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about this book

WHAT'S NEW IN 2019

Costs for construction labor and materials continue to rise faster than general consumer costs. Rising costs are fueled by a booming construction market in nearly all regions of North America, increasing tariffs, and higher fuel costs. This often means that even in a hot construction market, many repair and remodeling builders are seeing increasing pressure on margins as they struggle to find skilled labor and keep ahead of rising materials costs.

A TOOL

This book is a tool, and like all tools it can be misused. It is an excellent tool for the renovation and repair professional. It is not a substitute for experience, skill, and knowledge.

Prices in this book are based on research of actual jobs and successful estimates. They represent an average of the typical conditions. Estimators should compare the conditions described in this book with actual conditions on site and adjust the price accordingly.

UNIQUE TO RENOVATION AND REPAIR WORK

This book is compiled specifically for the unique problems and conditions found in renovation and repair work. It is not a new construction cost book.

Renovation and repair work involve completely different circumstances than those found in new construction.

For example, the renovation or repair professional must work around existing conditions including home contents, access problems, out-of-plumb or out-of-square buildings, outdated materials, existing conditions that violate current building codes.

New-construction professionals have the luxury of placing items in a logical order, but renovation, remodel, or repair professionals must deal with conditions as they find them.

This means that joists have to be replaced in an existing floor system, paint has to be applied in a room where stain-grade base and carpeting are already installed, structures may have to be braced, contents have to be moved or worked around and materials and installation techniques must be matched.

DETERMINING COSTS

All costs in this book are based on typical conditions and typical problems found when remodeling or repairing a structure.

This means a door takes 10 to 15 minutes longer to install than it would in the ideal circumstances found in new construction.

Stairs are more difficult to install around pre-existing walls, wall framing takes longer when walls are typically splicing into existing work, and so on.

Some prices in this book will very closely match prices used in new construction. Other prices will reflect the complex conditions found in renovation and repair and will be dramatically different.

For example, using this book's stair building prices to estimate stair work in a series of 150 tract homes will result in an estimate that is far too high.

THE ART OF ESTIMATING

Estimating is part art, part science. Estimators must consider many factors, including access, crew productivity, special techniques, special abilities, temperament of the owner, and how busy the company is.

A contractor who is desperate for work will estimate much lower than a contractor who is swamped with work.

All of these factors — and many other similar ones — cannot be included in this or any other price book. They are part of the art of estimating.

The science of estimating, which includes prices, typical techniques, and materials, is included in this book.

This book is designed to make the science of estimating easier, which allows you to spend much more time focusing on the art of estimating, where your skill is crucial to the success of your company.

GENERAL VS. SPECIFIC

It is important to note that the more specific the estimator is, the more accurate the final estimate will be.

For example, when an estimator calculates all electrical costs for a typical home using a square foot cost, it may not be as accurate as if the estimator priced each fixture, outlet, and appliance hook-up.

Since the square foot price is based on a typical installation, it will not be exact for a home that is atypical in any way — for example, one with special outdoor lighting or with an expensive crystal fixture in the entry.

The more specific the item, the more exact the prices. The more general an item, the more assumptions must be made.

To help ensure the accuracy of your estimates, we describe any assumptions made when determining general items.

For example, the Rough Carpentry chapter contains a square foot price for estimating 2" by 4" wall framing. To help you make sure that this price will work for you, we describe our assumptions: the stud centers, the number of openings, headers, corners, plates and so forth, that would typically be found in a wall.

rounding

This book rounds hourly wage rates and the material, labor, and equipment components of a unit price.

These prices are rounded to "three significant digits." This means that prices under three digits (including two to the right of the decimal) are not rounded. Prices four digits and larger are rounded to the third digit from the left.

For example:

.23 is not rounded
 2.33 is not rounded
 23.33 is rounded to 23.30
 233.33 is rounded to 233.00
 2,333.33 is rounded to 2,330.00
 23,333.33 is rounded to 23,300.00

In most cases, the square foot price will apply, but you will always want to carefully consider items that are more general, and if needed, adjust them to fit the conditions.

In the case above, the estimator may want to use the square foot price for average fixtures, then add an allowance for the crystal fixture and the outdoor lighting.

TIME AND MATERIAL CHARTS

Almost all chapters include time and material charts at the end. These time and material charts are designed to show you the materials used, waste, labor rates, labor burden costs, and labor productivity.

When materials with a range of sizes appear, only the small and large size are usually listed.

When materials with a range of qualities appear, only the low and high prices are usually listed.

These charts are designed to give you accurate detail on the exact prices used. When prices change, this book does not become obsolete. Compare current prices with those used and factor accordingly.

MATERIAL COSTS

National average material costs are compiled from surveys of suppliers throughout the country.

Costs for some materials, such as clay tile, building stone and hardwood, will vary a great deal from region to region.

For example, clay tile plants are located near naturally occurring clay sources. Because clay tiles are heavy, the further the tiles have to be shipped, the more expensive the tiles will be. The user of this book must be aware of local price variations.

Materials commonly found in every city are priced based on local delivery. In most cases this will be delivery no greater than 20 miles away from a local source. However, many rural areas have lumber yards that will deliver to a wider area at no additional charge.

Materials that are not commonly available locally, like hand-carved moldings or historical wallpaper, include shipping costs anywhere in North America. Estimators in Hawaii, Alaska and remote areas of Canada should add for additional shipping costs when applicable.

Material waste is often indicated with the items, but it's always a good idea to check the time and material charts for the exact waste calculated for all the components of an item.

Waste indicates material that is discarded during installation. It does not include waste that occurs when materials are taken to storage and ruined, run over at the job site, spilled, improperly cut, or damaged due to mishandling.

These types of occurrences are kept to a minimum by every good contractor, but will still occur on any job site.

Another common waste issue in renovation and repair is when a contractor must buy a minimum quantity for a small repair. For example, to replace a six-inch section of base, it is necessary to buy a piece of base that is eight-feet long or longer. In these cases, use the minimum price.

Material prices may not be listed with the time and material charts in some chapters. In these chapters, little new information would be provided by the materials chart so the space is saved for other information.

For example, a materials chart in the Appliance chapter will not provide an estimator with any new information.

The materials component of the unit price for an oven as listed in the main body of the chapter will tell the estimator how much the oven and connections cost.

Relisting these appliances in a materials chart wastes valuable space.

LABOR COSTS

Labor costs are national average rates that usually are consistent with union labor wages.

See the time and material charts for specific benefit costs and labor rates.

Crew labor rates are an average hourly rate for each member of the crew. For example, a masonry crew might consist of a mason, a mason's helper, and a hod carrier.

The hourly rate for this crew is the average cost of all three. In other words, the hourly rate is for 20 minutes work by the mason, 20 minutes work by the mason's helper, and 20 minutes work by the hod carrier.

Separation of labor in renovation and insurance repair work is much more difficult than is separation of labor on large commercial construction projects.

On a typical repair or renovation job a carpenter may participate in demolition, frame walls, set doors, set toilets, install electrical outlets and fixtures, and do a little painting.

In the jobs analyzed for this cost book, well over 40 percent of the demolition work was done by skilled workers. This is because demolition is often selective, requiring a skilled worker to ensure that additional damage does not occur.

Many renovation and repair companies are relatively small, so skilled workers participate in all phases of construction.

These realities are reflected in the labor costs used in this book. This means that a demolition laborer's hourly rate may seem higher than is normal for an unskilled worker.

The time and material charts show all items that are built into each labor rate.

Some contractors may not provide health insurance or retirement plans to some or all of their workers. Estimators can "back-out" these expenses from the labor costs.

It is critical that estimators examine the Workers' Compensation costs calculated in the wage rates. Some states have Workers' Compensation rates that are double, triple, or even quadruple the national average rates used in this book.

Workers' Compensation rates should be adjusted to match local conditions.

Labor productivity is based on observation of work performed in renovation and repair conditions.

These conditions differ from new construction in many ways, but a few of the most common are:

① difficulty matching existing work, ② access problems, ③ materials that must be more carefully shaped and attached than is typical in new construction, ④ out-of-plumb or out-of-square structures, ⑤ reinforcing, ⑥ more trips and effort are required to find materials, ⑦ much more travel time is required because most jobs will have a relatively small amount of work in some trades, ⑧ more vehicles are required by the renovation or repair contractor because many tradespeople are often traveling between jobs, compared to new construction where crews may spend weeks or months on one job, and because crews tend to be smaller and each crew may need a vehicle, ⑨ more unexpected problems, ⑩ more restrictions in established neighborhoods.

Labor productivity is based on a clean job site where tools are put away and secured at the end of each day.

Depending on the trade, 20 to 30 minutes per eight hours is allowed for clean-up and putting away tools. Normally, skilled workers spend half as much time cleaning up as do unskilled workers.

As is typical in new construction, labor includes unpacking materials, in some cases unloading materials from a truck on site, some travel to pick up minor materials (e.g. a forgotten tube of caulk, or a forgotten tool), typical breaks, lay-out, planning, discussion, coordination, mobilization (many companies meet at a central location each morning to receive instructions), recording hours (including specific information needed for job costing), occasional correction of mistakes in installation, and so forth.

Supervision is not included in these costs but should not generally be required. This is because each crew includes a skilled tradesperson who

normally would not require supervision beyond the normal dispatch and mobilization discussed previously.

EQUIPMENT COSTS

Equipment costs are included only when equipment will be used that is not typically a part of the tools used by the majority of renovation or repair contractors.

For example, each carpenter should have a worm-drive saw, miter box, compressor, nail guns, and so forth. These types of tools are not included in the equipment costs.

However, equipment like cranes, backhoes, concrete saws, and jack hammers are not assumed to be part of the equipment and tools owned by a typical renovation or repair contractor. When these are needed, equipment rates are included in the unit price.

Equipment costs include the typical cost to rent the equipment from a local equipment rental shop. When applicable, they also include fuel or blade costs.

Check each item to determine if it includes delivery to the job site or operator labor. Also be careful to note minimum costs for work where rented equipment is needed.

MARKUP

Prices in this book do not include markup. Insurance repair markup is almost always 20 percent: 10 percent for overhead and 10 percent for profit.

In renovation work on historical structures, markup may be as high as 30 percent, although markup over 20 percent may be "hidden" inside the unit cost. Typical remodeling work markup varies from 15 percent to 25 percent. The most common markup for all types of work is 20 percent.

THE COST LINES

The cost tables in each section of this manual consist of individual tasks or items followed by a description.

Beneath the description is a list of the items to be replaced or removed. For instance, under Appliances on page 17, you'll see Electric range, followed by a list of different ranges. Looking across, you'll see five columns of numbers and symbols. Let me explain how to read the numbers and symbols in those columns.

First let's look at the column headed Craft@Hrs. The Craft@Hrs column shows the recommended crew and manhours per unit for installation. For example, 2A in the Craft@Hrs column means that we recommend a crew of one appliance installer. The crew composition, with the cost per hour, is listed on page 12.

The manhours (following the @ symbol) is our estimate of the crew time required for installation (or demolition) of each unit. Manhours are listed in hundredths of an hour rather than minutes because it's easier to add, subtract, multiply and divide hundredths of a unit. For example, if the Craft@Hrs column shows 2A@.250, the Labor Cost column will show \$14.55. That's the labor cost per unit for a crew of one appliance installer at \$58.20 per hour multiplied by .250 manhours, rounded to the nearest penny. The unit is listed right after the Craft@Hrs, and may be the cost per square foot (sf), linear foot (lf), each (ea), or another unit of measurement.

The crew costs include the basic wage, taxable fringe benefits (vacation pay), Workers' Compensation insurance, liability insurance, taxes (state and federal unemployment, Social Security and Medicare), and typical nontaxable fringe benefits such as medical insurance and retirement. A breakdown of these expenses is included as a percentage in the footnote beneath the Labor table at the end of each section.

If your hourly crew cost is much lower or much higher, you can adjust your totals. For example, if your hourly labor cost is 25 percent less, reduce the labor figures in the cost tables by 25 percent to find your local cost.

The Material column shows your material cost for the item described under the heading.

The Total column is the sum of the Material and Labor cost columns.

CHARTS

Material charts show the material description, the material cost priced per typical unit purchased, the gross coverage, the typical waste, the net coverage after waste has been subtracted, and the resulting materials price including waste and often converted to a different unit of measure.

Equipment charts show the cost to rent equipment, the amount of work that can be done with the equipment per a period of time, and the resulting unit price.

Labor charts show the base wage, then add all additional costs that are based on wage. More information is always listed below this chart. It's important to note the "True" wage before adding labor related expenses. The true wage is the wage rate plus an allowance for vacation time. Since all the other costs must be paid even when an employee is on vacation, it is important that they become a component in the cost calculations when estimating work.

Labor productivity charts show the description of the work, the laborer or crew who will do the work, the average cost per man hour, the productivity and the resulting cost per unit.

REGIONAL DIFFERENCES

Construction techniques vary from region to region. Different cli-

mates and different local customs provide a variety of unique regional methods.

For example, in southern Florida it is common to build the first floor of a home from concrete block capped with a grade beam. This method won't be found in Colorado.

Similarly, coral stone walls won't be commonly found in Denver, although they are widely used in Miami.

Slate roofs are common on historical homes and newer custom homes in Philadelphia but are virtually nonexistent in Rapid City.

Homes in the south often include screened porches which aren't nearly so common in the west.

A Georgia home is much more likely to include a series of architecturally-correct columns with Corinthian capitals than is a home in Minnesota.

A Hawaii home may be built entirely from treated wood, when an Arizona home only uses treated lumber when it contacts dirt or concrete.

Many regional materials and techniques are priced in this book. Keep in mind that you should not use these prices if the item is not common to your area.

NATIONAL ESTIMATOR '19

The National Estimator program makes it easy to copy and paste these costs into an estimate, or bid, and then add whatever markup you select. Quarterly price updates on the Web are free and automatic all during 2019. You'll be

prompted when it's time to collect the next update. A connection to the Web is required.

To access the software download, follow the instructions printed on the certificate in the back of the book. The software will run on PCs using Windows XP, Vista, 7, 8, or 10 operating systems.

When you've installed the National Estimator program, click Help on the menu bar to see a list of topics that will get you up and running. Or, go online to www.craftsman-book.com, click on "Support," then "Tutorials" to view an interactive video for National Estimator.

If you have any problems using National Estimator, we'll be glad to help. Free telephone assistance is available from 8 a.m. until 5 p.m. Pacific time, Monday through Friday (except holidays). Call 760-438-7828.

WE WANT TO HEAR FROM YOU

If you have questions or concerns about this cost book, let us hear from you. Send letters to:

Craftsman Book Company
NRI Editor
6058 Corte del Cedro
Carlsbad, CA 92011

abbreviations

ABSAcrylonitrile butadiene styrene	lflineal foot	SBS styrene butyl styrene
ac alternating current	lilineal inch	sf square foot
bfboard foot	m one thousand	shsheet
BtuBritish thermal units	mbf1,000 board feet	si square inch
CEC California Earthquake Code	mBtu1,000 British thermal units	sq 100 square feet
.....(also see page 56)	mhman hour	st step
cfcubic foot	mi mile	sysquare yard
cfm cubic foot per minute	mlf 1,000 linear feet	t&g tongue-&-groove edge
ci cubic inch	mmmillimeter(s)	TVtelevision
cycubic yard	momonth	UBC Uniform Building Code
ea each	mph miles per hour	UL Underwriters' Laboratory
FUTA Federal Unemployment	msf 1,000 square feet	vlf vertical linear foot
..... Compensation Act tax	no. number	wkweek
galgallon	oc on center	w/ with
GFCI ..ground fault circuit interrupter	oz ounce	x by or times
gphgallon(s) per hour	pr pair	
gpmgallon(s) per minute	psipounds per square inch	SYMBOLS
hp horsepower	PVC polyvinyl chloride	/ per
hr(s) hour(s)	qt quart	- through or to
IMC intermediate metal conduit	R/L random length(s)	@ at
kd kiln dried	R/W/Lrandom widths and lengths	% percent
<b(kv< b="">.....kilovolt(s)</b(kv<>	RSC rigid steel conduit	\$ U.S. dollars
kva 1,000 volt amps	S1S2E surfaced 1 side, 2 edges	'feet
kwkilowatt(s)	S2S surfaced 2 sides	" inches
lb(s) pound(s)	S4S surfaced 4 sides	# pound or number

acknowledgements

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area modification factors

Construction costs are higher in some cities than in other cities. Use the factors on this and the following page to adapt the costs listed in this book to your job site. Increase or decrease your estimated total project cost by the percentage listed for the appropriate city in this table to find your estimated building cost.

These factors were compiled by comparing the actual construction cost of residential, institutional and commercial buildings in communities throughout the United States. Because these factors are based on completed project costs, they consider all construction cost variables, including labor, equipment and material cost, labor productivity, climate, job conditions and markup.

Use the factor for the nearest or most comparable city. If the city you need is not listed in the table, use the factor for the appropriate state. Note that these location factors are composites of many costs and will not necessarily be accurate when estimating the cost of any particular part of a building. But when used to modify all estimated costs on a job, they should improve the accuracy of your estimates.

ALABAMA -4%	Pine Bluff -11%	Durango -1%	Pensacola -8%	ILLINOIS 4%
Aniston -8%	Russellville -4%	Fort Morgan -2%	Saint Augustine -2%	Arlington Heights 14%
Auburn -4%	West Memphis -2%	Glenwood Springs 4%	Saint Cloud -2%	Aurora 14%
Bellamy 5%		Grand Junction 0%	St Petersburg -6%	Belleville 0%
Birmingham 2%	CALIFORNIA 7%	Greeley 5%	Tallahassee -6%	Bloomington -1%
Dothan -7%	Alhambra 8%	Longmont 2%	Tampa -1%	Carbondale -4%
Evergreen -10%	Bakersfield 2%	Pagosa Springs -4%	West Palm Beach -2%	Carol Stream 14%
Gadsden -9%	El Centro 0%	Pueblo 0%		Centralia -3%
Huntsville -1%	Eureka -5%	Salida -6%	GEORGIA -4%	Champaign -2%
Jasper -8%	Fresno -2%		Albany -6%	Chicago 15%
Mobile -2%	Herlong -2%	CONNECTICUT 8%	Athens -5%	Decatur -7%
Montgomery -2%	Inglewood 9%	Bridgeport 6%	Atlanta 12%	Galesburg -4%
Scottsboro -4%	Irvine 13%	Bristol 12%	Augusta -2%	Granite City 3%
Selma -5%	Lompoc 3%	Fairfield 9%	Buford -2%	Green River 5%
Sheffield 0%	Long Beach 9%	Hartford 11%	Calhoun -9%	Joliet 13%
Tuscaloosa -4%	Los Angeles 8%	New Haven 7%	Columbus -3%	Kankakee -3%
	Marysville -2%	Norwich 3%	Dublin/Fort Valley -8%	Lawrenceville -6%
ALASKA 23%	Modesto 1%	Stamford 12%	Hinesville -6%	Oak Park 18%
Anchorage 26%	Mojave 5%	Waterbury 6%	Kings Bay -10%	Peoria 6%
Fairbanks 27%	Novato 12%	West Hartford 5%	Macon -4%	Peru 2%
Juneau 19%	Oakland 17%		Marietta 4%	Quincy 16%
Ketchikan 18%	Orange 12%	DELAWARE 2%	Savannah -4%	Rockford 3%
King Salmon 23%	Oxnard 2%	Dover -4%	Statesboro -11%	Springfield 0%
	Pasadena 9%	Newark 6%	Valdosta -1%	Urbana -4%
ARIZONA -4%	Rancho Cordova 4%	Wilmington 4%		
Chambers -8%	Redding -3%		HAWAII 20%	INDIANA -3%
Douglas -8%	Richmond 17%	DISTRICT OF COLUMBIA 12%	Aliamanu 22%	Aurora -5%
Flagstaff -7%	Riverside 4%		Ewa 20%	Bloomington -2%
Kingman -5%	Sacramento 3%	FLORIDA -5%	Halawa Heights 20%	Columbus -4%
Mesa 3%	Salinas 1%	Altamonte Springs -3%	Hilo 20%	Elkhart -4%
Phoenix 3%	San Bernardino 2%	Bradenton -6%	Honolulu 22%	Evansville 4%
Prescott -6%	San Diego 8%	Brooksville -7%	Kailua 22%	Fort Wayne -1%
Show Low -7%	San Francisco 27%	Daytona Beach -9%	Lualualei 20%	Gary 8%
Tucson -5%	San Jose 17%	Fort Lauderdale 2%	Mililani Town 20%	Indianapolis 4%
Yuma 2%	San Mateo 21%	Fort Myers -6%	Pearl City 20%	Jasper -8%
	Santa Barbara 7%	Fort Pierce -10%	Wahiawa 20%	Jeffersonville -5%
ARKANSAS -7%	Santa Rosa 5%	Gainesville -9%	Waianae 20%	Kokomo -8%
Batesville -9%	Stockton 4%	Jacksonville -2%	Wailuku (Maui) 20%	Lafayette -5%
Camden -2%	Sunnyvale 20%	Lakeland -8%		Muncie -8%
Fayetteville -4%	Van Nuys 8%	Melbourne -8%	IDAHO -9%	South Bend -2%
Fort Smith -7%	Whittier 8%	Miami 1%	Boise -5%	Terre Haute -3%
Harrison -12%		Naples -2%	Coeur d'Alene -10%	
Hope -8%	COLORADO 1%	Ocala -12%	Idaho Falls -9%	IOWA -3%
Hot Springs -13%	Aurora 7%	Orlando 1%	Lewiston -11%	Burlington 1%
Jonesboro -9%	Boulder 4%	Panama City -11%	Meridian -9%	Carroll -11%
Little Rock -3%	Colorado Springs 0%		Pocatello -10%	Cedar Falls -4%
	Denver 8%		Sun Valley -8%	

