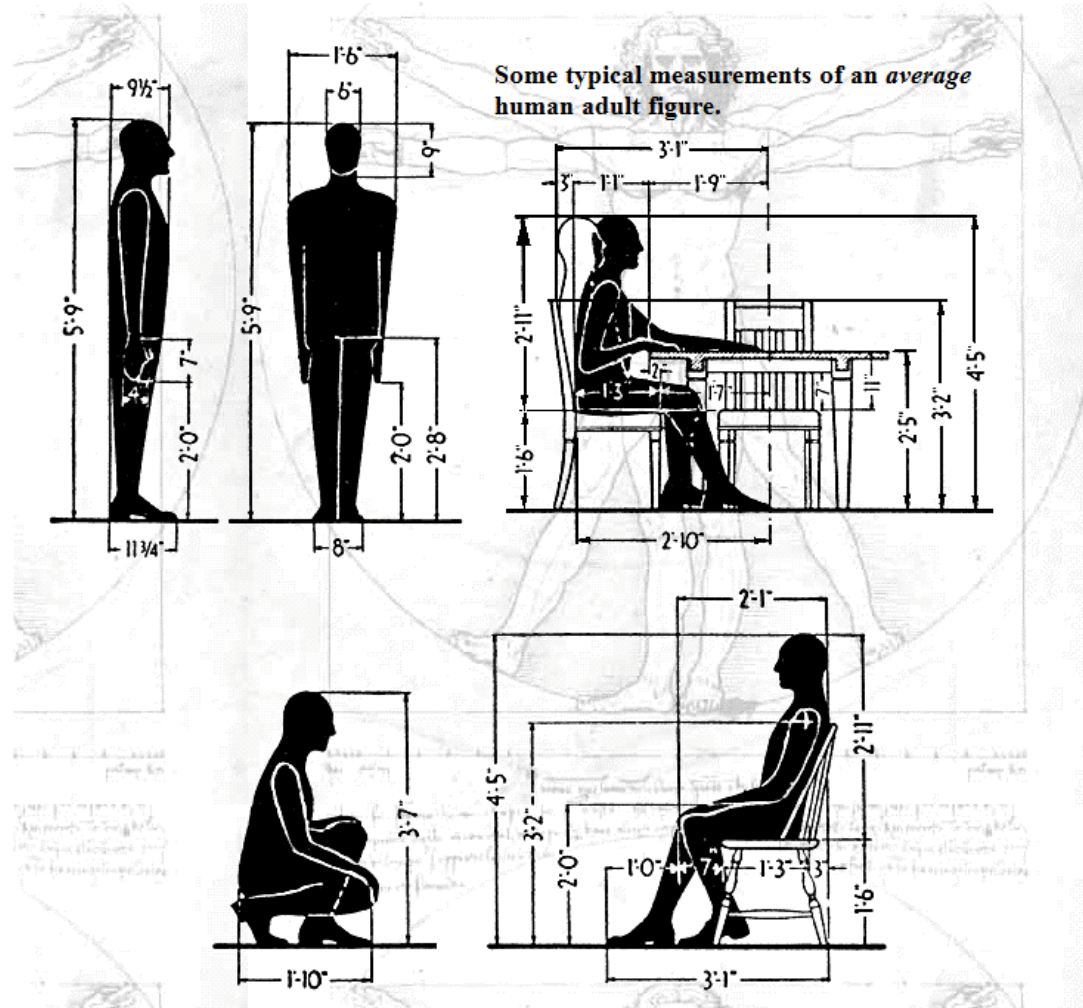


Standard Dimensions for Furniture Design

The Average Human Adult Figure



Tables

Table Design Guidelines

1. In choosing between a round or rectangular (including square) table, keep in mind that round tables blend in easier with other furniture and also allow easy movement around them.
2. Most tables designed for writing or dining should be 28" to 30" high (29" is common) with chair seats 11" to 13" lower. The higher the tabletop, the more uncomfortable and formal the table feels. Provide about 24" of leg room below the table (height from floor to bottom of table rail) and at least 12" for knee clearance (projection of table top beyond table leg). In figuring seating capacity, allow at least 24" of elbow room width per person and 12" to 15" depth from the edge of the table.
3. Bedside tables should not be more than six inches above the height of the bed.
4. Coffee tables are generally 1/2 to 2/3 the length of the sofa and about the same height as the sofa seat.
5. End tables should be the same height or a few inches shorter than the armrest of the sofa. Also, if a lamp is to be placed on the end table, the bottom of the lampshade should be at eye level when seated.
6. Sofa tables are designed to conceal the back side of a sofa that is not against a wall. They are usually 2/3 the length of the sofa and about the same height as the back of the sofa.
7. Additional guidelines exist for desks and tables designed for use as [computer workstations](#).



Standard Dimensions of Tables

Type of Table	Height	Length	Width/Depth
Card	26"-30"	30"-36"	30"-36"
Coffee, round	15"-17"	36"-42" diam	36"-42" diam
Coffee, rectangular	15"-17"	36"-60"	18"-24"
Console	28"	48"-54"	16"-18"
Dining, rectangular	28"-30"	60"-80"	36"-42"
Dining, round	28"-30"	40" min diam	40" min diam
Drafting	32"-44"	31"-72"	23"-44"
Drum	30"	36" dia	36" dia
End	18"-24"	24"-28"	18"-20"
Hallway/entry	34"-36"	36"-72"	16"-20"
Library	28"-30"	60"-84"	24"-36"
Night	16"-25"	18"-28"	16"-22"
Sewing	26"	any	17" min
Sofa	26"-27"	60"	14"-17"
Workbench	32"	any	26"
Writing	28"-30"	36"-40"	20"-24"

Standard Heights of Tables and Seats for Children

Child's Age (Years)	Table Height	Seat Height
1 to 4	20"-22"	10"-12"
5 to 7	22"-25"	12"-14"
8 to 10	24"-29"	13"-17"
11 to 13	26"-30"	15"-18"

Table Seating Specifications

Here are the minimum dimensions for rectangular, square, and round tables needed to accommodate the number of people listed in the first column.

