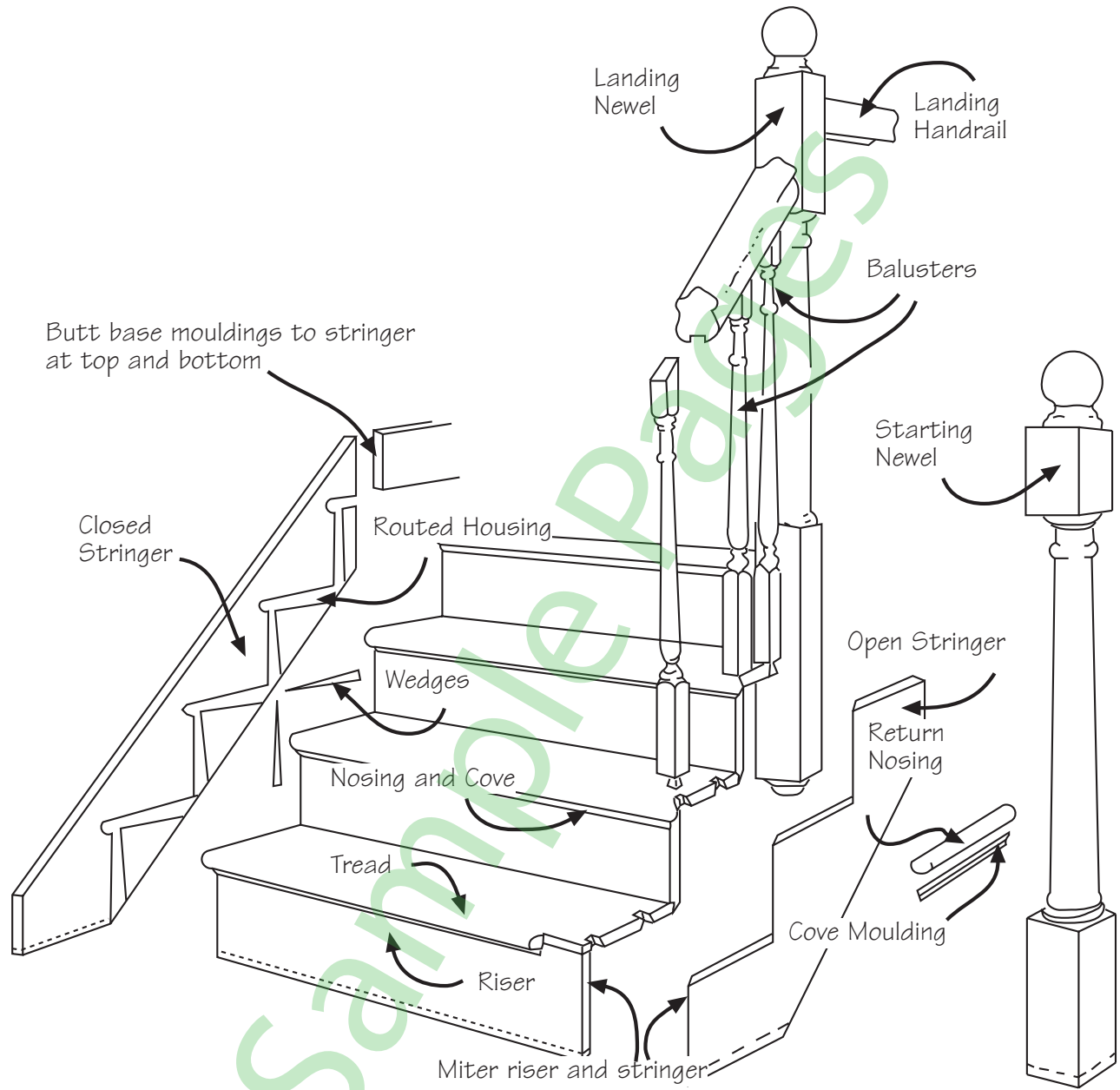




**Stairwork & Rails**  
**Section 800**



800

Stair Parts - Figure 800-01





## General Criteria

### 800-G-1

#### Scope

Includes:

Interior stair stringers, treads, nosing, risers, starting steps, handrails, rail fittings, balusters, newel posts, and related trims.