Cedar Rapids.....2%	MAINE-5%	Mankato.....-4%	North Platte.....-6%	Ithaca.....-5%
Cherokee.....1%	Auburn.....-4%	Minneapolis.....13%	Omaha.....0%	Jamaica.....14%
Council Bluffs.....-1%	Augusta.....-5%	Rochester.....-1%	Valentine.....-15%	Jamestown.....-7%
Creston.....1%	Bangor.....-6%	St Cloud.....2%	NEVADA1%	Kingston.....-4%
Davenport.....1%	Bath.....-6%	St Paul.....12%	Carson City.....-4%	Long Island.....30%
Decorah.....-8%	Brunswick.....-1%	Thief River Falls.....-2%	Elko.....9%	Montauk.....7%
Des Moines.....5%	Camden.....-10%	Willmar.....-6%	Ely.....-3%	New York (Manhattan)31%
Dubuque.....-4%	Cutler.....-7%	MISSISSIPPI-6%	Fallon.....0%	New York City.....31%
Fort Dodge.....-3%	Dexter.....-4%	Clarksdale.....-9%	Las Vegas.....3%	Newcomb.....0%
Mason City.....-3%	Northern Area.....-8%	Columbus.....0%	Reno.....-1%	Niagara Falls.....-6%
Ottumwa.....-6%	Portland.....2%	Greenville.....-14%	NEW HAMPSHIRE-1%	Plattsburgh.....-1%
Sheldon.....-7%	MARYLAND2%	Greenwood.....-10%	Charlestown.....-5%	Poughkeepsie.....1%
Shenandoah.....-14%	Annapolis.....8%	Gulfport.....-6%	Concord.....-3%	Queens.....17%
Sioux City.....5%	Baltimore.....7%	Jackson.....-3%	Dover.....1%	Rochester.....2%
Spencer.....-7%	Bethesda.....13%	Laurel.....-7%	Lebanon.....-3%	Rockaway.....10%
Waterloo.....-3%	Church Hill.....-4%	McComb.....-11%	Littleton.....-6%	Rome.....-4%
KANSAS0%	Cumberland.....-8%	Meridian.....3%	Manchester.....2%	Staten Island.....8%
Colby.....-8%	Elkton.....-5%	Tupelo.....-7%	New Boston.....3%	Stewart.....-5%
Concordia.....-12%	Frederick.....7%	MISSOURI-3%	NEW JERSEY9%	Syracuse.....2%
Dodge City.....-4%	Laurel.....8%	Cape Girardeau.....-5%	Atlantic City.....4%	Tonawanda.....-1%
Emporia.....8%	Salisbury.....-6%	Caruthersville.....-7%	Brick.....2%	Utica.....-6%
Fort Scott.....-6%	MASSACHUSETTS ...12%	Chillicothe.....-4%	Dover.....9%	Watertown.....-1%
Hays.....-13%	Ayer.....6%	Columbia.....-4%	Edison.....13%	West Point.....6%
Hutchinson.....-6%	Bedford.....15%	East Lynne.....4%	Hackensack.....10%	White Plains.....14%
Independence.....29%	Boston.....37%	Farmington.....-8%	Monmouth.....12%	NORTH CAROLINA2%
Kansas City.....5%	Brockton.....20%	Hannibal.....-2%	Newark.....11%	Asheville.....-7%
Liberal.....14%	Cape Cod.....4%	Independence.....5%	Passaic.....12%	Charlotte.....7%
Salina.....-7%	Chicopee.....7%	Jefferson City.....-5%	Paterson.....7%	Durham.....0%
Topeka.....-1%	Dedham.....18%	Joplin.....-6%	Princeton.....10%	Elizabeth City.....0%
Wichita.....-4%	Fitchburg.....11%	Kansas City.....6%	Summit.....16%	Fayetteville.....2%
KENTUCKY-4%	Hingham.....19%	Kirksville.....-15%	Trenton.....7%	Goldsboro.....8%
Ashland.....-4%	Lawrence.....14%	Knob Noster.....3%	NEW MEXICO-8%	Greensboro.....5%
Bowling Green.....-5%	Nantucket.....9%	Lebanon.....-12%	Alamogordo.....-11%	Hickory.....0%
Campton.....-11%	New Bedford.....6%	Poplar Bluff.....-10%	Albuquerque.....-3%	Kinston.....-1%
Covington.....2%	Northfield.....2%	Saint Charles.....1%	Clovis.....-11%	Raleigh.....2%
Elizabethtown.....-10%	Pittsfield.....1%	Saint Joseph.....-1%	Farmington.....-1%	Rocky Mount.....1%
Frankfort.....7%	Springfield.....8%	Springfield.....-8%	Fort Sumner.....-2%	Wilmington.....2%
Hazard.....-10%	MICHIGAN1%	St Louis.....8%	Gallup.....-7%	Winston-Salem.....4%
Hopkinsville.....-5%	Battle Creek.....-1%	MONTANA-3%	Holman.....-10%	NORTH DAKOTA4%
Lexington.....1%	Detroit.....7%	Billings.....-2%	Las Cruces.....-8%	Bismarck.....3%
London.....-7%	Flint.....-4%	Butte.....-3%	Santa Fe.....-8%	Dickinson.....15%
Louisville.....2%	Grand Rapids.....1%	Fairview.....12%	Socorro.....-14%	Fargo.....0%
Owensboro.....-4%	Grayling.....-7%	Great Falls.....-6%	Truth or Consequences.....-8%	Grand Forks.....-1%
Paducah.....0%	Jackson.....-1%	Havre.....-9%	Tucumcari.....-8%	Jamestown.....-4%
Pikeville.....-8%	Lansing.....0%	Helena.....-2%	NEW YORK6%	Minot.....9%
Somerset.....-11%	Marquette.....3%	Kalispell.....-6%	Albany.....7%	Nekoma.....-10%
White Plains.....-4%	Pontiac.....12%	Miles City.....-7%	Amityville.....9%	Williston.....21%
LOUISIANA0%	Royal Oak.....7%	Missoula.....-6%	Batavia.....1%	OHIO0%
Alexandria.....-2%	Saginaw.....-5%	NEBRASKA-8%	Binghamton.....-2%	Akron.....1%
Baton Rouge.....10%	Traverse City.....-2%	Alliance.....-10%	Bronx.....10%	Canton.....-2%
Houma.....4%	MINNESOTA-1%	Columbus.....-7%	Brooklyn.....7%	Chillicothe.....-2%
Lafayette.....2%	Bemidji.....-6%	Grand Island.....-8%	Buffalo.....2%	Cincinnati.....3%
Lake Charles.....6%	Brainerd.....-3%	Hastings.....-9%	Elmira.....-3%	Cleveland.....3%
Mandeville.....-3%	Duluth.....2%	Lincoln.....-4%	Flushing.....15%	Columbus.....5%
Minden.....-5%	Fergus Falls.....-10%	McCook.....-9%	Garden City.....15%	Dayton.....1%
Monroe.....-8%	Magnolia.....-8%	Norfolk.....-10%	Hicksville.....14%	Lima.....-5%
New Orleans.....2%				Marietta.....-5%
Shreveport.....-4%				Marion.....-6%

Newark.....	3%	Punxsutawney.....	-3%	Austin.....	5%	Lynchburg.....	-9%	Powell.....	-3%
Sandusky.....	-3%	Reading.....	2%	Bay City.....	28%	Norfolk.....	-2%	Rawlins.....	8%
Steubenville.....	1%	Scranton.....	1%	Beaumont.....	7%	Petersburg.....	-3%	Riverton.....	-6%
Toledo.....	7%	Somerset.....	-9%	Brownwood.....	-8%	Radford.....	-9%	Rock Springs.....	1%
Warren.....	-5%	Southeastern.....	8%	Bryan.....	-3%	Reston.....	7%	Sheridan.....	-3%
Youngstown.....	-3%	Uniontown.....	-6%	Childress.....	-14%	Richmond.....	2%	Wheatland.....	-3%
Zanesville.....	-1%	Valley Forge.....	11%	Corpus Christi.....	7%	Roanoke.....	-9%		
		Warminster.....	11%	Dallas.....	6%	Staunton.....	-7%	CANADIAN AREA MODIFIERS	
OKLAHOMA.....	-5%	Warrendale.....	5%	Del Rio.....	0%	Tazewell.....	-6%	These figures assume an	
Adams.....	-10%	Washington.....	8%	El Paso.....	-7%	Virginia Beach.....	-2%	exchange rate of \$1.00 Canadian	
Ardmore.....	-1%	Wilkes Barre.....	-1%	Fort Worth.....	2%	Williamsburg.....	-3%	to \$0.76 U.S.	
Clinton.....	-3%	Williamsport.....	-2%	Galveston.....	13%	Winchester.....	4%		
Durant.....	-11%	York.....	-1%	Giddings.....	0%			ALBERTA AVERAGE... 13%	
Enid.....	-4%			Greenville.....	3%	WASHINGTON..... 0%		Calgary.....	14%
Lawton.....	-8%	RHODE ISLAND..... 5%		Houston.....	15%	Clarkston.....	-8%	Edmonton.....	14%
McAlester.....	-7%	Bristol.....	5%	Huntsville.....	15%	Everett.....	2%	Fort McMurray.....	12%
Muskogee.....	-8%	Coventry.....	5%	Longview.....	1%	Olympia.....	-2%		
Norman.....	-4%	Cranston.....	6%	Lubbock.....	-7%	Pasco.....	1%	BRITISH COLUMBIA	
Oklahoma City.....	-3%	Davisville.....	5%	Lufkin.....	-3%	Seattle.....	11%	AVERAGE..... 7%	
Ponca City.....	-1%	Narragansett.....	5%	McAllen.....	-12%	Spokane.....	-3%	Fraser Valley.....	6%
Poteau.....	-7%	Newport.....	5%	Midland.....	10%	Tacoma.....	2%	Okanagan.....	6%
Pryor.....	-6%	Providence.....	6%	Palestine.....	2%	Vancouver.....	3%	Vancouver.....	9%
Shawnee.....	-8%	Warwick.....	5%	Plano.....	7%	Wenatchee.....	-6%		
Tulsa.....	0%			San Angelo.....	-6%	Yakima.....	-5%	MANITOBA AVERAGE... 0%	
Woodward.....	5%	SOUTH CAROLINA..... 3%		San Antonio.....	1%			North Manitoba.....	0%
		Aiken.....	4%	Texarkana.....	-8%	WEST VIRGINIA..... -5%		Selkirk.....	0%
OREGON..... -3%		Beaufort.....	-2%	Tyler.....	-7%	Beckley.....	-5%	South Manitoba.....	0%
Adrian.....	-12%	Charleston.....	7%	Victoria.....	1%	Bluefield.....	0%	Winnipeg.....	0%
Bend.....	-5%	Columbia.....	6%	Waco.....	-3%	Charleston.....	4%		
Eugene.....	-3%	Greenville.....	5%	Wichita Falls.....	-9%	Clarksburg.....	-7%	NEW BRUNSWICK	
Grants Pass.....	-5%	Myrtle Beach.....	0%	Woodson.....	-3%	Fairmont.....	-11%	AVERAGE..... -13%	
Klamath Falls.....	-8%	Rock Hill.....	3%			Huntington.....	-4%	Moncton.....	-13%
Pendleton.....	-3%	Spartanburg.....	-3%	UTAH..... -3%		Lewisburg.....	-14%		
Portland.....	10%			Clearfield.....	0%	Martinsburg.....	-5%	NEWFOUNDLAND/	
Salem.....	-2%	SOUTH DAKOTA..... -6%		Green River.....	-3%	Morgantown.....	-4%	LABRADOR AVERAGE... -3%	
		Aberdeen.....	-7%	Ogden.....	-9%	New Martinsville.....	-9%		
PENNSYLVANIA..... -1%		Mitchell.....	-6%	Provo.....	-6%	Parkersburg.....	1%	NOVA SCOTIA	
Allentown.....	3%	Mobridge.....	-9%	Salt Lake City.....	1%	Romney.....	-7%	AVERAGE..... -8%	
Altoona.....	-8%	Pierre.....	-10%			Sugar Grove.....	-8%	Amherst.....	-8%
Beaver Springs.....	-5%	Rapid City.....	-8%	VERMONT..... -5%		Wheeling.....	5%	Nova Scotia.....	-7%
Bethlehem.....	4%	Sioux Falls.....	-1%	Albany.....	-7%			Sydney.....	-8%
Bradford.....	-8%	Watertown.....	-4%	Battleboro.....	-4%	WISCONSIN..... 0%			
Butler.....	-2%			Beecher Falls.....	-8%	Amery.....	-1%	ONTARIO AVERAGE..... 7%	
Chambersburg.....	-7%	TENNESSEE..... -2%		Bennington.....	-6%	Beloit.....	5%	London.....	7%
Clearfield.....	-3%	Chattanooga.....	2%	Burlington.....	4%	Clam Lake.....	-8%	Thunder Bay.....	6%
DuBois.....	-10%	Clarksville.....	1%	Montpelier.....	-4%	Eau Claire.....	-2%	Toronto.....	7%
East Stroudsburg.....	-5%	Cleveland.....	-1%	Rutland.....	-7%	Green Bay.....	3%		
Erie.....	-6%	Columbia.....	-7%	Springfield.....	-6%	La Crosse.....	0%	QUEBEC AVERAGE..... -1%	
Genesee.....	-4%	Cookeville.....	-8%	White River Junction.....	-5%	Ladysmith.....	-2%	Montreal.....	-1%
Greensburg.....	4%	Jackson.....	-2%			Madison.....	8%	Quebec City.....	-1%
Harrisburg.....	3%	Kingsport.....	-5%	VIRGINIA..... -4%		Milwaukee.....	6%		
Hazleton.....	-3%	Knoxville.....	-2%	Abingdon.....	-9%	Oshkosh.....	4%	SASKATCHEWAN	
Johnstown.....	-9%	Mckenzie.....	-8%	Alexandria.....	10%	Portage.....	0%	AVERAGE..... 4%	
Kittanning.....	-6%	Memphis.....	1%	Charlottesville.....	-6%	Prairie du Chien.....	-7%	La Ronge.....	3%
Lancaster.....	-1%	Nashville.....	2%	Chesapeake.....	-4%	Wausau.....	-3%	Prince Albert.....	2%
Meadville.....	-9%			Culpeper.....	-5%			Saskatoon.....	5%
Montrose.....	-4%	TEXAS..... 1%		Farmville.....	-12%	WYOMING..... -1%			
New Castle.....	-3%	Abilene.....	-2%	Fredericksburg.....	-5%	Casper.....	1%		
Philadelphia.....	11%	Amarillo.....	-2%	Galax.....	-10%	Cheyenne/Laramie.....	-2%		
Pittsburgh.....	6%	Arlington.....	1%	Harrisonburg.....	-6%	Gillette.....	3%		
Pottsville.....	-8%								

crews

CRAFT CODE	AVG. COST /HR	CREW COMPOSITION	CRAFT CODE	AVG. COST /HR	CREW COMPOSITION
1A	\$51.30	acoustic ceiling installer	11	\$47.00	insulation installer
2A	\$58.20	appliance installer	21	\$54.40	cabinet installer laborer
3A	\$69.40	appliance refinisher	31	\$62.50	flooring installer
4A	\$58.80	awning installer	41	\$46.70	flooring installer's helper
5A	\$44.50	awning installer's helper	51	\$54.60	flooring installer flooring installer's helper
6A	\$51.70	awning installer awning installer's helper	61	\$65.10	paneling installer
1B	\$36.20	cleaning laborer	71	\$48.80	paneling installer's helper
2B	\$82.20	post & beam carpenter	2L	\$43.50	cabinet installer's helper
3B	\$58.70	post & beam carpenter's helper	3L	\$40.00	masking & moving laborer
4B	\$70.50	post & beam carpenter post & beam carpenter's helper	1M	\$67.40	mason
1C	\$65.30	carpenter	2M	\$61.90	mason's helper
5C	\$48.80	carpenter's helper	3M	\$47.90	hod carrier
6C	\$57.10	carpenter carpenter's helper	4M	\$59.10	mason mason's helper hod carrier / laborer
1D	\$44.10	demolition laborer	5M	\$64.70	mason mason's helper
2D	\$51.40	drywall hanger drywall hanger's helper	6M	\$109.00	stone carver
3D	\$58.50	drywall hanger	7M	\$47.10	mobile home repair specialist
4D	\$44.20	drywall hanger's helper	10	\$85.20	equipment operator
5D	\$59.00	drywall taper	20	\$59.00	concrete saw operator
6D	\$53.90	drywall hanger drywall hanger's helper drywall taper	4P	\$60.60	plasterer
5E	\$42.20	excavation laborer	5P	\$54.50	plasterer's helper
6E	\$63.70	excavation laborer equipment operator	6P	\$57.60	plasterer plasterer's helper
7E	\$70.20	electrician	7P	\$75.10	plumber
8E	\$52.30	electrician's helper	8P	\$57.00	paneling installer paneling installer's helper
9E	\$61.30	electrician electrician's helper	9P	\$57.30	plumber's helper
1F	\$59.80	concrete form installer	3R	\$63.90	retaining wall installer
2F	\$43.70	concrete laborer	4R	\$76.20	roofer
3F	\$51.80	concrete form installer concrete laborer	5R	\$64.60	roofer's helper
4F	\$57.10	carpenter (fence installer) carpenter's helper	6R	\$70.40	roofer roofer's helper
5F	\$62.80	painter	1S	\$52.20	susp. ceiling installer susp. ceiling installer's helper
6F	\$59.60	concrete finisher	2S	\$59.60	susp. ceiling installer
7F	\$49.50	concrete finisher's helper	3S	\$44.80	susp. ceiling installer's helper
8F	\$54.60	concrete finisher concrete finisher's helper	4S	\$64.20	siding installer
9F	\$53.20	concrete form installer concrete laborer concrete finisher concrete finisher's helper	5S	\$48.10	siding installer's helper
1G	\$83.50	compaction grouting specialist	6S	\$56.20	siding installer siding installer's helper
2G	\$63.60	compaction grouting specialist concrete laborer	7S	\$57.30	security system installer
1H	\$55.40	hazardous materials laborer	8S	\$73.00	swimming pool installer
2H	\$68.90	HVAC installer	9S	\$55.10	water extractor
3H	\$50.50	wallpaper hanger	1T	\$60.30	tile layer
			7Z	\$44.30	mildew remediation specialist
			8Z	\$27.60	mildew remediation assistant
			9Z	\$36.00	mildew remediation specialist mildew remediation assistant

	Craft@Hrs	Unit	Material	Labor	Total
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Acoustic Ceilings**Minimum charge.**

for acoustic ceiling tile work	1A@1.25	ea	23.60	64.10	87.70
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1/2" on strips. 12" x 12" tiles stapled in place. Includes 12" x 12" ceiling tiles, staples, and installation labor. Does not include furring strips. Includes 3% waste.

1/2" ceiling tiles on furring strips					
replace, smooth face	1A@.025	sf	1.44	1.28	2.72
replace, fissured face	1A@.025	sf	1.84	1.28	3.12
replace, textured face	1A@.025	sf	2.14	1.28	3.42
replace, patterned face	1A@.025	sf	2.25	1.28	3.53
remove only	1D@.012	sf	—	.53	.53

1/2" on flat ceiling. 12" x 12" tiles glued in place. Includes 12" x 12" ceiling tiles, glue, and installation labor. Includes 3% waste.

1/2" ceiling tiles on flat ceiling					
replace, smooth face	1A@.029	sf	1.44	1.49	2.93
replace, fissured face	1A@.029	sf	1.84	1.49	3.33
replace, textured face	1A@.029	sf	2.14	1.49	3.63
replace, patterned face	1A@.029	sf	2.25	1.49	3.74
remove only	1D@.016	sf	—	.71	.71

5/8" on strips. 12" x 12" tiles stapled in place. Includes 12" x 12" ceiling tiles, staples, and installation labor. Does not include furring strips. Includes 3% waste.

5/8" ceiling tiles on furring strips					
replace, smooth face	1A@.025	sf	1.84	1.28	3.12
replace, fissured face	1A@.025	sf	2.14	1.28	3.42
replace, textured face	1A@.025	sf	2.37	1.28	3.65
replace, patterned face	1A@.025	sf	2.53	1.28	3.81
remove only	1D@.012	sf	—	.53	.53

5/8" on flat ceiling. 12" x 12" tiles glued in place. Includes 12" x 12" ceiling tiles, glue, and installation labor. Includes 3% waste.

5/8" ceiling tiles on flat ceiling					
replace, smooth face	1A@.029	sf	1.84	1.49	3.33
replace, fissured face	1A@.029	sf	2.14	1.49	3.63
replace, textured face	1A@.029	sf	2.37	1.49	3.86
replace, patterned face	1A@.029	sf	2.53	1.49	4.02
remove only	1D@.016	sf	—	.71	.71

3/4" on strips. 12" x 12" tiles stapled in place. Includes 12" x 12" ceiling tiles, staples, and installation labor. Does not include furring strips. Includes 3% waste.

3/4" ceiling tiles on furring strips					
replace, smooth face	1A@.025	sf	2.14	1.28	3.42
replace, fissured face	1A@.025	sf	2.37	1.28	3.65
replace, textured face	1A@.025	sf	2.47	1.28	3.75
replace, patterned face	1A@.025	sf	2.74	1.28	4.02
remove	1D@.012	sf	—	.53	.53

	Craft@Hrs	Unit	Material	Labor	Total
3/4" on flat ceiling. 12" x 12" tiles glued in place. Includes 12" x 12" ceiling tiles, glue, and installation labor. Includes 3% waste.					

3/4" ceiling tiles on flat ceiling					
replace, smooth face	1A@.029	sf	2.14	1.49	3.63
replace, fissured face	1A@.029	sf	2.37	1.49	3.86
replace, textured face	1A@.029	sf	2.47	1.49	3.96
replace, patterned face	1A@.029	sf	2.74	1.49	4.23
remove	1D@.016	sf	—	.71	.71

Additional costs for acoustical ceiling tile.

add for 3/4" tiles with fire rating	—	sf	.40	—	.40
add for aluminum-coated tiles	—	sf	.59	—	.59

Furring strips. Includes 1" x 2" furring strips, nails, construction adhesive as needed, and installation labor. Furring strips placed as fireblocking is included. Includes 4% waste.

replace 1" x 2" furring strips 12" on center	1A@.007	sf	.35	.36	.71
remove	1D@.009	sf	—	.40	.40

Repair loose ceiling tile.

repair loose acoustic tile	1A@.253	ea	.16	13.00	13.16
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Angled install for ceiling tile.

- add 24% for diagonal install
- add 31% for chevron install
- add 40% for herringbone install

Time & Material Charts (selected items)**Acoustic Ceiling Materials**

1/2" thick acoustic tile (per 12" x 12" tile)					
smooth face, (\$1.20 each, 1 sf, 3% waste)	—	sf	1.23	—	1.23
fissured face, (\$1.62 each, 1 sf, 3% waste)	—	sf	1.67	—	1.67
textured face, (\$1.86 each, 1 sf, 3% waste)	—	sf	1.91	—	1.91
patterned face, (\$2.00 each, 1 sf, 3% waste)	—	sf	2.07	—	2.07
5/8" thick acoustic tile (per 12" x 12" tile)					
smooth face, (\$1.62 each, 1 sf, 3% waste)	—	sf	1.67	—	1.67
fissured face, (\$1.86 each, 1 sf, 3% waste)	—	sf	1.91	—	1.91
textured face, (\$2.15 each, 1 sf, 3% waste)	—	sf	2.21	—	2.21
patterned face, (\$2.25 each, 1 sf, 3% waste)	—	sf	2.31	—	2.31
3/4" thick acoustic tile (per 12" x 12" tile)					
smooth face, (\$1.86 each, 1 sf, 3% waste)	—	sf	1.91	—	1.91
fissured face, (\$2.15 each, 1 sf, 3% waste)	—	sf	2.21	—	2.21
textured face, (\$2.22 each, 1 sf, 3% waste)	—	sf	2.28	—	2.28
patterned face, (\$2.44 each, 1 sf, 3% waste)	—	sf	2.51	—	2.51

Acoustic Ceiling Labor

Laborer	base wage	paid leave	true wage	taxes & ins.	total
Acoustic ceiling installer	\$29.00	2.26	\$31.26	20.04	\$51.30
Demolition laborer	\$24.10	1.88	\$25.98	18.12	\$44.10



Paid Leave is calculated based on two weeks paid vacation, one week sick leave, and seven paid holidays. Employer's matching portion of **FICA** is 7.65 percent. **FUTA** (Federal Unemployment) is .8 percent. **Worker's compensation** for the acoustic ceiling trade was calculated using a national average of 12.50 percent. **Unemployment insurance** was calculated using a national average of 8 percent. **Health insurance** was calculated based on a projected national average for 2019 of \$1,248 per employee (and family when applicable) per month. Employer pays 80 percent for a per month cost of \$998 per employee. **Retirement** is based on a 401(k) retirement program with employer matching of 50 percent. Employee contributions to the 401(k) plan are an average of 6 percent of the true wage. **Liability insurance** is based on a national average of 12.0 percent.

	Craft@Hrs	Unit	Material	Labor	Total
Acoustic Ceiling Labor Productivity					
Repair of ceiling tile					
repair loose tile	1A@.253	ea	—	13.00	13.00
Installation of ceiling tile					
tiles on furring strips	1A@.025	sf	—	1.28	1.28
tiles on flat ceiling	1A@.029	sf	—	1.49	1.49
furring strips	1A@.007	sf	—	.36	.36



Appliances**Minimum charge for appliances.**

for appliance work	2A@1.05	ea	18.30	61.10	79.40
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Gas cook top.

replace, standard grade		7P@1.99	ea	667.00	149.00	816.00
replace, high grade		7P@1.99	ea	878.00	149.00	1,027.00
replace, with grill / griddle		7P@1.99	ea	1,180.00	149.00	1,329.00
remove		1D@.615	ea	—	27.10	27.10
remove for work, then reinstall		7P@2.20	ea	5.28	165.00	170.28

Gas range, free standing.

replace, economy grade		7P@2.05	ea	699.00	154.00	853.00
replace, standard grade		7P@2.05	ea	938.00	154.00	1,092.00
replace, high grade		7P@2.05	ea	1,280.00	154.00	1,434.00
replace, with grill / griddle		7P@2.10	ea	1,720.00	158.00	1,878.00
remove		1D@.618	ea	—	27.30	27.30
remove for work, then reinstall		7P@2.80	ea	5.60	210.00	215.60

Space-saver gas range, free-standing.

replace, standard grade		7P@1.99	ea	911.00	149.00	1,060.00
replace, high grade		7P@1.99	ea	1,180.00	149.00	1,329.00
remove		1D@.618	ea	—	27.30	27.30
remove for work, then reinstall		7P@2.80	ea	5.60	210.00	215.60

	Craft@Hrs	Unit	Material	Labor	Total
Gas range, free-standing with double oven.					
replace, standard grade	7P@2.05	ea	1,490.00	154.00	1,644.00
replace, high grade	7P@2.05	ea	1,770.00	154.00	1,924.00
replace, deluxe grade	7P@2.05	ea	2,110.00	154.00	2,264.00
remove	1D@.618	ea	—	27.30	27.30
remove for work, then reinstall	7P@2.80	ea	5.60	210.00	215.60

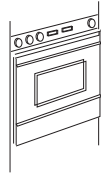
Restaurant-style gas range. Some common manufacturers are Viking, Thermador and Garland. Also, be aware of "mimicked" restaurant styles from prominent manufacturers of home kitchen ranges that sell from \$1,000 to \$2,500.

replace, standard grade	7P@2.88	ea	3,800.00	216.00	4,016.00
replace, high grade	7P@2.88	ea	8,330.00	216.00	8,546.00
replace, deluxe grade	7P@2.88	ea	13,200.00	216.00	13,416.00
remove	1D@1.58	ea	—	69.70	69.70
remove for work, then reinstall	7P@3.55	ea	7.93	267.00	274.93



Gas wall oven.

replace, economy grade	7P@1.79	ea	685.00	134.00	819.00
replace, standard grade	7P@1.79	ea	894.00	134.00	1,028.00
replace, high grade	7P@1.79	ea	1,130.00	134.00	1,264.00
replace, deluxe grade	7P@1.79	ea	1,400.00	134.00	1,534.00
remove	1D@.630	ea	—	27.80	27.80
remove for work, then reinstall	7P@2.48	ea	6.62	186.00	192.62



Gas double wall oven.

replace, economy grade	7P@2.22	ea	1,500.00	167.00	1,667.00
replace, standard grade	7P@2.22	ea	1,760.00	167.00	1,927.00
replace, high grade	7P@2.22	ea	2,220.00	167.00	2,387.00
replace, deluxe grade	7P@2.22	ea	2,750.00	167.00	2,917.00
remove	1D@.782	ea	—	34.50	34.50
remove for work, then reinstall	7P@2.70	ea	7.93	203.00	210.93



Electric cook top.