No. of (Rectangular) (Square) (Round)
 People Width Length Width Diameter

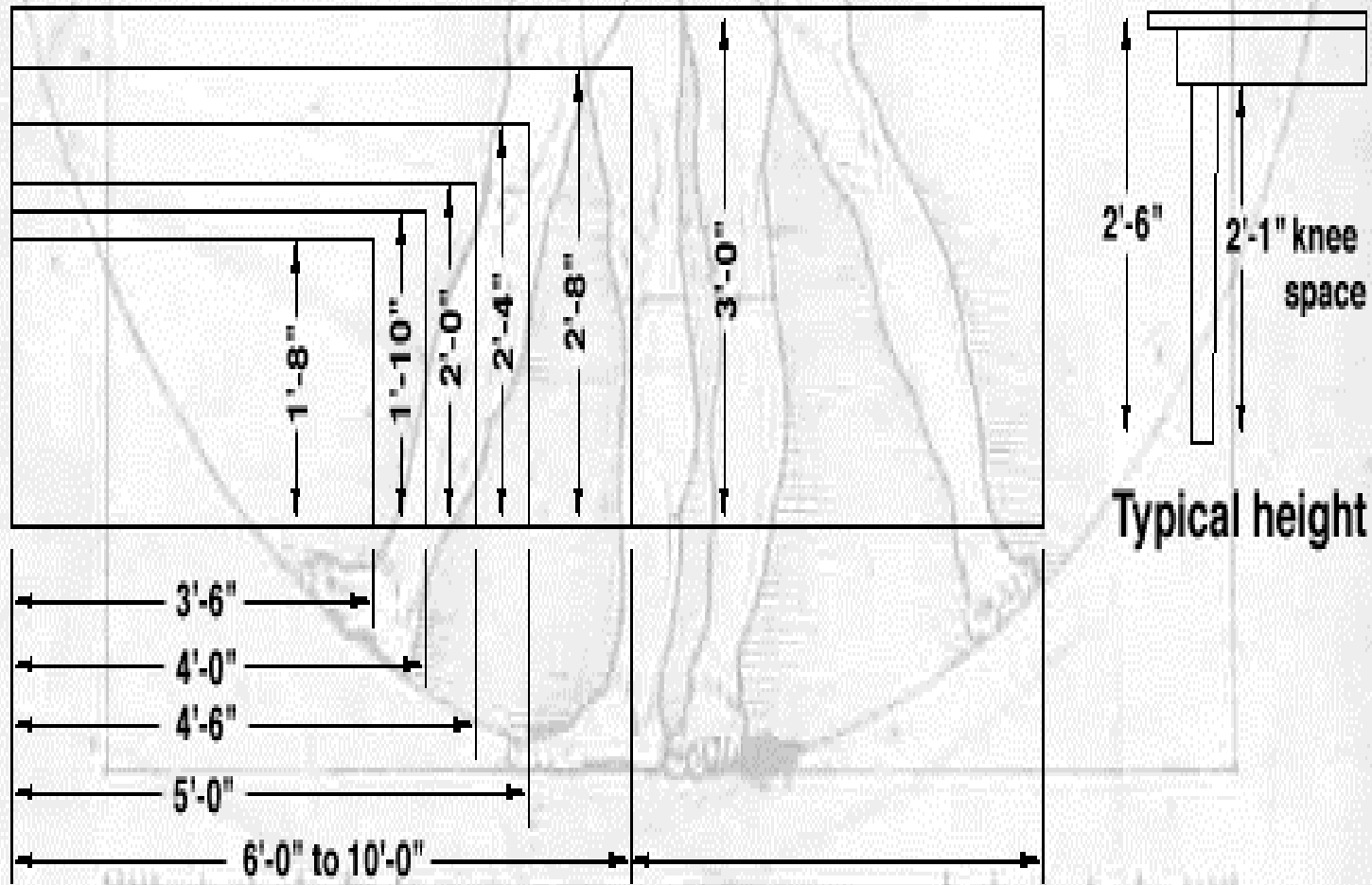
No. of People	(Rectangular) Width	Length	(Square) Width	(Round) Diameter
2	22"-28"	28"-32"	24"-30"	22"-28"
4	28"-36"	44"-52"	32"-42"	32"-42"
6	34"-42"	60"-72"	44"-52"	46"-54"
8	34"-42"	72"-90"	48"-54"	56"-72"
10	42"-48"	96"-108"	56"-62"	72"-84"

Determining Table Size

For square or rectangular dining tables, allow 24" of elbow room width per person. For round tables, allow 26" width per person for a table seating 3 to 6 people and 24" for a table seating 6 or more people. Add 2" to all of the above figures if armchairs will be used. Subtract 2" for snug seating.

The circumference of a round table equals the width per person times the total number of seating spaces and the diameter equals the circumference divided by 3.14. For example, in designing a table to comfortably seat 8 people using chairs without arm supports, the circumference equals 8 times 24 inches width per person (192 inches) and the diameter equals $192/3.14$ or 61 inches. If 22" of width was allocated per person, the resultant table diameter would be about 56" (see table above).

Typical table proportions



Chairs

Chair Design Guidelines

1. The occupant should be able to sit in and get up from the chair without difficulty. The feet should rest flat on the floor without the knees projecting above the upper leg. A seat height of 16 to 18 inches fits the bill for most adults. Armrests should support the forearms without raising the shoulders (7" to 9" above seat). Half armrests enable the chair to be drawn up close to a table.
2. The depth of the seat should allow clearance from the front edge of the seat to the back of the occupant's leg. A seat that is too deep will press against the back of the legs forcing the occupant to slouch forward. A seat that is too shallow may be unstable and feel precarious. A seat depth of 15 to 18 inches is recommended for most adults.
3. The width of the seat often tapers by 2" to 3" from the front to the rear to allow clearance for legs and clothes in front while allowing elbow room in back. Many chairs have seats that are about 15" wide in the rear and 18" wide in the front.
4. For relaxed seating, the seat should slant slightly toward the back (about 5° to 8°) to keep the occupant from slipping out of the chair. However, an office desk or typist's chair often has a flat seat to facilitate leaning forward.
5. The back of the chair is often slanted backwards for comfort - up to 5° for a dining chair and 10° to 15° for a more casual chair. As the chair back angle increases, the seat should be tilted further backward to prevent forward sliding and lowered to prevent the front edge of the seat from pressing against the back of the legs.
6. The seat back should support the lumbar region without being so high as to interfere with the shoulder blades. A back height of about 12" to 16" above the seat is ideal for most adults. Note that this guideline is often ignored for formal "high-backed" dining chairs.
7. The lower portion of the seat back (first 4"-8") should curve out or be left open to allow room for the buttocks.



