FOUNDATIONS

SECTION UIP 1

FOUNDATION COSTS

Foundation costs include all labor, materials and equipment, plus overhead and profit for the installing contractor.

All foundations are normally below the level of the lowest floor. If the building has a basement, the basement floor is the lowest floor. Whether there is a basement or not, the cost of foundations should be included in all buildings. These costs, converted to a Segregated Cost basis, are in Sections SEG 1 through SEG 6 for the various types of construction and building occupancy and they include an allowance for foundation excavation and backfill. Basement excavation must be priced separately.

In Section UIP 1, foundation costs are directly related to size and composition, but not to occupancy. Specific foundation costs can be developed using this section. Foundation costs may normally comprise excavation or trenching, concrete footing, foundation wall, waterproofing and drain tile.

Foundation and frame costs are dependent on the total weight that must be supported. The foundation cost for a one story with basement building is approximately the same as for a two story building without a basement. In using the Segregated Costs, the total area including basement, which is supported, must be used in order to develop a reasonable cost.

Buildings with heavy floor loads, such as warehouses, must have larger foundations than lighter structures. Also buildings with greater wall heights or heavier walls must have heavier foundations even though they have comparable floor areas.

Buildings with slab floors constructed on the ground usually have lighter foundations. In light construction where heavily insulated shallow foundations are employed, these buildings may have very little foundation; however, a cost of 40% to 60% of the normal foundation cost should be included to allow for perimeter footings and preparatory work not included in the slab cost. In these areas, ordinary foundation costs may be 40% lower than in the conventional deep foundations. Where the slab and footings are poured simultaneously (monolithically poured) and form one unit, the costs will be lower.

HILLSIDE CONSTRUCTION

Buildings located on hillsides have added costs because of the more extensive underground footings, the higher foundation walls required on the low side, the difficulty of construction on steep slopes, added excavation and the additional cost of transporting materials to the site. In addition, there is usually a great deal of site preparation, which must be estimated separately.

The costs of hillside foundations can run up to more than five times as much for a similar building on flat land. Generally, reinforced concrete foundation costs will run 150% to 200% more than the costs for normal footings and walls listed on Page 2. Beam and column supports will cost 25% to 75% more than those shown on Pages 7 and 8. Hillside screen walls (finished one side) can be built-up from Section UIP 5.

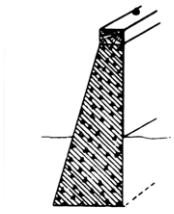
SUBTERRANEAN CONSTRUCTION

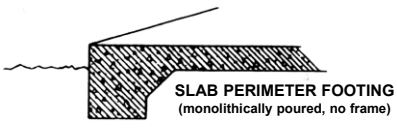
Earth sheltered residences and similar buildings usually require additional waterproofing; this includes materials similar to those used on roofs and exterior walls of standard structures above ground. These costs can be found on Page 3 of this section.

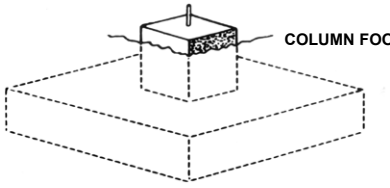
WOOD FOUNDATIONS

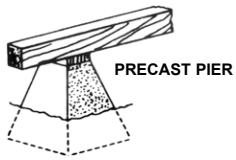
The mineral content of soils, in certain areas, makes treated wood a viable and desirable alternative to concrete and concrete block for underground foundation walls (including full basements). Costs for these types of walls are on Page 3 of this section.

Mudsills are a substandard construction practice of resting a wood frame directly on the earth. This is not to be confused with current terminology, where the term refers to the first wooden framing member that is in direct contact with a foundation stem wall or slab, to which it is attached by anchor bolts or power pins. In this case as well as where the frame rests on light wood blocking, there is little or no foundation cost and it is often included in the frame cost. In some areas a so called concrete mudsill is used, which is merely a thin layer of concrete spread under the frame to remove it from contact with the earth and give a level bearing surface. This cost is usually negligible.

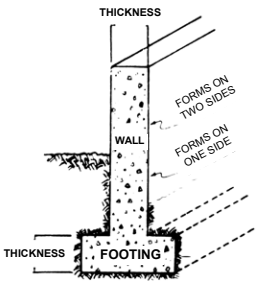




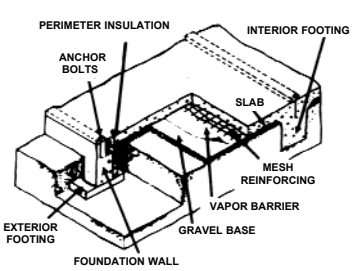




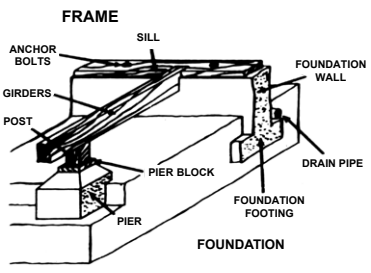
FOUNDATION WALLS

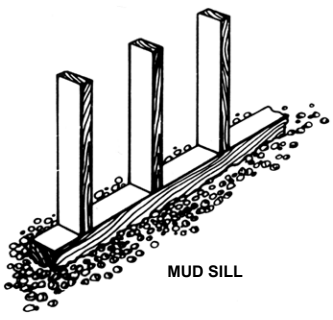


CONCRETE SLAB AND FOUNDATION



WOOD FLOOR CONSTRUCTION
(with interior frame supports)





FOUNDATIONS

SECTION UIP 1

BULK CONCRETE FOR FOUNDATIONS

(in place)

	LOW	AVERAGE	GOOD
Concrete, plain (cubic foot) . . .	$ 7.02	$ 8.22	$ 9.35
Concrete, reinforced (cubic foot)	8.95	10.60	12.55
Concrete, reinforced deep caissons (cubic foot)	16.40	21.70	28.25
Forms, surface area (square foot)	3.91	5.39	7.31
Concrete, piers, precast residential (each)	10.60	22.95	49.25

MISCELLANEOUS SITE PREPARATION

SITE CLEARING . . . Cost per acre. Does not include demolition.

	COST RANGE
Level with light grass	$ 625 – $1,170
Rolling with medium brush and small trees . .	1,170 – 2,490
Steep with heavy growth and trees	2,725 – 5,350

General lot grading, cut and fill, etc., is listed in the Segregated Cost sections.

SOIL STABILIZATION . . . Cost per square yard.

	COST RANGE
Lime stabilization	$ 5.39 – $ 10.50
Gabions filled with stone	81.00 – 245.00
Riprap	79.00 – 110.00
Geotextile fabric	.61 – 4.53
Synthetic matting	9.92 – 17.00
hexagonal matrix	11.90 – 19.55
rigid with integral drain	14.15 – 22.05

BULK EXCAVATION . . . Cost per cubic yard, includes allowance for one mile haul, disposal and return. For each additional mile add $2.32 to $3.79.

	COST RANGE
Soft earth	$ 4.48 – $ 6.23
Medium earth	4.87 – 6.85
Hard earth	5.39 – 7.37
Clay or adobe	8.22 – 11.50
Loose rock, hardpan or sand (requiring shoring)	9.35 – 15.30

Excavation by hand costs $35.00 to $74.00, per cubic yard.

UTILITY TUNNELS

Costs of tunnels carrying utilities between buildings will vary greatly depending on the depth of the tunnel and the soil type, but the following costs are smoothed averages of reinforced concrete lined tunnels per cubic foot of tunnel, including lighting and drainage.

Wall Thickness	Light Soil	Medium Soil	Hardpan	Rock
3" – 5"	$20.50	$22.55	$24.85	$27.25
5" – 7"	24.00	27.00	29.50	32.75
7" – 10"	28.00	31.25	35.25	39.25

TRENCHING

Cost per linear foot, includes chain trencher and operator.

Width x Depth	Soft Earth	Medium Earth	Hard Earth
6" x 12"	$ .77	$ .89	$ .95
6" x 24"	.79	.91	.97
6" x 48"	1.30	1.55	1.66
12" x 12"	.95	1.10	1.19
12" x 24"	.97	1.15	1.25
12" x 48"	1.65	1.92	2.06

TRENCHING

Cost per linear foot, including backhoe, operator, backfill and compaction. Bucket sizes vary and costs may vary plus or minus 50%.

Width x Depth	Soft Earth	Medium Earth	Hard Earth
24” x 2’	$ 1.49	$ 1.68	$ 2.53
24” x 4’	2.97	3.34	5.08
36” x 3’	3.35	3.71	5.64
36” x 6’	6.73	7.47	11.35
36” x 8’	8.92	9.92	15.00
48” x 3’	4.46	4.97	7.51
48” x 4’	6.01	6.61	10.05
48” x 6’	8.66	9.92	15.25
48” x 8’	11.75	13.20	20.40
72” x 4’	9.13	10.25	15.80
72” x 8’	17.70	19.65	30.00

EARTH WORK

(Cost per cubic yard)

	Soft Earth	Medium Earth	Hard Earth
Cut and fill and compact	$ 3.12	$ 6.23	$ 10.50
dock height fill	9.06	11.05	14.15
Backfill and compaction,			
Unconfined	14.15	17.25	22.05
Confined area	23.80	29.75	37.25
Handwork	69.00	105.00	165.00

Haul and Fill	1 mile	3 miles	5 miles	8 mile
5-CY truck	$4.87	$11.60	$16.15	$22.05
10-CY truck	4.08	7.37	11.60	14.75

CONCRETE CONTINUOUS (STRIP) FOOTINGS

Cost per linear foot, includes forms and reinforcing as noted.

SIZE	LEVEL GRADE		SLOPING GRADE	
Depth or Thickness/ Width	Plain	Reinforced	Plain	Reinforced
6” x 12”	$10.65	$ 13.80	$ 12.15	$ 15.75
6” x 14”	11.90	15.20	13.65	17.25
8” x 12”	13.40	16.15	14.90	18.30
8” x 18”	15.50	19.60	17.25	22.00
8” x 24”	17.05	20.95	19.55	24.20
12” x 18 ”	17.25	21.10	20.60	24.65
12” x 24	22.00	26.50	24.95	30.50
12” x 36”	28.25	34.00	31.75	38.25
12” x 48”	32.25	39.25	36.25	43.75
16” x 48”	43.00	50.00	47.50	56.00
16” x 60”	49.75	59.00	55.00	64.00
24” x 72”	78.00	89.00	84.00	97.00
24” x 96 ”	97.00	110.00	105.00	120.00

FOUNDATIONS

SECTION UIP 1

CONCRETE COLUMN (SPREAD) FOOTINGS

Cost each, includes forms and reinforcing as noted.

Square x Depth	Plain	Rein-forced	Square x Depth	Plain	Rein-forced
3' x 12"	$175	$205	8' x 24"	$1,000	$ 1,240
4' x 12"	240	285	12' x 36"	2,850	3,500
4' x 16"	310	360	16' x 36"	4,725	6,100
6' x 16"	545	640	20' x 48"	9,050	11,700

CONCRETE GRADE BEAMS

Cost per linear foot, includes forming and reinforcing.

SIZE Width x Depth	COST	SIZE Width x Depth	COST
12" x 16"	$28.25	14" x 28"	$44.00
12" x 18"	30.25	16" x 30"	51.00
12" x 20"	34.00	16" x 32"	52.00
12" x 24"	38.75	20" x 52"	80.00
14" x 26"	42.25	24" x 52"	89.00

CONCRETE FOUNDATION WALLS*

Cost per square foot of wall area, includes forming and reinforcing as noted. For walls formed on one side only, reduce costs by 15% to 25%.

Thickness	Plain	Reinforced
6"	$12.75	$14.15
8"	13.90	15.60
10"	14.45	17.00
12"	15.60	17.85
16"	17.60	19.85

For stay-in-place (EPS) forming, add $ .51 to $1.87.

***NOTE:** For hillside retaining walls, costs can be 100% to 300% higher.

CONCRETE BLOCK FOUNDATION WALLS*

Cost per square foot of wall area, includes grouting and reinforcing as noted.

	PLAIN			REINFORCED	
Thickness	Above Grade	Below Grade	Thickness	Above Grade	Below Grade
8"	$ 9.86	$ 8.72	8"	$10.70	$ 9.63
12"	11.65	10.60	12"	13.35	12.85

***NOTE:** For hillside retaining walls, costs can be 100% to 300% higher.

WOOD FOUNDATION WALLS

Cost per square foot of wall area, includes treated wood, studs, sheathing and waterproofing. Add for insulation and interior finish from Section UIP 5.

