way the designer can count to the object in one photograph and continue counting in the other picture.

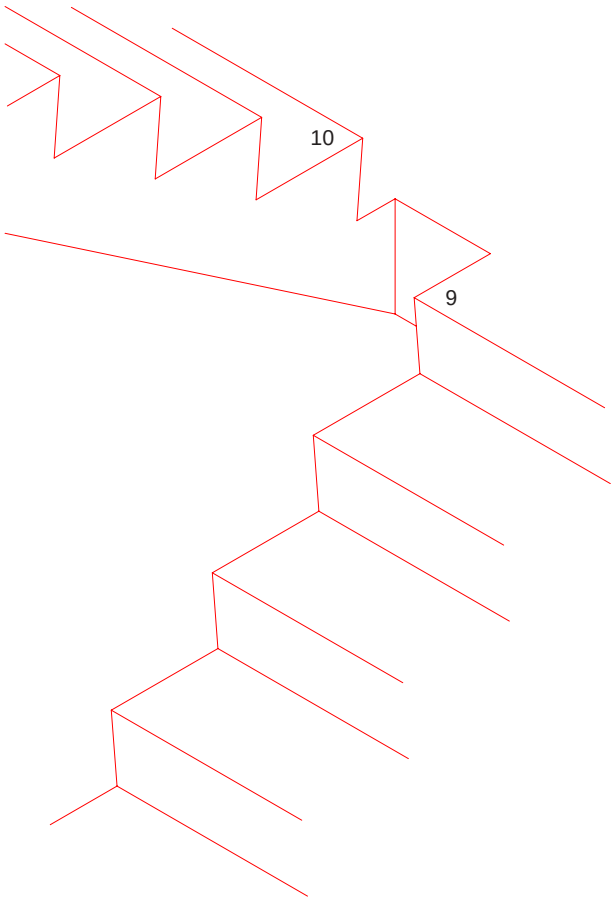
Three photographs are recommended for each intermediate landing. One taken from each side of the landing and one taken on the end.

The photographs should show any abnormalities in the wall or stairway, such as wall offsets, radiators, doors, windows, etc.

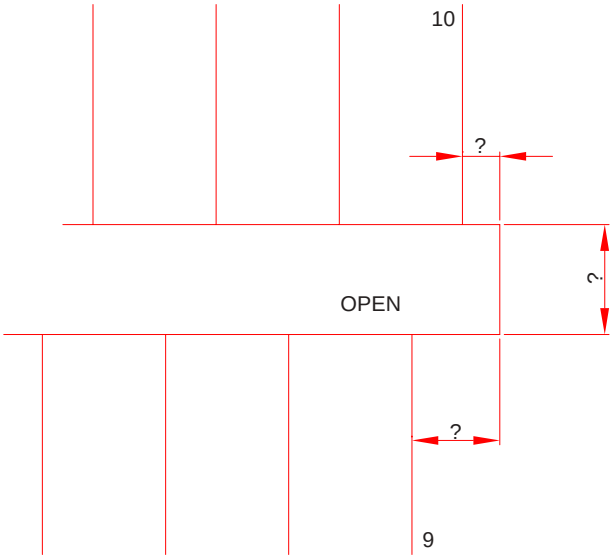
If the overhead clearance is restricted please include a photograph showing the location of the obstruction.

When sending in the photographs remember to write on the back of the print the job name and a picture number. Always keep a copy of the photographs for the file. The same picture reference numbers should be used on both sets of photographs. This allows for easy referencing during telephone conversations or other communications.