Rails used on corridor walls and guard rails at glass openings.

Excludes:

Rough horses, structural wood framing or timbers, metal handrail brackets, metal safety nosing, flooring, and priming or painting.

Commodity stair parts purchased directly without the benefit of selection and production under AWI Quality Standards.

Exterior stairs or rails.

### 800-G-2

#### Specification Requirements

##### GRADE MUST BE SPECIFIED

These standards provide for three grades: Premium, Custom, and Economy.

##### Premium Grade

The Grade specified when the highest degree of control over the quality of workmanship, materials, installation, and execution of the design intent is required. Usually reserved for special projects, or feature areas within a project.

##### Custom Grade

The Grade specified for most conventional architectural woodwork. This grade provides a well-defined degree of control over the quality of workmanship, materials, and installation of a project. The vast majority of all work produced is Custom Grade.

##### Economy Grade

The Grade which defines the minimum expectation of quality, workmanship, materials, and installation within the scope of the Standards.

##### Prevailing Grade

When the Quality Standards are referenced as a part of the contract documents and no Grade is specified, Custom Grade standards shall prevail. In the absence of specifications, material shall be mill option lumber or veneers suitable for opaque finish.

### 800-G-3

#### Smoothness of Flat, Moulded and Turned Surfaces

The smoothness of surfaces which have been machined, planed, moulded, or turned is determined by the closeness of the knife cuts. The closer the cuts to each other (i.e., the more knife cuts per inch [KCPI]) the closer the ridges, and therefore the smoother the resulting appearance.

Surfaces can be further smoothed by sanding. Sandpapers come in grits from coarse to fine and are assigned ascending grit numbers. The coarser the grit, the faster the stock removal. The surface will show the striations caused by the grit. Sanding with finer grit papers will produce smoother surfaces.

### 800-G-4

#### Design Summary

This short summary is a collection of hints and illustrations about the challenges of designing and building safe stairs. The QSI cannot and does not offer these data as advice on code compliance. Safe stairs and design and engineering to meet local codes remains the responsibility of the design professional.

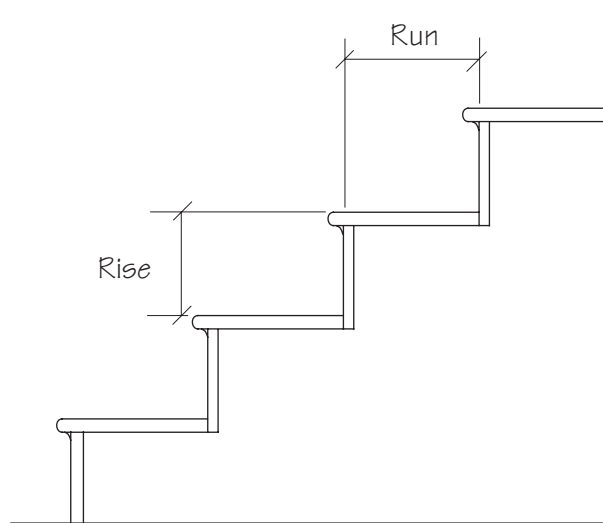
The three critical steps in stair design are...

- check local code;
- consult with an experienced stair builder to double check your geometry; and
- pre-clear your stair design with the local building officials.

**NET STAIR WIDTH** - The minimum width of a normal stairway is 1118 mm [44"] when expected occupant load is 50 or more. Otherwise the minimum width is usually 915 mm [36"].