SIZE	COST RANGE	SIZE	COST RANGE
2" x 4" – 12" OC	$5.89 – $7.14	2" x 8" – 12" OC	$7.25 – $10.70
2" x 4" – 16" OC	5.39 – 6.46	2" x 8" – 16" OC	6.29 – 9.68
2" x 6" – 12" OC	7.09 – 8.44	2" x 10" – 12" OC	7.37 – 12.40
2" x 6" – 16" OC	6.11 – 6.75	2" x 10" – 16" OC	7.14 – 12.15

WOOD MUDSILLS

Cost per linear foot, treated wood.

SIZE	COST	SIZE	COST
4" x 4"	$2.32	6" x 8"	$ 7.48
4" x 6"	3.28	8" x 8"	9.68
6" x 6"	4.82	10" x 10"	15.15

SLAB ON GRADE

Cost per square foot of slab area, includes forming and reinforcing as noted. For post-tension reinforcing, add 10%.

Thickness	Plain	Reinforced
3"	$2.78 – $2.95	$3.12 – $3.52
4"	2.95 – 3.40	3.45 – 4.14
6"	3.79 – 4.31	4.31 – 5.05
8"	4.53 – 5.15	5.39 – 6.11
10"	5.49 – 6.23	6.29 – 7.31
12"	6.29 – 7.02	7.02 – 8.22

PERIMETER FOOTING . . . Monolithically poured with slab, cost per linear foot, including forms.

Depth Below Slab	Cost	Depth Below Slab	Cost
8"	$12.75	20"	$36.50
12"	18.95	24"	48.00
16"	27.25	30"	64.00

ADJUSTMENTS . . . To slab on grade; cost per square foot of slab area.

Thickness		.002"	.006"	.010"
Polyethylene vapor barrier:		$ .21	$ .26	$ .30
Depth		**4"**	**6"**	**12"**
Base:	Gravel	$ .40	$ .58	$1.09
	Sand	.64	.90	1.70
	Crushed Stone	.79	1.10	2.01

WATERPROOFING . . . Cost per square foot.	COST RANGE
Asphalt, bituminous, built–up, 1 ply	$1.08 – $1.42
2 ply	1.65 – 2.04
3 ply	2.32 – 2.89
For protector board, add	.79 – 1.08
Asphalt or pitch, one coat	.68 – 1.08
Two coats	.79 – 1.30
Asphalt with fibers, 1/16" thick	1.08 – 1.48
1/8" thick	1.42 – 2.04
Asphalt–coated board and mastic, 1/4" thick	1.42 – 2.10
1/2" thick	2.21 – 3.28
Bentonite clay, 3/8" thick	2.04 – 2.95
Bituthene, 1/8" thick	2.78 – 3.97
Cement parging, two coats, 1/2" thick	2.44 – 3.79
Elastomeric, Neoprene, 1/16"	3.79 – 5.49
Gypsum board, 1/2" thick thermal barrier or backer board	.96 – 1.42
Polyethylene sheet, .006" thick	.19 – .25
.010" thick	.21 – .29
Silicone spray, one coat	.41 – .48
Two coats	.68 – .81

PERIMETER INSULATION . . . Cost per square foot.	
Cork, asphalt impregnated 1/2" thick	$1.65 – $1.87
1"	2.04 – 2.44
Polystyrene beadboard, 1" thick	1.08 – 1.48
1½"	1.30 – 1.75
2"	1.65 – 2.04
3"	2.38 – 2.89
SITE TREATMENT, TERMITE . . . Cost per sq. ft.	$ .36 – $ .64

DRAIN PIPE . . . Cost per linear foot, includes bedding.

Diameter	4"	6"
Cement fiber/metal	$7.37 –	$ 9.86
Clay	8.33 –	12.25
Concrete	6.35 –	8.72
Plastic	6.68 –	8.22

PILING

SECTION UIP 1

EXPLANATION

Pilings and special foundations must be priced as an addition to other foundation costs. The costs given below are averages of total costs in place, exclusive of architect's fees. Setting up and dismantling a job depends mainly on the size of equipment needed and the difficulty of access to the job. For a small residential job or boat dock where light piling is used and a mobile rig can run up to the work, setup and dismantling may amount to only a few hundred dollars. While a major dam or seawall project far from a shipping point and requiring piecemeal movement of heavy equipment, the cost might run twice the average as shown. When placement is in wet conditions, riverfront, marshland, over water, etc., the costs should be increased 25% to 50%.

Where light residential piles are used as common practice, installed costs have been as low as $3.74 per linear foot for one hundred 8" tapered wood piles, and as high as $12.20 per linear foot for composition wood pole and concrete lined pipe over water, and up to $26.50 per linear foot for fifteen 12" precast concrete piles, plus $8,350 for setup costs in wetlands.

For pile tests, add $130 to $355 per ton of load per test pile.

EXAMPLE

A piling job requires 100 treated wood pilings, each 50' long by 14" diameter.

Cost of setup and dismantling	$ 17,900
100 piles 50' long = 5,000 linear feet @ $33.80	169,000
Total job cost	$186,900

SHEET PILING

TYPE	COST RANGE
Sheeting, bulkheads, left in place, per square foot	
concrete, poured in place	$20.70 – $27.50
Metal, aluminum panels	21.55 – 24.65
Steel, 27# average	30.00 – 42.25
Wood, untreated	12.20 – 14.15
Vinyl	12.45 – 13.90
Treated	14.15 – 16.15

Seawalls, cost per linear foot where typically installed, 10' – 14' depth for small residential jobs. For large commercial projects, costs may be 50% lower.

Treated wood, 8" – 12", including tiebacks	$315.00 – $430.00
Concrete, precast, 5" – 6" including Ties or piling	535.00 – 885.00
Masonry block, decorative, 1' solid, Including 1' of bedding	605.00 – 850.00
Rubble stone, 3', including 1' of bedding	730.00 – 955.00

PILING COSTS

TYPE OF PILING		COST PER LINEAR FOOT PILE	DRIVING	TOTAL	SETUP COST
Untreated Wood	10"	$ 7.14	$ 9.41	$16.55	$12,500
	12"	10.80	10.15	20.95	15,600
	14"	15.50	10.90	26.40	17,900
	16"	21.05	11.75	32.80	20,600
Treated Wood	10"	12.60	9.41	22.01	12,500
	12"	17.35	10.15	27.50	15,600
	14"	22.90	10.90	33.80	17,900
	16"	29.25	11.75	41.00	20,600
Steel, "H"	8" x 8"	27.50	10.50	38.00	13,900
	10" x 10"	38.25	12.10	50.35	16,100
	12" x 12"	49.75	13.80	63.55	19,000
	14" x 14"	62.00	15.05	77.05	21,300
Concrete, precast	10"	20.65	12.75	33.40	17,300
	12"	26.75	15.05	41.80	20,400
	14"	33.50	17.20	50.70	23,000
	16"	40.50	19.25	59.75	26,100
	18"	47.75	21.15	68.90	29,200
	24"	73.00	27.00	100.00	37,900
Steel pipe, concrete filled	8"	30.50	10.95	41.45	11,900
	10"	38.00	12.50	50.50	14,200
	12"	45.25	13.80	59.05	17,900
	16"	60.00	16.05	76.05	24,100
	18"	73.00	18.10	91.10	29,200
	20"	83.00	21.55	104.55	33,100
	24"	99.00	24.00	123.00	37,900
	30"	120.00	28.75	148.75	44,100
Concrete, in drilled holes	12"	-----	-----	33.50	-----
	16"	-----	-----	39.75	-----
	24"	-----	-----	60.00	-----
	36"	-----	-----	105.00	-----
	48"	-----	-----	190.00	-----

FRAMES

SECTION UIP 1

EXPLANATIONS

DEFINITION

Frames are independent structures which hold up the floors and roof of a building. In many cases they will also support or brace the walls. Frame costs are listed in the Segregated Cost sections.

Bearing walls and partitions are priced under Walls and Interior Construction, respectively. In addition, some buildings with bearing walls have floor supports for wood floors, which are priced separately under Frames in the Segregated Cost sections.

Pilasters and bond beams for bearing walls are priced under Walls as an additional wall cost.

Roof trusses are priced under Trusses and Girders in the Segregated Cost sections. When a complete frame cost is used, generally the trusses or girders would be included as the horizontal members of the frame. In certain cases, a low frame cost (Rank 1) could be used to account for just the vertical portions, and then the appropriate truss or space frame cost could be priced separately.

BEARING WALLS

A bearing wall is constructed to support the weight of the floors or roof above. In addition, in many buildings the interior walls will aid in supporting the roof and floors. In the case of a bearing wall, the costs given under Walls in the Segregated Cost sections are all-inclusive, with an average amount of wall materials, windows, doors, plaster, paint, etc., commensurate with the classification. Since this cost is complete, no further charge is made for supporting structure except for pilasters and bond beams, which are listed under Concrete or Masonry Walls, or floor supports, which are listed separately under Frames in the Segregated Cost sections.

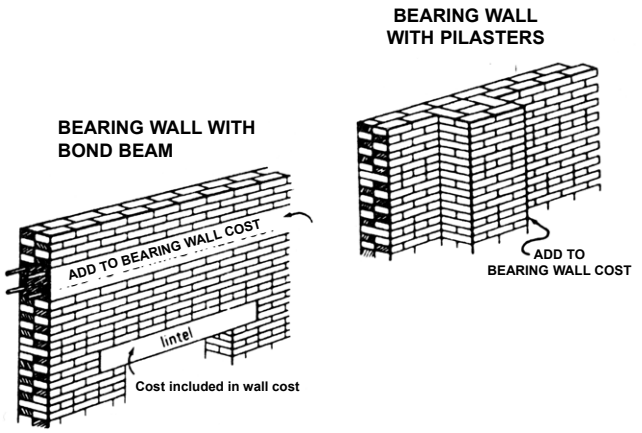
If bearing walls are used in part, they will substitute to that extent for the frame, and the frame cost is reduced accordingly, as described to the right.

PILASTERS

Brick and concrete walls are often strengthened with added thicknesses forming columns at intervals. Often the roof trusses will bear on these columns or pilasters, which are priced as an additive to the bearing wall cost in the Segregated Cost sections.

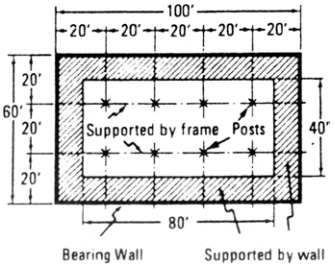
BOND BEAMS

Masonry walls also may be strengthened by horizontal concrete beams, bonded to the bricks or concrete blocks, which distribute vertical loads. These costs are also found as an additive to the bearing wall costs.



PARTIAL BEARING WALLS

When a building has a combination of frame and bearing walls, it is more accurate to first price the bearing walls with pilasters and bond beams and then price the frame on the basis of the area supported by the frame, or to price the columns and girders separately. In the drawing below it is assumed that each wall supports the roof halfway to the posts or columns as shown by the shaded area. Therefore, the balance is supported by the frame. For this example, assume a frame cost from the Segregated Cost section of $3.66 per square foot.



Area supported by frame = 40' x 80' = 3,200 sq. ft.
Total area supported by walls and frame = 60' x 100' = 6,000 sq. ft.
Percentage of total supported by frame = 53% (3,200 ÷ 6,000).
.53 x $3.66 = $1.94 per square foot of total area for the frame cost including pipe columns or posts and girders.

The table below indicates approximate percentages which may be used in lieu of this computation.

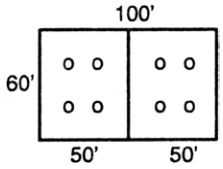
PARTIALLY FRAMED BUILDINGS

If a building is supported partially by frame and partially by bearing walls, and the exact proportion is difficult to determine in the manner shown above, then the following table may be useful. The distances listed are the smallest dimension between bearing walls.

SHORTEST DISTANCE	PERCENTAGE OF FRAME COST	SHORTEST DISTANCE	PERCENTAGE OF FRAME COST
30'	30%	75'	60%
40'	40%	90'	70%
50'	50%	120' and over	75%

EXAMPLE

This building is 60' x 100' without interior bearing walls; therefore, the shortest dimension is 60'. If there were an interior bearing wall like that shown by the broken line, the shortest dimension would be 50'.



From table above: 50' span, use 50% of full frame cost.
75' span, use 60% of full frame cost.
By interpolation 60' span, use 54% of full frame cost.