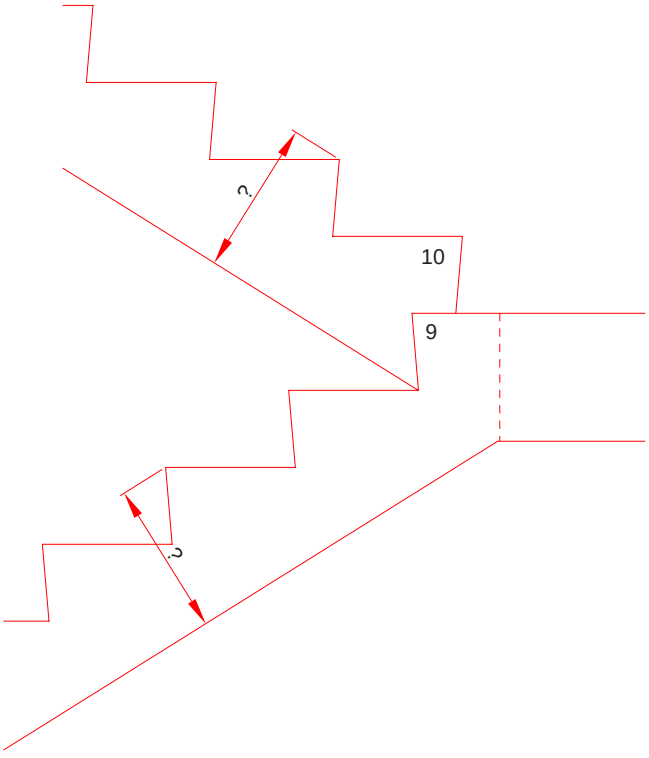
Example of a Turnback 180° with no wall



Required dimensions and sketches for a 180° turnback with no wall

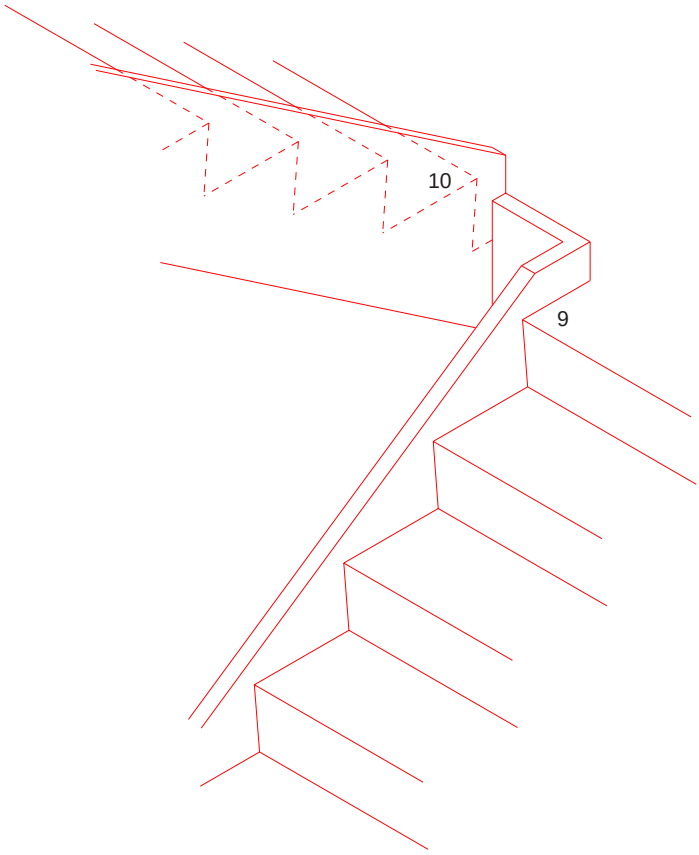


PLAN VIEW