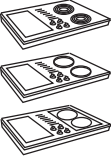

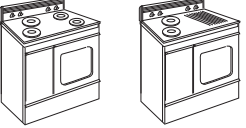
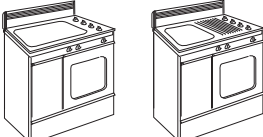
replace, economy grade	7E@1.32	ea	360.00	92.70	452.70
replace, standard grade	7E@1.32	ea	528.00	92.70	620.70
replace, high grade	7E@1.32	ea	662.00	92.70	754.70
replace, cook top with grill / griddle	7E@1.32	ea	793.00	92.70	885.70
remove	1D@.612	ea	—	27.00	27.00
remove for work, then reinstall	7E@2.21	ea	2.63	155.00	157.63




Solid-disk electric cook top.


replace, standard grade	7E@1.32	ea	831.00	92.70	923.70
replace, high grade	7E@1.32	ea	938.00	92.70	1,030.70
replace, with grill / griddle	7E@1.32	ea	1,020.00	92.70	1,112.70
remove	1D@.612	ea	—	27.00	27.00
remove for work, then reinstall	7E@2.21	ea	2.63	155.00	157.63



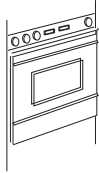
		Craft@Hrs	Unit	Material	Labor	Total
Flat-surface radiant electric cook top.						
replace, standard grade		7E@1.32	ea	1,000.00	92.70	1,092.70
replace, high grade		7E@1.32	ea	1,130.00	92.70	1,222.70
replace, cook top with grill / griddle		7E@1.32	ea	1,220.00	92.70	1,312.70
remove		1D@.612	ea	—	27.00	27.00
remove for work, then reinstall		7E@2.21	ea	2.63	155.00	157.63
Modular electric cook top.						
replace, two coil (Calrod) burners		7E@.287	ea	409.00	20.10	429.10
replace, two solid disk burners		7E@.287	ea	489.00	20.10	509.10
replace, two flat-surface radiant burners		7E@.287	ea	554.00	20.10	574.10
replace, griddle		7E@.287	ea	583.00	20.10	603.10
replace, grill		7E@.287	ea	621.00	20.10	641.10
replace, downdraft unit		7E@.287	ea	304.00	20.10	324.10
add for telescopic downdraft unit		—	ea	195.00	—	195.00
remove		1D@.215	ea	—	9.48	9.48
Remove for work and reinstall.						
Modular cooking unit		7E@.344	ea	—	24.10	24.10
Modular downdraft unit		7E@.394	ea	2.68	27.70	30.38
Electric range, free-standing.						
replace, economy grade		2A@1.05	ea	503.00	61.10	564.10
replace, standard grade		2A@1.05	ea	723.00	61.10	784.10
replace, high grade		2A@1.05	ea	1,020.00	61.10	1,081.10
replace, deluxe grade		2A@1.05	ea	1,330.00	61.10	1,391.10
replace, cook top with grill / griddle		2A@1.05	ea	1,510.00	61.10	1,571.10
remove		1D@.505	ea	—	22.30	22.30
remove for work, then reinstall		2A@1.72	ea	5.28	100.00	105.28
Solid-disk electric range, free-standing.						
replace, standard grade		2A@1.05	ea	963.00	61.10	1,024.10
replace, high grade		2A@1.05	ea	1,070.00	61.10	1,131.10
replace, deluxe grade		2A@1.05	ea	1,270.00	61.10	1,331.10
replace, cook top with grill / griddle		2A@1.05	ea	1,570.00	61.10	1,631.10
remove		1D@.505	ea	—	22.30	22.30
remove for work, then reinstall		2A@1.72	ea	5.28	100.00	105.28
Flat-surface radiant electric range, free-standing.						
replace, standard grade		2A@1.05	ea	1,150.00	61.10	1,211.10
replace, high grade		2A@1.05	ea	1,270.00	61.10	1,331.10
replace, deluxe grade		2A@1.05	ea	1,570.00	61.10	1,631.10
replace, cook top with grill / griddle		2A@1.05	ea	2,380.00	61.10	2,441.10
remove		1D@.505	ea	—	22.30	22.30
remove for work, then reinstall		2A@1.72	ea	5.28	100.00	105.28

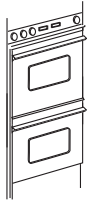
		Craft@Hrs	Unit	Material	Labor	Total
Drop-in or slide-in electric range.						
replace, standard grade		2A@1.05	ea	1,000.00	61.10	1,061.10
replace, high grade		2A@1.05	ea	1,330.00	61.10	1,391.10
replace, deluxe grade		2A@1.05	ea	1,540.00	61.10	1,601.10
replace, cook top with grill / griddle		2A@1.05	ea	1,920.00	61.10	1,981.10
remove		1D@.505	ea	—	22.30	22.30
remove for work, then reinstall		2A@1.72	ea	6.62	100.00	106.62

Space-saver electric range, free-standing.						
replace, standard grade		2A@.980	ea	1,340.00	57.00	1,397.00
replace, high grade		2A@.980	ea	1,400.00	57.00	1,457.00
remove		1D@.505	ea	—	22.30	22.30
remove for work, then reinstall		2A@1.72	ea	5.28	100.00	105.28

High-low electric range with microwave high.						
replace, standard grade		2A@1.90	ea	428.00	111.00	539.00
replace, high grade		2A@1.90	ea	574.00	111.00	685.00
replace, deluxe grade		2A@1.90	ea	888.00	111.00	999.00
remove		1D@.883	ea	—	38.90	38.90
remove for work, then reinstall		2A@2.11	ea	6.62	123.00	129.62

Electric range, free-standing with double oven.						
replace, standard grade		2A@.980	ea	1,260.00	57.00	1,317.00
replace, high grade		2A@.980	ea	1,540.00	57.00	1,597.00
replace, deluxe grade		2A@.980	ea	2,060.00	57.00	2,117.00
remove		1D@.505	ea	—	22.30	22.30
remove for work, then reinstall		2A@1.72	ea	2.63	100.00	102.63

Electric wall oven.						
replace, economy grade		7E@1.55	ea	739.00	109.00	848.00
replace, standard grade		7E@1.55	ea	855.00	109.00	964.00
replace, high grade		7E@1.55	ea	1,080.00	109.00	1,189.00
replace, deluxe grade		7E@1.55	ea	1,350.00	109.00	1,459.00
remove		1D@.652	ea	—	28.80	28.80
remove for work, then reinstall		7E@2.50	ea	2.63	176.00	178.63

Electric double wall oven.						
replace, economy grade		7E@2.72	ea	1,080.00	191.00	1,271.00
replace, standard grade		7E@2.72	ea	1,360.00	191.00	1,551.00
replace, high grade		7E@2.72	ea	1,950.00	191.00	2,141.00
replace, deluxe grade		7E@2.72	ea	2,610.00	191.00	2,801.00
remove		1D@.774	ea	—	34.10	34.10
remove for work, then reinstall		7E@2.78	ea	3.99	195.00	198.99

	Craft@Hrs	Unit	Material	Labor	Total
Warming drawer.					
replace, standard grade	7E@.977	ea	882.00	68.60	950.60
replace, high grade	7E@.977	ea	1,060.00	68.60	1,128.60
replace, deluxe grade	7E@.977	ea	1,500.00	68.60	1,568.60
remove	1D@.444	ea	—	19.60	19.60
remove for work, then reinstall	7E@1.66	ea	10.60	117.00	127.60

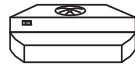
Range hood. Under-cabinet range hoods. Economy and standard grades may be non-vented. Stainless steel hoods usually range from high to custom grade. Designer hoods are usually deluxe or custom grade.

replace, economy grade	2A@1.33	ea	86.00	77.40	163.40
replace, standard grade	2A@1.33	ea	142.00	77.40	219.40
replace, high grade	2A@1.33	ea	175.00	77.40	252.40
replace, deluxe grade	2A@1.33	ea	212.00	77.40	289.40
replace, custom grade	2A@1.33	ea	278.00	77.40	355.40
remove	1D@.422	ea	—	18.60	18.60
remove for work, then reinstall	2A@1.58	ea	2.63	92.00	94.63



Range hood, oversized. Under-cabinet range hoods. Economy and standard grades may be non-vented. Stainless steel hoods usually range from high to custom grade. Designer hoods are usually deluxe or custom grade.

replace, standard grade	2A@1.46	ea	462.00	85.00	547.00
replace, high grade	2A@1.46	ea	555.00	85.00	640.00
replace, deluxe grade	2A@1.46	ea	679.00	85.00	764.00
replace, custom grade	2A@1.46	ea	893.00	85.00	978.00
remove	1D@.422	ea	—	18.60	18.60
remove for work, then reinstall	2A@2.04	ea	2.63	119.00	121.63



Range hood, slide-out. Under-cabinet slide-out range hoods.

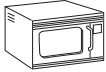
replace, standard grade	2A@1.58	ea	628.00	92.00	720.00
replace, high grade	2A@1.58	ea	758.00	92.00	850.00
replace, deluxe grade	2A@1.58	ea	871.00	92.00	963.00
remove	1D@.492	ea	—	21.70	21.70
remove for work, then reinstall	2A@2.84	ea	2.63	165.00	167.63

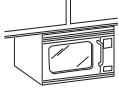
Chimney range hood. Island-mount or wall-mount vented chimney hood. The most common finish (and the most popular) is stainless steel, but a wide range of finishes are available. Copper chimney hoods usually fall in the deluxe to custom deluxe grades.

replace, economy grade	2A@2.62	ea	1,100.00	152.00	1,252.00
replace, standard grade	2A@2.62	ea	1,500.00	152.00	1,652.00
replace, high grade	2A@2.62	ea	1,930.00	152.00	2,082.00
replace, deluxe grade	2A@2.88	ea	2,450.00	168.00	2,618.00
replace, custom grade	2A@2.88	ea	3,360.00	168.00	3,528.00
replace, custom deluxe grade	2A@3.04	ea	4,720.00	177.00	4,897.00
remove	1D@.787	ea	—	34.70	34.70
remove for work, then reinstall	2A@4.00	ea	2.63	233.00	235.63


Downdraft ventilation system. Stand-alone downdraft ventilation systems used with cook tops and ranges. These units are often telescopic and retract when not in use. Do not use these prices for cook tops and ranges that have integrated downdraft systems.


replace, standard grade	2A@1.87	ea	652.00	109.00	761.00
replace, high grade	2A@1.87	ea	784.00	109.00	893.00
replace, deluxe grade	2A@1.87	ea	1,100.00	109.00	1,209.00
remove	1D@.576	ea	—	25.40	25.40
remove for work, then reinstall	2A@3.04	ea	2.63	177.00	179.63


		Craft@Hrs	Unit	Material	Labor	Total
Microwave oven. Countertop microwave.						
replace, economy grade		2A@.290	ea	131.00	16.90	147.90
replace, standard grade		2A@.290	ea	354.00	16.90	370.90
replace, high grade		2A@.290	ea	511.00	16.90	527.90
replace, deluxe grade		2A@.290	ea	727.00	16.90	743.90
replace, custom grade		2A@.290	ea	877.00	16.90	893.90
remove		1D@.182	ea	—	8.03	8.03
remove for work, then reinstall		2A@.345	ea	—	20.10	20.10

Microwave, under cabinet. Microwave oven mounted to wall and/or cabinets. Also called an "over-the-range" microwave.						
replace, standard grade		2A@.950	ea	472.00	55.30	527.30
replace, high grade		2A@.950	ea	732.00	55.30	787.30
replace, deluxe grade		2A@.950	ea	869.00	55.30	924.30
remove		1D@.346	ea	—	15.30	15.30
remove for work, then reinstall		2A@.677	ea	—	39.40	39.40

Dishwasher.						
replace, economy grade		2A@1.85	ea	297.00	108.00	405.00
replace, standard grade		2A@1.85	ea	454.00	108.00	562.00
replace, high grade		2A@1.85	ea	732.00	108.00	840.00
replace, deluxe grade		2A@1.85	ea	1,070.00	108.00	1,178.00
replace, custom deluxe grade		2A@1.85	ea	1,730.00	108.00	1,838.00
remove		1D@.649	ea	—	28.60	28.60
remove for work, then reinstall		2A@2.32	ea	—	135.00	135.00

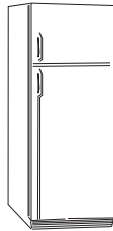
Dishwasher, convertible (portable).						
replace, standard grade		2A@1.18	ea	534.00	68.70	602.70
replace, high grade		2A@1.18	ea	675.00	68.70	743.70
replace, deluxe grade		2A@1.18	ea	858.00	68.70	926.70
remove		1D@.388	ea	—	17.10	17.10
remove for work, then reinstall		2A@1.56	ea	—	90.80	90.80

Dishwasher, space-saver under-sink .						
replace, standard grade		2A@2.63	ea	789.00	153.00	942.00
replace, high grade		2A@2.63	ea	928.00	153.00	1,081.00
remove		1D@.732	ea	—	32.30	32.30
remove for work, then reinstall		2A@3.22	ea	6.62	187.00	193.62

Garbage disposal.						
replace, 1/3 hp		7P@1.51	ea	136.00	113.00	249.00
replace, 1/2 hp, standard grade		7P@1.51	ea	168.00	113.00	281.00
replace, 1/2 hp, high grade		7P@1.51	ea	262.00	113.00	375.00
replace, 3/4 hp, standard grade		7P@1.51	ea	267.00	113.00	380.00
replace, 3/4 hp, high grade		7P@1.51	ea	398.00	113.00	511.00
replace, 1 hp, standard grade		7P@1.51	ea	365.00	113.00	478.00
replace, 1 hp, high grade		7P@1.51	ea	402.00	113.00	515.00
remove		1D@.628	ea	—	27.70	27.70
remove for work, then reinstall		7P@2.51	ea	6.62	189.00	195.62

	Craft@Hrs	Unit	Material	Labor	Total
Refrigerator / freezer, side-by-side.					
24 to 29 cf capacity refrigerator / freezer					
replace, economy grade	2A@.813	ea	1,240.00	47.30	1,287.30
replace, standard grade	2A@.813	ea	1,570.00	47.30	1,617.30
replace, high grade	2A@.813	ea	2,310.00	47.30	2,357.30
replace, deluxe grade	2A@.813	ea	2,670.00	47.30	2,717.30
replace, custom deluxe grade	2A@.813	ea	4,130.00	47.30	4,177.30
remove	1D@.794	ea	—	35.00	35.00
remove for work, then reinstall	2A@1.77	ea	6.62	103.00	109.62
19 to 23 cf capacity refrigerator / freezer					
replace, economy grade	2A@.813	ea	1,440.00	47.30	1,487.30
replace, standard grade	2A@.813	ea	1,610.00	47.30	1,657.30
replace, high grade	2A@.813	ea	2,340.00	47.30	2,387.30
replace, deluxe grade	2A@.813	ea	2,750.00	47.30	2,797.30
replace, custom deluxe grade	2A@.813	ea	4,810.00	47.30	4,857.30
remove	1D@.976	ea	—	43.00	43.00
remove for work, then reinstall	2A@1.77	ea	6.62	103.00	109.62

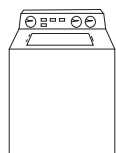
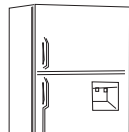
	Craft@Hrs	Unit	Material	Labor	Total
Refrigerator with top freezer.					
21 to 25 cf capacity					
replace, economy grade	2A@.700	ea	860.00	40.70	900.70
replace, standard grade	2A@.700	ea	1,250.00	40.70	1,290.70
replace, high grade	2A@.700	ea	1,510.00	40.70	1,550.70
replace, deluxe grade	2A@.700	ea	2,940.00	40.70	2,980.70
replace, custom deluxe grade	2A@.700	ea	4,930.00	40.70	4,970.70
remove	1D@.365	ea	—	16.10	16.10
remove for work, then reinstall	2A@1.42	ea	6.62	82.60	89.22
17 to 20 cf capacity					
replace, economy grade	2A@.700	ea	620.00	40.70	660.70
replace, standard grade	2A@.700	ea	1,100.00	40.70	1,140.70
replace, high grade	2A@.700	ea	1,350.00	40.70	1,390.70
replace, deluxe grade	2A@.700	ea	1,850.00	40.70	1,890.70
replace, custom deluxe grade	2A@.700	ea	4,630.00	40.70	4,670.70
remove	1D@.365	ea	—	16.10	16.10
remove for work, then reinstall	2A@1.42	ea	6.73	82.60	89.33



Refrigerator with bottom freezer. Higher grades sometimes have French-style refrigerator doors. Deluxe and custom deluxe grades may have French-style refrigerator doors and/or armoire-style freezer drawers.

21 to 25 cf capacity					
replace, economy grade	2A@.700	ea	906.00	40.70	946.70
replace, standard grade	2A@.700	ea	1,320.00	40.70	1,360.70
replace, high grade	2A@.700	ea	1,610.00	40.70	1,650.70
replace, deluxe grade	2A@.700	ea	3,140.00	40.70	3,180.70
replace, custom deluxe grade	2A@.700	ea	5,210.00	40.70	5,250.70
remove	1D@.365	ea	—	16.10	16.10
remove for work, then reinstall	2A@1.42	ea	6.62	82.60	89.22
17 to 20 cf capacity					
replace, economy grade	2A@.700	ea	654.00	40.70	694.70
replace, standard grade	2A@.700	ea	1,170.00	40.70	1,210.70
replace, high grade	2A@.700	ea	1,410.00	40.70	1,450.70
replace, deluxe grade	2A@.700	ea	1,940.00	40.70	1,980.70
replace, custom deluxe grade	2A@.700	ea	4,890.00	40.70	4,930.70
remove	1D@.365	ea	—	16.10	16.10
remove for work, then reinstall	2A@1.42	ea	6.62	82.60	89.22

	Craft@Hrs	Unit	Material	Labor	Total
Refrigerator / freezer, counter-depth. Also called cabinet-depth refrigerators.					
23 to 26 cf capacity					
replace, standard grade	2A@.733	ea	2,880.00	42.70	2,922.70
replace, high grade	2A@.733	ea	3,650.00	42.70	3,692.70
replace, deluxe grade	2A@.733	ea	4,440.00	42.70	4,482.70
replace, custom deluxe grade	2A@.733	ea	5,120.00	42.70	5,162.70
remove	1D@.548	ea	—	24.20	24.20
remove for work, then reinstall	2A@1.67	ea	—	97.20	97.20
19 to 22 cf capacity					
replace, standard grade	2A@.733	ea	2,610.00	42.70	2,652.70
replace, high grade	2A@.733	ea	3,550.00	42.70	3,592.70
replace, deluxe grade	2A@.733	ea	4,040.00	42.70	4,082.70
replace, custom deluxe grade	2A@.733	ea	4,810.00	42.70	4,852.70
remove	1D@.548	ea	—	24.20	24.20
remove for work, then reinstall	2A@1.67	ea	—	97.20	97.20
Refrigerator / freezer, cabinet-match. Refrigerator and freezer doors made to match kitchen cabinetry.					
Add for refrigerator / freezer doors made to match cabinets					
replace	—	ea	583.00	—	583.00
Refrigerator drawer. Cabinet-match or stainless steel drawer face. Per unit installed in lower cabinets, with two to three drawers per unit.					
replace, standard grade	2A@1.49	ea	2,880.00	86.70	2,966.70
replace, high grade	2A@1.49	ea	3,570.00	86.70	3,656.70
remove	1D@.599	ea	—	26.40	26.40
remove for work, then reinstall	2A@2.11	ea	—	123.00	123.00
Refrigerator / freezer refreshment center.					
Add for refreshment center in refrigerator / freezer					
replace	2A@1.88	ea	297.00	109.00	406.00
Refreshment center plumbing. With supply lines and hook-up to appliances. For installation of supply lines only, see Plumbing on page 320.					
Disconnect water supply line for work, then reinstall					
replace	7P@.283	ea	.92	21.30	22.22
Refreshment center plumbing hook-up					
replace, in existing building	7P@2.22	ea	36.80	167.00	203.80
replace, in new construction	7P@1.37	ea	34.40	103.00	137.40
Refinish refrigerator.					
replace, typical	3A@2.21	ea	42.10	153.00	195.10
replace, refinish and recondition (replace gaskets)	3A@2.69	ea	97.20	187.00	284.20
Washing machine, top loading.					
replace, economy grade	2A@1.49	ea	458.00	86.70	544.70
replace, standard grade	2A@1.49	ea	607.00	86.70	693.70
replace, high grade	2A@1.49	ea	855.00	86.70	941.70
replace, deluxe grade	2A@1.49	ea	1,230.00	86.70	1,316.70
replace, custom deluxe grade	2A@1.49	ea	1,680.00	86.70	1,766.70
remove	1D@.421	ea	—	18.60	18.60
remove for work, then reinstall	2A@2.04	ea	—	119.00	119.00



Craft@Hrs Unit Material Labor Total

Washing machine, front loading.

replace, economy grade	2A@1.49	ea	760.00	86.70	846.70
replace, standard grade	2A@1.49	ea	1,120.00	86.70	1,206.70
replace, high grade	2A@1.49	ea	1,410.00	86.70	1,496.70
replace, deluxe grade	2A@1.49	ea	2,050.00	86.70	2,136.70
replace, custom deluxe grade	2A@1.49	ea	2,670.00	86.70	2,756.70
remove	1D@.421	ea	—	18.60	18.60
remove for work, then reinstall	2A@2.04	ea	—	119.00	119.00

Washing machine, steam.

replace, standard grade	2A@1.49	ea	1,680.00	86.70	1,766.70
replace, high grade	2A@1.49	ea	1,850.00	86.70	1,936.70
replace, deluxe grade	2A@1.49	ea	2,290.00	86.70	2,376.70
remove	1D@.421	ea	—	18.60	18.60
remove for work, then reinstall	2A@2.04	ea	—	119.00	119.00

Washing machine and dryer, stacked. Also called unitized, Spacemaker by GE, and sometimes referred to as combo units, but most manufacturers refer to these space-saver styles as stacked or stackable units.

with electric dryer					
replace, standard grade	2A@2.04	ea	1,100.00	119.00	1,219.00
replace, high grade	2A@2.04	ea	1,540.00	119.00	1,659.00
replace, deluxe grade	2A@2.04	ea	1,730.00	119.00	1,849.00
remove	1D@.542	ea	—	23.90	23.90
remove for work, then reinstall	2A@2.88	ea	—	168.00	168.00
with gas dryer					
replace, standard grade	2A@2.54	ea	1,180.00	148.00	1,328.00
replace, high grade	2A@2.54	ea	1,680.00	148.00	1,828.00
replace, deluxe grade	2A@2.54	ea	1,830.00	148.00	1,978.00
remove	1D@.533	ea	—	23.50	23.50
remove for work, then reinstall	2A@3.22	ea	—	187.00	187.00

Clothes dryer, electric. Electric dryer with up to 20' of vent pipe. Deluxe and custom deluxe grades include steam dryers.