FRAMES

SECTION UIP 1

EXPLANATIONS

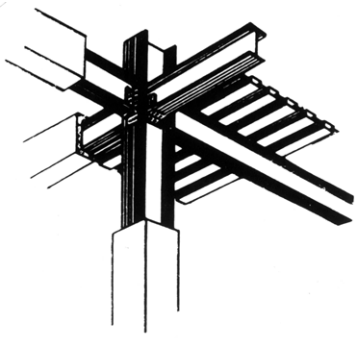
CLASS A AND B FRAMES

Class A and B frames are of fireproof construction, steel or concrete. In these buildings, especially in composite construction, there must be some arbitrary breakdown between roof, floors, walls and frame. This has been done by making the frame costs residual to the costs of other elements of the building shell, or in other words, the frame costs include all supporting structure costs which are not charged to the wall, roof or floors.

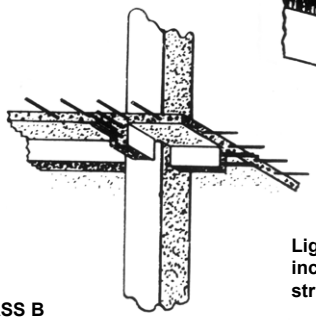
The walls of Class A and B buildings may rest on the frame or may be hung on it, and usually bear no more than their own weight. These are known as curtain walls since they merely enclose space.

CLASS C AND D FRAMES

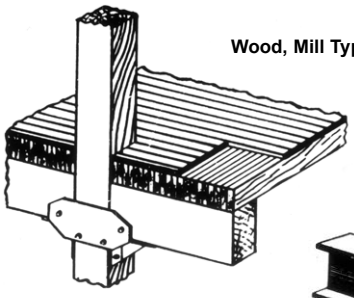
Class C and D buildings may also be of framed construction where an independent frame supports the floors and roof, and if all walls and partitions were removed, the skeleton would still stand insofar as vertical loads are concerned. This frame may consist of wood or steel posts and girders, wood poles, Glulam arches, etc. The vertical members can be encased in fire resistive coverings or enclosed within the walls. It is often called an open frame since it lacks the complete fire resistance of a Class A or B frame. Costs are listed under Frames in the Segregated Cost sections and further descriptions and pictures may be found in the introduction.



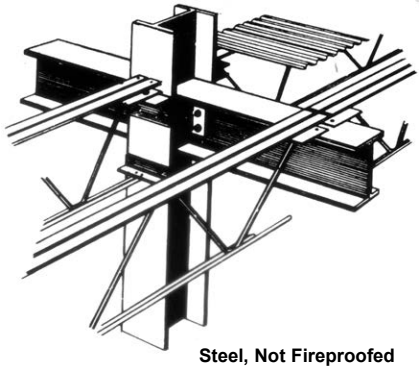
CLASS A
Fireproofed Steel



CLASS B
Reinforced Concrete

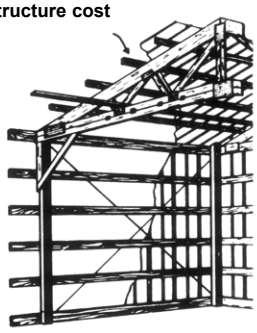


Wood, Mill Type



Steel, Not Fireproofed

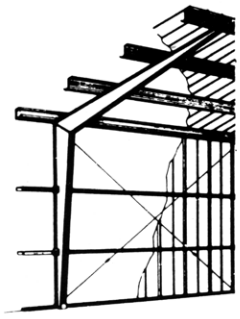
Light purlin supports included in roof structure cost



CLASS D Pole Frame (posts and prefab. trussed rafters)

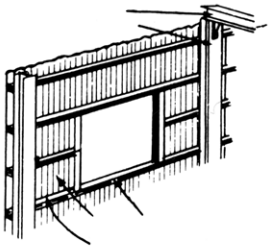
CLASS S FRAMES

Class S frames are typically open steel skeleton members consisting of post and beam and/or rigid bent configurations. The vertical members can be enclosed within the walls but the frame is basically non fire resistive. Costs are listed under Frames in the Segregated Cost sections. Costs for light pre-engineered frame can also be found in Section UIP 11.



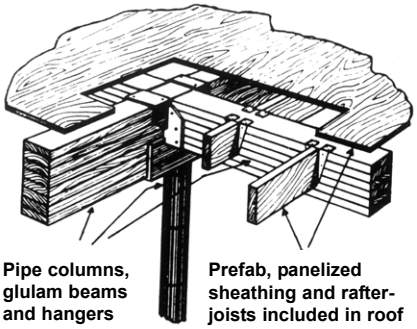
Rigid tapered plate frame

Columns, beams and ties included in frame cost



Wall cover, girts, and windows, included in wall cost

Post and beam frame



Pipe columns, glulam beams and hangers included in frame cost

Prefab, panelized sheathing and rafter-joists included in roof structure cost

FRAME COSTS

SECTION UIP 1

WOOD BEAMS AND COLUMNS

Average cost, in place, per linear foot, including bolts, gussets and miscellaneous ties. For other sizes, use the equivalent cross section. For finished and wrapped or treated structural lumber add 10% to 20%.

SIZE	TIMBER	BUILT UP	SIZE	TIMBER
4" x 4"	$ 4.36 – $ 4.98	$ 4.36	8" x 24"	$ 55.00 –$ 62.00
4" x 8"	7.88 – 9.97	7.99	10" x 10"	26.25 – 30.50
4" x 12"	11.55 – 13.60	11.85	10" x 20"	48.00 – 56.00
6" x 6"	9.06 – 11.45	9.63	10" x 30"	74.00 – 80.00
6" x 10"	14.85 – 18.05	15.50	12" x 12"	37.50 – 43.50
6" x 14"	20.70 – 24.35	19.45	12" x 24"	68.00 – 76.00
6" x 20"	29.50 – 34.25	25.75	12" x 36"	105.00 – 120.00
8" x 8"	16.05 – 20.85	18.30	14" x 14"	53.00 – 60.00
8" x 12"	26.50 – 30.75	23.80	14" x 28"	105.00 – 110.00
8" x 16"	35.75 – 41.50	29.25	16" x 32"1	50.00 – 175.00

For posts and girders supporting the floor structure of the first floor, use costs above, deducting 15%.

WOOD GLULAM BEAMS

Average cost, in place, per linear foot, including erection, hangers and miscellaneous connectors. For other sizes, use the equivalent cross section. For finished and wrapped lumber add 10%.

SIZE	COST	SIZE	COST	SIZE	COST	SIZE	COST
3" x 9"	$17.00	7" x 15"	$38.50	9" x 21"	$ 82.00	11" x 21"	$105.00
3" x 12"	20.20	7" x 18"	45.25	9" x 24"	94.00	11" x 24"	120.00
3" x 15"	23.50	7" x 21"	52.00	9" x 27"	105.00	11" x 27"	135.00
5" x 12"	26.00	7" x 24"	59.00	9" x 30"	120.00	11" x 30"	145.00
5" x 15"	30.75	7" x 27"	66.00	9" x 33"	130.00	11" x 33"	155.00
5" x 18"	35.50	7" x 30"	73.00	9" x 36"	140.00	11" x 36"	170.00
5" x 21"	39.25	7" x 33"	79.00	9" x 39"	150.00	11" x 42"	200.00
5" x 24"	42.75	9" x 18"	72.00	9" x 42"	160.00	11" x 45"	215.00

WOOD POLE FRAMES

Average cost, in place, per linear foot above ground for pressure-treated columns. Add wood trussed rafters from Section UIP 7. For untreated lumber, deduct 10%.

4" x 4" posts	$4.59 – $ 6.26	6" x 6" posts	$ 7.93 – $ 9.46
4" x 6" posts	5.67 – 7.37	6" x 8" posts	10.55 – 12.30
8" x 8" posts	12.90 – 14.75	12" to 14" poles	20.85 – 31.25

WOOD SILLS

Average cost, in place, per linear foot of bolted, pressure-treated or redwood sills. For sill sealer add $.40 to $.57 per linear foot.

2" x 4"	$2.15 – $2.66	2" x 6"	$3.06 – $3.79
2" x 8"	4.31 – 4.59		

REINFORCED CONCRETE COLUMNS

Average cost per linear foot. The amount of reinforcement can vary considerably based on the weight supported, and costs may vary plus or minus 15%.

CIRCULAR COLUMNS		ADD FOR	SQUARE COLUMNS	
DIA.	COST RANGE	CAPS (each)	DIA.	COST RANGE
12"	$ 34.25 – $ 46.00	$295	12"	$ 47.25 – $ 59.00
14"	43.25 – 59.00	320	14"	57.00 – 73.00
16"	52.00 – 72.00	345	16"	67.00 – 88.00
18"	61.00 – 87.00	360	18"	78.00 – 105.00
20"	72.00 – 100.00	395	20"	90.00 – 120.00
24"	92.00 – 135.00	450	24"	110.00 – 155.00
28"	110.00 – 165.00	535	28"	140.00 – 190.00
32"	140.00 – 210.00	610	32"	165.00 – 230.00
36"	165.00 – 245.00	695	36"	185.00 – 275.00

For ornamental nonbearing columns, see Section UIP 6.

REINFORCED CONCRETE BEAMS

Cost per linear foot, includes erection and ties. For other sizes, use equivalent cross section. Add 10% for stressing.

SIZE	COST RANGE	SIZE	COST RANGE
4" x 6"	$14.75 – $22.05	10" x 18"	$49.25 – $63.00
6" x 8"	24.35 – 34.00	12" x 16"	53.00 – 65.00
8" x 10"	34.00 – 48.00	12" x 20"	58.00 – 73.00
10" x 12"	44.00 – 52.00	12" x 24"	64.00 – 79.00

PILASTERS AND BOND BEAMS

Average cost in place per linear foot.

BLOCK (BOND BEAMS)	CONCRETE	MASONRY (PILASTERS)
$12.20 – $17.00	$24.65 – $39.75	$31.25 – $47.00

PIPE AND TUBE COLUMNS

Typical cost range, per linear foot, including ancillary items and/or welding.

	ROUND		SQUARE
SIZE	COST RANGE	SIZE	COST RANGE
3"	$ 28.25 – $ 34.25	3"	$ 27.75 – $ 34.75
4"	36.50 – 44.75	4"	35.00 – 46.00
6"	53.00 – 65.00	6"	52.00 – 67.00
8"	71.00 – 87.00	8"	68.00 – 89.00
10"	87.00 – 105.00	10"	84.00 – 110.00
12"	105.00 – 130.00	12"	100.00 – 135.00

Add $ .33 to $ .49 each inch of diameter per linear foot for concrete fill.

Adjustable jack columns for residential basements cost $61.00 to $105.00 each.

FRAME COSTS

SECTION UIP 1

PRE-ENGINEERED STEEL FRAMES

Costs are for industrial type integral roof and wall column truss frames including ties, connections and/or welding. Design loads vary and costs may vary by plus or minus 25%.

TYPE	COST – EACH TRUSS					
Span	**20**	**30**	**40**	**50**	**60**	**80**
Open-web . . . . . tapered truss	$1,300	$1,650	$2,180	$2,725	$3,350	$5,300
Post and web . . . truss	1,420	1,750	2,230	2,850	3,650	5,550
Post and beam .	1,480	1,870	2,440	3,050	3,825	6,000
Tapered plate . . .	2,060	2,575	3,275	4,175	5,250	8,350

Add 4% for high profile (4:12 roof slope) buildings.

Add or deduct 4% for each foot of deviation from 14' base eave height.

STEEL

(Wide Flange “H” and “I” Beams)

Average cost per linear foot. Steel weights and types vary considerably and costs may vary from a plus 50% to minus 25%. Beams are designated by web length, where the flange width at each end increases the beam weight and cost as the flange gets larger.

Example: W8 cost range

Low, 15# per linear foot “I” beam, 8" web, 4" flange

High, 40# per linear foot “H” beam, 8" web, 8" flange

SIZE (web length)	COST RANGE	SIZE (web length)	COST RANGE
3"	$28.25 – $ 29.75	18"	$87.00 – $140.00
4"	33.75 – 39.75	21"	100.00 – 145.00
5"	39.25 – 45.25	24"	110.00 – 155.00
6"	44.00 – 52.00	27"	125.00 – 165.00
8"	47.00 – 67.00	30"	140.00 – 240.00
10"	52.00 – 87.00	33"	150.00 – 250.00
12"	59.00 – 110.00	36"	160.00 – 295.00
14"	69.00 – 125.00		

For trusses, see Section UIP 4, Roofs.

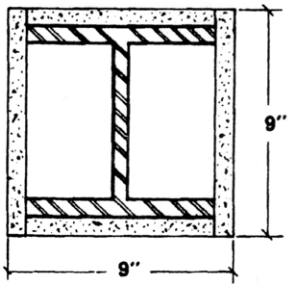
FIREPROOFING

The following are average costs per square foot of covered or enclosed area for fireproofing of structural steel.