Chair Dimensions for Children

The following table presents seat heights for children of various ages. Other chair dimensions can be derived proportionately based on the chair dimensions for adults. For most elementary school age children, a seat width and depth of 12 to 14 inches, a backrest height of 9 to 11 inches, and an armrest height of 5 to 7 inches are good starting points.

Child's Age (Years)	Seat Height
1 to 4	10"-12"
5 to 7	12"-14"
8 to 10	13"-17"
11 to 13	15"-18"

Specifications for Different Types of Seats

(Listed dimensions are based on average-sized adults).

Dining Chair: The seat height averages 16" to 17", seat width averages about 15-1/2" in back and 18" in front, and average seat depth is 16" to 16-1/2". If armrests are used, they should be 7" to 9" above the seat but able to fit under the table apron. The average width between armrests at the front of the chair is approximately 19". The seat is usually level or has a maximum front to back slope of about 1". The seat back is reclined no more than 5 degrees and ranges in height from 12" to 20" above the seat (or higher in very formal chairs).

Desk Chair: Most specifications for a dining chair apply here except that the seat back often protrudes no higher than the middle of the back - about 14" to 16".

Easy Chair: Should provide a more relaxed, reclining position than a dining chair - seat height is lower (about 16") with allowance made for compression of seat cushion. The seat is angled backwards about 10 degrees with a seat to back angle of 95 to 120 degrees. For maximum comfort, the seat back should be no more than 14" to 16" above the seat. Armrests are recommended for easy in/out and they average 5" to 8" in height and 2" to 4" in width.

Sofa/Loveseat: Seat depth ranges from 18" to 22" and seat height ranges from 14" to 18" (16" average). The seat back typically rises 15" to 18" above the seat and is usually angled backwards at up to 25 degrees. Upholstered seats generally slope 1" from front to back. Armrests generally protrude 4" to 8" above seat. The overall width of a loveseat is about 56" to 60" - 24" per person, plus 4" to 6" for each armrest. A full-size sofa measures about 90" in overall width.

Bar Stool: In general, the seat of a bar stool should be 12" to 15" below the top surface of the bar, but never higher than 30". For a normal bar that is 40" to 45" high, a seat height of 28" to 30" is standard. For a 30" high bar (most tables), a seat height of 22" to 24" is standard. The seat back is typically 10" to 14" above the seat. The seat width ranges from 15" to 18" and the seat depth ranges from 12" to 16" (16" to 17" diameter if the seat is round). A rung 20" below the seat provides a comfortable resting spot for the occupant's feet.

Rockers: In a stationary position, the seat back should tilt back approximately 25 degrees from the vertical with a seat to seat back angle of about 95 degrees. The seat height in front should be no higher than 16" to 17". Standard seat widths and depths are 18" to 22" and 16" to 18" respectively. The seat back is higher than most chairs - about 40" above the floor. The runners commonly have a horizontal extension of about 30" with a curvature radius of 36" to 38".

Chair Dimensions For Average-Sized Adults

The following dimensions apply to chairs designed for average-sized adults sitting in an upright or alert posture.