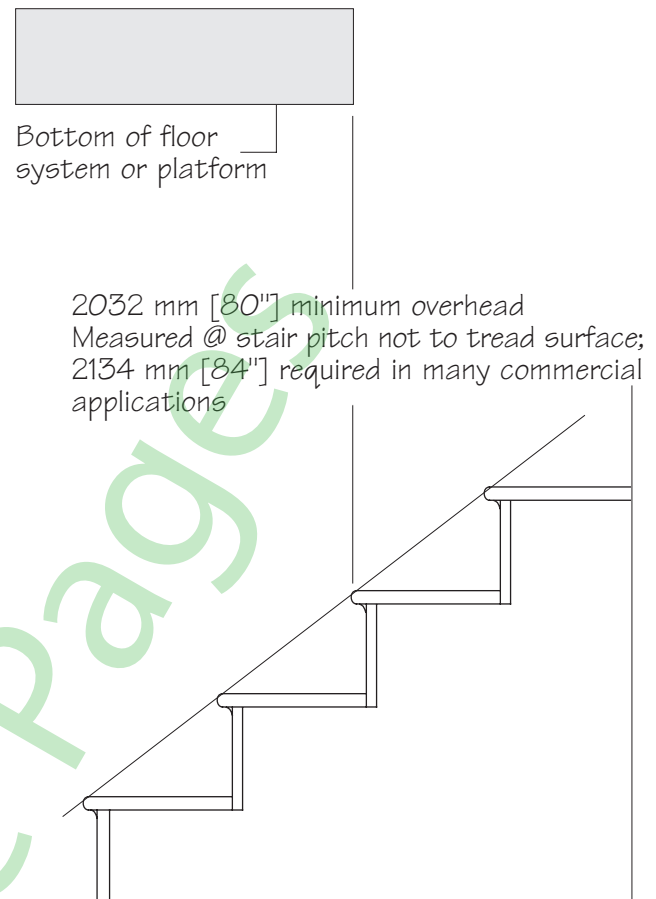
**RISER HEIGHT** - For stairways serving an occupant load of greater than 10 persons, the typical maximum riser height is about 178 mm [7"]. For stairways serving an occupant load of fewer than 10, the maximum riser height varies from 197 mm [7-<sup>3</sup>/<sub>4</sub>"] to 210 mm [8-<sup>1</sup>/<sub>4</sub>"] depending on local code. All codes agree that the height of each riser must be consistent with the others. Riser height is measured from the finished top of a tread to the finished top of the adjacent tread.

**TREADLENGTH (RUN)** - For stairways serving an occupant load of greater than 10, the minimum tread length is usually 279 mm [11"]. For stairways serving fewer than 10, the minimum is usually 241 mm [9-1/2"]. Just as the rise must be consistent, so must the run.



Rise and Run - Figure 800-02

**RATIO OF RISER TO TREAD** - There are some well established Imperial guidelines for stair layout. Three rules of thumb for a good relation between the height of a riser and the width of a tread are: (1) the tread width multiplied by the riser height in inches should equal between 72 and 75; (2) the tread width plus twice the riser height should equal about 25; or rise + run = about 17", remembering that the rise and run must work together. It is the pitch of the stair which makes it functional and safe. A stair which meets two of the three guidelines should be easy to use.