TYPE OF ENCASEMENT	FIRE RATING 1 HR.	2 HR.	3 HR.	4 HR.
Sprayed fiber, beams	$ 1.99	$ 2.89	$ 3.28	$ 3.74
columns	2.61	3.91	5.15	6.40
Drywall	7.31	9.86	11.85	13.40
Lath and plaster	11.00	13.95	15.85	17.65
Concrete	12.15	15.15	17.05	18.70
Masonry units	-----	11.90	15.30	18.05

Sprayed fiber on underside of decking costs $1.65 to $2.10 per square foot.

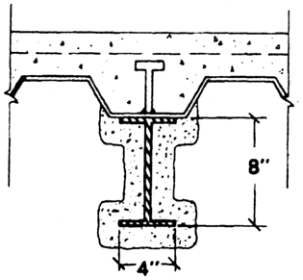
To convert the amount of covered area to a cost per linear foot, add up the total number of covered sides and divide by 12 inches.



A Wide-Flange "H" Column (W8 x 40#) enclosed by drywall boxed all around with a 2-hour fire rating.

$$\frac{9 + 9 + 9 + 9}{12} =$$

3.00 sq. ft. x $9.86 = $29.58 /LF



A Wide-Flange "I" Beam (W8 x 15#) covered by sprayed fiber all around except for one flange side with a 3-hour fire rating

$$\frac{8 + 4 + 4 + 8 + 4}{12} =$$

2.33 sq. ft. x $3.28 = $7.64 /LF

INTERIOR CONSTRUCTION

SECTION UIP 2

INTERIOR PARTITIONS

Costs are averages for wall construction only, per square foot of wall area of nonbearing partitions. Additions should be made for doors from the Interior Door table without deducting for the areas of the openings. See Section UIP 5 for basic walls, wall covers, insulation and finishes not shown here. For shear walls or double layers of gypsum or sound board, add costs from the Sheathing category found on Page 4 of Section UIP 5.

MASONRY

TYPE	UNFINISHED	PLASTER ONE SIDE	PLASTER TWO SIDES
Clay tile, 4”	$ 9.15 – $10.50	$11.35 – $14.10	$13.50 – $17.50
6”	10.65 – 12.45	12.70 – 16.00	14.90 – 19.50
8”	12.00 – 13.35	14.10 – 16.80	16.15 – 20.35
Concrete block,			
2” solid	6.17 – 7.74	8.36 – 11.20	10.45 – 14.70
4” solid	7.02 – 8.75	9.36 – 12.40	11.45 – 15.80
6” solid	8.36 – 9.93	10.50 – 13.35	12.60 – 16.85
4” hollow	6.85 – 8.47	8.97 – 12.00	11.10 – 15.45
6” hollow	7.85 – 9.15	9.98 – 12.70	12.00 – 16.20
8” hollow	8.64 – 10.20	10.85 – 13.70	12.80 – 17.30

NOTE: For gypsum board, deduct $ .37 to $ .79. For furring, add $1.00 to $2.24.
For glazed block or tile, add $5.95 to $8.24 for each glazed side.

FRAME

TYPE	2½" – 3" WALL	4" WALL	6" WALL
Steel studs,			
Plaster one side	$4.37 – $ 8.59	$4.49 – $ 8.75	$4.49 – $ 9.15
Two sides	6.85 – 13.65	6.96 – 14.00	6.96 – 14.30
Solid wall	8.36 – 10.85	----- – -----	----- – -----
Gypsum board			
One side	3.54 – 5.38	3.60 – 5.61	3.60 – 5.99
Two sides	4.82 – 7.02	4.88 – 7.41	4.88 – 8.08
Solid wall	7.91 – 9.87	----- – -----	----- – -----

NOTE: Add insulation to solid wall for 4" shaft wall cost.

Wood studs,			
Plaster one side	3.54 – 5.28	3.69 – 5.72	3.60 – 6.29
Two sides	5.90 – 8.86	6.17 – 9.36	5.78 – 9.98
Gypsum board			
One side	2.35 – 3.54	2.58 – 3.81	2.53 – 4.49
Two sides	3.81 – 5.04	4.16 – 5.61	3.81 – 6.23

NOTE: For staggered studs on 2" x 6" plate, add $1.26 per square foot to 4” wall.
For lead lined lath, add $10.10 to $24.90 per square foot.
For gypsum green board (wet walls), add $.17 per square foot per side.

MISCELLANEOUS

TYPE	COST RANGE
Glass block, white or aqua	$ 38.00 – $ 53.00
Color and intaglio	52.00 – 71.00
Folding partitions, wood and plastic	16.50 – 25.25
Acoustical	40.00 – 84.00
Add for electrical operation	22.45 – 24.40
Movable office partitions, hardboard/plastic	10.35 – 15.65
Softwood/plywood	12.35 – 20.80
Hardwood	18.80 – 29.50
Metal partitions, single thickness	14.90 – 23.25
2” insulated	16.50 – 27.75
3” insulated	18.80 – 28.50
add for glazing	1.35 – 2.58
Clear glass, full height	27.00 – 70.00
Frameless, structural glazing	210.00 – 270.00
Metal channels, 2¼” gypsum	8.41 – 12.35
Cement fiber panels	13.45 – 24.40
Woven wire, including doors	7.29 – 14.30
X–ray viewing, clear–opaque	
Lead–plastic panels	190.00 – 310.00

For hospital privacy curtains, see Section UIP 12, Page 3.

TOILET PARTITIONS

Average cost of each unit completely installed, including door. For privacy screens use the low side of the price range, deducting 10% to 20%. For stall shower with dressing cabinet, use high side of the price range plus 50% to 75%.

TYPE	COST RANGE
Laminated plastic	$ 675 – $1,300
High-density solid plastic	955 – 1,830
Marble or Corian	1,120 – 1,970
Metal, baked enamel	700 – 870
Stainless steel or porcelainized	985 – 2,020
Wood	420 – 895

For grab bars, add $68.00 to $160.00 each.

INTERIOR DOORS

Average cost in place per square foot of door opening, including hardware.

Accordion	$13.20 – $ 25.25
Bypass folding	8.02 – 16.35
Cafe (bar) doors	16.25 – 21.85
Flush doors, hollow core:	
Hardboard	8.97 – 12.65
Metal	24.40 – 35.00
Plastic–clad	23.80 – 30.75
Wood	14.30 – 21.60
add for solid core	3.09 – 4.32
add for raised panel door	.93 – 6.46
add for decorative pattern or carved	27.25 – 41.75
add for metal frame	2.18 – 4.32
add for lead–lined frame	30.75 – 41.00
add for lead–lined door or glass	54.00 – 62.00
add for glass areas	9.81 – 18.45
add for Underwriters’ label	8.02 – 16.65
add for security locksets (restrooms, hotel/motel)	4.04 – 11.45
card entry, excluding monitoring system	11.45 – 16.00
French doors, wood	18.45 – 23.80
Louver doors, wood	13.45 – 21.05
Mirror wardrobe panels	14.20 – 24.95
Add for automatic door closers, each	71.00 – 230.00

For panic hardware, see Section UIP 6, Page 6; smoke-activated closers, Section UIP 3, Page 12.

INTERIOR STAIRWAYS

Apply cost to each full flight of stairs. The following costs include stair framing, finish and railings. For staircases that have a large number of the same railings and balustrades along an open landing or balcony, increase cost by 20% to 30%. For partial flights use proportionate costs. For every foot of floor height above 10', add 5%. Custom curved or floating stairways are constructed of hardwood, hardwood with some tile or stone or with marble, with costs ascending in that order. The width of the staircase, landings if any, overall height, along with materials used, workmanship, and complexity of design (split staircase), must be considered when determining quality.

Disappearing attic stairs, slide-up pivot type, manual	$ 560 – $ 2,020
Motorized	10,600 – 13,500
Folding type, wood	700 – 1,570
Aluminum	2,750 – 3,525
Telescoping access ladder	2,950 – 3,525
Spiral stairs, aluminum	3,525 – 6,450
Steel	3,125 – 6,800
Wood	4,925 – 7,400
Wood, residential, with balustrade,	
Softwood	1,300 – 4,100
Hardwood	1,790 – 6,850
Spiral or curved	4,850 – 15,200
Add or deduct 10% – 15% for each ft. deviation from 42" base width.	
Custom stairways, spiral	8,500 – 21,200
Curved	16,000 – 53,000
Floating	16,600 – 74,500

INTERIOR CONSTRUCTION

SECTION UIP 2

FLOOR COVERING

(Cost per square foot)

TYPE	COST RANGE
Access (computer) floor, raised	$ 17.10 – $ 34.00
add for ramps, each	870.00 – 1,400.00
Railing, per linear foot	58.00 – 93.00
Full office floors	11.50 – 21.30
Asphalt tile	2.02 – 3.76
Bamboo, laminated plank	8.97 – 19.65
Block, creosoted wood, in asphalt	6.46 – 12.35
Brick, acidproof, industrial	14.05 – 36.50
Brick, common in mortar	7.74 – 15.55
Brick, pavers in concrete	9.36 – 18.95
Carpet, light grade	1.40 – 3.60
Medium grade	3.25 – 5.50
Heavy grade (includes carpet tiles)	4.65 – 10.05
Custom (special order)	8.70 – 43.50
Indoor/outdoor	1.79 – 5.11
add for pad	.50 – 1.40
Concrete, color	.81 – 2.25
Staining	3.60 – 4.94
Concrete, foamed, 1–5/8”	1.06 – 1.95
Concrete hardener and sealer	.68 – 2.30
Heavy duty	1.57 – 4.09
Aggregate topping, 1/2” – 1”	4.26 – 12.75
Cork	5.11 – 9.98
Diato, magnesite, etc.	6.46 – 12.35
Epoxy terrazzo, 3/8” to 1/2” tile or poured	8.70 – 18.80
Epoxy, urethane, neoprene, 1/32” – 1/16”	3.37 – 8.41
1/8” – 3/8”	5.90 – 13.20
add for colored chips or glitter	1.57 – 3.54
Felt underlay	.29 – .54
Flagstone, random local stone, in concrete	12.35 – 24.40
Granite	24.70 – 69.00
Gratings, plastic	8.97 – 44.00
Steel or aluminum	9.81 – 42.50
Stainless steel	41.75 – 145.00
Linoleum	3.25 – 6.85
Marble	22.45 – 72.00
Cast tile	13.45 – 25.50
Melamine laminated tiles or sheet	2.69 – 9.09
Deluxe	6.90 – 13.20
Plastic tile, interlocking	6.73 – 10.25
Rubber fabric tile	8.70 – 17.40
Rubber tile or sheet	3.42 – 11.55
Slate, grouted	14.05 – 27.50
Terrazzo, exclusive of base slab	9.54 – 22.15
Tile, 1” to 1–1/2”	18.00 – 33.75
Tile, ceramic or quarry	8.97 – 23.60
Custom tile	21.60 – 47.00
Vinyl composition tile or sheet	1.74 – 3.69
Premium, designer grade	3.13 – 4.94
Vinyl sheet	2.64 – 9.48
Vinyl tile	2.81 – 9.93
Premium, designer grade	8.64 – 16.45

Add 15% for conductive flooring.

For exterior decking, see Section UIP 13. Synthetic sports surfaces, see Section UIP 14.

WOOD FLOORING

(Cost per square foot)

Cost per square foot, exclusive of floor structure and subfloor, including wood base at walls, sanding and finish. Vapor barrier or building paper underlayment not included. Add $ .73 to $2.01 per square foot for sleepers. Custom patterns and/or special species may run two to three times costs listed. For custom finishes, add $.51 to $.68 for each additional layer of urethane.

TYPE	COMMON	SELECT	CLEAR
Hardwood			
Strip, 1/2"	$ 8.08 – $ 9.09	$10.50 – $12.55	$15.50 – $17.00
3/4" – 13/16"	8.02 – 9.15	10.85 – 13.00	16.75 – 18.50
Plank, imitation			
3/8" – 1/2"	9.36 – 10.45	11.60 – 14.35	16.50 – 20.00
3/4" – 13/16"	10.05 – 11.45	12.25 – 16.35	17.00 – 23.20
Parquet,			
3/4" – 13/16"	10.85 – 12.15	13.35 – 18.15	18.50 – 27.25
3/16" – 1/2" in mastic	7.41 – 8.59	10.10 – 13.75	15.80 – 22.70
3/4" – 13/16" in mastic	8.80 – 10.20	13.65 – 16.25	17.50 – 26.00
Softwood			
Strip, 3/4" – 13/16"	$6.34 – $7.35	$7.74 – $9.36	$10.60 – $12.00
Gymnasium Flooring			
Hardwood flooring on subfloor and sleepers, per square foot			$11.05 – $18.15
Portable floors on 2 x 4s and 2 x 6s, per square foot			11.85 – 19.70

For synthetic and other special sports surfaces, see Section UIP 14.