Seat width	16"-20"
Seat depth	15"-18"
Seat height from floor	16"-18"
Slope of seat front to rear	5° to 8° (3/4" to 1" drop)
Armrest height above seat	7"-9"
Armrest length (full armrest)	8" minimum
Armrest width	2" average
Set back of armrest from front	2"-3"
Seat back height	12"-16" above seat
Seat back recline angle	0°-5° (formal); 10°-15° (casual)

Wood Selection for Chairs

- Use hardwoods for pieces where shocks, abrasions, and other stresses will occur.
- Use softwoods in larger thicknesses to enable greater penetration of hardwood pieces (e.g., spindles).
- Do not join softwood to softwood.
- For bent chair parts, select woods such as white oak or ash that can be steam-bent without fracturing.
- Legs: The legs of a chair are subject to extreme stresses and abrasive forces. Select a wood such as hard maple that is hard, resists impression, and does not splinter.
- Stretchers: Abrasion resistance is less of an issue but a hard wood such as maple is recommended. Bending strength may be important (e.g., feet placed on the stretcher), so consider white oak or hickory.
- Seat: Many woods will suffice, but soft woods such as pine or poplar are much easier to sculpt if you are intending to use hand tools (early craftsmen typically chose soft woods for this reason).
- Back: Use hard woods such as maple, oak or ash for spindles. For longer spindles, select a resilient wood that allows for movement - hickory is ideal. Softwoods in thicker dimensions may be used for arms and rails.

Beds

Adult Bed Specifications

Height to top of mattress	16"-24"
Best mattress height for sitting	17"-18"
Best mattress height for changing sheets	24"
Acceptable toe room for platform beds	6"-8"

Bunk Bed Specifications

Overall height	60"-87"
Height to top of lower mattress	16"-24"
Height to top of upper mattress from top of lower mattress	30"-45"

Crib Specifications

Mattress height adjustment	31" to 39"
Spacing between slats	2-1/4"
Height-floor to top of crib	48"

Cradle Specifications

Width x Height	22" x 36"
Height (top)	22" average
Height (swing type)	40" average

Bedroom Storage Specifications

Hanging space for long coats and dresses	58"-64"
Hanging space for jackets and shirts	32"-36"
Clothing storage unit depth	24"
Drawer depth (shirts sweaters towels)	16"-20"

Standard Dimensions of Adult Mattresses

Mattress	Width	Length
Bunk	30", 33"	75"
Single	36"	75"
Twin	39"	75", 80", 84"
Double	54"	75", 80"
Queen	60"	80", 84"
King	76"	80", 84"

Standard Dimensions of Juvenile Mattresses

Mattress	Width	Length
Bassinet	18"	36"
Bassinet	22-1/4"	38-3/4"
Junior crib	23"	46"
Junior crib	25-1/4"	50-3/4"
6-year crib	27"	51"
6-year crib	31-1/4"	56-3/4"
Youth bed	33"	66"
Youth bed	36"	76"

Standard Thicknesses of Mattresses and Boxsprings

Type	Thickness
Inner spring	5-1/2" to 6-1/2"
Foam	4" to 7-1/2"
Boxspring	5-1/2" to 9"
Futon	3" to 6"

Standard Dimensions of Bedroom Furniture

Item	Height	Width	Depth
Dresser (bureau)	29"-37"	36"-48"	18"-24"
Chest of drawers	42"-56"	32"-40"	18"-22"
Double dresser	26"-34"	60"-72"	18"-22"
Night table	16"-25"	18"-28"	16"-22"
Blanket chest	16"-20"	32"-54"	14"-22"
Lingerie chest	50"-54"	22"-24"	16"-18"

Desks

Standard Dimensions of Desks

Desk Type	Height	Width	Depth
Children's desk	20"-22"	24"-30"	18"-20"
Computer desk	24"-28"	24"-60"	20"-30"
Lap desk	4"-6"	20"-24"	12"-18"
Pedestal desk	28"-30"	48"-72"	24"-30"
Rolltop desk	28"-30"	48"-72"	24"-30"
Secretary	28"-30"	36"-42"	18"-24"
Slant-front desk	28"-30"	36"-42"	18"-24"
Table desk	28"-30"	30"-48"	20"-30"
Typing table	24"-28"	36"-42"	16"-24"
Writing table	28"-30"	36"-40"	20"-24"