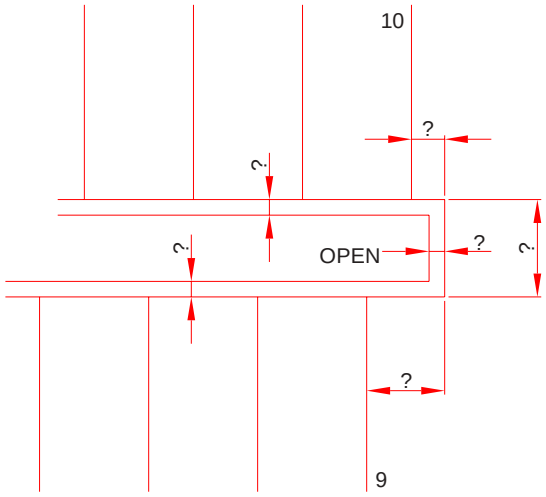


ELEVATION VIEW

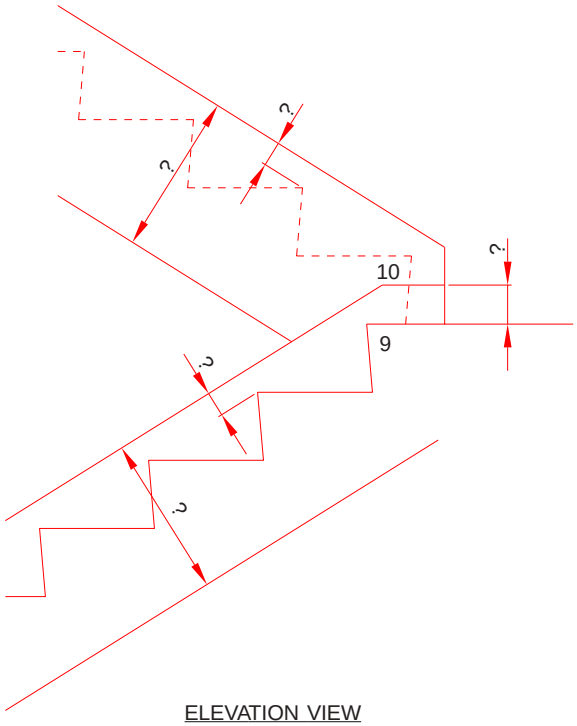
Example Turnback 180° with Stringer



Required dimensions and sketches for a 180° turnback with stringer