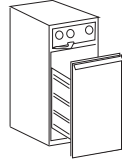
replace, economy grade	2A@.932	ea	479.00	54.20	533.20
replace, standard grade	2A@.932	ea	682.00	54.20	736.20
replace, high grade	2A@.932	ea	1,060.00	54.20	1,114.20
replace, deluxe grade	2A@.932	ea	1,280.00	54.20	1,334.20
replace, custom deluxe grade	2A@.932	ea	1,680.00	54.20	1,734.20
remove	1D@.400	ea	—	17.60	17.60
remove for work, then reinstall	2A@1.46	ea	—	85.00	85.00



Clothes dryer, gas. Gas dryer with up to 20' of vent pipe. Deluxe and custom deluxe grades include steam dryers.

replace, economy grade	2A@1.94	ea	553.00	113.00	666.00
replace, standard grade	2A@1.94	ea	757.00	113.00	870.00
replace, high grade	2A@1.94	ea	1,130.00	113.00	1,243.00
replace, deluxe grade	2A@1.94	ea	1,360.00	113.00	1,473.00
replace, custom deluxe grade	2A@1.94	ea	1,780.00	113.00	1,893.00
remove	1D@.488	ea	—	21.50	21.50
remove for work, then reinstall	2A@2.59	ea	—	151.00	151.00

	Craft@Hrs	Unit	Material	Labor	Total
Trash compactor. Use high grade for compactor with cabinet-match door.					
replace, economy grade	2A@1.09	ea	614.00	63.40	677.40
replace, standard grade	2A@1.09	ea	728.00	63.40	791.40
replace, high grade	2A@1.09	ea	1,060.00	63.40	1,123.40
remove	1D@.288	ea	—	12.70	12.70
remove for work, then reinstall	2A@1.39	ea	.92	80.90	81.82



Time & Material Charts (selected items)

Appliance Materials

See Appliance material prices above.

Appliance Labor

Laborer	base wage	paid leave	true wage	taxes & ins.	total
Appliance installer	\$34.70	2.71	\$37.41	20.79	\$58.20
Appliance refinisher	\$40.00	3.12	\$43.12	26.28	\$69.40
Electrician	\$42.50	3.32	\$45.82	24.38	\$70.20
Plumber	\$44.70	3.49	\$48.19	26.91	\$75.10
Demolition laborer	\$24.10	1.88	\$25.98	18.12	\$44.10

Paid leave is calculated based on two weeks paid vacation, one week sick leave, and seven paid holidays. Employer's matching portion of **FICA** is 7.65 percent. **FUTA** (Federal Unemployment) is .8 percent. **Worker's compensation** was calculated using a national average of 7.36 percent for the appliance installer; 15.00 percent for the appliance refinisher; 8.08 percent for the electrician; 11.24 percent for the plumber; and 14.26 percent for the demolition laborer. **Unemployment insurance** was calculated using a national average of 8 percent. **Health insurance** was calculated based on a projected national average for 2019 of \$1,248 per employee (and family when applicable) per month. Employer pays 80 percent for a per month cost of \$998 per employee. **Retirement** is based on a 401(k) retirement program with employer matching of 50 percent. Employee contributions to the 401(k) plan are an average of 6 percent of the true wage. **Liability insurance** is based on a national average of 12.0 percent.

Appliances Labor Productivity

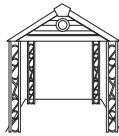
Install appliances					
gas cook top	7P@1.99	ea	—	149.00	149.00
gas range	7P@2.05	ea	—	154.00	154.00
space-saver gas range	7P@1.99	ea	—	149.00	149.00
gas range with double oven	7P@2.05	ea	—	154.00	154.00
restaurant-style gas range	7P@2.88	ea	—	216.00	216.00
gas wall oven	7P@1.79	ea	—	134.00	134.00
gas double wall oven	7P@2.22	ea	—	167.00	167.00
electric cook top	7E@1.32	ea	—	92.70	92.70
modular cooking unit	7E@.287	ea	—	20.10	20.10
modular electric cook top downdraft unit	7E@.287	ea	—	20.10	20.10
electric range	2A@1.05	ea	—	61.10	61.10
drop-in or slide-in electric range	2A@1.05	ea	—	61.10	61.10
space-saver electric range	2A@.980	ea	—	57.00	57.00
electric wall oven	7E@1.55	ea	—	109.00	109.00
electric double wall-oven	7E@2.72	ea	—	191.00	191.00
range hood	2A@1.33	ea	—	77.40	77.40
oversized range hood	2A@1.46	ea	—	85.00	85.00
dishwasher	2A@1.85	ea	—	108.00	108.00
convertible (portable) dishwasher	2A@1.18	ea	—	68.70	68.70
space-saver under-sink dishwasher	2A@2.63	ea	—	153.00	153.00

	Craft@Hrs	Unit	Material	Labor	Total
garbage disposal	7P@1.51	ea	—	113.00	113.00
microwave oven	2A@.290	ea	—	16.90	16.90
microwave oven under cabinet	2A@.950	ea	—	55.30	55.30
side-by-side refrigerator / freezer	2A@.813	ea	—	47.30	47.30
refrigerator with freezer top or bottom	2A@.700	ea	—	40.70	40.70
disconnect refrig. water lines for work, reinstall	2A@.283	ea	—	16.50	16.50
refreshment center plumbing hook-up in existing building	7P@2.22	ea	—	167.00	167.00
refreshment center plumbing hook-up in new construction	7P@1.37	ea	—	103.00	103.00
trash compactor	2A@1.09	ea	—	63.40	63.40
clothes washing machine	2A@1.49	ea	—	86.70	86.70
clothes dryer, electric	2A@.932	ea	—	54.20	54.20

Awnings

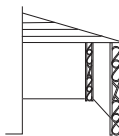
Free-standing carport. 40 psf. Aluminum with baked enamel finish. Includes 4 posts for carports under 200 sf, 6 to 8 posts for carports over 200 sf.

	Craft@Hrs	Unit	Material	Labor	Total
Free-standing aluminum carport					
replace, 150 sf or less	6A@.077	sf	20.10	3.98	24.08
replace, 151 to 250 sf	6A@.077	sf	18.80	3.98	22.78
replace, 251 to 480 sf	6A@.077	sf	17.10	3.98	21.08
add for heavy gauge aluminum	—	sf	2.33	—	2.33
remove	1D@.050	sf	—	2.21	2.21
remove for work, then reinstall	6A@.161	sf	.67	8.32	8.99



Attached carport. 40 psf. Aluminum with baked enamel finish. Includes 3 posts for carports and patio covers under 200 sf, 4 to 5 posts for carports and patio covers over 200 sf.

	Craft@Hrs	Unit	Material	Labor	Total
Attached aluminum carport or patio cover					
replace, 150 sf or less	6A@.071	sf	19.40	3.67	23.07
replace, 151 to 250 sf	6A@.071	sf	18.50	3.67	22.17
replace, 251 to 480 sf	6A@.071	sf	16.60	3.67	20.27
add for heavy gauge aluminum	—	sf	2.44	—	2.44
remove	1D@.054	sf	—	2.38	2.38
remove for work, then reinstall	6A@.150	sf	.67	7.76	8.43



Minimum charge.

for carport or patio cover work	6A@1.85	ea	66.00	95.60	161.60
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Carport or patio cover parts.

Post					
replace	6A@.687	ea	31.40	35.50	66.90
remove	1D@.280	ea	—	12.30	12.30
remove, for work, then reinstall	6A@.925	ea	2.84	47.80	50.64
Scroll post					
replace, cover post scroll	6A@.722	ea	57.60	37.30	94.90
remove	1D@.280	ea	—	12.30	12.30
remove, for work, then reinstall	6A@.994	ea	1.29	51.40	52.69

	Craft@Hrs	Unit	Material	Labor	Total
Fascia, aluminum					
replace	6A@.080	lf	9.36	4.14	13.50
remove	1D@.028	lf	—	1.23	1.23
remove, for work, then reinstall	6A@.110	lf	—	5.69	5.69
Roof panel					
replace	6A@.622	ea	64.50	32.20	96.70
remove	1D@.488	ea	—	21.50	21.50
remove, for work, then reinstall	6A@1.14	ea	5.17	58.90	64.07
Downspout					
replace	6A@.082	ea	27.10	4.24	31.34
remove	1D@.075	ea	—	3.31	3.31
remove for work, then reinstall	6A@.145	ea	—	7.50	7.50

Door awning. 25 to 40 psf. Aluminum with baked enamel finish. Includes all hardware and adjustable supports.

42" projection door awning					
replace, 2 to 4 lf	6A@.464	lf	81.40	24.00	105.40
replace, 5 to 8 lf	6A@.464	lf	87.10	24.00	111.10
replace, 9 to 12 lf	6A@.464	lf	94.60	24.00	118.60
remove	1D@.248	lf	—	10.90	10.90
remove for work, then reinstall	6A@.873	lf	8.40	45.10	53.50
54" projection door awning					
replace, 2 to 4 lf	6A@.484	lf	91.70	25.00	116.70
replace, 5 to 8 lf	6A@.484	lf	98.10	25.00	123.10
replace, 9 to 12 lf	6A@.484	lf	108.00	25.00	133.00
remove	1D@.250	lf	—	11.00	11.00
remove for work, then reinstall	6A@.878	lf	8.40	45.40	53.80
Minimum charge for door awning work	6A@1.85	ea	66.00	95.60	161.60

Window awning. 25 to 40 psf. Aluminum with baked enamel finish. Includes all hardware and adjustable supports.

3' high window awning					
replace, 2 to 4 lf	6A@.424	lf	74.80	21.90	96.70
replace, 5 to 8 lf	6A@.424	lf	58.40	21.90	80.30
replace, 9 to 12 lf	6A@.424	lf	55.00	21.90	76.90
remove	1D@.024	lf	—	1.06	1.06
remove for work, then reinstall	6A@.550	lf	8.40	28.40	36.80
4' high window awning					
replace, 2 to 4 lf	6A@.454	lf	87.50	23.50	111.00
replace, 5 to 8 lf	6A@.454	lf	72.20	23.50	95.70
replace, 9 to 12 lf	6A@.454	lf	67.60	23.50	91.10
remove	1D@.028	lf	—	1.23	1.23
remove for work, then reinstall	6A@.589	lf	8.40	30.50	38.90
5' high window awning					
replace, 2 to 4 lf	6A@.470	lf	116.00	24.30	140.30
replace, 5 to 8 lf	6A@.470	lf	106.00	24.30	130.30
replace, 9 to 12 lf	6A@.470	lf	83.60	24.30	107.90
remove	1D@.030	lf	—	1.32	1.32
remove for work, then reinstall	6A@.595	lf	8.40	30.80	39.20
6' high window awning					
replace, 2 to 4 lf	6A@.479	lf	133.00	24.80	157.80
replace, 5 to 8 lf	6A@.479	lf	128.00	24.80	152.80

	Craft@Hrs	Unit	Material	Labor	Total
replace, 9 to 12 lf	6A@.479	lf	98.20	24.80	123.00
remove	1D@.038	lf	—	1.68	1.68
remove for work, then reinstall	6A@.631	lf	8.40	32.60	41.00
Minimum charge for window awning work	6A@1.85	ea	66.00	95.60	161.60

Door or window awning slat. Includes prefinished standard length single slat up to 8' long in slat-style aluminum awning. Can be horizontal- or vertical-slat style. Includes replacement slat and hardware. Does not include painting or finishing slat to match.

replace	6A@.381	ea	22.80	19.70	42.50
remove	1D@.232	ea	—	10.20	10.20

Roll-up awning. Security awning that covers window. Aluminum with baked enamel finish. Includes all hardware and adjustable supports.

replace, 2 to 5 lf	6A@.274	lf	83.90	14.20	98.10
replace, 6 to 12 lf	6A@.274	lf	64.10	14.20	78.30
remove	1D@.409	lf	—	18.00	18.00
remove for work, then reinstall	6A@.599	lf	6.46	31.00	37.46

Canvas awning. Waterproof acrylic duck colorfast fabric with retractable metal frame and hardware.

24" drop canvas awning					
replace, 2 to 3 lf	6A@.484	lf	114.00	25.00	139.00
replace, 4 to 5 lf	6A@.493	lf	108.00	25.50	133.50
30" drop canvas awning					
replace, 2 to 3 lf	6A@.526	lf	133.00	27.20	160.20
replace, 4 to 5 lf	6A@.526	lf	118.00	27.20	145.20
replace, 5 to 6 lf	6A@.526	lf	107.00	27.20	134.20
replace, 7 to 8 lf	6A@.526	lf	94.70	27.20	121.90
replace, 9 to 10 lf	6A@.526	lf	77.90	27.20	105.10
replace, 11 to 12 lf	6A@.526	lf	72.00	27.20	99.20
remove	1D@.324	lf	—	14.30	14.30
remove canvas awning for work, then reinstall	6A@1.15	lf	6.60	59.50	66.10
Minimum charge for canvas awning work	6A@1.65	ea	55.70	85.30	141.00

Vinyl awning. Vinyl awning with acrylic coating. Includes metal frame and all hardware.

24" drop vinyl awning					
replace, 2 to 3 lf	6A@.491	lf	68.30	25.40	93.70
replace, 4 to 5 lf	6A@.491	lf	62.30	25.40	87.70
30" drop vinyl awning					
replace, 2 to 3 lf	6A@.520	lf	80.00	26.90	106.90
replace, 4 to 5 lf	6A@.520	lf	69.90	26.90	96.80
replace, 5 to 6 lf	6A@.520	lf	63.70	26.90	90.60
replace, 7 to 8 lf	6A@.520	lf	51.00	26.90	77.90
replace, 9 to 10 lf	6A@.520	lf	46.70	26.90	73.60
replace, 11 to 12 lf	6A@.520	lf	45.30	26.90	72.20
remove	1D@.324	lf	—	14.30	14.30
remove awning for work then reinstall	6A@1.13	lf	6.60	58.40	65.00
Minimum charge for vinyl awning work	6A@1.47	ea	37.50	76.00	113.50

Craft@Hrs Unit Material Labor Total

Time & Material Charts (selected items)**Awning Materials**

Aluminum carport					
free-standing, 151 to 250 sf	—	sf	19.00	—	19.00
attached, 151 to 250 sf	—	sf	18.70	—	18.70
Aluminum door awning					
with 42" projection, 5 to 8 lf	—	lf	88.30	—	88.30
with 54" projection, 5 to 8 lf	—	lf	99.40	—	99.40
Aluminum window awning					
3' high, 5 to 8 lf	—	lf	59.30	—	59.30
6' high, 5 to 8 lf	—	lf	129.00	—	129.00
Roll-up aluminum awning					
2 to 5 lf	—	lf	85.20	—	85.20
6 to 12 lf	—	lf	64.90	—	64.90
Canvas awning					
24" drop, 2 to 3 lf	—	lf	115.00	—	115.00
24" drop, 4 to 5 lf	—	lf	109.00	—	109.00
30" drop, 2 to 3 lf	—	lf	134.00	—	134.00
30" drop, 7 to 8 lf	—	lf	96.30	—	96.30
30" drop, 11 to 12 lf	—	lf	72.90	—	72.90
Vinyl awning					
24" drop, 2 to 3 lf	—	lf	69.20	—	69.20
24" drop, 4 to 5 lf	—	lf	63.50	—	63.50
30" drop, 2 to 3 lf	—	lf	80.90	—	80.90
30" drop, 7 to 8 lf	—	lf	51.60	—	51.60
30" drop, 11 to 12 lf	—	lf	46.10	—	46.10

Awning Labor

Laborer	base wage	paid leave	true wage	taxes & ins.	total
Awning installer	\$32.80	2.56	\$35.36	23.44	\$58.80
Awning installer's helper	\$23.90	1.86	\$25.76	18.74	\$44.50
Demolition laborer	\$24.10	1.88	\$25.98	18.12	\$44.10

Paid leave is calculated based on two weeks paid vacation, one week sick leave, and seven paid holidays. Employer's matching portion of **FICA** is 7.65 percent. **FUTA** (Federal Unemployment) is .8 percent. **Worker's compensation** for the awning trade was calculated using a national average of 17.00 percent. **Unemployment insurance** was calculated using a national average of 8 percent. **Health insurance** was calculated based on a projected national average for 2019 of \$1,248 per employee (and family when applicable) per month. Employer pays 80 percent for a per month cost of \$998 per employee. **Retirement** is based on a 401(k) retirement program with employer matching of 50 percent. Employee contributions to the 401(k) plan are an average of 6 percent of the true wage. **Liability insurance** is based on a national average of 12.0 percent.

Awning Installation Crew

install, awnings and patio covers	awning installer	\$58.80
install, awnings and patio covers	awning installer's helper	\$44.50
awning installation crew	awning installation crew	\$51.70

	Craft@Hrs	Unit	Material	Labor	Total
Awning Labor Productivity					
Install aluminum carport or patio cover					
free-standing carport	6A@.077	sf	—	3.98	3.98
attached carport or patio	6A@.071	sf	—	3.67	3.67
Install aluminum door awning					
42" projection	6A@.464	lf	—	24.00	24.00
54" projection	6A@.484	lf	—	25.00	25.00
Install aluminum window awning					
3' high	6A@.424	lf	—	21.90	21.90
4' high	6A@.454	lf	—	23.50	23.50
5' high	6A@.470	lf	—	24.30	24.30
6' high	6A@.479	lf	—	24.80	24.80
Install roll-up aluminum awning					
per lf	6A@.274	lf	—	14.20	14.20
Install canvas awning					
24" drop	6A@.493	lf	—	25.50	25.50
30" drop	6A@.526	lf	—	27.20	27.20
Install vinyl awning					
24" drop	6A@.491	lf	—	25.40	25.40
30" drop	6A@.520	lf	—	26.90	26.90

Bathroom Hardware

Hardware Quality. Here are some "rules of thumb" for determining bathroom hardware quality. Economy: Light-gauge metal, chrome plated. May have some plastic components. Little or no pattern. Standard: Heavier gauge metal, chrome or brass plated with little or no pattern, or wood hardware made of ash or oak. High: Brass, chrome over brass, or nickel over brass with minimal detail, or plated hardware with ornate detail, or European-style curved plastic, or hardware with porcelain components, or wood hardware made of walnut, cherry or similar wood. Deluxe: Brass, chrome over brass, or nickel over brass with ornate detail. Antique Reproduction / Custom: Brass, chrome over brass, or nickel over brass with ornate antique-style detail.

Minimum charge.

for bathroom hardware work	1C@.563	ea	30.90	36.80	67.70
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Complete bath hardware. Bathroom with toilet, sink, and bathtub / shower. Includes towel bar, wash cloth bar, door-mount robe hook, toilet paper dispenser, and cup / toothbrush holder.

replace, economy grade	1C@4.02	ea	156.00	263.00	419.00
replace, standard grade	1C@4.02	ea	291.00	263.00	554.00
replace, high grade	1C@4.02	ea	426.00	263.00	689.00
replace, deluxe grade	1C@4.02	ea	575.00	263.00	838.00
replace, custom grade	1C@4.02	ea	654.00	263.00	917.00
replace, antique reproduction	1C@4.02	ea	1,070.00	263.00	1,333.00
remove	1D@2.22	ea	—	97.90	97.90

	Craft@Hrs	Unit	Material	Labor	Total
1/2 bath hardware. Bathroom with toilet and sink. Includes wash cloth bar, towel ring, and toilet paper dispenser.					
replace, economy grade	1C@2.17	ea	50.90	142.00	192.90
replace, standard grade	1C@2.17	ea	99.10	142.00	241.10
replace, high grade	1C@2.17	ea	143.00	142.00	285.00
replace, deluxe grade	1C@2.17	ea	196.00	142.00	338.00
replace, custom grade	1C@2.17	ea	223.00	142.00	365.00
replace, antique reproduction	1C@2.17	ea	377.00	142.00	519.00
remove	1D@1.60	ea	—	70.60	70.60

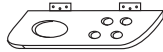
Glass bathroom shelf. 21" x 5-1/2".

replace, glass	1C@.283	ea	54.10	18.50	72.60
replace, glass & brass	1C@.283	ea	76.40	18.50	94.90
remove	1D@.205	ea	—	9.04	9.04
remove for work, then reinstall	1C@.300	ea	—	19.60	19.60



Cup & toothbrush holder.

replace, standard grade	1C@.169	ea	14.90	11.00	25.90
replace, high grade	1C@.169	ea	24.40	11.00	35.40
remove	1D@.163	ea	—	7.19	7.19
remove for work, then reinstall	1C@.217	ea	—	14.20	14.20



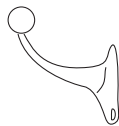
Door-mounted clothes hanger.

replace, standard grade	1C@.141	ea	13.20	9.21	22.41
replace, high grade	1C@.141	ea	22.10	9.21	31.31
remove	1D@.139	ea	—	6.13	6.13
remove for work, then reinstall	1C@.175	ea	—	11.40	11.40



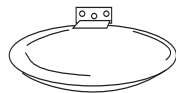
Robe hook.

replace, standard grade	1C@.141	ea	14.90	9.21	24.11
replace, high grade	1C@.141	ea	25.30	9.21	34.51
remove	1D@.139	ea	—	6.13	6.13
remove for work, then reinstall	1C@.175	ea	—	11.40	11.40



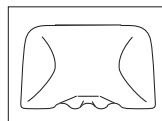
Soap holder.


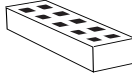
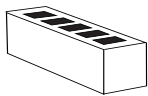
replace, standard grade	1C@.169	ea	28.20	11.00	39.20
replace, high grade	1C@.169	ea	47.90	11.00	58.90
remove	1D@.163	ea	—	7.19	7.19
remove for work, then reinstall	1C@.217	ea	—	14.20	14.20




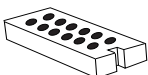

Recessed soap holder.

replace, standard grade	1C@.201	ea	29.40	13.10	42.50
replace, high grade	1C@.201	ea	60.90	13.10	74.00
remove	1D@.163	ea	—	7.19	7.19
remove for work, then reinstall	1C@.267	ea	—	17.40	17.40

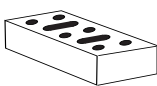


		Craft@Hrs	Unit	Material	Labor	Total
replace, Norwegian brick		4M@.111	sf	5.20	6.56	11.76
jumbo utility brick		4M@.102	sf	6.63	6.03	12.66
triple brick		4M@.096	sf	5.42	5.67	11.09
remove		1D@.087	sf	—	3.84	3.84

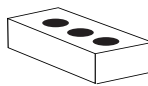
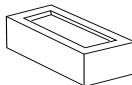
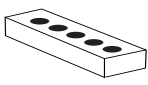

6" wide brick wall. With 3/8" wide mortar joints. Includes 4% waste for brick and 25% waste for mortar.


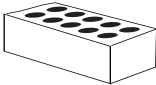
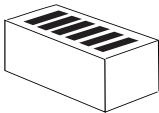

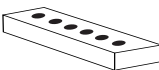
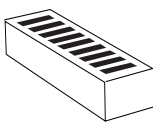
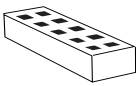
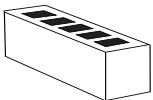
replace, Norwegian brick wall		4M@.124	sf	7.16	7.33	14.49
replace, Norman brick wall		4M@.148	sf	8.81	8.75	17.56
replace, jumbo brick wall		4M@.113	sf	8.01	6.68	14.69
remove		1D@.104	sf	—	4.59	4.59

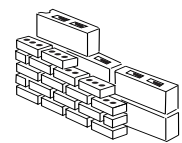
8" wide brick wall. With 3/8" wide mortar joints. Includes 4% waste for brick and 25% waste for mortar.

replace, jumbo brick		4M@.127	sf	9.33	7.51	16.84
remove		1D@.132	sf	—	5.82	5.82


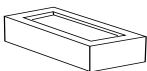
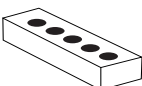

8" wide double wythe brick wall. With 3/8" wide mortar joints. Includes 4% waste for brick and 25% waste for mortar.