Shelves

Shelf Design Guidelines

1. For ease of shelf access, bookcases are generally no higher than 84 inches. Small bookcases are usually 30 to 42 inches high. The highest shelf in a bookcase should be as high as an average-sized person can comfortably reach - about 72 to 78 inches. If the shelves will be accessed from a sitting position, the highest shelf should be no more than 60 inches above the floor. The lowest shelf should be 3 to 4 inches from the floor level.
2. Shelf width or span is determined both by aesthetics and sag considerations. A fully loaded bookshelf carries a load of 20 to 25 pounds per running foot. The eye will notice a deflection of 1/32 inch per running foot so that a fully loaded (70-80 pounds) bookshelf that is 3 feet wide, should sag no more than 3/32 inches. For most shelves made from 3/4 inch stock, a practical span is 30 to 36 inches.
3. Shelf depth is determined by the size of the items to be stored, generally within the range of 6 to 24 inches. Shelf depth for a general purpose bookshelf is usually 10 to 12 inches.
4. Shelf spacing will generally range from 7 to 15 inches with 8 to 12 inches being common for bookshelves. To prevent the case from looking and being top-heavy, use a smaller shelf spacing near the top and a larger one near the bottom.
5. A well built shelf unit will exhibit minimal side-to-side racking. One of the most effective means of preventing racking is to add a 1/4 inch plywood back that is rabbeted and tacked to the shelves. Other methods include a diagonal back brace, corner blocks, and support cleats on the top and bottom of the unit.
6. In choosing a shelving material, factor in each material's stiffness and susceptibility to creep. Solid wood is stiffer than plywood which is stiffer than particleboard. Particleboard will creep more than other materials so that an unsightly sag could develop if an excessive shelf span is used.



Maximum No-Sag Spans for Various Shelf Materials

The following table depicts the maximum spans for 10 inch wide shelves supporting 20 pounds per square foot (typical loading for a bookshelf) without noticeable sagging.

Shelf Material	Maximum No-Sag Span
3/8" Glass	18"
3/4" Particleboard	26"
3/4" Plywood	32"
3/4" Plywood w/ one 1-1/2" wide support cleat	42"
3/4" Plywood w/ two 1-1/2" wide support cleats	48"
3/4" Yellow pine	36"
1" Yellow pine	48"
1-1/2" Yellow pine	64"
3/4" Red oak	44"
1" Red oak	52"

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1-1/2" Yellow pine	64"
3/4" Red oak	44"
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Stiffness Ratings for Various Wood Species

Here are stiffness ratings for several woods commonly used for shelves, ranked in order of decreasing stiffness. Shelf stiffness is measured by the modulus of elasticity (E). The higher the E value, the stiffer the material, and the less it will sag.

Wood Species	Modulus of Elasticity (E)
Yellow Birch	2.01
Douglas Fir	1.95
Hard Maple (Sugar)	1.83
White Oak	1.78
White Ash	1.77
Shortleaf Pine	1.76
Black Walnut	1.68
Yellow Poplar	1.58
Black Cherry	1.49
Red Oak	1.49
White Fir	1.38
Ponderosa Pine	1.26
White Pine	1.24
Western Red Cedar	1.12

Techniques for Increasing Shelf Stiffness

1. Shorten the shelf span or use vertical support pieces.
2. Attach a 1 to 2 inch wide cleat to the front or back of the shelf.
3. Screw case back to back edge of shelves.
4. Use thicker material.
5. Change the shelving material.
6. Employ torsion box construction for the shelves.

Shelf Space Requirements for Various Items

Shelf Storage Item	Shelf Spacing	Shelf Depth
Compact discs	6"	7"
Stereo equipment	7"	18"
Children's books	8"	8"
Small paperbacks	8"	8"
General reading	10"	10"
Video cassettes	10"	7"
Slide trays	10"	10"
Magazines	12"	12"
Photo albums	13"	12"
Record albums	13"	14"
Linens, clothes	14"	18"
Large hardcover	15"	12"

Standard Dimensions of Bookcases and Shelves

Standing Bookcase

Height:	30" - 84"
Highest shelf:	72" - 78"
Depth:	8" - 24"
Width:	24" - 48"
Minimum shelf spacing:	7" - 8"
Maximum shelf spacing:	13" - 15"