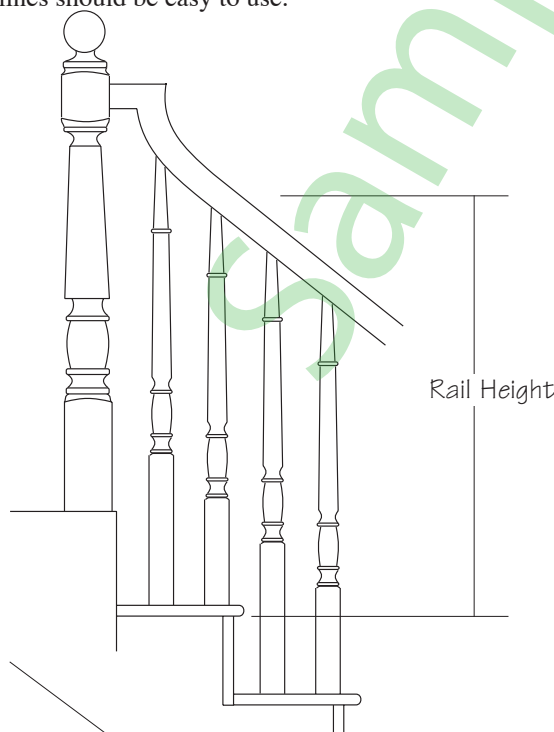
Headroom - Figure 800-03

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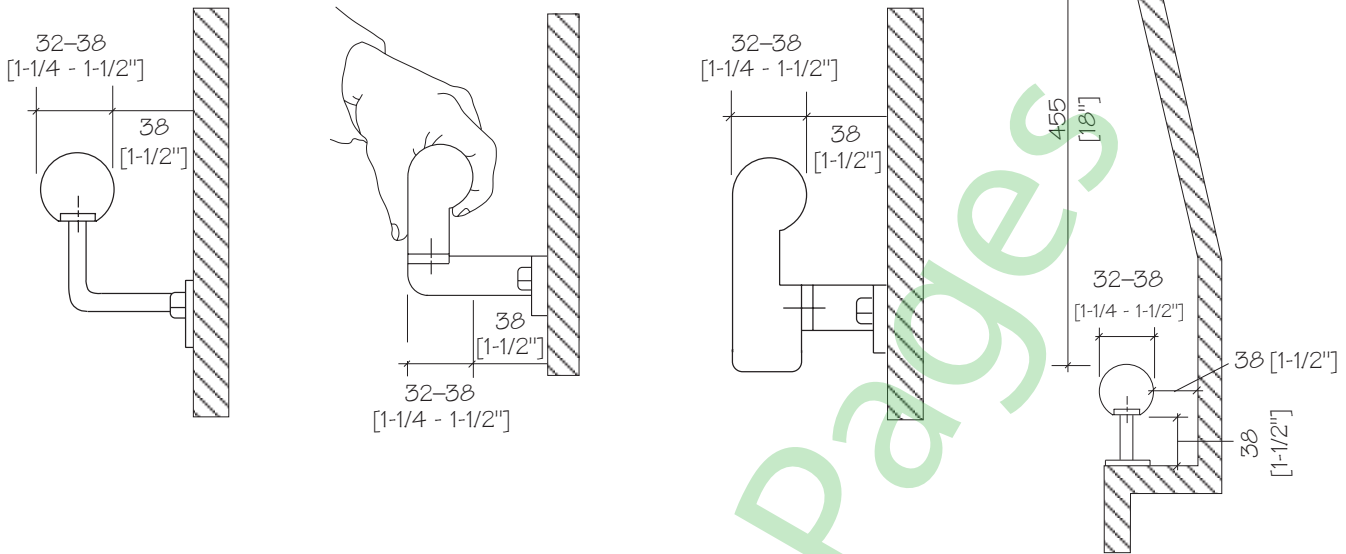
**HEADROOM** - A minimum of 2032 mm [80"] must be allowed for headroom measured from a plane parallel and tangent to the nose of the treads to all overhead points.

**HANDRAILS** - Stair handrails should be mounted in such a manner that the top of the handrail be no less than 864 mm [34"] and no more than 965 mm [38"] above tread and landing noses. Stairways wider than 1118 mm [44"] should include a handrail on both sides of the stair. Handrails should clear walls and other obstructions by no less than 38 mm [1-1/2"] to allow for adequate finger clearance, but should not project more than about 115 mm [4-1/2"] Consult all codes and requirements.

**LEVEL BALUSTRADE** - Balustrade at balconies or landings must be at least 915 mm [36"] above the finish floor for most residential applications and at least 1067 mm [42"] above the finish floor for most commercial applications. Some jurisdictions require the use of a guardrail in addition to the handrail on the stair.