MOLDING AND TRIM

(Cost per linear foot)

FLOOR BASE	
Ceramic or quarry tile	$ 9.36 – $13.70
Epoxy or diato topset	6.67 – 9.81
Hardwood	2.07 – 4.37
Ornate	5.38 – 8.80
Plastic	1.95 – 3.60
Softwood	1.91 – 3.81
Terrazzo	11.10 – 16.00
Vinyl or rubber topset	1.79 – 3.03
CEILING TRIM	
Hardwood	$ 2.64 – $10.60
Ornate	12.45 – 41.75
Metal	6.23 – 14.70
Plaster, cast	16.50 – 41.75
Plastic	2.47 – 6.73
Softwood	2.35 – 8.47
CHAIR AND WALL RAILS	
Hardwood	$ 2.98 – $ 10.20
Metal	20.95 – 43.25
Stainless steel	63.00 – 105.00
Plaster, reinforced	14.60 – 37.75
Plastic	2.47 – 6.23
Softwood	2.35 – 8.02
MISCELLANEOUS	
Ceiling medallions, wood or cast plaster, each, small	$185.00 – $ 310.00
Large, over 2' diameter	395.00 – 1,320.00
Wall niches, cast plaster, each	865.00 – 1,660.00

For mantels, see Section UIP 9.

INTERIOR CONSTRUCTION

SECTION UIP 2

CEILING COSTS

(Cost per square foot)

Costs of ceilings, with the exception of suspended or dropped ceilings, do not include framing, as flat plaster on lath is usually supported by the bottom of the floor joists or roof structure. Painting or other finish typical of the quality and type of ceiling is included. For wallpaper, see Section UIP 5.

For finished buildings and residences, ceiling joists are considered in the roof structure costs. In plain buildings such as industrials and warehouses, no such allowance is made, and where a ceiling exists under a roof, the cost of ceiling joists must be added, as in all instances where special ceiling framing is needed.

A ceiling structure hung by wires or supports is a suspended ceiling, and the cost of the suspension system must be added, except as noted.

To convert costs to floor area for high-pitched ceilings, use the roof-slope multipliers from Section UIP 4.

TYPE	COST RANGE	
Acoustical ceilings, tile or panels:		
Metal panels, including pads and suspension system	$ 6.46 –	$15.15
Mineral fiber, fiberglass, tiles (1' x 1')	1.95 –	4.88
panels (2' x 2' or 4')	1.07 –	4.16
Mirror–faced panels	17.40 –	29.50
Organic fiber, wood or cane	1.74 –	3.30
Embossed metal	4.26 –	15.40
Fiberboard panels	1.40 –	2.58
Gypsum board, taped and painted	1.79 –	3.03
Spray–on, texture	1.74 –	2.69
Hardboard paneling, 1/4", decorative	2.47 –	5.67
Paint only, on bottom of roof or floor structure	.56 –	1.68
Plaster on lath: acoustical	3.54 –	6.40
Spray–on (thincoat w/texture) on lath	2.53 –	4.43
Standard, add 20% for Keene's	3.13 –	5.67
add for metal lath	.50 –	.93
Plaster on masonry soffit: acoustical	2.98 –	5.50
Spray–on (thincoat w/texture)	2.02 –	3.60
Standard, add 24% for Keene's	2.53 –	4.72
Plaster panels, reinforced, decorative	12.65 –	20.80
Plastic panels, including suspension system but excluding lighting (included in electrical cost)	5.44 –	12.80
Plywood paneling, softwood, 1/4" 3/8"	2.69 –	5.50
Hardwood, 1/4" 3/8"	3.87 –	8.70
Coffered or vaulted panel with molding	8.70 –	27.50
Custom woods, site built	22.45 –	45.75
Polylaminated panels	2.81 –	4.65
Insulated panels	4.21 –	6.96
Wood, boards or T&G, softwood, 1/2"	2.64 –	5.99
Hardwood, 1/2"	4.49 –	9.93
Hardwood, decorative carved or coffered	7.91 –	32.75
Add for wood furring	.80 –	1.91
Add for metal furring	1.35 –	3.13
Add for ceramic tile finish	10.90 –	30.25
Custom tile	23.80 –	53.00
Add for ceiling structure which is not part of the roof or floor structure	1.35 –	3.13
Add for suspended ceiling, metal	1.23 –	3.03
Add for suspended ceiling, fiberglass	1.79 –	4.16
Add for suspended ceiling, hardwood decorative	3.20 –	9.36
Add for suspended ceiling, seismic supports	.18 –	.56

For ceiling insulation or exposed plank or deck, see detailed costs in Section UIP 4.

For art glass, see Section UIP 6.

INTERIOR DECORATING

The following costs are for the highly specialized type of ornamental finishes associated with auditoriums, public buildings and some high-value theaters. These figures are generally included in the costs in the Calculator and Segregated Cost Methods. In some cases, however, it may be desirable to make separate estimates of ornamented interiors. If a figure on the ornamentation is desired, the method suggested is to multiply the total area of all decorated surfaces by the costs given below.

The assessor who uses these costs must ascertain the proper classification. As a guide, small or neighborhood cinemas will usually fit into the plain category, the medium–size theater will be in the average category and the expensive major theater will normally be in the expensive classification.

A study of the individual structures will enable the assessor to place the type of decoration in the cost range. Two or more of the classifications listed may be found in one building. Thus, a theater auditorium may be extensively decorated and the foyer relatively plain. Both the extent of the decoration and the relative cost of the medium employed should be considered.

PLAIN DECORATING . . . This consists largely of flat or plain color work, some border or cove stenciling, or a minimum of plaster staff or other ornamental medium.

$4.37 to $7.06 per square foot

AVERAGE DECORATING . . . This includes basic flat work and considerable ornamental treatment of openings, columns, beams and arch facings; also a limited amount of staff, terra cotta, marble or tile, such as for niches, plaques or crestings.

$11.25 to $31.75 per square foot

EXTENSIVE DECORATING . . . This ranges from the upper limit of the average class to the finest type wherein the surfaces are largely covered with intricate designs in expensive media.

$40.00 to $82.00 per square foot

Detailed costs for stone and marble veneers can be found in Section UIP 6.

Hand-painted murals by famous artists must be valued by a qualified art appraiser, but those by commercial or billboard artists usually cost $75.00 to $115.00 per square foot. Simple hand-painted stenciling will cost $22.90 to $46.00 per square foot.

Photo murals in black and white or sepia, pasted on the wall, will cost $18.05 to $32.25 per square foot. In color, the cost is $44.50 to $98.00.

Staff, stone or wood ornamentation will usually take the same depreciation as the building, but items of artistic merit may depreciate little, and ornamentation which is subject to wear may depreciate at a high rate. Works designated as having historical or artistic merit must be valued by fine arts specialists.

INTERIOR CONSTRUCTION

SECTION UIP 2

CABINETS

(Cost per linear foot)

TYPE	LOW	AVG.	GOOD	HIGH COST
Base cabinets				
paint or print, laminates	$ 86.00	$135.00	$ 205.00	$ 565.00
natural, lacquer finish	115.00	175.00	265.00	670.00
Resins, baked enamel	730.00	870.00	1,040.00	1,250.00
Metal	120.00	175.00	260.00	600.00

For island cabinetry, add 10% to 20%; peninsula (doors both sides), add 55% to 65%.
For lazy-susan, add 10%.
For matching stove/sink fronts only, deduct 60%.

Wall cabinets, 12" deep by 30" high				
Paint or print, laminates	$ 75.00	$115.00	$165.00	$380.00
Natural, lacquer finish	86.00	125.00	200.00	485.00
Resins, baked enamel	560.00	635.00	745.00	870.00
Metal	86.00	135.00	195.00	420.00

For peninsula (double sided), add 60% to 75%.
For each 6" variation from base, add or deduct 10%.
For undercabinet canopies with recessed lighting, add $19.05 to $39.25 per linear foot.

Full height, utility (broom, water heater, wardrobe)				
Paint or print, laminates	$ 125.00	$ 200.00	$ 330.00	$ 870.00
Natural, lacquer finish	160.00	260.00	420.00	1,080.00
Resins, baked enamel	1,160.00	1,400.00	1,680.00	2,040.00
Metal	165.00	255.00	385.00	950.00

For storage, oven or linen, add 30% to 35%. High cost, add 5% to 10%.
For garage storage or work benches, deduct 10% to 25%.

Pullman or vanity bases				
Paint or print, laminates	$72.00	$115.00	$175.00	$430.00
Natural, lacquer finish	86.00	135.00	205.00	565.00
Resins, baked enamel	515.00	625.00	785.00	920.00
Built–in desks				
Paint or print, laminates	105.00	145.00	195.00	415.00
Natural, lacquer finish	115.00	165.00	245.00	515.00
Resins, baked enamel	760.00	805.00	860.00	920.00
Open shelves				
8” paint or print, laminates	4.32	9.54	19.05	87.00
Natural, lacquer finish	4.94	10.10	22.45	110.00
Metal	8.41	14.30	28.00	96.00
12” paint or print,				
Laminates	4.94	10.35	22.45	110.00
Natural, lacquer finish	5.90	12.10	26.50	130.00
Metal	8.97	16.50	31.50	115.00

COUNTER OR SINK TOPS

(Cost per linear foot. Do not deduct sink or other built-in space.)

TYPE	COST RANGE
Laminated plastic	$ 15.65 – $125.00
Solid plastic	
(Avonite, Corian, Nevamar, etc.)	97.00 – 190.00
add for integral sink	53.00 – 130.00
Marble, cultured with integral sink	81.00 – 125.00
Marble or granite	125.00 – 330.00
Metal, stainless steel	100.00 – 195.00
Tile	46.25 – 175.00
Custom hand painted	100.00 – 260.00
Wood	48.25 – 135.00

RESTROOM ACCESSORIES

(Cost each except as noted)

Baby changing station, foldout	$ 325.00 – $ 535.00
Stainless steel	1,540.00 – 2,220.00
Child protection seat	93.00 – 180.00
Dispensers, air freshener	37.00 – 125.00
Facial tissue, surface	43.75 – 205.00
Custom residential or recessed	195.00 – 395.00
Paper cup	31.50 – 105.00
Paper towel, surface	56.00 – 685.00
Combination waste receptacle	230.00 – 915.00
Recessed	125.00 – 835.00
Combination waste receptacle	205.00 – 1,140.00
Sanitary napkin	220.00 – 735.00
Combination disposal unit	645.00 – 1,140.00
Seat cover, surface	49.25 – 125.00
Recessed	93.00 – 395.00
Dual unit	405.00 – 405.00
Soap	43.75 – 130.00
Surface mounted	31.50 – 215.00
Recessed	115.00 – 250.00
Custom dishes	81.00 – 225.00
Three station w/ liquid storage system	1,220.00 – 1,680.00
Toilet paper	37.00 – 270.00
Recessed	43.75 – 130.00
Custom holders or dual unit	75.00 – 535.00
Grab bars	37.00 – 75.00
L shape	120.00 – 210.00
Swinging or custom	220.00 – 755.00
Fold–up seat, handicapped	115.00 – 895.00
Hand dryers	495.00 – 1,760.00
Medicine cabinets, surface	75.00 – 455.00
Recessed	115.00 – 610.00
Mirrors, to 12 sq. ft., framed, per sq. ft.	37.00 – 81.00
Custom residential	115.00 – 320.00
Over 12 sq. ft., unframed	19.05 – 49.25
Robe hooks	12.35 – 69.00
Custom	56.00 – 220.00
Shelves, per linear foot	31.50 – 93.00
Custom residential	115.00 – 340.00
Toilet seats	37.00 – 180.00
Custom	125.00 – 600.00
Raised seat, handicapped	115.00 – 250.00
Towel bars	24.70 – 105.00
Custom	155.00 – 750.00
Rings, custom	81.00 – 310.00
Urns	105.00 – 295.00
Waste receptacles	81.00 – 405.00
Custom residential	290.00 – 635.00
Sanitary napkin disposal	37.00 – 310.00

NOTE: Equipment and cabinet costs for some occupancies can be found in Section UIP 12.

INTERIOR CONSTRUCTION

SECTION UIP 2

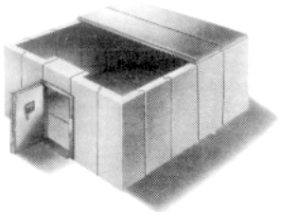
VAULTS

Costs per square foot of floor area for poured-in-place construction are based on an average eight foot ceiling height, exclusive of floors and doors, but including built in alarm systems, ventilators and interior finish. Add or deduct 2% for each foot of height variation.