Hanging shelves

Height of unit:	30" - 42"
Height of base above floor:	36" - 54"
Depth:	6" - 16"
Width:	24" - 36"

Stepback Cabinet

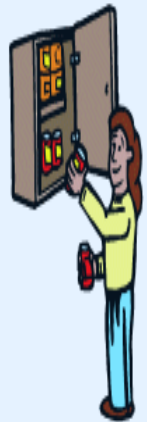
Height of unit:	72" - 84"
Height of base cabinet:	30" - 36"
Height of shelves above base:	36" - 54"
Base cabinet depth:	15" - 25"
Shelf depth:	10" - 13"
Width:	36" - 48"

Methods of Attaching Fixed Shelves

Butt joint	Simple, minimal racking resistance
Cleats, quarter rounds	Simple, unattractive, shelf height reduced on ends
Dado	Fairly strong, relatively simple, must cover exposed ends
Stopped dado	Fairly strong, clean, not exposed, additional work to notch shelves
Sliding dovetail	Strongest joint, good racking resistance, close tolerances required
Dowels	Fairly strong, clean precise alignment, minimal racking resistance
Biscuits	Fairly strong, simple, clean minimal racking resistance
Metal brackets	Simple, unattractive, ok for utility shelving

Kitchen Cabinet Design and Layout Tips

1. The three most used elements of a kitchen are the sink, stove, and refrigerator. To minimize wasted motion, situate each to form a triangle with a perimeter less than 18 feet.
2. The oven and refrigerator should not be adjacent. The dishwasher should be located nearby the sink and if possible, position the sink under a window with a light above it.
3. The number of doors for each cabinet is based on the door width not exceeding its height. For cabinets between 2 to 4 feet wide, use 2 doors.
4. Use false drawer fronts where drawers not possible (e.g., under sink) for a consistent look.
5. Allow 18" of counter space on either side of the range or microwave.
6. Allow 18" of counter space on door-opening side of the refrigerator.
7. Allow 30" of counterspace to right of sink, 24" to left
8. Provide a corridor width or passing space of no less than 36".
9. Maximum height of a shelf above a countertop is 42" for an average sized adult. 36" is optimal.



Standard Dimensions of Wall Cabinets

Depth (25" deep countertop)	12-1/4"
Depth (30" deep countertop)	15"
Height with full soffit	30"
Height with no soffit	42"
Height of cabinet above countertop	18"
Height of cabinet above stove top	24"
Height of highest shelf	60"-68"
Width	to match base cabinet

Standard Dimensions of Base Cabinets

Cabinet depth	24"
Countertop depth (1" overlap)	25"
Height from floor to countertop	36"
Splashboard height	4"
Kickspace height	4"
Kickspace depth	3"
Depth of drawer above cabinet doors	4"

Standard Dimensions of Counters

Countertop height	36"
Counter length per person	21"
Depth (one-sided seating)	15"
Depth (two-sided seating)	30" min
<i>For the physically challenged:</i>	
Countertop height	31"
Under counter access width	30"
Under counter access height	29-1/2"

Standard Dimensions of Kitchen Appliances

The dimensions of most appliances used for residential purposes in the U.S. fall within the ranges given below. Although these dimensions are useful for planning purposes, obtain actual measurements before starting cabinet construction. In general, major appliances are designed to fit beneath a 24 inch wide countertop.

Appliance	Height	Width	Depth
Cooktop	2- 3"	12-48"	18-22"
Dishwasher	33-35	23-24"	23-26"
Microwave	13-18"	21-23"	14-22"
Range, floor model	35-36"	19-40"	24-26"
Range, w/ upper oven	61-68"	30-40"	25-28"
Range, drop-in	23-24"	23-24"	22-25"
Range hood	5-8"	24-72"	12-72"
Refrigerator	55-69"	24-36"	26-33"
Trash Compactor	33-35"	12-15"	18-24"
Wall oven, single	23-25"	21-24"	21-23"
Wall oven, double	39-50"	21-24"	21-23"
Wall oven with broiler	38-40"	21-24"	21-23"