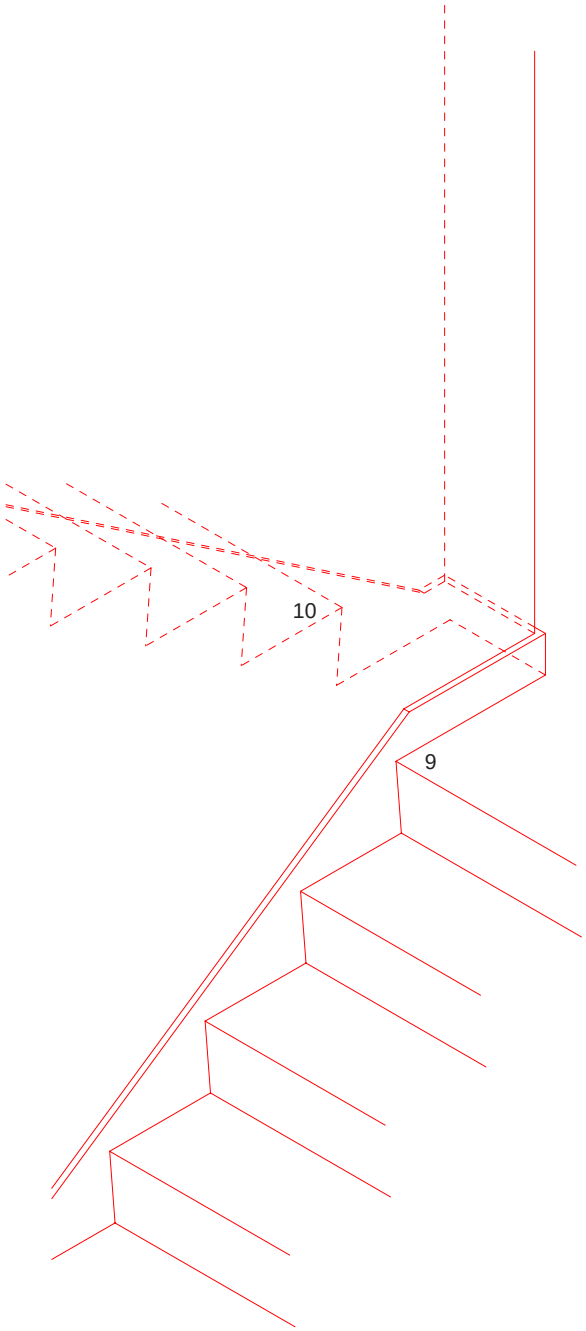


PLAN VIEW

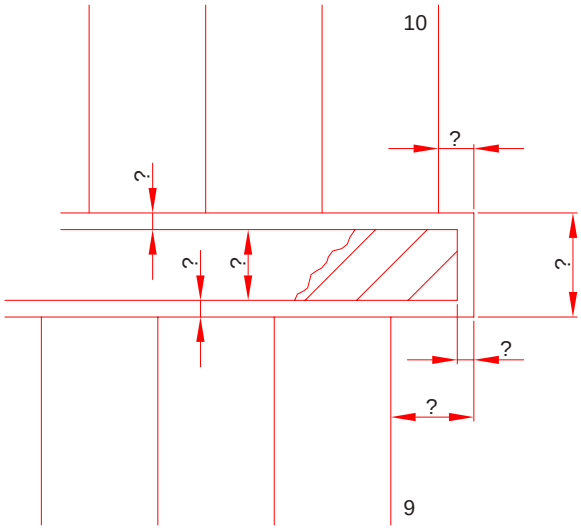


ELEVATION VIEW

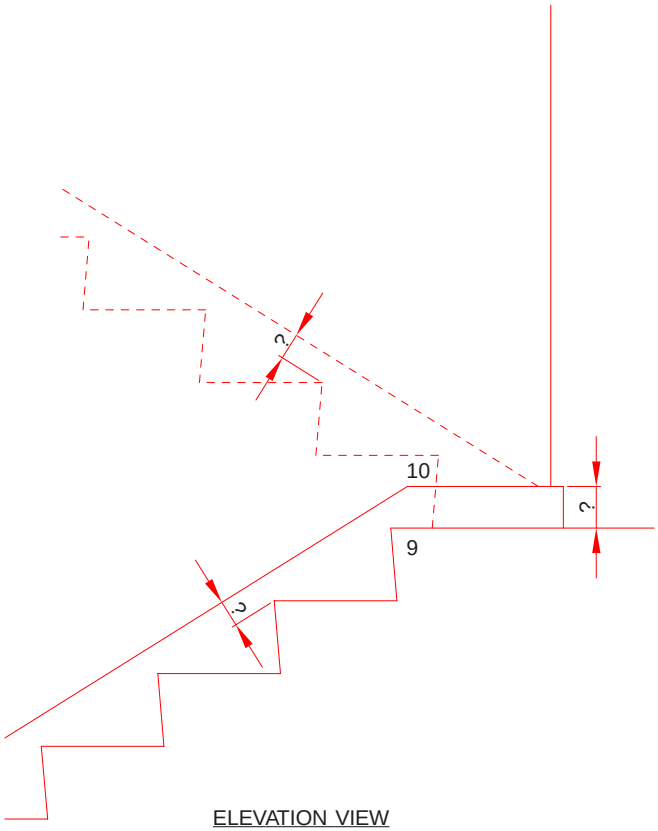
Example Turnback 180° with wall and moulding