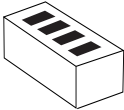
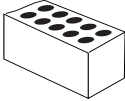
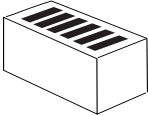
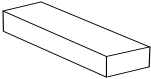
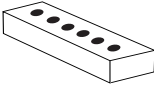
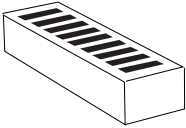
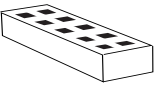
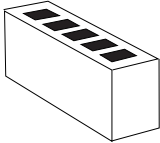
replace, standard non-modular brick		4M@.307	sf	17.40	18.10	35.50
replace, oversize non-modular brick		4M@.303	sf	14.40	17.90	32.30
replace, three-inch non-modular brick		4M@.300	sf	14.30	17.70	32.00
replace, standard brick		4M@.305	sf	12.50	18.00	30.50

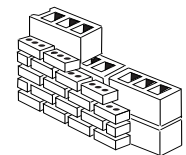
		Craft@Hrs	Unit	Material	Labor	Total
replace, engineer brick		4M@.253	sf	12.80	15.00	27.80
replace, jumbo closure brick		4M@.216	sf	12.80	12.80	25.60
replace, double brick		4M@.181	sf	10.70	10.70	21.40
replace, Roman brick		4M@.287	sf	17.20	17.00	34.20
replace, Norman brick		4M@.234	sf	13.90	13.80	27.70
replace, Norwegian brick		4M@.199	sf	10.90	11.80	22.70
replace, jumbo utility brick		4M@.184	sf	13.70	10.90	24.60
replace, triple brick		4M@.173	sf	11.50	10.20	21.70
remove		1D@.132	sf	—	5.82	5.82



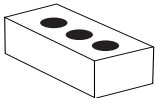
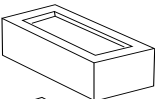
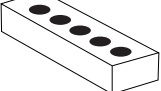
8" wide brick & block wall. 8" wide wall with 4" wide brick and 4" wide concrete block. With 3/8" wide mortar joints. Includes 4% waste for brick and block and 25% waste for mortar.

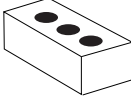

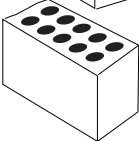
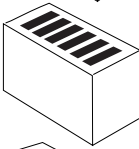
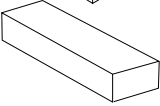
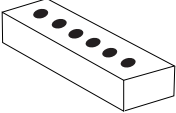
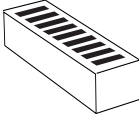
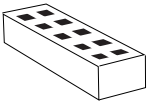
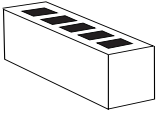
replace, standard non-modular brick		4M@.233	sf	12.10	13.80	25.90
replace, oversize non-modular brick		4M@.231	sf	10.70	13.70	24.40
replace, three-inch non-modular brick		4M@.230	sf	10.50	13.60	24.10
replace, standard brick		4M@.233	sf	9.61	13.80	23.41

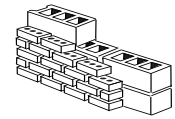
		Craft@Hrs	Unit	Material	Labor	Total
replace, engineer brick		4M@.206	sf	9.86	12.20	22.06
replace, jumbo closure brick		4M@.188	sf	9.88	11.10	20.98
replace, double brick		4M@.170	sf	8.78	10.00	18.78
replace, Roman brick		4M@.224	sf	12.00	13.20	25.20
replace, Norman brick		4M@.197	sf	10.40	11.60	22.00
replace, Norwegian brick		4M@.180	sf	8.88	10.60	19.48
replace, jumbo utility brick		4M@.172	sf	10.30	10.20	20.50
replace, triple brick		4M@.166	sf	9.10	9.81	18.91
remove		1D@.132	sf	—	5.82	5.82



10" wide brick & block wall. 10" wide wall with 4" wide brick and 6" wide concrete block. With 3/8" wide mortar joints. Includes 4% waste for brick and block and 25% waste for mortar.

replace, standard non-modular brick		4M@.236	sf	12.60	13.90	26.50
replace, oversize non-modular brick		4M@.234	sf	11.10	13.80	24.90
replace, three-inch non-modular brick		4M@.233	sf	11.10	13.80	24.90

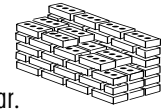
		Craft@Hrs	Unit	Material	Labor	Total
replace, standard brick		4M@.235	sf	10.20	13.90	24.10
replace, engineer brick		4M@.209	sf	10.40	12.40	22.80
replace, jumbo closure brick		4M@.190	sf	10.40	11.20	21.60
replace, double brick		4M@.173	sf	9.28	10.20	19.48
replace, Roman brick		4M@.226	sf	12.50	13.40	25.90
replace, Norman brick		4M@.200	sf	10.90	11.80	22.70
replace, Norwegian brick		4M@.182	sf	9.44	10.80	20.24
replace, jumbo utility brick		4M@.175	sf	10.90	10.30	21.20
replace, triple brick		4M@.170	sf	9.63	10.00	19.63
remove		1D@.149	sf	—	6.57	6.57



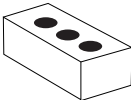
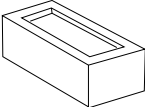
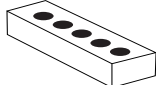
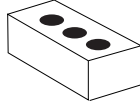
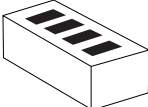
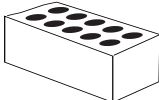
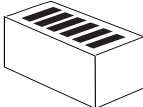
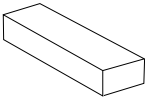
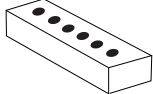
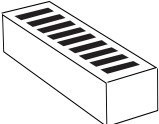
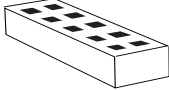
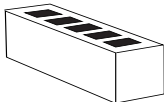
12" wide brick & block wall. 12" wide wall with 4" wide brick and 8" wide concrete block. With 3/8" wide mortar joints. Includes 4% waste for brick and block and 25% waste for mortar.

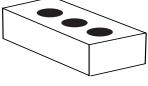
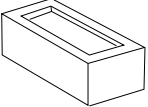
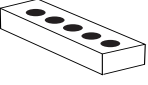
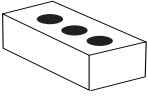

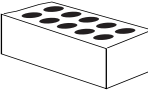
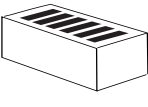
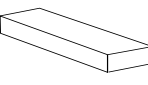
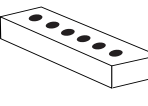
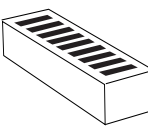
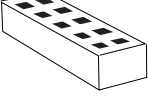
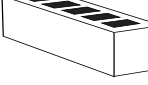
		Craft@Hrs	Unit	Material	Labor	Total
replace, standard non-modular brick		4M@.240	sf	13.40	14.20	27.60
replace, oversize non-modular brick		4M@.239	sf	12.10	14.10	26.20
replace, three-inch non-modular brick		4M@.237	sf	12.10	14.00	26.10
replace, standard brick		4M@.240	sf	11.10	14.20	25.30
replace, engineer brick		4M@.214	sf	11.40	12.60	24.00
replace, jumbo closure brick		4M@.195	sf	11.50	11.50	23.00
replace, double brick		4M@.178	sf	10.20	10.50	20.70
replace, Roman brick		4M@.231	sf	13.30	13.70	27.00
replace, Norman brick		4M@.204	sf	12.00	12.10	24.10
replace, Norwegian brick		4M@.187	sf	10.40	11.10	21.50
replace, jumbo utility brick		4M@.180	sf	11.90	10.60	22.50
replace, triple brick		4M@.174	sf	10.50	10.30	20.80
remove		1D@.177	sf	—	7.81	7.81

Craft@Hrs Unit Material Labor Total



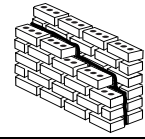
12" wide triple wythe brick wall. With 3/8" wide mortar joints. Includes 4% waste for brick and 25% waste for mortar.

replace, standard non-modular brick		4M@.433	sf	25.70	25.60	51.30
replace, oversize non-modular brick		4M@.427	sf	21.10	25.20	46.30
replace, three-inch non-modular brick		4M@.424	sf	21.30	25.10	46.40
replace, standard brick		4M@.429	sf	18.40	25.40	43.80
replace, engineer brick		4M@.357	sf	19.00	21.10	40.10
replace, jumbo closure brick		4M@.305	sf	19.00	18.00	37.00
replace, double brick		4M@.255	sf	15.80	15.10	30.90
replace, Roman brick		4M@.407	sf	25.50	24.10	49.60
replace, Norman brick		4M@.330	sf	20.80	19.50	40.30
replace, Norwegian brick		4M@.282	sf	16.40	16.70	33.10
replace, jumbo utility brick		4M@.260	sf	20.50	15.40	35.90
replace, triple brick		4M@.244	sf	17.00	14.40	31.40
remove		1D@.177	sf	—	7.81	7.81

		Craft@Hrs	Unit	Material	Labor	Total
replace, standard non-modular brick		4M@.244	sf	12.20	14.40	26.60
replace, oversize non-modular brick		4M@.240	sf	10.80	14.20	25.00
replace, three-inch non-modular brick		4M@.240	sf	10.80	14.20	25.00
replace, standard brick		4M@.244	sf	9.82	14.40	24.22
replace, engineer brick		4M@.216	sf	10.00	12.80	22.80
replace, jumbo closure brick		4M@.196	sf	10.00	11.60	21.60
replace, double brick		4M@.178	sf	8.92	10.50	19.42
replace, Roman brick		4M@.234	sf	12.10	13.80	25.90
replace, Norman brick		4M@.206	sf	10.50	12.20	22.70
replace, Norwegian brick		4M@.188	sf	9.04	11.10	20.14
replace, jumbo utility brick		4M@.180	sf	10.40	10.60	21.00
replace, triple brick		4M@.174	sf	9.25	10.30	19.55
remove		1D@.132	sf	—	5.82	5.82

Craft@Hrs Unit Material Labor Total

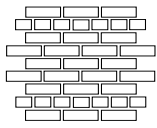
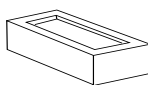
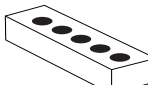


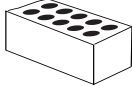

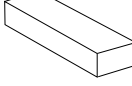
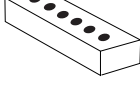

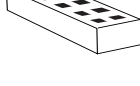
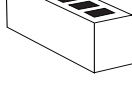
10" wide brick cavity wall. Made from 4" wide brick on both sides. With 2" dead air space (see cavity wall insulation below) and 3/8" wide mortar joints. Includes 4% waste for brick and 25% waste for mortar.

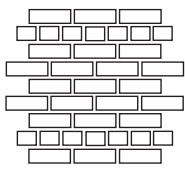


replace, standard non-modular brick		4M@.321	sf	17.50	19.00	36.50
replace, oversize non-modular brick		4M@.317	sf	14.50	18.70	33.20
replace, three-inch non-modular brick		4M@.314	sf	14.40	18.60	33.00
replace, standard brick		4M@.319	sf	12.60	18.90	31.50
replace, engineer brick		4M@.266	sf	13.00	15.70	28.70
replace, jumbo closure brick		4M@.226	sf	13.00	13.40	26.40
replace, double brick		4M@.189	sf	10.90	11.20	22.10
replace, Roman brick		4M@.301	sf	17.30	17.80	35.10
replace, Norman brick		4M@.245	sf	14.20	14.50	28.70
replace, Norwegian brick		4M@.209	sf	11.10	12.40	23.50
replace, jumbo utility brick		4M@.193	sf	13.90	11.40	25.30
replace, triple brick		4M@.181	sf	11.60	10.70	22.30
remove		1D@.132	sf	—	5.82	5.82

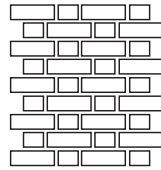
Add for cavity wall insulation.

2" polystyrene		4M@.001	sf	1.25	.06	1.31
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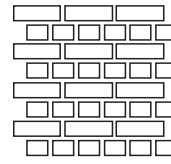
		Craft@Hrs	Unit	Material	Labor	Total
						
Brick veneer. With 3/8" wide mortar joints. Includes 4% waste for brick and 25% waste for mortar.				<i>common bond</i>		
replace, standard non-modular brick		4M@.144	sf	8.38	8.51	16.89
replace, oversize non-modular brick		4M@.143	sf	6.97	8.45	15.42
replace, three-inch non-modular brick		4M@.141	sf	6.88	8.33	15.21
replace, used brick		4M@.144	sf	12.10	8.51	20.61
replace, standard brick		4M@.144	sf	5.94	8.51	14.45
replace, engineer brick		4M@.119	sf	6.17	7.03	13.20
replace, jumbo closure brick		4M@.102	sf	6.19	6.03	12.22
replace, double brick		4M@.085	sf	5.08	5.02	10.10
replace, Roman brick		4M@.136	sf	8.23	8.04	16.27
replace, Norman brick		4M@.110	sf	6.75	6.50	13.25
replace, Norwegian brick		4M@.094	sf	5.20	5.56	10.76
replace, jumbo utility brick		4M@.087	sf	6.63	5.14	11.77
replace, triple brick		4M@.082	sf	5.42	4.85	10.27
remove		1D@.082	sf	—	3.62	3.62



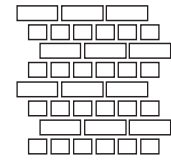
common bond



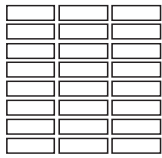
Flemish bond



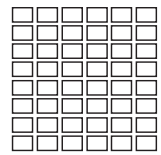
English bond



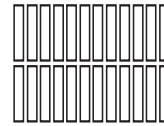
English cross bond



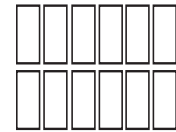
stack bond



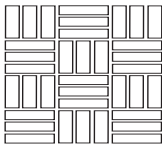
header bond



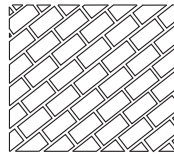
soldier course



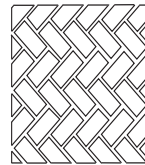
sailor course



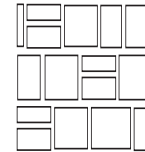
basketweave



diagonal



herringbone



coursed ashlar style

Craft@Hrs Unit Material Labor Total

Add for other brick bonds. All brick prices above are for running bond. For other bonds add the percentage listed below.

add for common bond (also called American bond)	—	%	—	16.0	—
add for Flemish bond	—	%	—	54.0	—
add for English bond	—	%	—	65.0	—
add for English cross bond (also called Dutch bond)	—	%	—	65.0	—
add for stack bond	—	%	—	8.0	—
add for false all header bond	—	%	—	116.0	—
add for all header bond	—	%	—	115.0	—
add for soldier course	—	%	—	15.0	—
add for sailor course	—	%	—	5.0	—
add for basketweave	—	%	—	122.0	—
add for herringbone weave	—	%	—	125.0	—
add for diagonal bond	—	%	—	90.0	—
add for coursed ashlar style brick bond with two sizes of bricks	—	%	—	70.0	—
add for curved brick walls	—	%	—	27.0	—

Add for openings in brick wall. Use only if sf of opening has been deducted from sf price. Includes angle iron lintel. Replace only.

4" wide wall	4M@.260	If	7.02	15.40	22.42
6" wide wall	4M@.263	If	12.20	15.50	27.70
8" wide wall	4M@.265	If	12.20	15.70	27.90
10" wide wall	4M@.270	If	14.10	16.00	30.10
12" wide wall	4M@.272	If	14.10	16.10	30.20

	Craft@Hrs	Unit	Material	Labor	Total
22" wide fixed skylight					
28" long	1C@2.69	ea	338.00	176.00	514.00
38" long	1C@2.69	ea	395.00	176.00	571.00
48" long	1C@2.69	ea	441.00	176.00	617.00
55" long	1C@2.69	ea	482.00	176.00	658.00
30" wide fixed skylight					
38" long	1C@2.69	ea	456.00	176.00	632.00
55" long	1C@2.69	ea	558.00	176.00	734.00
44" wide fixed skylight					
28" long	1C@2.69	ea	496.00	176.00	672.00
48" long	1C@2.69	ea	633.00	176.00	809.00
22" wide fixed skylight with ventilation flap					
28" long	1C@2.69	ea	383.00	176.00	559.00
38" long	1C@2.69	ea	441.00	176.00	617.00
48" long	1C@2.69	ea	490.00	176.00	666.00
55" long	1C@2.69	ea	519.00	176.00	695.00
30" wide fixed skylight with ventilation flap					
38" long	1C@2.69	ea	516.00	176.00	692.00
55" long	1C@2.69	ea	602.00	176.00	778.00
44" wide fixed skylight with ventilation flap					
28" long	1C@2.69	ea	576.00	176.00	752.00
48" long	1C@2.69	ea	694.00	176.00	870.00
22" wide ventilating skylight					
28" long	1C@2.94	ea	637.00	192.00	829.00
38" long	1C@2.94	ea	694.00	192.00	886.00
48" long	1C@2.94	ea	758.00	192.00	950.00
55" long	1C@2.94	ea	789.00	192.00	981.00
30" wide ventilating skylight					
38" long	1C@2.94	ea	770.00	192.00	962.00
55" long	1C@2.94	ea	888.00	192.00	1,080.00
44" wide ventilating skylight					
28" long	1C@2.94	ea	810.00	192.00	1,002.00
48" long	1C@2.94	ea	990.00	192.00	1,182.00
22" wide roof window					
28" long	1C@2.94	ea	871.00	192.00	1,063.00
48" long	1C@2.94	ea	961.00	192.00	1,153.00
30" wide roof window					
38" long	1C@2.94	ea	967.00	192.00	1,159.00
55" long	1C@2.94	ea	1,100.00	192.00	1,292.00
44" wide roof window					
55" long	1C@2.94	ea	1,200.00	192.00	1,392.00
Add for cord-operated roller shades					
28" long	1C@.832	ea	91.70	54.30	146.00
38" long	1C@.832	ea	91.70	54.30	146.00
48" long	1C@.832	ea	91.70	54.30	146.00
55" long	1C@.832	ea	91.70	54.30	146.00

	Craft@Hrs	Unit	Material	Labor	Total
Add for motorized rod cord control for roller shades all sizes	—	ea	286.00	—	286.00
Add for manually controlled Venetian blinds					
28" long	—	ea	129.00	—	129.00
38" long	—	ea	154.00	—	154.00
48" long	—	ea	162.00	—	162.00
55" long	—	ea	204.00	—	204.00
Add for electrically controlled skylight system					
28" long	1C@2.00	ea	210.00	131.00	341.00
38" long	1C@2.00	ea	210.00	131.00	341.00
48" long	1C@2.00	ea	210.00	131.00	341.00
55" long	1C@2.00	ea	210.00	131.00	341.00
Add for electrically controlled window or skylight opener					
28" long	1C@1.39	ea	210.00	90.80	300.80
38" long	1C@1.39	ea	210.00	90.80	300.80
48" long	1C@1.39	ea	210.00	90.80	300.80
55" long	1C@1.39	ea	210.00	90.80	300.80
Add for infrared remote control system for opener					
28" long	1C@1.11	ea	465.00	72.50	537.50
38" long	1C@1.11	ea	465.00	72.50	537.50
48" long	1C@1.11	ea	465.00	72.50	537.50
55" long	1C@1.11	ea	465.00	72.50	537.50

Storm window.

24" wide aluminum storm window					
24" tall	1C@1.00	ea	100.00	65.30	165.30
36" tall	1C@1.00	ea	145.00	65.30	210.30
48" tall	1C@1.00	ea	180.00	65.30	245.30
60" tall	1C@1.00	ea	204.00	65.30	269.30
36" wide aluminum storm window					
24" tall	1C@1.00	ea	145.00	65.30	210.30
36" tall	1C@1.00	ea	191.00	65.30	256.30
48" tall	1C@1.00	ea	225.00	65.30	290.30
60" tall	1C@1.08	ea	256.00	70.50	326.50
48" wide aluminum storm window					
24" tall	1C@1.00	ea	180.00	65.30	245.30
36" tall	1C@1.00	ea	225.00	65.30	290.30
48" tall	1C@1.08	ea	268.00	70.50	338.50
60" tall	1C@1.08	ea	311.00	70.50	381.50
60" wide aluminum storm window					
24" tall	1C@1.00	ea	204.00	65.30	269.30
36" tall	1C@1.08	ea	256.00	70.50	326.50
48" tall	1C@1.08	ea	311.00	70.50	381.50
60" tall	1C@1.08	ea	363.00	70.50	433.50
72" wide aluminum storm window					
24" tall	1C@1.00	ea	225.00	65.30	290.30
36" tall	1C@1.08	ea	290.00	70.50	360.50
48" tall	1C@1.08	ea	355.00	70.50	425.50
60" tall	1C@1.22	ea	418.00	79.70	497.70

	Craft@Hrs	Unit	Material	Labor	Total
24" wide wood storm window					
24" tall	1C@1.00	ea	120.00	65.30	185.30
36" tall	1C@1.00	ea	170.00	65.30	235.30
48" tall	1C@1.00	ea	197.00	65.30	262.30
60" tall	1C@1.00	ea	224.00	65.30	289.30
36" wide wood storm window					
24" tall	1C@1.00	ea	170.00	65.30	235.30
36" tall	1C@1.00	ea	206.00	65.30	271.30
48" tall	1C@1.00	ea	242.00	65.30	307.30
60" tall	1C@1.08	ea	278.00	70.50	348.50
48" wide wood storm window					
24" tall	1C@1.00	ea	197.00	65.30	262.30
36" tall	1C@1.00	ea	242.00	65.30	307.30
48" tall	1C@1.08	ea	290.00	70.50	360.50
60" tall	1C@1.08	ea	334.00	70.50	404.50
60" wide wood storm window					
24" tall	1C@1.00	ea	224.00	65.30	289.30
36" tall	1C@1.08	ea	278.00	70.50	348.50
48" tall	1C@1.08	ea	334.00	70.50	404.50
60" tall	1C@1.08	ea	394.00	70.50	464.50
72" wide wood storm window					
24" tall	1C@1.00	ea	242.00	65.30	307.30
36" tall	1C@1.08	ea	312.00	70.50	382.50
48" tall	1C@1.08	ea	383.00	70.50	453.50
60" tall	1C@1.22	ea	452.00	79.70	531.70

Window screen. Includes prefabricated window screen with aluminum frame and installation. Screens are made to match existing windows and include a tinted or mill-finish frame with fiberglass mesh.

24" wide window screen					
24" tall	1C@.125	ea	16.50	8.16	24.66
36" tall	1C@.125	ea	19.90	8.16	28.06
48" tall	1C@.125	ea	22.60	8.16	30.76
60" tall	1C@.125	ea	27.10	8.16	35.26
36" wide window screen					
24" tall	1C@.125	ea	19.20	8.16	27.36
36" tall	1C@.125	ea	20.70	8.16	28.86
48" tall	1C@.125	ea	28.70	8.16	36.86
60" tall	1C@.125	ea	31.50	8.16	39.66

Reglaze window. Includes removal of damaged glass, replacement of gaskets or glazing compound, and glass piece to fit. Does not include replacement parts in window or door frame.

Reglaze windows with clear glass					
1/8" thick	1C@.063	sf	6.00	4.11	10.11
3/16" thick	1C@.063	sf	8.02	4.11	12.13
1/4" thick	1C@.063	sf	6.56	4.11	10.67
3/8" thick	1C@.063	sf	21.10	4.11	25.21
Reglaze window with tempered glass					
1/8" thick	1C@.063	sf	10.00	4.11	14.11
3/16" thick	1C@.063	sf	11.80	4.11	15.91
1/4" thick	1C@.063	sf	12.50	4.11	16.61

	Craft@Hrs	Unit	Material	Labor	Total
Reglaze window with laminated glass					
1/4" thick	1C@.063	sf	14.90	4.11	19.01
3/8" thick	1C@.063	sf	20.50	4.11	24.61
Reglaze window with polished wire glass					
1/4" thick	1C@.063	sf	39.40	4.11	43.51
Minimum charge for reglazing all types of glass	1C@2.50	ea	49.90	163.00	212.90

Repair antique double-hung window.

rehang sash weight	1C@2.27	ea	25.60	148.00	173.60
refurbish	1C@3.13	ea	45.60	204.00	249.60
recondition	1C@2.08	ea	23.10	136.00	159.10

Time & Material Charts (selected items)**Windows Materials**

See Windows material prices with the line items above.