TYPE	COST RANGE	
Security vault	$170.00 –	$270.00
Record storage	67.00 –	92.00

MODULAR VAULT SYSTEMS

Costs per square foot of floor area are based on an average eight foot ceiling height exclusive of floors and doors, but including built-in alarm systems, ventilators and interior finishes for solid precast panel construction. All modular vault systems shown are comprised of U.L. listed components. For other than ground level construction, add 30% to 40% for security vault systems comprised of laminated lightweight panels.



Security Vault Systems – Attack Resistance Rated Components		
Class M	$ 52.00 –	$ 59.00
Class 1	59.00 –	82.00
Class 2	75.00 –	110.00
Class 3	125.00 –	145.00
Insulated/Record Storage Vault Systems – Fire Resistance Rated Components		
1 Hour	$43.75 –	$57.00
2 Hour	53.00 –	59.00
4 Hour	58.00 –	71.00
6 Hour	70.00 –	82.00

VAULT DOORS

Costs for security vault doors include door delivered to premises and installed with time lock, day gate, sill and other hardware. Cost for insulated/record storage doors includes complete installation. Costs shown are for doors with clear opening of 78" high x 40" wide; reduce costs by 15% for doors 78" high x 32" wide. These vault doors are shown by U.L. listing. Older, unrated rectangular doors are shown in approximate equivalence to current U.L. listings. Circular doors are no longer made; the listed costs are normal at the time installed trended to date.

Security Vault Doors – Attack-Resistance Rating		
Class M (2” – 3” thick)	$8,750 –	$12,700
Class 1 (3½” – 6” thick)	23,600 –	34,100
Class 2 (7” – 9” thick)	28,400 –	44,300
Class 3 (10” thick)	39,600 –	64,250
Insulated/Record Storage Vault Doors – Fire-Resistance Rating		
1 Hour	$3,500 –	$5,100
2 Hour	3,925 –	5,450
4 Hour	4,700 –	5,900
6 Hour	5,450 –	7,400
Circular Vault Doors – Thickness		
8”	$138,000 –	$174,000
10”	147,000 –	187,000
12”	158,000 –	198,000
14”	171,000 –	212,000
16”	181,000 –	226,000

SAFE DEPOSIT BOXES AND LOCKERS

Costs of modular steel units, 24" deep, completely installed, per box. Add 10% for custom-built units. Deduct 25% for aluminum units.

TYPE	COST RANGE	
3” x 5”	$ 91 –	$ 115
5” x 5”	120 –	140
3” x 10”	125 –	145
5” x 10”	160 –	190
10” x 10”	250 –	335
5” x 16”	305 –	360
11” x 16”	495 –	735
22” x 16”	1,090 –	1,390
44” x 16” (includes 4” base)	1,990 –	2,410

BANK FIXTURES

Costs for teller stations include teller cages, undercounter equipment, service counters, islands, alarm systems, and other equipment not listed individually on this page.

Cost per teller station	$9,150.00 –	$12,300.00

Costs for hardened steel plates include complete installation with necessary accessories. Hardened steel plate, per square foot.

1/2"	$ 78.00 –	$120.00
1"	120.00 –	195.00
2"	180.00 –	260.00

For security surveillance equipment, see Section UIP 3.

TRANSACTION EQUIPMENT

Night deposit chutes and boxes, each	$12,600.00 –	$24,100.00
Drive-up/walk-up windows, each	10,600.00 –	19,000.00
Vision window only, per station	2,270.00 –	2,675.00
Pneumatic drive-up system, excluding canopy, window, and other site improvements.		
For multiple installations: deduct 20% for second unit; 2% for each unit thereafter.		
Cost per station	21,900.00 –	39,000.00
Customer TV monitor systems,		
Per station	65,250.00 –	78,250.00
add for remote cameras, each	2,140.00 –	2,675.00
Automated teller machines		
Lobby/retail units, each	9,650.00 –	36,600.00
Drive-up/walk-up through-wall units,		
Stand-alone island units	26,500.00 –	58,000.00

For ATM structures, see Section UIP 11.

INTERIOR CONSTRUCTION

SECTION UIP 2

CLEAN ROOMS DEFINITIONS

Each clean room space is specially engineered based on how clean the room must be. Costs can vary greatly for each of the three basic cost ranges and should be used with caution. We would recommend that, wherever possible, actual contract costs be obtained.

Clean room space is subdivided into three types classifed by the number of particles of a certain size present in a cubic foot of air. The classifications used in this book are described below:

Type 1: Class 100,000 to 10,000. This cost range represents cleaned space that has no more than 100,000 to 10,000 particles of 0.5 microns or larger per cubic foot of air.

Type 2: Class 1,000 to 100. This cost range represents cleaned space that has no more than 1,000 particles of 0.5 microns or larger, to 100 particles of 0.3 microns or larger, per cubic foot of air.

Type 3: Class 100 to 10. This cost range represents cleaned space that has no more than 100 particles no larger than 0.3 microns, to 10 or fewer particles of 0.12 microns or smaller, per cubic foot of air.

MODULAR ROOM ENCLOSURE SYSTEMS

Cost each, based on an average 8 foot ceiling height exclusive of floors or roof deck, but including downflow filtered air flow, lighting and ceiling panel and wall modules appropriate for the two enclosure types.

PREFABRICATED HARDWALL ROOMS

ROOM SIZE	COST RANGE		
(SQ. FT.)	Type 1	Type 2	Type 3
50	$ 9,000	$19,300	$ 30,600
100	14,600	29,400	45,700
150	20,600	40,100	64,750
200	26,500	52,500	83,750
300	34,900	68,500	111,000
400	45,600	92,250	157,000

VINYL CURTAIN ROOMS

ROOM SIZE	COST RANGE		
(SQ. FT.)	Type 1	Type 2	Type 3
50	$ 4,925	$ 7,400	$ 21,800
100	7,900	10,700	31,800
150	11,200	15,600	46,500
200	14,100	19,500	61,500
300	18,900	27,000	80,500
400	28,100	41,800	122,000

For curtain tunnels and horizontal airflow, add 50% to 70%.

For pass-thru chambers, add $465 to $4,325.

Personnel air showers, 16 to 30 square feet, add $17,600 to $28,100 per unit.

CLEAN ROOM EQUIPMENT

COST EACH	COST RANGE
Clean room storage cabinets, filtered	$5,650 – $7,400
Unfiltered	4,100 – 4,925
Containment weigh station	6,600 – 8,950
Work stations, laminated finish, horizontal laminar flows,	
3' to 5' long	5,650 – 8,950
6' to 8' long	8,650 – 13,200

For table mount units without base cabinet, deduct 10%. For downflow units, add 10%; vertical recirculation or negative flow, add 25%. For polypropylene units, add an additional 100%. For wet stations without hood (air flow), deduct 40%.

For general laboratory equipment, see Section UIP 12.

MISCELLANEOUS INTERIOR ITEMS

UNIT	COST RANGE
Building directories, 6 to 12 sq. ft., per sq. ft.	$ 180.00 – $ 480.00
12 to 24 sq. ft., per sq. ft.	150.00 – 400.00
Mail chutes, per floor	2,850.00 – 5,200.00
Mail collection boxes, single, each	1,990.00 – 2,550.00
Double, each	3,125.00 – 4,475.00
Mail boxes, apartment type, 4 8 doors,	
Vertical, each door	43.75 – 120.00
Over 8 doors, each door	37.00 – 115.00
Horizontal, each door	49.25 – 75.00
Post office type, wall unit, each door	37.00 – 135.00
Free–standing, each door	8.70 – 24.70
Plaques, bronze, per square foot	320.00 – 590.00
Sound system, base cost	860.00 – 1,540.00
add per speaker, paging only	86.00 – 160.00
Music and voice	210.00 – 290.00
Telephone enclosures, wall hung	915.00 – 1,800.00
Full height	3,650.00 – 4,975.00
Handicapped, portable amplifiers	49.25 – 62.00
Telecommunicators	480.00 – 800.00
Television antenna system, per outlet	135.00 – 210.00

For waste/linen chutes, see Section UIP 9.

KITCHEN UNITS

Average costs per linear foot of single-unit steel kitchens such as those found in motels, efficiency apartments, etc., containing sink, stove, oven and refrigerator. Add $75.00 per foot for snack bar. For microwave oven see, SEG 2.

UNIT	COST RANGE
Base section only (72" to 30")	$ 745.00 – $ 945.00
Base section and upper cabinets	1,020.00 – 1,140.00

Lump Sum Method:

For Units having kitchens or built-in kitchen units, add the following:

Excellent (stove, refrigerator, sink and cabinet unit)	$5,250
Good	3,825
Average (cabinets and sink)	2,850
Low Cost (kitchenette)	2,130

HEATING

SECTION UIP 3

EXPLANATION

The following costs are averages of typical installations, including cost of unit, miscellaneous materials and labor included in installation, cost of roughing in necessary utilities and vents, and a pro rata share of contractor's profit and overhead through a general contractor.

Heating and cooling costs per square foot of floor area are included in the Calculator and Segregated Cost Sections.

FLOOR AND WALL FURNACES

Costs are for gas fired units. Add $145 to $200 per thermostat. Add $180 to $230 for electric ignition. Add $145 to $210 for circulating fan. For direct vent thru-wall or freestanding units, add $110 to $275.

RATED CAPACITY	FLOOR FURNACES		WALL FURNACES	
	SINGLE	DUAL	SINGLE	DUAL
25,000 B.T.U.	$1,040	-----	$ 910	$1,020
35,000	1,130	$1,380	970	1,070
45,000	1,230	1,460	1,050	1,160
55,000	1,290	1,580	1,130	1,240
65,000	1,340	1,670	1,240	1,350
75,000	-----	1,810	-----	-----

FORCED-AIR AND GRAVITY FURNACES

Average cost of installed gas fired units with electric ignition including thermostat. Gravity and upflow furnaces will typically be at the lower end of the cost range while downflow (counterflow), horizontal and electric furnaces will be at the higher end. For high-efficiency models use higher side of the range, adding an additional $350 for deluxe low-$NO_x$ emission high-efficiency condensing furnaces. Add $210 to $305 per outlet for ducts, registers and grills. Deduct $190 to $255 for standing pilot ignition systems. Add 10% for oil-fired or stoker-fired units plus cost for a storage tank below. For dual chamber wood-burning units, add 100%; for outdoor wood-burning units, add 110% to 130%, larger units cost $24.50 to $28.50 per 1,000 B.T.U.s. See Section UIP 12 for chimneys.

RATED CAPACITY	COST RANGE	RATED CAPACITY	COST RANGE
65,000 BTU	$1,840 – $2,650	125,000 BTU	$2,310 – $3,250
75,000	1,930 – 2,750	150,000	2,525 – 3,575
85,000	2,010 – 2,925	200,000	3,000 – 4,325
100,000	2,070 – 3,075	300,000	4,350 – 6,350
For storage tanks, add:			
275 gallons	$ 880 – $1,100	1,000 gallons	$2,200 – $2,750
550	1,430 – 1,840	1,500	3,000 – 3,775

CLOCK THERMOSTATS

Single setback thermostats will range in cost from $165 to $200 plus $8.48 for each additional setback. Multistage programmable thermostats, used to automatically raise or lower temperature at preselected times, cost from $325 to $495. Hazardous location thermostats for controlling heating systems in explosive environments cost $260 to $405.

AUTOMATIC VENT DAMPERS

Automatic vent dampers cost $285 to $390 installed.

VENTILATION

For roof ventilators and blowers, see Section UIP 4.

SPACE HEATERS – SUSPENDED

Costs are for each gas-fired unit complete with propeller type fans, including installation. High efficiency, power vented units are at the high end of the range. Add $345 for blower-type operation. For poly-tube adapter, add $175. Add $210 to $350 for electric ignition. Add $99 for propane-powered units. For oil fired units, add 150%. For steam heat costs, use Section SEG 3 or 4.

RATED CAPACITY	COST RANGE	RATED CAPACITY	COST RANGE
35,000 BTU	$1,120 – $1,730	150,000 BTU	$1,880 – $2,525
50,000	1,290 – 1,840	175,000	1,930 – 2,750
60,000	1,330 – 1,880	200,000	2,070 – 2,975
75,000	1,380 – 2,040	250,000	2,525 – 3,450
100,000	1,480 – 2,200	300,000	2,925 – 4,025
125,000	1,630 – 2,330	400,000	4,025 – 5,800

SPACE HEATERS – FLOOR

Costs are for oil fired industrial heaters complete with fans, filters, controls, limited ductwork, storage and piping.