Required dimensions and sketches for a 180° turnback with wall and moulding

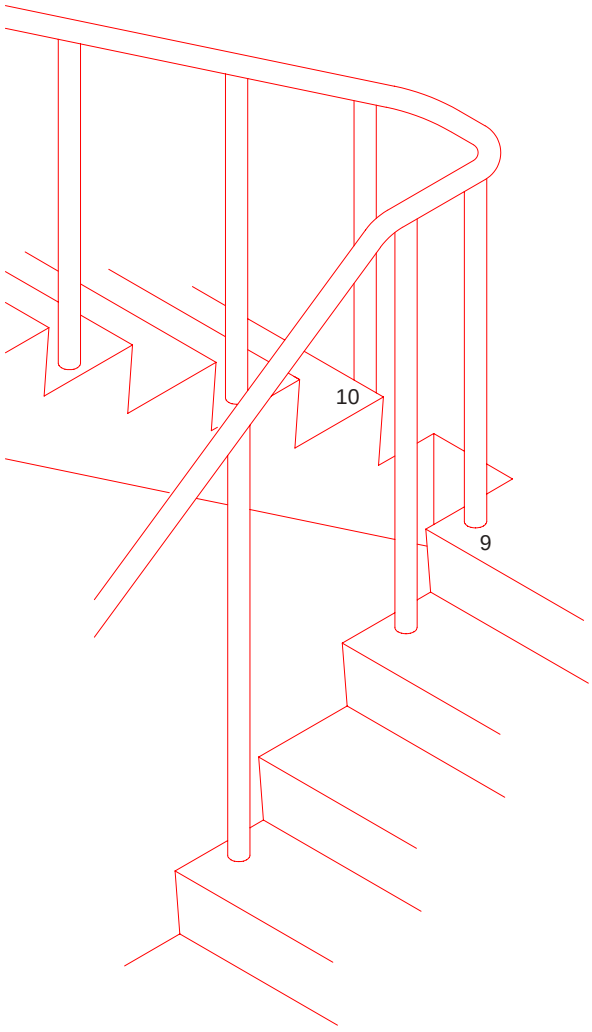


PLAN VIEW

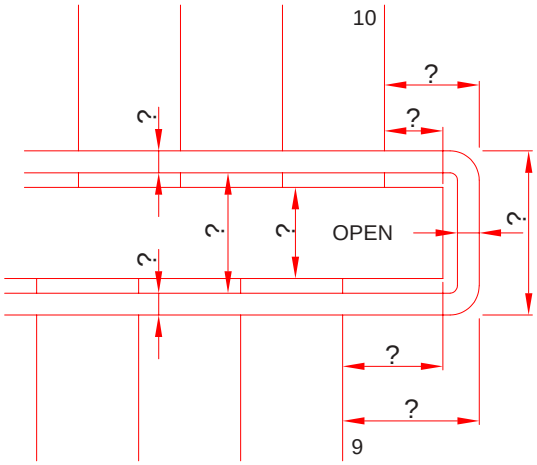


ELEVATION VIEW

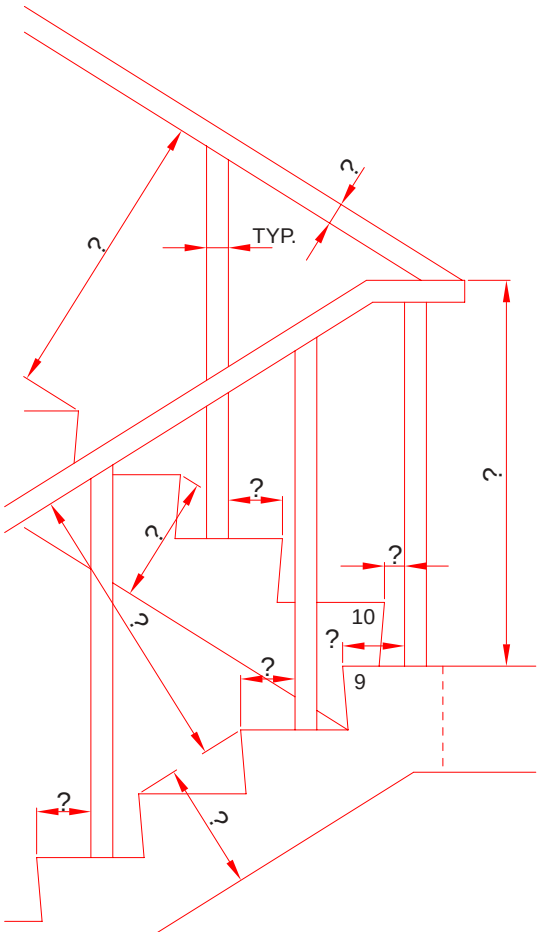
Example Turnback 180° with open core and handrail