Windows Labor

Laborer	base wage	paid leave	true wage	taxes & ins.	total
Carpenter	\$36.80	2.87	\$39.67	25.63	\$65.30
Demolition laborer	\$24.10	1.88	\$25.98	18.12	\$44.10

Paid leave is calculated based on two weeks paid vacation, one week sick leave, and seven paid holidays. Employer's matching portion of **FICA** is 7.65 percent. **FUTA** (Federal Unemployment) is .8 percent. **Worker's compensation** for the windows trade was calculated using a national average of 17.21 percent. **Unemployment insurance** was calculated using a national average of 8 percent. **Health insurance** was calculated based on a projected national average for 2019 of \$1,248 per employee (and family when applicable) per month. Employer pays 80 percent for a per month cost of \$998 per employee. **Retirement** is based on a 401(k) retirement program with employer matching of 50 percent. Employee contributions to the 401(k) plan are an average of 6 percent of the true wage. **Liability insurance** is based on a national average of 12.0 percent.

	Craft@Hrs	Unit	Material	Labor	Total
Windows Labor Productivity					
Remove window					
small (4 to 10 sf)	1D@.397	ea	—	17.50	17.50
average size (11 to 16 sf)	1D@.407	ea	—	17.90	17.90
large (17 to 29 sf)	1D@.424	ea	—	18.70	18.70
very large (30 sf and larger)	1D@.433	ea	—	19.10	19.10
Remove window for work & reinstall					
small (4 to 10 sf)	1C@1.23	ea	—	80.30	80.30
average size (11 to 16 sf)	1C@1.72	ea	—	112.00	112.00
large (17 to 28 sf)	1C@2.51	ea	—	164.00	164.00
very large (30 sf and larger)	1C@3.70	ea	—	242.00	242.00

	Craft@Hrs	Unit	Material	Labor	Total
Install window					
small (4 to 10 sf)	1C@.991	ea	—	64.70	64.70
average size (11 to 16 sf)	1C@1.39	ea	—	90.80	90.80
large (17 to 28 sf)	1C@2.00	ea	—	131.00	131.00
very large (30 sf and larger)	1C@2.94	ea	—	192.00	192.00
Install skylight or roof window					
dome ventilating	1C@2.78	ea	—	182.00	182.00
fixed	1C@2.69	ea	—	176.00	176.00
ventilating	1C@2.94	ea	—	192.00	192.00
cord-operated roller shades	1C@.832	ea	—	54.30	54.30
electrically controlled system	1C@2.00	ea	—	131.00	131.00
electrically controlled opener	1C@1.39	ea	—	90.80	90.80
infrared remote control system for opener	1C@1.11	ea	—	72.50	72.50
Install storm window					
small (4 to 14 sf)	1C@1.00	ea	—	65.30	65.30
average size (15 to 25 sf)	1C@1.08	ea	—	70.50	70.50
large storm (26 sf and larger)	1C@1.22	ea	—	79.70	79.70
Reglaze window					
remove and replace glass	1C@.063	sf	—	4.11	4.11
Repair antique double-hung window					
rehang sash weight	1C@2.27	ea	—	148.00	148.00
refurbish	1C@3.13	ea	—	204.00	204.00
recondition	1C@2.08	ea	—	136.00	136.00

QuickCalculators



QUICKCALCULATORS

Quantity	450-463	<i>Gable Roof Trusses (lineal feet)</i>	456-457	Surface Area	464-469
<i>Bearing Wall (board feet)</i>	450-451	<i>Gable Roofing (squares)</i>	458-459	<i>Prismatic Room</i>	464-465
<i>Concrete Wall & Footing (cubic yards)</i>	452-453	<i>Joist System (board feet)</i>	460-461	<i>Rectangular Room</i>	466-467
<i>Gable Roof Rafters (board feet)</i>	454-455	<i>Non-bearing Wall (board feet)</i>	462-463	<i>Round Room</i>	468-469

QuickCalculators are designed to help you quickly calculate quantities and the surface areas of some basic room shapes. Pages 450-463 contain QuickCalculators that are designed to calculate quantities, and pages 464-469 contain QuickCalculators that are designed to calculate the surface area of rooms.

Instruction for each QuickCalculator sheet are contained above the page.

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QuickCalculator mathematics

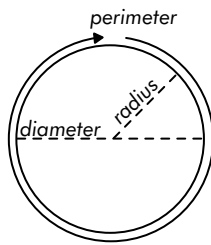
CIRCLE

Area

- ① = $\text{Pi} \times \text{radius}^2$
- ② = $.7854 \times \text{diameter}^2$
- ③ = $.0796 \times \text{perimeter}^2$

Perimeter

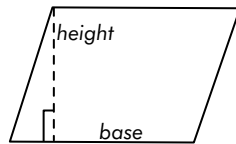
- ① = $\text{Pi} \times \text{diameter}$



PARALLELOGRAM

Area

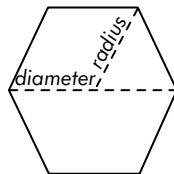
- ① = $\text{base} \times \text{height}$



PRISM

Area

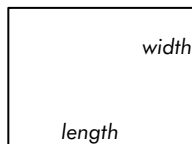
- ① = $\text{sum of sides} \div 2 \times \text{radius}$



RECTANGLE

Area

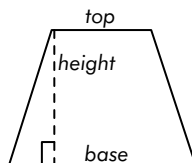
- ① = $\text{length} \times \text{width}$



TRAPEZOID

Area

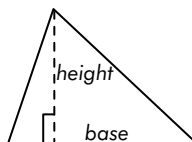
- ① = $\text{base} + \text{top} \div 2 \times \text{height}$



TRIANGLE

Area

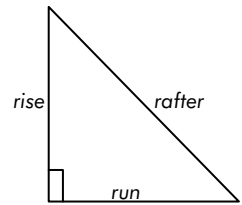
- ① = $\text{base} \times \text{height} \div 2$



PYTHAGOREAN THEOREM

Rafter length

- ① $\text{rafter length}^2 = \text{rise}^2 + \text{run}^2$



CONVERSION FACTORS

<i>DIVIDE</i>	<i>BY</i>	<i>TO CONVERT TO</i>
square inches	144	square feet
square inches	144	board feet
cubic inches	1,728	cubic feet
cubic inches	46,656	cubic yards
square feet	9	square yards
square feet	100	squares
cubic feet	27	cubic yards
feet	16.5	rods
rods	40	furlongs
feet	5,280	miles
meters	1,609	miles
yards	1,760	miles

<i>MULTIPLY</i>	<i>BY</i>	<i>TO CONVERT TO</i>
inches	2.54	centimeters
square inches	6.4516	square centimeters
square inches	.0069	square feet
square feet	9.29	square centimeters
square feet	.0929	square meters
square yards	.8361	square meters
square meters	1.1959	square yards
centimeters	.3937	inches
feet	.3048	meters
meters	3.281	feet
yards	91.44	centimeters
yards	.9144	meters
cubic feet	.0283	cubic meters
cubic meters	35.3145	cubic feet
cubic meters	1.3079	cubic yards
cubic yards	.7646	cubic meters
cubic inches	16.3872	cubic centimeters
cubic centimeters	.0610	cubic inches
cubic meters	1,000	cubic liters

USING THE BEARING WALL QUICKCALCULATOR

A Calculates the lineal feet of studs in a wall *before* adding for openings and corners. The length of the wall (Answer 1) is converted into inches by multiplying it by 12. The number of studs is calculated by dividing the wall length in inches by the stud centers (Answer 8), then adding 1 for the first stud. The calculation should now be rounded *up*, then multiplied by the wall height (Answer 4).

B Calculates the lineal feet of studs typically added for openings and corners. The number of openings (Answer 6) is multiplied by 2.4 (the *average* additional studs typically needed for an opening). The number of corners (Answer 7) is multiplied by 2.6 (the *average* additional studs typically needed at corners). The studs for openings and corners are added together, then should be rounded *up*. The total additional studs is then multiplied by the wall height (Answer 4).

C Calculates the total lineal feet of lumber in the wall. The length of the wall (Answer 1) is multiplied by the number of plates (Answer 3). The lineal feet of plates is added to the lineal feet of studs (Sum A) and additional studs (Sum B).

D Calculates the board feet in the headers. The lineal feet of headers (Answer 10) is multiplied by the header width (Answer 9), then multiplied by the wall thickness (Answer 2). This total is divided by 12 to convert to board feet.

E Calculates the total board feet in the wall. The lineal feet of board in the wall (Sum C) is multiplied by the wall width (Answer 5) then by the stud thickness (Answer 2). The total is divided by 12 to convert to board feet then added to the board feet in the headers (Sum D).

QUICK FACTS

👉 See page 449 for more information about the geometric formulas used in this *QuickCalculator*. See page 357 for wall framing priced per board foot.

QUICK CALCULATOR
Bearing Wall

Use this sheet and a calculator to determine the board feet in a bearing wall. Calculate each line from left to right. Do math in parentheses first.

1 The wall(s) are 33.5 lineal feet long.

2 The studs are 2 inches thick.

3 There are 3 plates.

4 The wall(s) are 8 feet tall.

5 There are 6 inches wide.

6 There are 5 door and window openings.

7 There are 4 corners.

8 The studs are 16 inches on center.

9 There are 17.5 lineal feet of header.

10 The headers are 10 inches wide.

11 All of studs (before openings) $\rightarrow \left(\frac{33.5}{\text{ANSWER 8}} \times 12 + 1 \right) \times \frac{8}{\text{ANSWER 4}} = \text{SUM A} = 216$

12 All of studs in openings $\rightarrow \left(\frac{5}{\text{ANSWER 6}} \times 2.4 \right) + \left(\frac{4}{\text{ANSWER 7}} \times 2.6 \right) \times \frac{8}{\text{ANSWER 4}} = \text{SUM B} = 184$

13 Lineal feet of board in wall $\rightarrow \left(\frac{33.5}{\text{ANSWER 11}} \times \frac{3}{\text{ANSWER 3}} + \frac{216}{\text{SUM A}} + \frac{184}{\text{SUM B}} \right) \times \frac{6}{\text{ANSWER 5}} \div 12 = \text{SUM C} = 501$

14 Board feet in headers $\rightarrow \frac{17.5}{\text{ANSWER 10}} \times \frac{10}{\text{ANSWER 9}} \times \frac{6}{\text{ANSWER 2}} \div 12 = \text{SUM D} = 88$

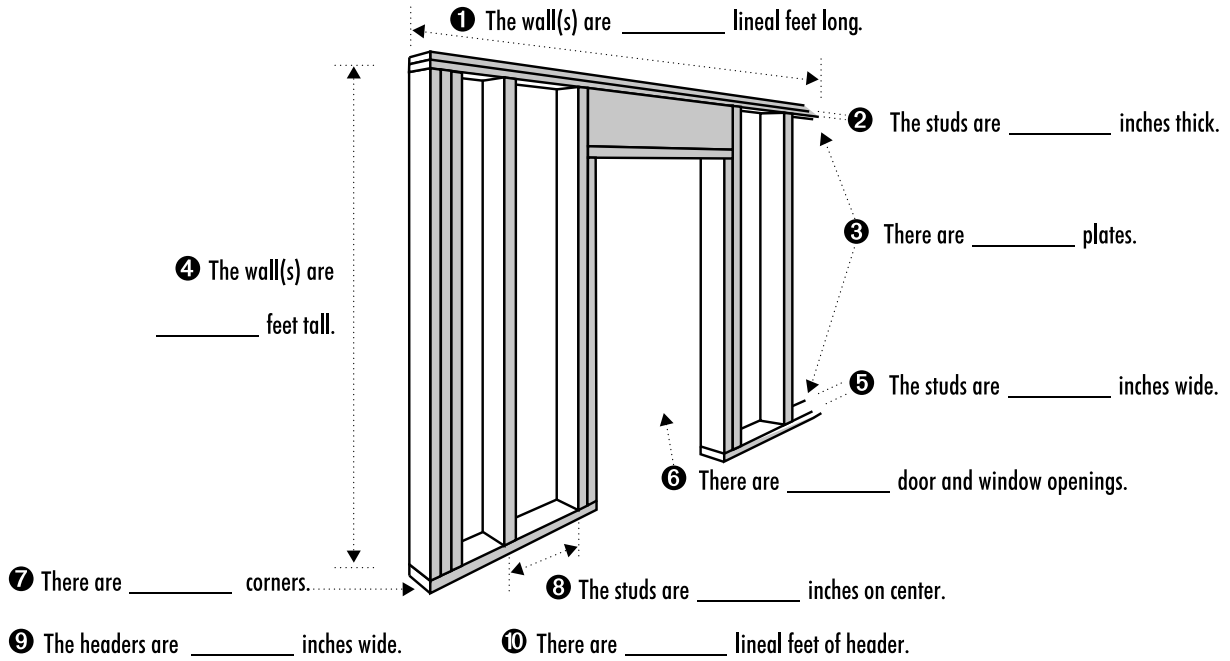
15 Total board feet $\rightarrow \frac{501}{\text{SUM C}} \times \frac{6}{\text{ANSWER 2}} \times \frac{2}{\text{ANSWER 2}} \div 12 + \frac{88}{\text{SUM D}} = \text{SUM E} = 589$

*Round up answer to next whole number here before continuing with calculation.
Converting inches to decimal feet: $1'' = .083 \cdot 2'' = .167 \cdot 3'' = .25 \cdot 4'' = .334 \cdot 5'' = .417 \cdot 6'' = .5 \cdot 7'' = .584 \cdot 8'' = .667 \cdot 9'' = .75 \cdot 10'' = .834 \cdot 11'' = .917$

QUICK CALCULATOR

Bearing Wall

Use this sheet and a calculator to determine the board feet in a bearing wall.
Calculate each line from left to right. Do math in parentheses first.



A Lf of studs (before openings) $\rightarrow \left(\frac{\text{ANSWER 1}}{\text{ANSWER 8}} \times 12 \div \frac{\text{ANSWER 8}}{\text{ANSWER 8}} + 1 \right)^* \times \frac{\text{ANSWER 4}}{\text{ANSWER 4}} = \frac{\text{SUM A}}{\text{SUM A}}$

B Lf of studs in openings $\rightarrow \left(\left(\frac{\text{ANSWER 6}}{\text{ANSWER 6}} \times 2.4 \right) + \left(\frac{\text{ANSWER 7}}{\text{ANSWER 7}} \times 2.6 \right) \right)^* \times \frac{\text{ANSWER 4}}{\text{ANSWER 4}} = \frac{\text{SUM B}}{\text{SUM B}}$

C Lineal feet of board in wall $\rightarrow \frac{\text{ANSWER 1}}{\text{ANSWER 1}} \times \frac{\text{ANSWER 3}}{\text{ANSWER 3}} + \frac{\text{SUM A}}{\text{SUM A}} + \frac{\text{SUM B}}{\text{SUM B}} = \frac{\text{SUM C}}{\text{SUM C}}$

D Board feet in headers $\rightarrow \frac{\text{ANSWER 10}}{\text{ANSWER 10}} \times \frac{\text{ANSWER 9}}{\text{ANSWER 9}} \times \frac{\text{ANSWER 5}}{\text{ANSWER 5}} \div 12 = \frac{\text{SUM D}}{\text{SUM D}}$

E Total board feet $\rightarrow \frac{\text{SUM C}}{\text{SUM C}} \times \frac{\text{ANSWER 5}}{\text{ANSWER 5}} \times \frac{\text{ANSWER 2}}{\text{ANSWER 2}} \div 12 + \frac{\text{SUM D}}{\text{SUM D}} = \frac{\text{SUM E}}{\text{SUM E}}$

*Round up answer to next whole number here before continuing with calculation.

USING THE CONCRETE WALL & FOOTING QUICKCALCULATOR

A Calculates the cubic yards of footing by multiplying Answer 2 by 12 to convert the length of the footing to inches. The length in inches is then multiplied by the thickness (Answer 4) and by the width (Answer 5) to determine the cubic inches in the footing. The cubic inches are converted to cubic feet by dividing by 1,728. The cubic feet are then converted to cubic yards by dividing by 27.

B Calculates the cubic yards of foundation wall by multiplying Answer 2 by 12 to convert the length of the wall to inches. The length in inches is then multiplied by the thickness (Answer 1) and by the height (Answer 3) to determine the cubic inches in the wall. The cubic inches are converted to cubic feet by dividing by 1,728. The cubic feet are then converted to cubic yards by dividing by 27.

C Calculates the total cubic yards of concrete in the wall & footing by adding the cubic yards of footing (Sum A) to the cubic yards of foundation wall (Sum B).

QUICK CALCULATOR
Concrete Wall & Footing

Use this sheet and a calculator to determine the cubic yards of concrete in a foundation wall and footing. Calculate each line from left to right.

1 The wall is 8 inches thick

2 The wall & footing are 25.75 feet long

3 The wall is 48 inches high

4 The footing is 12 inches thick

5 The footing is 24 inches wide

A The cubic yards of footing → $\frac{25.75}{\text{ANSWER 2}} \times 12 \times \frac{24}{\text{ANSWER 4}} \div 1,728 \div 27 = \frac{1.91}{\text{SUM A}}$

B The cubic yards of wall → $\frac{25.75}{\text{ANSWER 2}} \times 12 \times \frac{8}{\text{ANSWER 1}} \times \frac{48}{\text{ANSWER 3}} \div 1,728 \div 27 = \frac{2.54}{\text{SUM B}}$

C Total cubic yards of wall & footing → $\frac{1.91}{\text{SUM A}} + \frac{2.54}{\text{SUM B}} = \frac{4.45}{\text{SUM C}}$

Converting Inches to Decimal Feet
 $1'' = .083 \cdot 2'' = .167 \cdot 3'' = .25 \cdot 4'' = .334 \cdot 5'' = .417 \cdot 6'' = .5 \cdot 7'' = .583 \cdot 8'' = .667 \cdot 9'' = .75 \cdot 10'' = .834 \cdot 11'' = .917$

QUICK FACTS

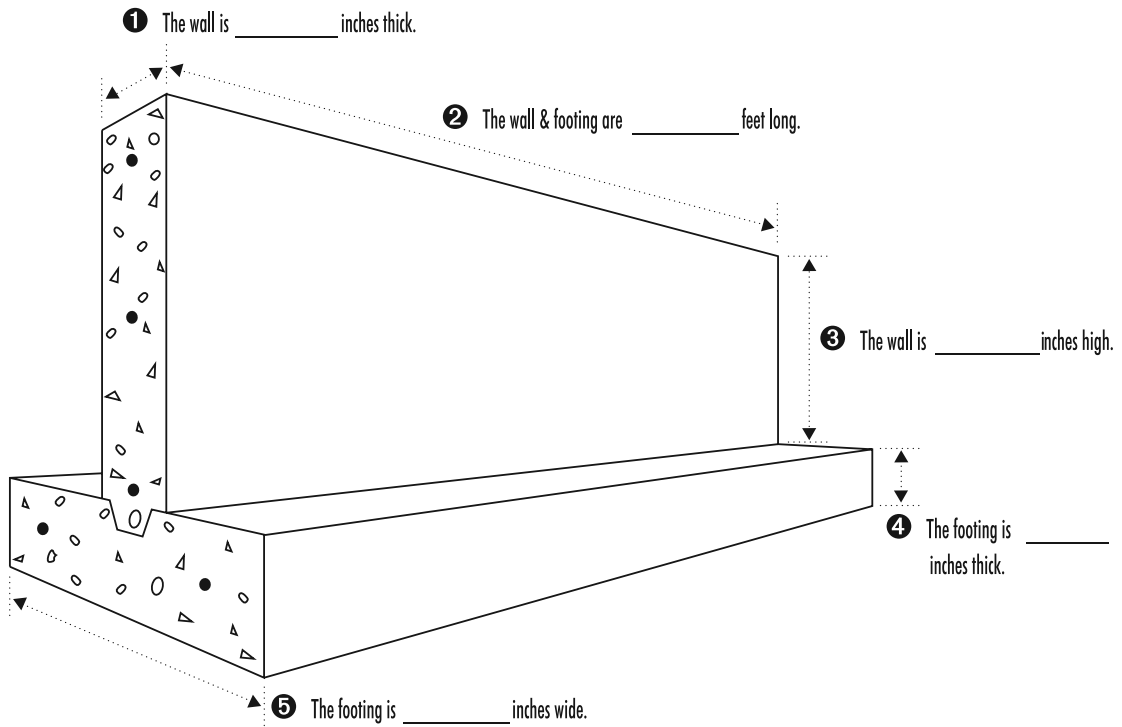
The sample *QuickCalculator* sheet shown above (in the printed book) contains quantities that have been rounded. We suggest rounding to two decimal places. We also suggest rounding the final total (Sum C) up to the next 1/4 yards since this is how concrete must usually be ordered. (In the example the Sum C total of 4.45 should be rounded up to 4.5 cubic yards.) See pages 56-59 for concrete walls and footings per cubic yard.

See page 449 for more information about the geometric formulas used in this *QuickCalculator*.

QUICK CALCULATOR

Concrete Wall & Footing

Use this sheet and a calculator to determine the cubic yards of concrete in a foundation wall and footing.
Calculate each line from left to right.



A The cubic yards of footing → $\frac{\text{ANSWER 2}}{\text{ANSWER 2}} \times 12 \times \frac{\text{ANSWER 4}}{\text{ANSWER 4}} \times \frac{\text{ANSWER 5}}{\text{ANSWER 5}} \div 1,728 \div 27 = \frac{\text{SUM A}}{\text{SUM A}}$

B The cubic yards of wall → $\frac{\text{ANSWER 2}}{\text{ANSWER 2}} \times 12 \times \frac{\text{ANSWER 1}}{\text{ANSWER 1}} \times \frac{\text{ANSWER 3}}{\text{ANSWER 3}} \div 1,728 \div 27 = \frac{\text{SUM B}}{\text{SUM B}}$

C Total cubic yards of wall & footing → $\frac{\text{SUM A}}{\text{SUM A}} + \frac{\text{SUM B}}{\text{SUM B}} = \frac{\text{SUM C}}{\text{SUM C}}$

USING GABLE ROOF RAFTERS

QUICKCALCULATOR

A Calculates the total number of rafters in the roof. The length of the roof (Answer 1) is converted into inches by multiplying it by 12. The number of rafters in the roof is calculated by taking the length in inches and dividing by the rafter centers (Answer 4) then adding 1 for the first rafter. Because you can never have a fraction of a rafter, the final answer should always be rounded *up* to the next *even* number. This calculates the total for one side of the roof only so the total is multiplied by 2.

B Calculates the lineal feet of rafters in the roof by multiplying the number of rafters (Sum A) by the rafter length (Answer 2).

C Calculates the board feet in the ridge and sub-fascia. The roof length (Answer 1) is multiplied by 3 (2 sub-fascia boards and 1 ridge) to get the total lineal feet of sub-fascia and ridge. This total is multiplied by the rafter thickness (Answer 5), then by the rafter width (Answer 3) plus 2" (e.g. a roof with 2" x 8" rafters will have 10" wide ridge and sub-fascia boards). This total is divided by 12 to get the total board feet in the ridge and sub-fascia boards.

D Calculates the total board feet in the roof system. The total lineal feet of rafters (Sum B) is *multiplied* by the rafter thickness (Answer 5) then by the rafter width (Answer 3). This total is *divided* by 12 to get the total board feet in the rafters. The total board feet of rafters is then added to the total board feet in the ridge and sub-fascia boards (Sum C) for the total board feet in the entire roof system.

QUICK CALCULATOR
Gable Roof Rafters
 Use this sheet and a calculator to determine the board feet of rafters in a gable roof. Calculate each line from left to right. Do math in parentheses first.