RATED CAPACITY	COST EACH	RATED CAPACITY	COST EACH
100,000 BTU	$4,350	400,000 BTU	$11,600
150,000	5,550	500,000	13,900
200,000	6,750	750,000	19,700
300,000	9,150	1,000,000	26,000

RADIANT HEATERS – SUSPENDED

Costs are for gas fired units complete with piping and controls. Continuous pipe loop systems with reflectors and vacuum pump are at the high end of the range.

RATED CAPACITY	COST RANGE	RATED CAPACITY	COST RANGE
15,000 BTU	$1,480 – $1,730	75,000 BTU	$2,650 – $3,100
30,000	1,730 – 2,040	100,000	2,975 – 3,575
45,000	1,930 – 2,330	125,000	3,775 – 4,475
50,000	2,040 – 2,480	150,000	4,350 – 5,100

FANJET DISTRIBUTION

Costs are for suspended fanjets including housing. Add $305 for motorized shutters.

FANJETS SIZE	FANJETS COST (EACH)	POLYTUBE DUCTING COST RANGE (PER LINEAR FOOT)
12"	$ 800	$.61 – $ .76
18"	965	.69 – .83
24"	1,210	.78 – 1.01
30"	1,380	.86 – 1.10

VENTILATION FANS – WALL

Costs are for each fan unit complete with square or slant-wall housing. Automatic wall shutters are included at the high end of the range.

SIZE	COST RANGE	SIZE	COST RANGE
24"	$1,210 – $1,630	42"	$1,730 – $2,310
30"	1,290 – 1,760	48"	2,010 – 2,675
36"	1,570 – 2,090	54"	2,370 – 3,175

HEATING

SECTION UIP 3

SOLAR HEATING SYSTEMS

The following costs are averages, including all ducting and ancillary equipment necessary for space heating either by use of liquid transfer-type or direct air-type collector systems.

The costs for individual installations can vary greatly and every application must be examined for its own special design costs, locational considerations, varying capacity, type of absorption, medium and storage facilities employed. Any conventional backup system must be priced separately. For large commercial applications use the complete system costs only, where 5,000 to 10,000 square feet of collector area will fall within the Good cost range and 50,000 square feet and over will normally fit the Low cost range for pricing purposes.

LIQUID SYSTEM	LOW	AVG.	GOOD
Complete system based on square feet of collector area	$ 60.00	$ 96.00	$ 160.00
Cost of individual component items:			
Collectors, per sq. ft.	30.75	48.25	76.00
Storage tank, per gal./capacity	4.02	5.01	5.95
Pipe loops, heat exchangers, ducts and controls, complete	7,850	12,400	19,300
Insulation, tank and pipes	1,430	2,500	4,150

AIR SYSTEM	LOW	AVG.	GOOD
Complete system based on square foot of collector area	$ 58.00	$ 93.00	$ 150.00
Cost of individual component items:			
Collectors, per sq. ft.	29.50	46.50	72.00
Pebble bed storage container with gravel, 200 – 400 sq. ft., each	1,900	3,025	4,975
Air handler, ducts, blowers and controls, complete	9,050	14,200	22,000
Insulation, tank and pipes	1,210	2,140	3,625

HEAT-RECOVERY SYSTEMS

The following costs are rough averages for complete air to air heat-recovery systems. The costs for individual design systems can vary greatly due to the many variables involved.

SIZE	COST – MCFM
2,500 – 5,000 CFM	$6,700 – $8,350
5,000 – 15,000	3,625 – 6,850
15,000 – 20,000	2,575 – 4,675
20,000 – 30,000	1,480 – 2,625

HOT WATER BOILERS

Cost are for small natural gas or propane fired cast iron boilers or generators with insulated jackets and standard controls and include pumps and gauges. For oil-fired, add 10% to 20%; electric hydronic boilers, add 25% to 40%. Deduct $190 to $265 for standing pilot ignition systems. For thru-wall power venting, add $470. Costs do not include piping or electric wiring. For large commercial and industrial boilers, see Section UIP 9. Add for expansion tank below.

RATED CAPACITY	COST RANGE
33,000 BTU	$2,525 – $3,250
60,000	2,675 – 3,575
75,000	2,750 – 3,775
100,000	2,975 – 4,000
125,000	3,075 – 4,275
150,000	3,250 – 4,575
175,000	3,400 – 4,850

HYDRONIC EXPANSION TANKS

Costs are for high-temperature steel expansion tanks installed with a maximum working pressure of 100 to 125 PSI.

2 gallon	$160 – $215	10 gallon	$345 – $475
5	215 – 320	15	440 – 635
7	265 – 385	20	550 – 805

HYDRONIC BASEBOARD HEATERS

Costs are for installed 7" high heaters used in hot-water systems with boilers and include tubing, panels, end caps and pivot-mounted dampers to regulate heat flow. Add $11.00 to $18.00 ($44 to $72 for 1-**1/4**" tube) for each corner application. For two-tier 1-**1/4**" tube assembly, add 50%; for three-tier, add 75%. For electric-heated hydronic, use electric baseboard costs from Page 3.

Length	1/2" Tube Cost Range	3/4" Tube Cost Range	1-1/4" Tube Cost Range
2’	$ 56 – $ 69	$ 69 – $ 87	$ 96 – $115
3’	65 – 83	83 – 105	120 – 150
4’	75 – 96	94 – 115	150 – 180
6’	96 – 120	120 – 155	195 – 245
7’	110 – 145	145 – 180	215 – 275
8’	145 – 180	180 – 215	250 – 300
9’	155 – 190	190 – 240	270 – 340
10’	160 – 200	200 – 255	290 – 365

HEATING

SECTION UIP 3

ELECTRIC WALL FURNACES

Costs are for wall or recess mounted counterflow electric wall furnace and includes thermostat switches and installation. For rear package that directs some of the heated air to an adjoining room, add $105 to $190.

RATED CAPACITY	COST RANGE	RATED CAPACITY	COST RANGE
2,000 watts	$525 – $730	6,000 watts	$825 – $1,300
4,000	690 – 990	8,000	960 – 1,600

RADIANT CABLE IN WALLS, FLOOR OR CEILING

Costs are for installed system and include cables, switches, controls and thermostats.

1,000 watts	$370 – $ 510	4,000 watts	$ 990 – $1,430
2,000	565 – 825	5,000	1,210 – 1,690
3,000	780 – 1,030	6,000	1,380 – 2,000

RADIANT CEILING PANELS

Costs are for suspended or surface-mounted panel including controls.

200 watts	$200 – $250	800 watts	$440 – $475
400	285 – 325	1,000	525 – 550
600	370 – 410	1,200	600 – 630

INFRARED CEILING OR WALL HEATERS

Costs are for indoor heaters and include installation and prorated share of electrical circuits. For outdoor infrared installations add 10% to 20%.

500 watts	$265 – $385	3,000 watts	$ 620 – $ 865
1,000	370 – 510	5,000	810 – 1,140
2,000	475 – 675	7,000	1,240 – 1,770

ELECTRIC BASEBOARD HEATERS

Costs are for baseboard heaters mounted directly on finished floor and include installation. Add $30 to $125 for wall thermostat. Add $44 to $215 for each built-in thermostat.

WATTS	LENGTH	COST RANGE	WATTS	LENGTH	COST RANGE
500	2’	$160 – $430	2,000	8’	$285 – $810
750	3’	175 – 475	3,000	10’	355 – 965
1,000	4’	195 – 585	5,000	11’	410 – 1,110
1,500	6’	245 – 675	7,000	12’	445 – 1,240

BATHROOM HEATERS

Costs are for ceiling or wall heaters including installation. Small wattage is bulb type. For ceiling light unit, add $44 to $72. For floor or kickspace units, add $145 to $190.

WATTS	WITHOUT FAN	WITH FAN
250	$ 93 – $190	$145 – $245
500	120 – 215	170 – 265
750	145 – 245	190 – 295
1,000	175 – 285	240 – 355
1,500	245 – 345	315 – 460
2,000	285 – 385	370 – 585

ELECTRIC INDUSTRIAL HEATERS WITH FAN

Costs are for 60-Hz fan-forced, ceiling or wall-mounted heaters used in industrial, commercial and farm applications, and include installation, summer fan switches and thermostats.

KW	COST RANGE	KW	COST RANGE
3	$ 940 – $1,290	15	$2,090 – $3,175
5	1,020 – 1,570	20	2,625 – 3,925
7.5	1,380 – 2,070	30	3,550 – 5,200
10	1,570 – 2,310	50	4,825 – 7,200

NOTE: For electric duct heaters with thermostat and relay, use above table deducting 25% to 40% from the cost range.

ELECTRIC CABINET UNIT HEATERS

Costs are for electric cabinet heaters with built-in thermostat and relays, and include installation, miscellaneous materials, connections and prorated share of electrical circuits. For recessed units, add 5% to 10%.

SURFACE MOUNTED

	LENGTH				
KW	3'	4'	5'	6'	7'
3	$2,575	-----	-----	-----	-----
4	-----	$2,625	-----	-----	-----
6	-----	2,725	-----	-----	-----
8	-----	2,825	$3,250	-----	-----
10	-----	2,975	3,450	$3,600	-----
12	-----	3,025	3,575	3,650	-----
16	-----	-----	3,625	3,825	-----
20	-----	-----	-----	3,925	$4,125
24	-----	-----	-----	-----	4,350

DUCTWORK

Costs are per linear foot of insulated, flexible, round polyester ducts and include supports, accessories and installation.

DIAM.	GRAY	METALIZED	DIAM.	GRAY	METALIZED
3”	$ 8.86	$ 9.31	12”	$17.60	$18.65
4”	9.14	9.74	13”	19.05	20.40
5”	9.74	10.30	14”	19.75	21.45
6”	10.20	10.85	15”	23.60	25.25
7”	12.25	12.90	16”	24.65	26.50
8”	12.85	13.60	17”	26.25	28.25
9”	13.30	14.30	18”	27.25	29.50
10”	13.60	14.65	19”	28.25	30.75
11”	17.25	18.30	20”	29.50	32.00

HEATING AND COOLING

SECTION UIP 3

REFRIGERATION

The rated horsepower of the motor is approximately equivalent to the number of tons of refrigeration. One ton of refrigeration equals 12,000 B.T.U.

WINDOW UNITS

CAPACITY	COST EACH	CAPACITY	COST EACH
1/2-Ton	$935 – $1,110	1 Ton	$1,460 – $1,740
3/4	1,110 – 1,520	2	2,200 – 2,725

For units installed in wall sleeves, the cost on new work is approximately the same. For remodeling, add cost of making hole and repairing. Add $320 for 220-volt units. Add 25% to 50% for reverse cycle (heat pump) window or wall units.

PACKAGE UNITS

Average cost includes single duct and outlet, or use of heating ducts. Add $200 per additional ducted outlet or intake.

CAPACITY	COST EACH	CAPACITY	COST EACH
2 Ton . . .	$ 4,225 – $ 4,725	7½ Ton . . .	$14,700 – $16,500
3	6,200 – 6,950	10	19,300 – 21,800
5	10,100 – 11,200	15	28,400 – 32,000

COMPLETE COOLING SYSTEM

Costs are averages of engineered systems, including complete ductwork, zone controls, power, and electrical connections. Open buildings such as auditoriums, industrials, and markets will usually have a lower cost per ton than buildings requiring a larger number of temperature zones and intricate piping or ductwork such as good offices, hospitals, etc. The costs shown are medians in three cost ranges.

	COST PER TON OF CAPACITY		
CAPACITY	LOW	AVERAGE	GOOD
5 Ton . .	$3,175	$3,925	$4,850
10	3,025	3,775	4,650
15	2,975	3,600	4,475
25	2,825	3,550	4,325
50	2,675	3,350	4,025
75	2,625	3,175	3,925
100	2,575	3,075	3,875
150	2,480	3,000	3,650
250	2,400	2,925	3,600
400	2,310	2,750	3,450

EVAPORATIVE COOLERS

WINDOW UNITS

Cubic Feet per Minute	Cost per Unit	Cubic Feet per Minute	Cost per Unit
1,500	$535 – $ 690	4,500	$1,050 – $1,380
2,500	690 – 895	5,500	1,230 – 1,580
3,500	855 – 1,110	6,500	1,380 – 1,770

ROOF OR WALL UNITS

Costs include one outlet, add $200 per additional outlet. For farm application, deduct 15% to 25%.

Cubic Feet per Minute	Cost per Unit	Cubic Feet per Minute	Cost per Unit
3,000	$1,480 – $1,880	8,000	$2,725 – $3,575
4,000	1,730 – 2,090	9,000	2,975 – 3,875
5,000	2,010 – 2,480	12,000	3,775 – 4,825
6,000	2,310 – 2,750	14,000	4,425 – 5,600
7,000	2,625 – 3,350	16,000	5,250 – 6,650

AIR CURTAINS

Air curtains in place, including necessary connections, cost from $39.00 to $65.00 per square foot of entrance opening. Add 70% to 80% for particulate filtered units and 80% to 100% for heated units.