Required dimensions and sketches for a 180° with open core and handrail

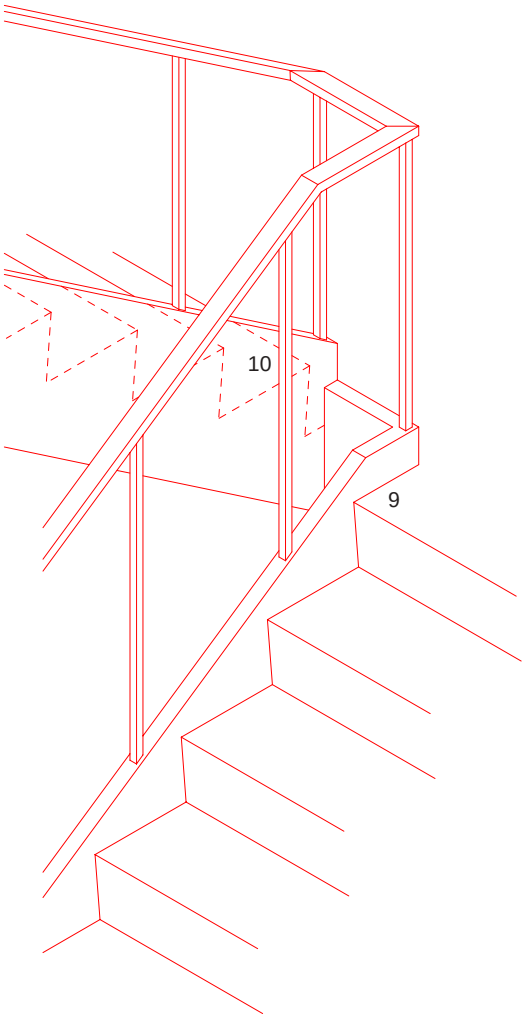


PLAN VIEW

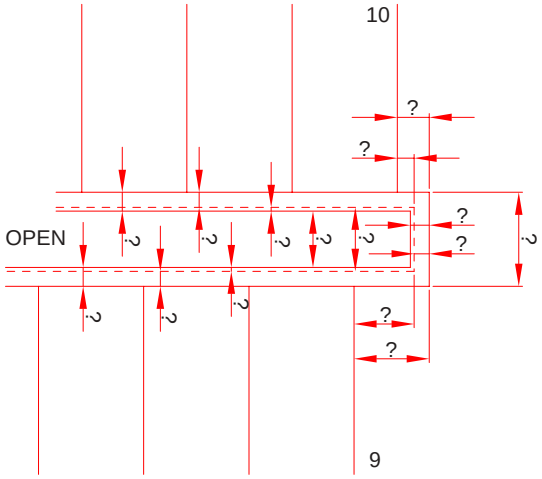


ELEVATION VIEW

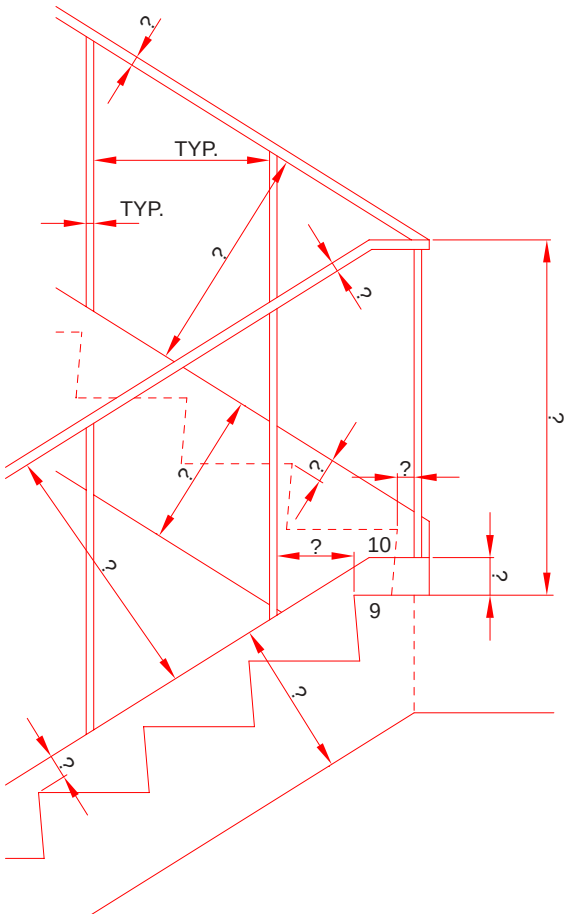
Example Turnback 180° with open core with stringer and handrail



Required dimensions and sketches for a 180° with open core with stringer and handrail