1 The roof system is 31 feet long.

2 The rafters are 125 feet long.

3 The rafters are 8 inches wide.

4 The rafters are 24 inches on center.

5 The rafters are 2 inches thick.

6 The number of rafters: $\left(\frac{31}{\text{ANSWER 1}} \times 12 \div \frac{24}{\text{ANSWER 4}} + 1 \right) \times 2 = \frac{34}{\text{SUM A}}$ (Round up to next even number)

7 Lineal feet of rafters: $\frac{34}{\text{SUM A}} \times \frac{125}{\text{ANSWER 2}} = \frac{425}{\text{SUM B}}$

8 Board feet in ridge & sub-fascia: $\left(\frac{31}{\text{ANSWER 1}} \times 3 \times \frac{2}{\text{ANSWER 3}} \times \left(\frac{8}{\text{ANSWER 5}} + 2 \right) \right) \div 12 = \frac{155}{\text{SUM C}}$

9 Total board feet in rafters: $\frac{425}{\text{SUM B}} \times \frac{2}{\text{ANSWER 5}} \times \frac{8}{\text{ANSWER 3}} \div 12 + \frac{155}{\text{SUM C}} = \frac{722}{\text{SUM D}}$

10 Total board feet in roof: $\frac{425}{\text{SUM B}} \times \frac{2}{\text{ANSWER 5}} \times \frac{8}{\text{ANSWER 3}} \div 12 + \frac{155}{\text{SUM C}} = \frac{722}{\text{SUM D}}$

*The ridge and sub-fascia boards are calculated to be 2 inches wider than the rafters. **Does not include ceiling joists for the room below (as illustrated) or collar ties.
 Converting Inches to Decimal Feet: 1" = .083 * 2 = .167 * 3 = .5 * 4 = .334 * 5 = .417 * 6 = .5 * 7 = .584 * 8 = .667 * 9 = .75 * 10 = .834 * 11 = .917

QUICK FACTS

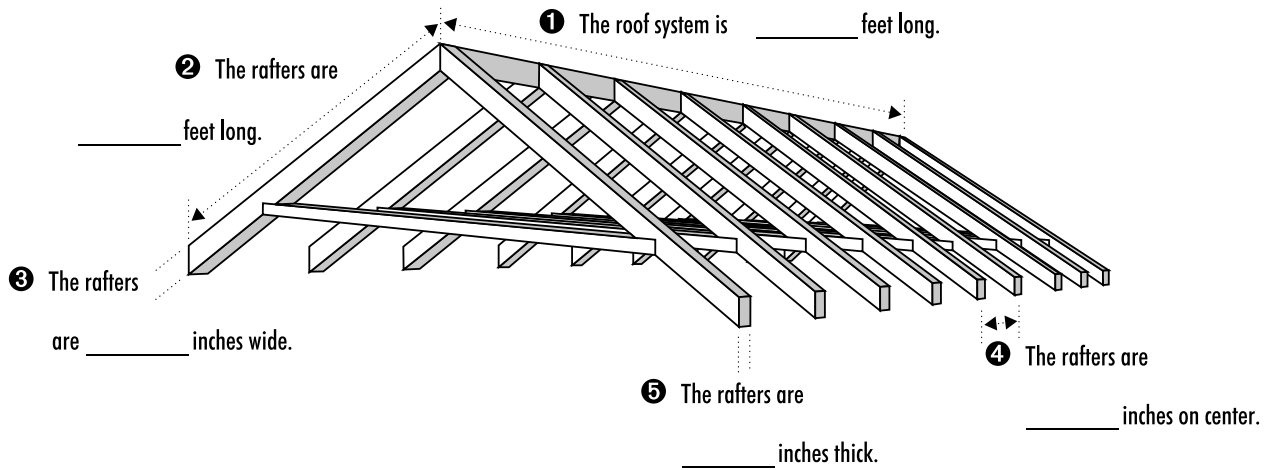
🔍 The sample *QuickCalculator* sheet shown above contains quantities that have been rounded. The total number of rafters should always be rounded up to the next even number. We also suggest rounding lineal feet and board feet to the nearest whole number.

🔍 See page 449 for more information about the geometric formulas used in this *QuickCalculator*. See page 372 for rafter systems priced per board foot.

QUICK CALCULATOR

Gable Roof Rafters

Use this sheet and a calculator to determine the board feet of rafters in a gable roof.
Calculate each line from left to right. Do math in parentheses first.



A The number of rafters $\left(\frac{\text{ANSWER 1}}{\text{ANSWER 4}} \times 12 \div \frac{\text{ANSWER 4}}{\text{ANSWER 4}} + 1 \right) \times 2 = \frac{\text{SUM A}}{\text{SUM A}}$ Round up to next even number

B Lineal feet of rafters $\frac{\text{SUM A}}{\text{SUM A}} \times \frac{\text{ANSWER 2}}{\text{ANSWER 2}} = \frac{\text{SUM B}}{\text{SUM B}}$

C Bf in ridge & sub-fascia* $\frac{\text{ANSWER 1}}{\text{ANSWER 1}} \times 3 \times \frac{\text{ANSWER 5}}{\text{ANSWER 5}} \times \left(\frac{\text{ANSWER 3}}{\text{ANSWER 3}} + 2 \right) \div 12 = \frac{\text{SUM C}}{\text{SUM C}}$

D Total board feet in roof** $\rightarrow \frac{\text{SUM B}}{\text{SUM B}} \times \frac{\text{ANSWER 5}}{\text{ANSWER 5}} \times \frac{\text{ANSWER 3}}{\text{ANSWER 3}} \div 12 + \frac{\text{SUM C}}{\text{SUM C}} = \frac{\text{SUM D}}{\text{SUM D}}$

*The ridge and sub-fascia boards are calculated to be 2 inches wider than the rafters. **Does not include ceiling joists for the room below (as illustrated) or collar ties.

USING THE GABLE ROOF TRUSSES QUICKCALCULATOR

A Calculates the number of trusses in the roof by converting the length of the roof (Answer 1) into inches by multiplying it by 12. The number of trusses is then calculated by taking this length in inches, dividing it by the truss centers (Answer 3), then adding 1 for the first truss.

B Calculates the lineal feet of trusses by multiplying the number of trusses (Sum A) by the length of the truss bottom chord (Answer 2).

QUICK CALCULATOR
Gable Roof Trusses

Use this sheet and a calculator to determine the number and lineal feet of trusses in a gable roof.
Calculate each line from left to right.

1 The roof system is 32.5 feet long.

2 The truss bottom chord is 20 feet wide.

3 The trusses are 24 inches on center.

4 Number of trusses: $\frac{32.5 \text{ ANSWER 1}}{1} \times 12 \div \frac{24 \text{ ANSWER 3}}{1} + 1 = \frac{18 \text{ SUM A}}{1}$ (Round up to next whole number)

5 Lineal feet of trusses: $\frac{18 \text{ SUM A}}{1} \times \frac{20 \text{ ANSWER 2}}{1} = \frac{360 \text{ SUM B}}{1}$

Converting Inches to Decimal Feet
 $1'' = .084 \cdot 2'' = .167 \cdot 3'' = .25 \cdot 4'' = .334 \cdot 5'' = .417 \cdot 6'' = .5 \cdot 7'' = .584 \cdot 8'' = .667 \cdot 9'' = .75 \cdot 10'' = .834 \cdot 11'' = .917$

QUICK FACTS

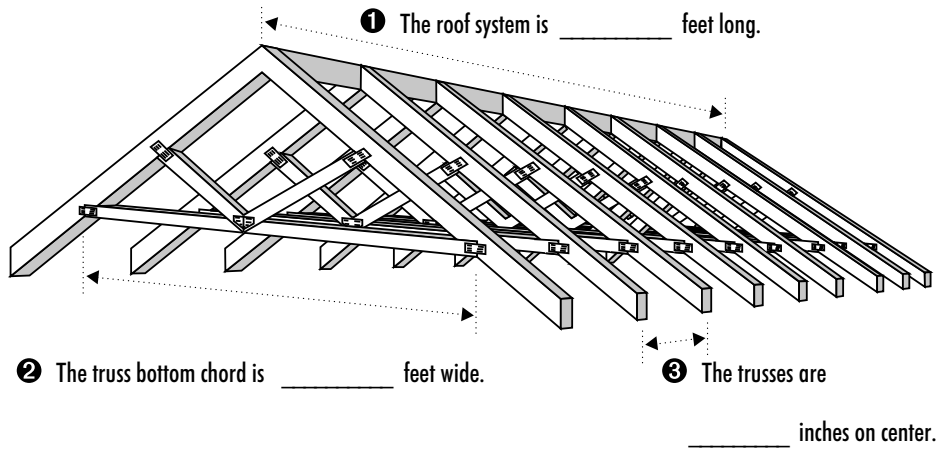
🔧 The sample *QuickCalculator* sheet shown above contains quantities that have been rounded. The total number of trusses should always be rounded up to the next whole number. We also suggest rounding lineal feet to the nearest whole number.

🔧 See page 449 for more information about the geometric formulas used in this *QuickCalculator*. See page 374 for truss systems priced per lineal foot.

QUICK CALCULATOR

Gable Roof Trusses

Use this sheet and a calculator to determine the number and lineal feet of trusses in a gable roof. Calculate each line from left to right.



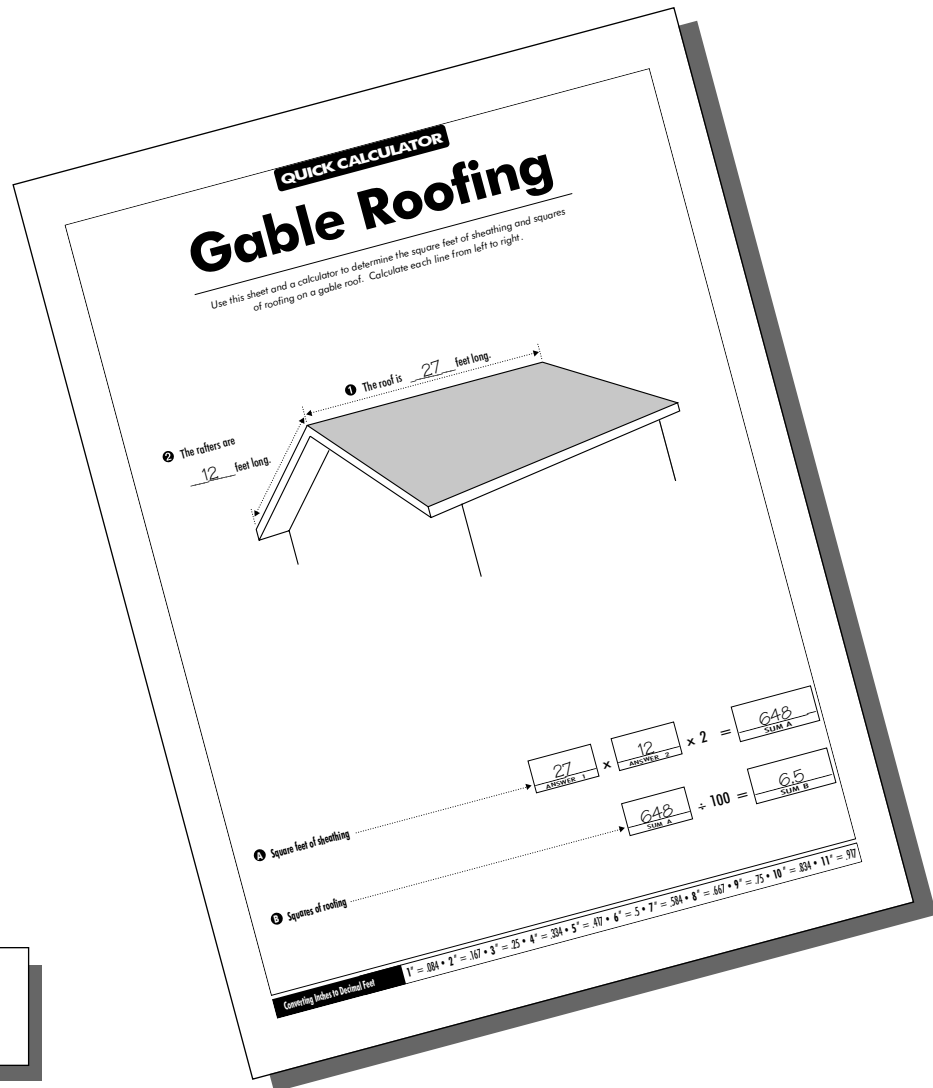
A Number of trusses $\xrightarrow{\hspace{10em}}$ $\frac{\text{ANSWER 1}}{\hspace{1.5em}} \times 12 \div \frac{\text{ANSWER 3}}{\hspace{1.5em}} + 1 = \frac{\hspace{1.5em}}{\text{SUM A}}$ Round up to next whole number

B Lineal feet of trusses $\xrightarrow{\hspace{10em}}$ $\frac{\text{SUM A}}{\hspace{1.5em}} \times \frac{\text{ANSWER 2}}{\hspace{1.5em}} = \frac{\hspace{1.5em}}{\text{SUM B}}$

Converting Inches to Decimal Feet

1" = .084 • 2" = .167 • 3" = .25 • 4" = .334 • 5" = .417 • 6" = .5 • 7" = .584 • 8" = .667 • 9" = .75 • 10" = .834 • 11" = .917

USING THE GABLE ROOFING QUICKCALCULATOR



A Calculates the square feet of sheathing on the roof by multiplying the roof length (Answer 1) by the rafter length (Answer 2), then multiplying this total by 2 to calculate both sides of the roof.

B Calculates the squares of roofing by dividing the square feet of roof (Sum A) by 100.

QUICK FACTS

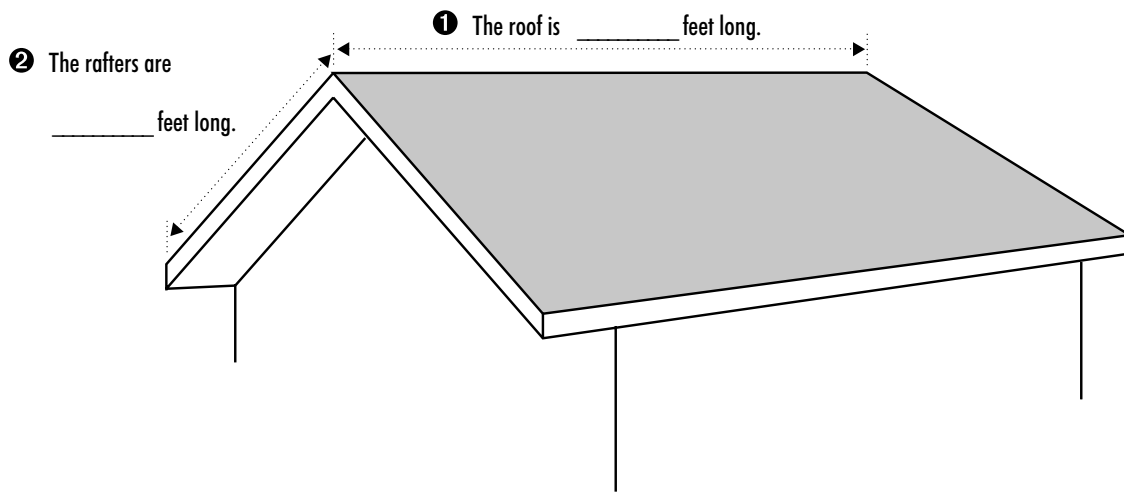
👉 The sample *QuickCalculator* sheet shown above contains quantities that have been rounded. We suggest rounding sheathing to the nearest square foot and rounding squares *up* to the next 1/5 square for shakes, the next 1/4 square for wood shingles and clay tile, and the next 1/3 square for asphalt shingles.

👉 See page 449 for more information about the geometric formulas used in this *QuickCalculator*. Also see Roofing beginning on page 339.

QUICK CALCULATOR

Gable Roofing

Use this sheet and a calculator to determine the square feet of sheathing and squares of roofing on a gable roof. Calculate each line from left to right.



A Square feet of sheathing $\frac{\text{ANSWER 1}}{\text{ANSWER 1}} \times \frac{\text{ANSWER 2}}{\text{ANSWER 2}} \times 2 = \frac{\text{SUM A}}{\text{SUM A}}$

B Squares of roofing $\frac{\text{SUM A}}{\text{SUM A}} \div 100 = \frac{\text{SUM B}}{\text{SUM B}}$

Converting Inches to Decimal Feet

1" = .084 • 2" = .167 • 3" = .25 • 4" = .334 • 5" = .417 • 6" = .5 • 7" = .584 • 8" = .667 • 9" = .75 • 10" = .834 • 11" = .917

USING THE JOIST SYSTEM QUICKCALCULATOR

A Calculates the total number of joists. The length of the joist system (Answer 1) is converted into inches by multiplying it by 12. The number of joists is calculated by taking the joist system length in inches and dividing it by the joist centers (Answer 4) then adding 1 for the first joist.

B Calculates the lineal feet of joists by multiplying the number of joists (Sum A) by the joist length (Answer 2).

C Calculates the lineal feet in rim joists and in solid blocking. The length of the rim joist (Answer 1) is multiplied by 2 for rim joists on both sides of the joist system. The total lineal feet of rim joists are then added to the lineal feet of solid blocking (Answer 2).

D Calculates total lineal feet of lumber in the joist system by adding the lineal feet of joists (Sum B) to the lineal feet of rim joists and solid blocking (Sum C).

E Calculates the board feet in the joist system by multiplying the total lineal feet of joists (Sum D) by the joist thickness (Answer 5), then by the joist width (Answer 3). This total is then divided by 12.

QUICK FACTS

🔍 The sample *QuickCalculator* sheet shown above contains quantities that have been rounded. The total number of joists should always be rounded up to the next whole number. We also suggest rounding lineal feet and board feet to the nearest whole number.

🔍 page 449 for more information about the geometric formulas used in this *QuickCalculator*. See page 369 for joist systems priced per board foot.

QUICK CALCULATOR
Joist System

Use this sheet and a calculator to determine the lineal feet and board feet in a joist system.
Calculate each line from left to right.

1 The joist system is 25 feet long.

2 The joists are 15 feet long.

3 The joists are 10 inches wide.

4 The joists are 24 inches on center.

5 The joists are 2 inches thick.

6 There are 25 lineal feet of solid blocking in the joist system.

7 The number of joists: $\frac{25 \text{ ANSWER 1}}{\text{ANSWER 4}} \times 12 \div \frac{24 \text{ ANSWER 3}}{\text{ANSWER 4}} + 1 = \frac{14 \text{ SUM A}}{\text{SUM A}}$ Round up to next whole number.

8 The lineal feet of joists: $\frac{15 \text{ ANSWER 2}}{\text{ANSWER 3}} \times \frac{14 \text{ SUM A}}{\text{SUM A}} = \frac{210 \text{ SUM B}}{\text{SUM B}}$

9 The lineal feet of rim joists and blocking: $\frac{25 \text{ ANSWER 1}}{\text{ANSWER 3}} \times 2 + \frac{25 \text{ ANSWER 6}}{\text{ANSWER 3}} = \frac{75 \text{ SUM C}}{\text{SUM C}}$

10 The total lineal feet of all joists and blocking: $\frac{210 \text{ SUM B}}{\text{SUM B}} + \frac{75 \text{ SUM C}}{\text{SUM C}} = \frac{285 \text{ SUM D}}{\text{SUM D}}$

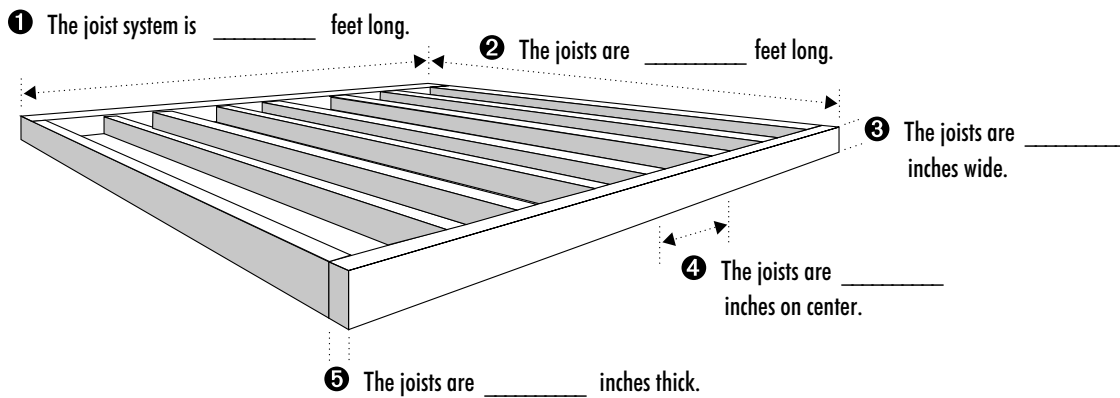
11 The total board feet in the joist system: $\frac{285 \text{ SUM D}}{\text{SUM D}} \times \frac{2 \text{ ANSWER 5}}{\text{ANSWER 3}} \times \frac{10 \text{ ANSWER 3}}{\text{ANSWER 3}} \div 12 = \frac{475 \text{ SUM E}}{\text{SUM E}}$

Converting Inches to Decimal Feet
1" = .084 • 2" = .167 • 3" = .25 • 4" = .334 • 5" = .417 • 6" = .5 • 7" = .584 • 8" = .667 • 9" = .75 • 10" = .834 • 11" = .917

QUICK CALCULATOR

Joist System

Use this sheet and a calculator to determine the lineal feet and board feet in a joist system.
Calculate each line from left to right.



6 There are _____ lineal feet of solid blocking in the joist system.

A The number of joists $\frac{\text{ANSWER 1}}{\text{ANSWER 4}} \times 12 \div \frac{\text{ANSWER 4}}{\text{ANSWER 4}} + 1 = \frac{\text{SUM A}}{\text{SUM A}}$ Round up to next whole number

B The lineal feet of joists $\frac{\text{ANSWER 2}}{\text{ANSWER 2}} \times \frac{\text{SUM A}}{\text{SUM A}} = \frac{\text{SUM B}}{\text{SUM B}}$

C The lineal feet of rim joists and blocking $\frac{\text{ANSWER 1}}{\text{ANSWER 1}} \times 2 + \frac{\text{ANSWER 6}}{\text{ANSWER 6}} = \frac{\text{SUM C}}{\text{SUM C}}$

D The total lineal feet of all joists and blocking $\frac{\text{SUM B}}{\text{SUM B}} + \frac{\text{SUM C}}{\text{SUM C}} = \frac{\text{SUM D}}{\text{SUM D}}$

E The total board feet in the joist system $\frac{\text{SUM D}}{\text{SUM D}} \times \frac{\text{ANSWER 5}}{\text{ANSWER 5}} \times \frac{\text{ANSWER 3}}{\text{ANSWER 3}} \div 12 = \frac{\text{SUM E}}{\text{SUM E}}$

Converting Inches to Decimal Feet

1" = .084 • 2" = .167 • 3" = .25 • 4" = .334 • 5" = .417 • 6" = .5 • 7" = .584 • 8" = .667 • 9" = .75 • 10" = .834 • 11" = .917

USING THE NON-BEARING WALL

QUICKCALCULATOR

A Calculates the lineal feet of studs in a wall *before* adding for openings and corners. The length of the wall (Answer 1) is converted into inches by multiplying it by 12. The number of studs is calculated by dividing the wall length in inches by the stud centers (Answer 8), then adding 1 for the first stud. The calculation should now be rounded *up*, then multiplied by the wall height (Answer 4).

B Calculates the lineal feet of studs typically added for openings and corners. The number of openings (Answer 6) is multiplied by 2.4 (the *average* additional studs typically needed for an opening). The number of corners (Answer 7) is multiplied by 2.6 (the *average* additional studs typically needed at corners). The studs for openings and corners are added together, then should be rounded *up*. The total additional studs is then multiplied by the wall height (Answer 4).

C Calculates the total lineal feet of lumber in the wall. The length of the wall (Answer 1) is multiplied by the number of plates (Answer 3). The lineal feet of plates is added to the lineal feet of studs (Sum A) and additional studs (Sum B).

D Calculates the total board feet in the wall. The lineal feet of board in the wall (Sum C) is multiplied by the wall width (Answer 5) then by the stud thickness (Answer 2). The total is divided by 12 to convert to board feet.

QUICK CALCULATOR

Non-Bearing Wall

Use this sheet and a calculator to determine the board feet in an interior wall. Calculate each line from left to right. Do math in parentheses first.