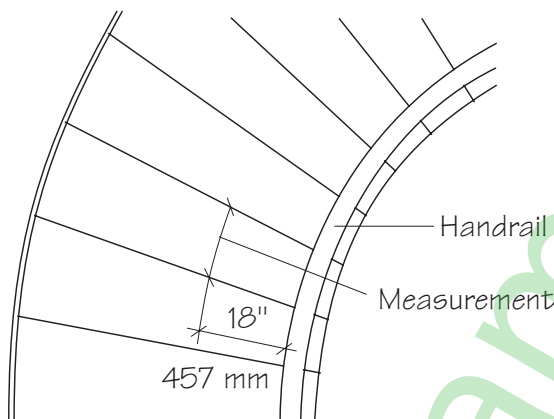


Handrail - Figure 800-04



Some Handrail Options - Figure 800-05

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Winding Plan View - Figure 800-06

**CURVED/CIRCULAR STAIRS** - In most regional codes, a circular stair must have an inside radius that is no less than twice the width of the stair. Most books also specify a minimum tread run of 152 mm [6"] at the most restrictive point, but this is not always practical or possible. Curved stairways with tighter radii and more limited tread run are usually allowed under stair codes. As a guide, the required tread run should be no less than 10", measured at a point 305-457 mm [12-18"] from the most restrictive (narrow) side of the stair.

Please consult with the local building department before committing a stair space to design details and project documents.



### Technical Criteria

#### 800-T-1

#### Specification Requirements

Architect or Design Professional shall ...

- specify the Grade required;
- specify the species and type of cut;
- specify the grain direction and articulated joints. In the absence of such indication, the grain direction shall be at woodworker's option;
- specify the ornamental details and joinery that affect the aesthetics and function;
- specify the fire-retardant rating, if required; and
- specify the preservative treatment for exterior use, if required.

## 800-T-2

### Materials

Hardwood members exceeding dimensions defined in Section 100 may be glued for width and thickness. Refer to Section 100 for maximum practical available lengths. If total length exceeds the practical available length of the species as defined in Section 100, members will be furnished in suitable lengths selected by the manufacturer.

Unless otherwise specified or detailed, the following standards shall apply:

Materials	Premium		Custom		Economy	
	Transparent	Opaque	Transparent	Opaque	Transparent	Opaque
Lumber Grade	I	II	II	II	III	III
Cut of Lumber	Plain sawn	Plain sawn	Plain sawn	Plain sawn	Plain sawn	Plain sawn

NOTE: When panel products are used, consultation with the stair manufacturer prior to specification is recommended.

## 800-T-3

### Workmanship

	Premium	Custom	Economy
Circular stair stringers, rails and floor trim	Shop laminated to radius	Shop laminated to radius	Not applicable
Wall stringer	Routed to receive treads, risers, and wedges	Unrouted	Unrouted
Face stringer	Mitered or housed, wedged and glue-blocked underneath except open riser stairs or backpitch stairs	Mitered or housed, wedged and glue-blocked underneath except open riser stairs or backpitch stairs	Shop cut and/or miter not required
Treads, open end	Tongued into riser. Return nosing mitered to front edge - attached	Tongued into riser. Return nosing mitered to front edge - attached	No requirement
Treads, closed end	No machining	No machining	No machining
Treads, level	Tread supports shall be machined and installed within a maximum slope of 6 mm [ $\frac{1}{4}$ " ] in 305 mm [12"]		
Risers	Routed to receive tongue on tread	No machining	No machining
Balusters, set to restrict passage of 100 mm [4"] ball	Dowel or pin on tread end; cut to fit on handrail end	Dowel or pin on tread end; uncut on handrail end	No requirement
Newel posts	Machined to fit assembly	No machining	No machining
<b>Stair Handrails</b>			
In-plant preparation of straight wood rails (field conditions permitting)	Assembled by rail bolts, joint fasteners, half-lap or dowel	Plant-prepared for jobsite joining by rail bolt, joint fasteners, half-lap or dowel	No machining
Radiused wood rails; rail returns; transitions; direction changes	Shop laminated to radius; assembled to straight rails as above	Shop laminated to radius; assembled to straight rails as above	Segmented radius joined by rail bolt, joint fasteners, half-lap or dowel

Note: Finger-jointed rail stock permitted for opaque finish, but only by direct specification for transparent finish.