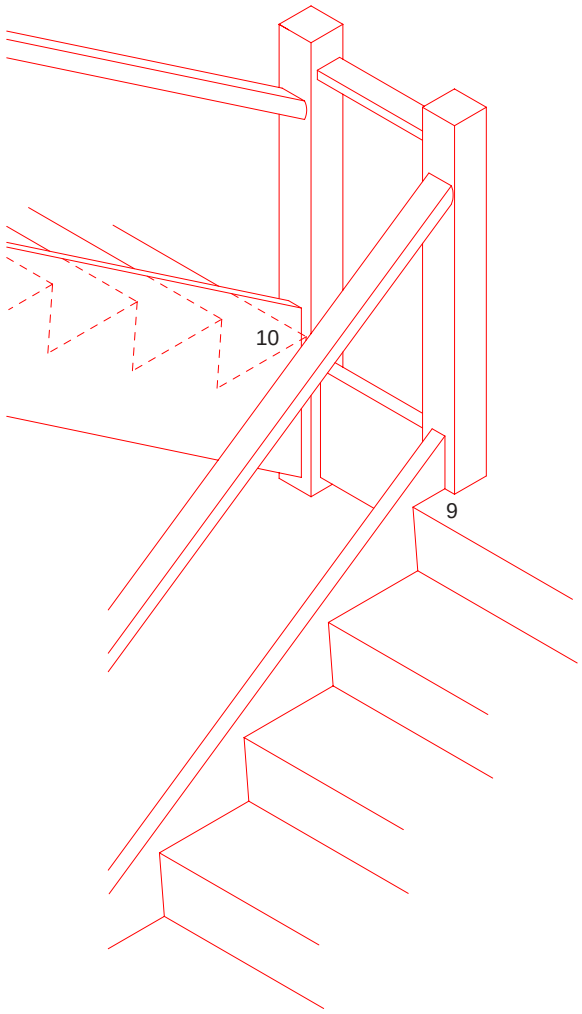


PLAN VIEW

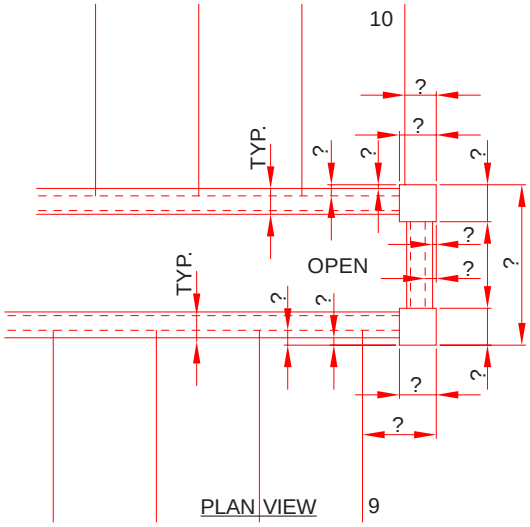


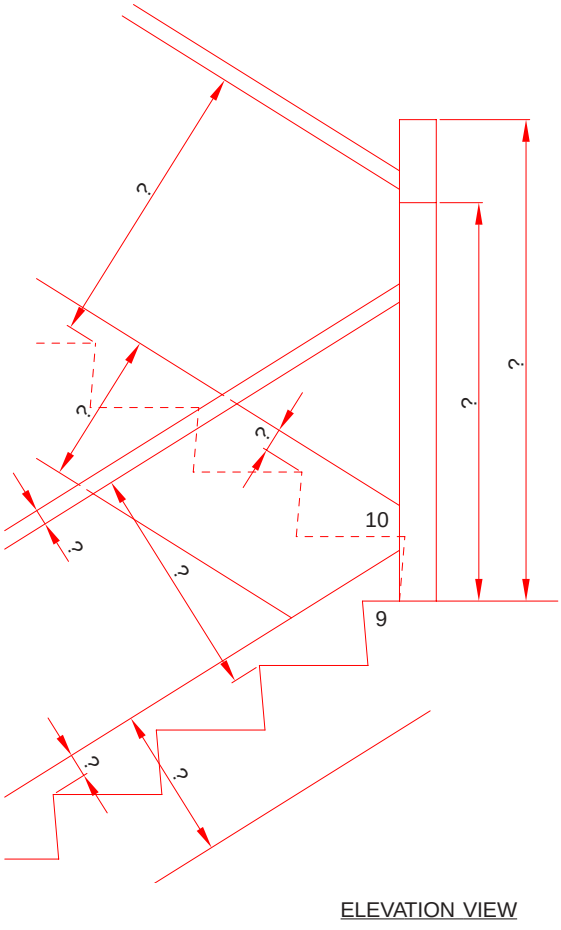
ELEVATION VIEW

Example Turnback 180° with open core with stringer, handrails and posts

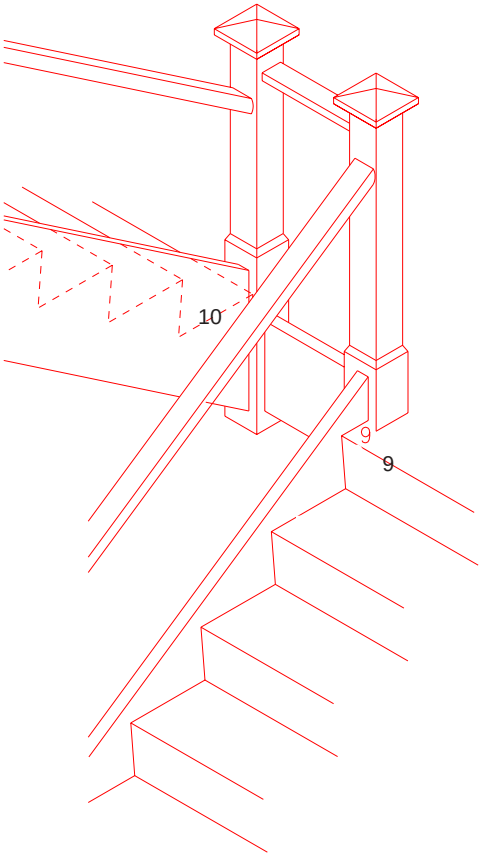


Required dimensions and sketches for a 180° with open core with stringer, handrails and posts