1 The wall(s) are 33.5 lineal feet long

2 The studs are 2 inches thick.

3 There are 3 plates.

4 The wall(s) are 8 feet tall.

5 The studs are 6 inches wide.

6 There are 5 door and window openings.

7 There are 4 corners.

8 The studs are 16 inches on center.

1 If of studs (before openings) → $\left(\frac{33.5}{\text{ANSWER 8}} \times 12 + \frac{16}{\text{ANSWER 8}} + 1 \right) \times \frac{8}{\text{ANSWER 4}} = \frac{216}{\text{SUM A}}$

2 If of studs in openings → $\left(\frac{5}{\text{ANSWER 6}} \times 2.4 \right) + \left(\frac{4}{\text{ANSWER 7}} \times 2.6 \right) \times \frac{8}{\text{ANSWER 4}} = \frac{184}{\text{SUM B}}$

3 Lineal feet of board in wall → $\frac{33.5}{\text{ANSWER 1}} \times \frac{3}{\text{ANSWER 3}} + \frac{216}{\text{SUM A}} + \frac{184}{\text{SUM B}} = \frac{501}{\text{SUM C}}$

4 Total board feet in wall → $\frac{501}{\text{SUM C}} \times \frac{6}{\text{ANSWER 5}} \times \frac{2}{\text{ANSWER 2}} \div 12 = \frac{501}{\text{SUM D}}$

*Round up answer to next whole number here before continuing with calculation.
 Converting Inches to Decimal Feet 1" = .084 • 2" = .161 • 3" = .25 • 4" = .334 • 5" = .417 • 6" = .5 • 7" = .584 • 8" = .667 • 9" = .75 • 10" = .834 • 11" = .917

QUICK FACTS

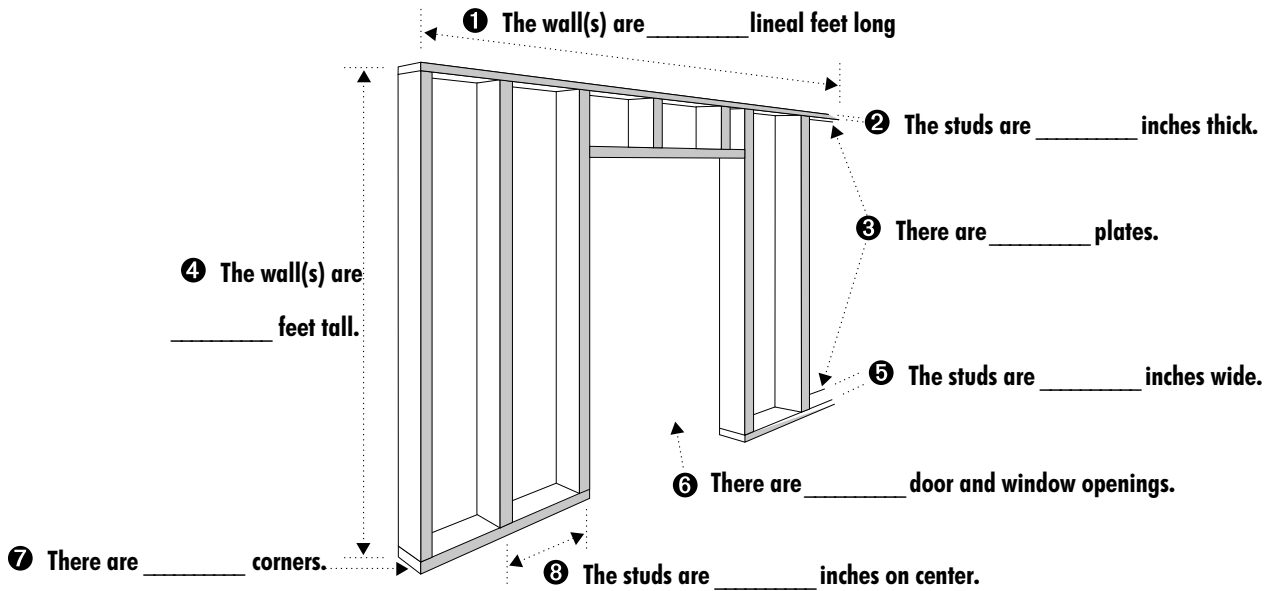
🔍 The sample *QuickCalculator* sheet shown above contains quantities that have been rounded. When calculating Sum A and Sum B we suggest rounding the calculation up to the next whole number at the asterisk. Board feet and lineal feet should be rounded.

🔍 See page 449 for more information about the geometric formulas used in this *QuickCalculator*. See page 357 for walls priced per board foot.

QUICK CALCULATOR

Non-Bearing Wall

Use this sheet and a calculator to determine the board feet in an interior wall.
Calculate each line from left to right. Do math in parentheses first.



A Lf of studs (before openings) $\rightarrow \left(\frac{\text{ANSWER 1}}{\text{ANSWER 8}} \times 12 \div \frac{\text{ANSWER 8}}{\text{ANSWER 8}} + 1 \right)^* \times \frac{\text{ANSWER 4}}{\text{ANSWER 4}} = \frac{\text{SUM A}}{\text{SUM A}}$

B Lf of studs in openings $\rightarrow \left(\left(\frac{\text{ANSWER 6}}{\text{ANSWER 6}} \times 2.4 \right) + \left(\frac{\text{ANSWER 7}}{\text{ANSWER 7}} \times 2.6 \right) \right)^* \times \frac{\text{ANSWER 4}}{\text{ANSWER 4}} = \frac{\text{SUM B}}{\text{SUM B}}$

C Lineal feet of board in wall $\rightarrow \frac{\text{ANSWER 1}}{\text{ANSWER 1}} \times \frac{\text{ANSWER 3}}{\text{ANSWER 3}} + \frac{\text{SUM A}}{\text{SUM A}} + \frac{\text{SUM B}}{\text{SUM B}} = \frac{\text{SUM C}}{\text{SUM C}}$

D Total board feet in wall $\rightarrow \frac{\text{SUM C}}{\text{SUM C}} \times \frac{\text{ANSWER 5}}{\text{ANSWER 5}} \times \frac{\text{ANSWER 2}}{\text{ANSWER 2}} \div 12 = \frac{\text{SUM D}}{\text{SUM D}}$

*Round up answer to next whole number here before continuing with calculation.

Converting Inches to Decimal Feet

1" = .084 • 2" = .167 • 3" = .25 • 4" = .334 • 5" = .417 • 6" = .5 • 7" = .584 • 8" = .667 • 9" = .75 • 10" = .834 • 11" = .917

USING THE PRISMATIC ROOM QUICKCALCULATOR


A Calculates the perimeter of the prism by multiplying the number of prism walls (Answer 4) by the length of the prism walls (Answer 3).


B Calculates the square feet of walls by multiplying the perimeter of the room (Sum A) by the room height (Answer 2).

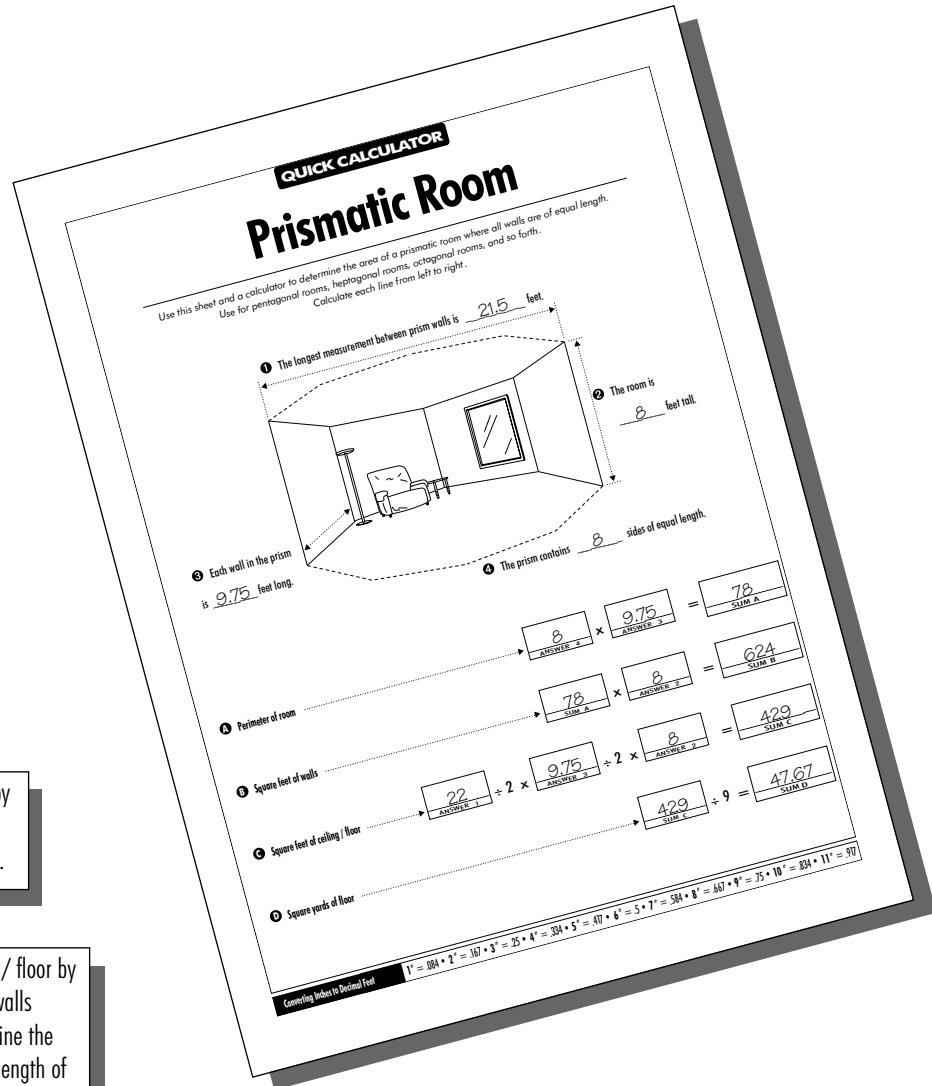
C Calculates the square feet of ceiling / floor by taking the longest dimension between walls (Answer 1) and dividing by 2 to determine the radius. The radius is multiplied by the length of each prism wall (Answer 3), divided by 2 and multiplied by the height of the walls (Answer 2).

D Calculates the square yards of flooring by dividing the square feet of floor (Sum C) by 9.

QUICK FACTS

 The sample *QuickCalculator* sheet shown above contains quantities that have been rounded. We suggest rounding lineal feet to two decimal places then to the nearest inch when converting to inches. Square feet should probably be rounded to the nearest square foot and square yards should be rounded up to the nearest 1/3 or 1/4 yard.

 See page 449 for more information about the geometric formulas used in this *QuickCalculator*.



QUICK CALCULATOR
Prismatic Room

Use this sheet and a calculator to determine the area of a prismatic room where all walls are of equal length. Use for pentagonal rooms, heptagonal rooms, octagonal rooms, and so forth. Calculate each line from left to right.

1 The longest measurement between prism walls is 21.5 feet.

2 The room is 8 feet tall.

3 Each wall in the prism is 9.75 feet long.

4 The prism contains 8 sides of equal length.

5 Perimeter of room: $8 \times 9.75 = 78$ (SUM A)

6 Square feet of walls: $78 \times 8 = 624$ (SUM B)

7 Square feet of ceiling / floor: $22 + 2 \times 9.75 + 2 \times 8 = 429$ (SUM C)

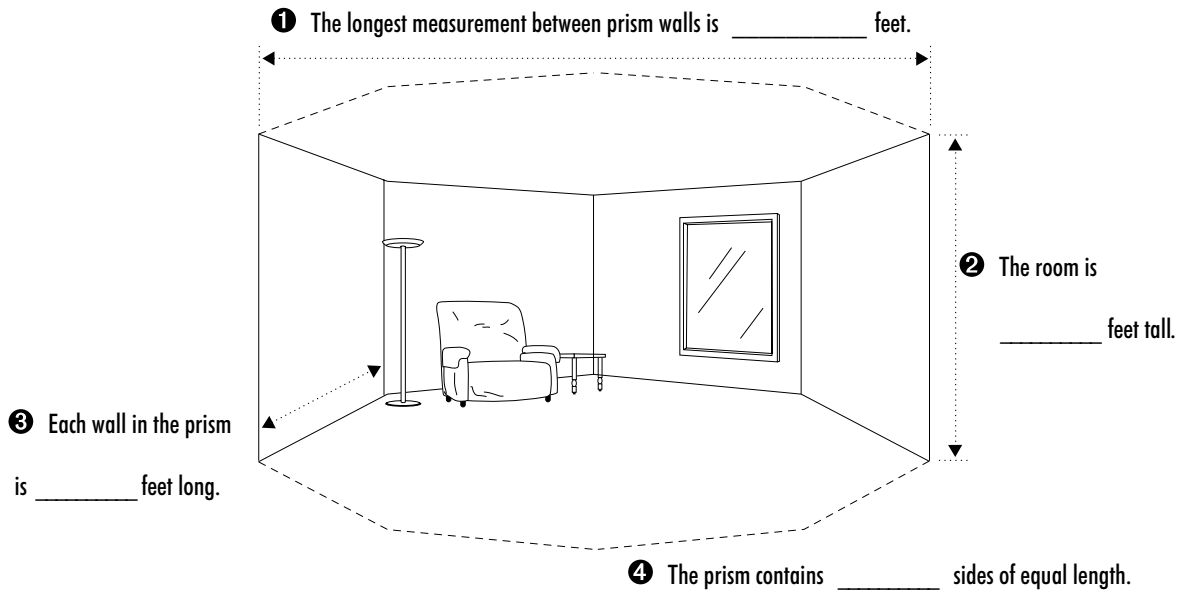
8 Square yards of floor: $429 \div 9 = 47.67$ (SUM D)

Converting Inches to Decimal Feet: $1'' = .084 \cdot 2'' = .167 \cdot 3'' = .25 \cdot 4'' = .334 \cdot 5'' = .417 \cdot 6'' = .5 \cdot 7'' = .584 \cdot 8'' = .667 \cdot 9'' = .75 \cdot 10'' = .834 \cdot 11'' = .917$

QUICK CALCULATOR

Prismatic Room

Use this sheet and a calculator to determine the area of a prismatic room where all walls are of equal length.
 Use for pentagonal rooms, heptagonal rooms, octagonal rooms, and so forth.
 Calculate each line from left to right.



A Perimeter of room $\frac{\text{ANSWER 4}}{\text{ANSWER 4}} \times \frac{\text{ANSWER 3}}{\text{ANSWER 3}} = \frac{\text{SUM A}}{\text{SUM A}}$

B Square feet of walls $\frac{\text{SUM A}}{\text{SUM A}} \times \frac{\text{ANSWER 2}}{\text{ANSWER 2}} = \frac{\text{SUM B}}{\text{SUM B}}$

C Square feet of ceiling / floor $\frac{\text{ANSWER 1}}{\text{ANSWER 1}} \div 2 \times \frac{\text{ANSWER 3}}{\text{ANSWER 3}} \div 2 \times \frac{\text{ANSWER 2}}{\text{ANSWER 2}} = \frac{\text{SUM C}}{\text{SUM C}}$

D Square yards of floor $\frac{\text{SUM C}}{\text{SUM C}} \div 9 = \frac{\text{SUM D}}{\text{SUM D}}$

Converting Inches to Decimal Feet

1" = .084 • 2" = .167 • 3" = .25 • 4" = .334 • 5" = .417 • 6" = .5 • 7" = .584 • 8" = .667 • 9" = .75 • 10" = .834 • 11" = .917

USING THE RECTANGULAR ROOM QUICKCALCULATOR

QUICK CALCULATOR

Rectangular Room

Use this sheet and a calculator to determine the area of a rectangular room. Calculate each line from left to right. Do math in parentheses first.

1 The room is 14.75 feet long.

2 The room is 8 feet tall.

3 The room is 11.25 feet wide.

4 Perimeter of room: $(14.75 + 11.25) \times 2 = 52$ (SUM A)

5 Square feet of walls: $52 \times 8 = 416$ (SUM B)

6 Square feet of ceiling / floor: $14.75 \times 11.25 = 166$ (SUM C)

7 Square yards of flooring: $166 \div 9 = 18.5$ (SUM D)

Converting Inches to Decimal Feet: $1'' = .084 \cdot 2'' = .167 \cdot 3'' = .25 \cdot 4'' = .334 \cdot 5'' = .417 \cdot 6'' = .5 \cdot 7'' = .584 \cdot 8'' = .667 \cdot 9'' = .75 \cdot 10'' = .834 \cdot 11'' = .917$

A Calculates the perimeter of the room by adding the length (Answer 1) to the width (Answer 3) and multiplying by 2.

B Calculates the square feet of walls by multiplying the perimeter of the room (Sum A) by the room height (Answer 2).

C Calculates the square feet of ceiling / floor by multiplying the length of the room (Answer 1) by the width (Answer 3).

D Calculates the square yards of flooring by dividing the square feet of floor (Sum C) by 9.

QUICK FACTS

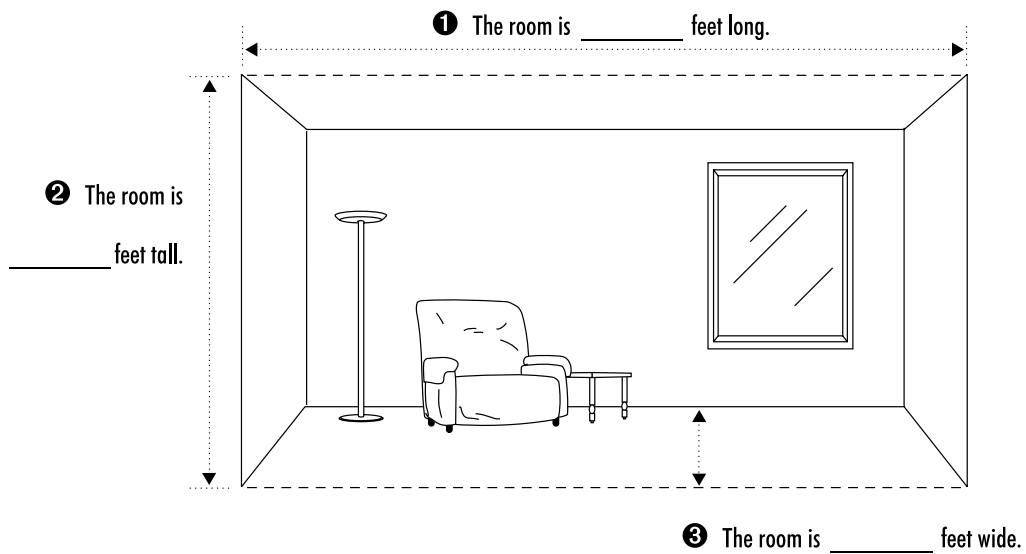
The sample *QuickCalculator* sheet shown above contains quantities that have been rounded. We suggest rounding lineal feet to two decimal places then to the nearest inch when converting to inches. Square feet should probably be rounded to the nearest square foot and square yards should be rounded to the nearest 1/3 or 1/4 yard.

See page 449 for more information about the geometric formulas used in this *QuickCalculator*.

QUICK CALCULATOR

Rectangular Room

Use this sheet and a calculator to determine the area of a rectangular room.
Calculate each line from left to right. Do math in parentheses first.



A Perimeter of room $\left(\frac{\text{ANSWER 1}}{\text{ANSWER 1}} + \frac{\text{ANSWER 3}}{\text{ANSWER 3}} \right) \times 2 = \frac{\text{SUM A}}{\text{SUM A}}$

B Square feet of walls $\frac{\text{SUM A}}{\text{SUM A}} \times \frac{\text{ANSWER 2}}{\text{ANSWER 2}} = \frac{\text{SUM B}}{\text{SUM B}}$

C Square feet of ceiling / floor $\frac{\text{ANSWER 1}}{\text{ANSWER 1}} \times \frac{\text{ANSWER 3}}{\text{ANSWER 3}} = \frac{\text{SUM C}}{\text{SUM C}}$

D Square yards of floor $\frac{\text{SUM C}}{\text{SUM C}} \div 9 = \frac{\text{SUM D}}{\text{SUM D}}$

USING THE ROUND ROOM QUICKCALCULATOR

QUICK CALCULATOR

Round Room

Use this sheet and a calculator to determine the area of a round room.
Calculate each line from left to right.

1 The room is 125 feet in diameter.

2 The room is 8 feet tall.

3 Perimeter of room \rightarrow $\frac{125}{\text{ANSWER 1}} \times 3.1416 = \frac{392.7}{\text{SUM A}}$

4 Square feet of walls \rightarrow $\frac{392.7}{\text{SUM B}} \times \frac{8}{\text{ANSWER 2}} = \frac{3142}{\text{SUM C}}$

5 Square feet of ceiling / floor \rightarrow $\frac{125}{\text{ANSWER 1}} \times \frac{125}{\text{ANSWER 1}} \times .7854 = \frac{1230}{\text{SUM D}}$

6 Square yards of floor \rightarrow $\frac{1230}{\text{SUM E}} \div 9 = \frac{136.7}{\text{SUM F}}$

Converting Inches to Decimal Feet

1" = .083	2" = .167	3" = .25	4" = .334	5" = .417	6" = .5	7" = .584	8" = .667	9" = .75	10" = .834	11" = .917
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A Calculates the perimeter of the circle by multiplying the diameter (Answer 1) by Pi (3.1416).

B Calculates the square feet of walls by multiplying the perimeter of the room (Sum A) by the room height (Answer 2).

C Calculates the square feet of ceiling / floor by squaring the diameter (Answer 1 times Answer 1) and multiplying by .7854.

D Calculates the square yards of flooring by dividing the square feet of floor (Sum C) by 9.

QUICK FACTS

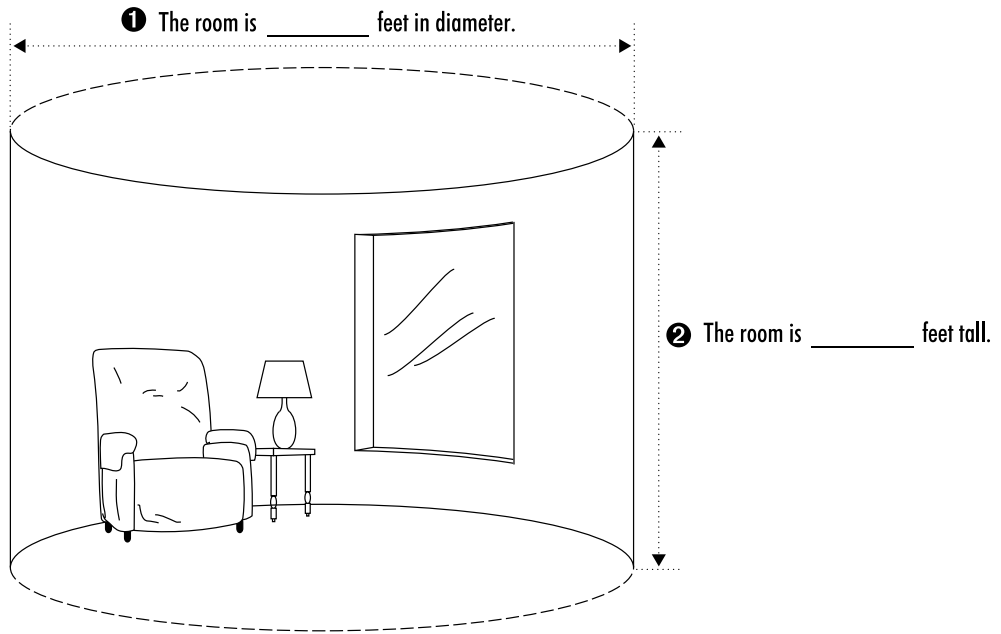
The sample *QuickCalculator* sheet shown above contains quantities that have been rounded. We suggest rounding lineal feet to two decimal places then to the nearest inch when converting to inches. Square feet should probably be rounded to the nearest square foot and square yards should be rounded to the nearest 1/3 or 1/4 yard.

See page 449 for more information about the geometric formulas used in this *QuickCalculator*.

QUICK CALCULATOR

Round Room

Use this sheet and a calculator to determine the area of a round room.
Calculate each line from left to right.



A Perimeter of room $\frac{\text{ANSWER 1}}{\text{ANSWER 1}} \times 3.1416 = \frac{\text{SUM A}}{\text{SUM A}}$

B Square feet of walls $\frac{\text{SUM A}}{\text{SUM A}} \times \frac{\text{ANSWER 2}}{\text{ANSWER 2}} = \frac{\text{SUM B}}{\text{SUM B}}$

C Square feet of ceiling / floor $\frac{\text{ANSWER 1}}{\text{ANSWER 1}} \times \frac{\text{ANSWER 1}}{\text{ANSWER 1}} \times .7854 = \frac{\text{SUM C}}{\text{SUM C}}$

D Square yards of floor $\frac{\text{SUM C}}{\text{SUM C}} \div 9 = \frac{\text{SUM D}}{\text{SUM D}}$

Converting Inches to Decimal Feet

1" = .084 • 2" = .167 • 3" = .25 • 4" = .334 • 5" = .417 • 6" = .5 • 7" = .584 • 8" = .667 • 9" = .75 • 10" = .834 • 11" = .917

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