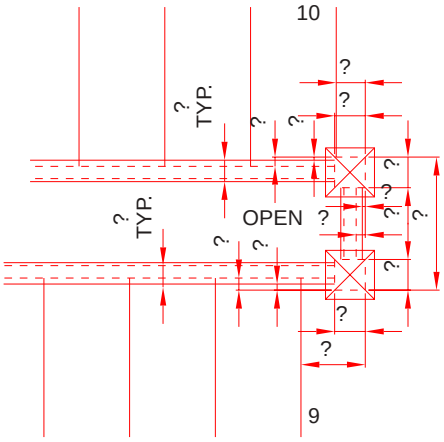




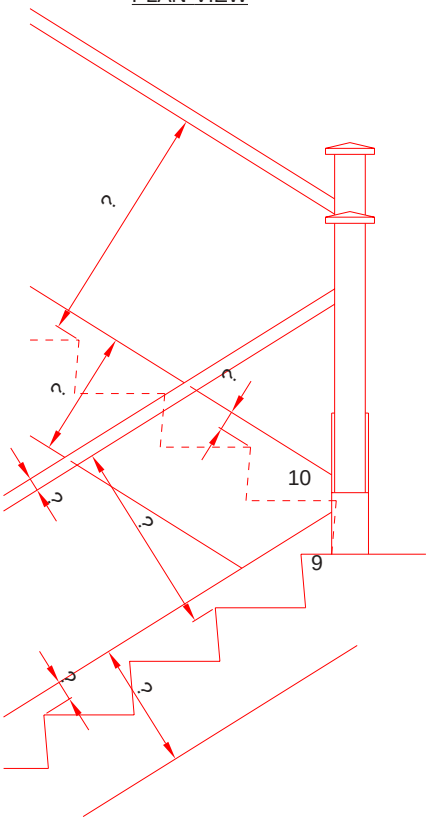
Example Turnback 180° open core with stringer, handrail and post with caps



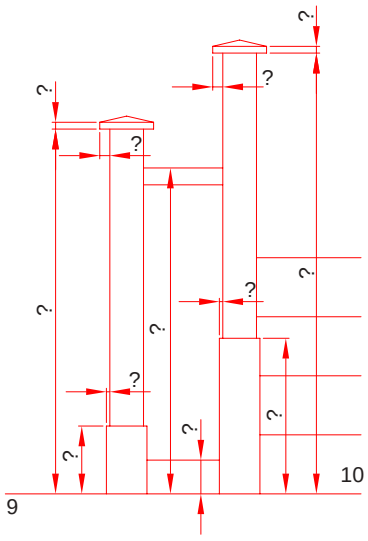
Required dimensions and sketches for a 180° open core with stringer, handrail and post with caps



PLAN VIEW



ELEVATION VIEW



SIDE VIEW

Glossary

Brick :	Fired clay, of solid construction (Varies)
Cinder Block:	Black cinder construction (Weak)
Clay Tile:	Fired clay, hollow core construction (Weak)
Concrete Masonry:	Concrete block, can be hollow or filled (Strong), also refered to as CMU construction
Kickplate:	A solid barrier above a landing
Mop Curves or boards:	A sanitary curve where the floor or treads meet a wall
Moulding:	A trim finish usually made of wood
Newel Post:	Post at the top or bottom of a staircase rail
Nose:	Outer point where riser and tread meet
Pickets:	Vertical spindles between stringer and handrail
Plumb bob:	Plumb line
Riser:	The vertical portion of a step
Stringer:	A structural member that supports the treads of the stair (usually located at either end of the treads)
Skirting:	Same as mop curve or moulding, although always located at the base of the wall
Terrazzo:	Hard finish of concrete and stone (if solid strong)
Tread:	Upper surface of a stair, where your foot would be placed
Wainscot:	Wooden paneling half way up wall