COMBINED HEATING AND COOLING

PACKAGE UNITS

Costs are averages per installation, with single duct system and necessary vents, plumbing, power, and electrical connections for each unit. Costs are for commercial split systems of gas fired, forced air heating with gas or electric refrigerated cooling, and for heat pumps (reverse cycle refrigeration). Residential-type systems will cost 20% less for a 2-ton unit to 40% less for 5 tons.

Add $250 to $305 for each additional ducted outlet or intake, and $390 for each control to commercial systems only.

In cooler climates, heat pumps need supplemental heat. If supplemental electric coils are installed in ducts, add $590 for each coil. If a complete extra heating system is used, price separately.

RATED COOLING CAPACITY	SPLIT SYSTEM	HEAT PUMP
2 Ton	$ 6,200 – $ 6,700	$ 5,550 – $ 6,050
3	9,050 – 9,700	8,150 – 8,850
5	14,400 – 15,700	13,300 – 14,400
7½	21,100 – 23,000	19,300 – 21,100
10	27,500 – 29,800	25,400 – 27,900
15	39,800 – 43,600	37,300 – 40,900
20	51,750 – 56,750	49,100 – 53,750
25	63,500 – 69,750	60,750 – 66,500
30	75,000 – 82,750	72,000 – 79,500

HEATING AND COOLING

SECTION UIP 3

COMBINED HEATING AND COOLING

ENGINEERED SYSTEMS

Costs of these systems vary greatly with climate and degree of temperature control required. Buildings with large open areas and few controls need much less ductwork and fewer control items than buildings with many subdivided rooms with individual controls. In cooler climates larger heating units are involved, while costs are listed per ton of cooling capacity. Costs are averaged medians of three cost ranges and include the complete unit, installation, power, connections, and all ancillary items.

The lowest priced installation would normally be in a sheltered area in an industrial plant or market with few separate temperature zones. The highest priced installation per ton would normally be found in good and excellent buildings with occupancies such as offices, hospitals, hotels, and others which require many temperature zones, in an open area experiencing severe wind chill.

The determining cost factors are the year round ambient temperatures and the number of temperature controls, plus the quality of equipment and design of the complete system.

RATED CAPACITY	COST PER TON		
(Tons)	LOW	AVERAGE	GOOD
10	$4,000	$5,900	$8,650
15	3,850	5,650	8,350
20	3,775	5,550	8,200
30	3,625	5,350	8,000
40	3,550	5,250	7,750
50	3,450	5,150	7,650
75	3,350	4,975	7,400
100	3,225	4,850	7,250
150	3,150	4,725	7,100
200	3,075	4,575	6,900
300	2,950	4,425	6,700
500	2,800	4,250	6,450
750	2,700	4,100	6,250
1,000	2,625	4,000	6,150
1,500	2,550	3,875	5,950

MISCELLANEOUS RESIDENTIAL ITEMS

Costs installed in place with necessary vents and/or connections.

	COST RANGE
Air purifier, electronic	$1,130 – $1,830
Air purifier, filtered air	530 – 915
Humidifier	550 – 805
Ceiling fan	145 – 410
add for lighting	55 – 510
Sauna heater, door unit	1,110 – 2,110
Rock unit	1,910 – 3,225

Attic exhaust fans and ventilators, see Section UIP 4.

AIR TERMINAL UNITS

VARIABLE AIR VOLUME

Costs are each and include reheat coils, controls and installation.

CAPACITY (CFM)	COST RANGE
100 – 200	$ 825 – $1,140
200 – 350	855 – 1,200
350 – 500	935 – 1,310
500 – 750	965 – 1,390
750 – 1,000	1,050 – 1,490
1,000 – 1,250	1,120 – 1,580
1,250 – 1,500	1,200 – 1,670
1,500 – 2,500	1,540 – 2,170
2,500 – 5,000	2,200 – 3,150

AIR TERMINAL UNITS

CONSTANT VOLUME

Costs are for single duct units and include reheat coils, controls and installation. Double row reheat coils cost $225 to $525 per square foot.

CAPACITY (CFM)	COST RANGE
100	$690 – $965
300	765 – 1,050
500	805 – 1,140
750	850 – 1,200
1,000	985 – 1,390
1,250	1,030 – 1,440
1,500	1,080 – 1,540
2,000	1,420 – 1,980
2,500	1,770 – 2,500
3,000	1,980 – 2,775
4,000	2,300 – 3,250

DEHUMIDIFIERS

Costs are for residential dehumidifiers with built in frost and overflow controls and automatic humidistat to maintain selected humidity. Add $20 to $50 dollars for separate hose connection and drip tray.

CAPACITY PINTS/24 HRS.	COST RANGE
15	$495 – $ 755
25	565 – 870
30	635 – 935
40	755 – 1,050
50	910 – 1,250

HEATING, COOLING AND VENTILATING

SECTION UIP 3

AIR-CONDITIONING REQUIREMENTS

Air conditioning requirements are greatly dependent on the occupancy of the structure. The following figures give typical quantities by occupancy in square feet per ton of cooling capacity, except as otherwise stated. Figures do not include cooling for ice making, cold storage, etc. The range of areas includes approximately 80% of all cases.

OCCUPANCY	SQUARE FEET/ TON
Fast food restaurants, small bars and taverns	100 – 225
Lounges and restaurants	125 – 275
Radio & TV stations, laboratories, barbershops, drug stores	150 – 300
Luxury high-value residential occupancies	150 – 450
Hospitals	180 – 280
Specialty retail shops, dental offices	200 – 300
Churches, auditoriums, theaters	200 – 375
Fraternal buildings, governmental, clubhouses, country clubs	225 – 400
Colleges, banks, department stores, libraries, museums	250 – 450
Schools, light industrials, offices, medical offices, telephone	275 – 500
Mortuaries, veterinary hospitals	300 – 475
Bowling alleys, retail stores, shopping centers	300 – 500
Hotels, motels, post offices	280 – 450
Discount stores, loft buildings, nursing homes	350 – 500
Dormitories, food markets	280 – 550
Vocational schools, jails	400 – 600
Residential occupancies	400 – 750
Fire stations and service garages	550 – 750
Food markets with energy recovery systems	600 – 750
Auditoriums	1 ton per each 15 to 25 seats
Theaters	1 ton per each 10 to 20 seats
Bars and taverns	1 ton per each 7 to 12 seats

HOME AUTOMATION SYSTEMS

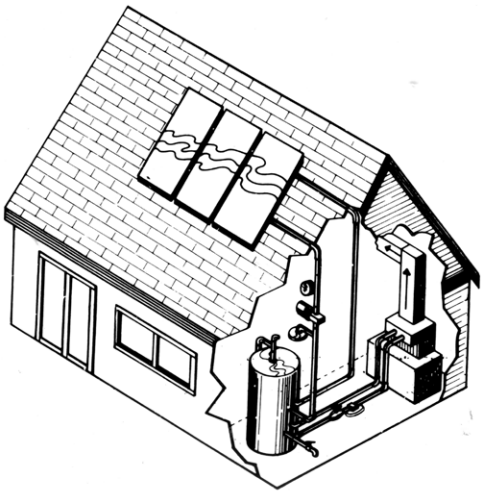
	COST RANGE
Home automation base system, one monitor and control panel for temperature, lighting, appliances and water heater control	$ 2,480 – $ 5,800
Custom system, including security (2040 zones), no camera base, up to 5 additional temperature zones	10,700 – 15,400
Two monitors, up to 20 temperature zones	19,000 – 28,300

BUILDING AUTOMATION SYSTEMS

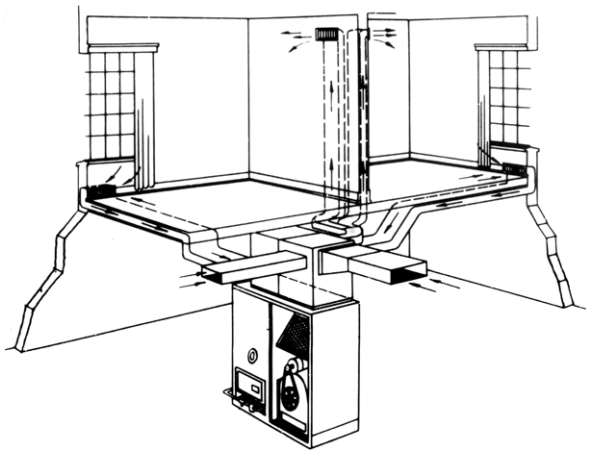
Commercial energy management or building automation system costs can vary greatly depending on the amount and sophistication of the monitoring and control equipment involved for HVAC, lighting, automation and life safety control, and energy management capabilities.

The following cost ranges are in some cases based on only a few projects and should be considered as very rough guides at best. We would suggest that whenever possible, survey, bid or contract costs should be obtained.

	COST RANGE
Small buildings, under 10,000 sq. ft., total cost Single function, no computer*	$ 770 – $8,450
Medium buildings, under 50,000 sq. ft., total cost multifunction, stand alone (microprocessor)	3,850 – 15,400
*Note - add for computer monitoring	8,450 – 30,500
Large buildings, over 50,000 sq. ft., fully distributed multifunction and central station cost per point, HVAC only	250 – 1,240
Lighting only	115 – 605
Integrated, energy, fire, security	1,540 – 3,450



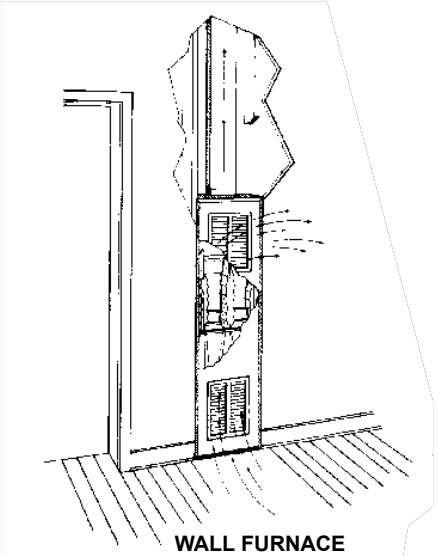
SOLAR HEATING SYSTEM



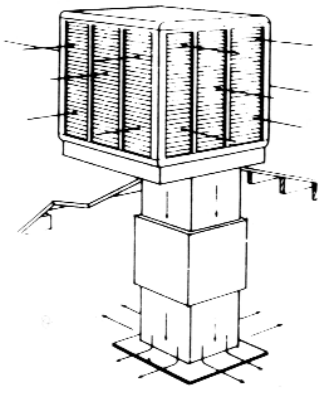
FORCED-AIR FURNACE

HEATING, COOLING AND VENTILATING

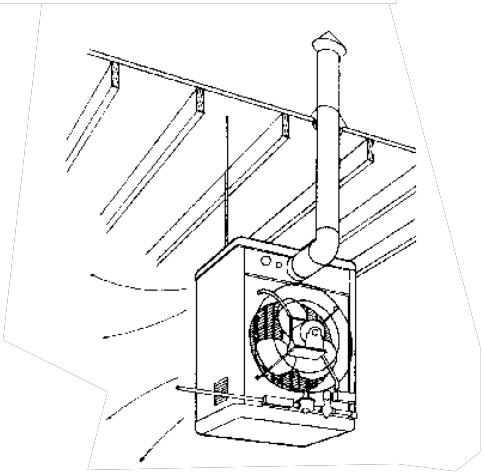
SECTION UIP 3



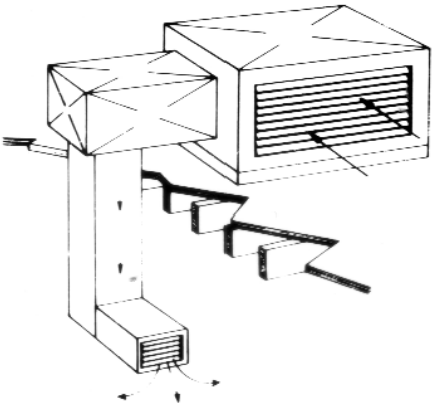
WALL FURNACE



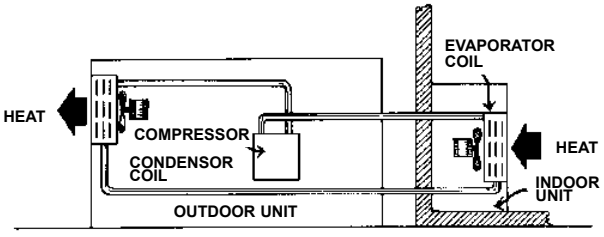
EVAPORATIVE COOLER



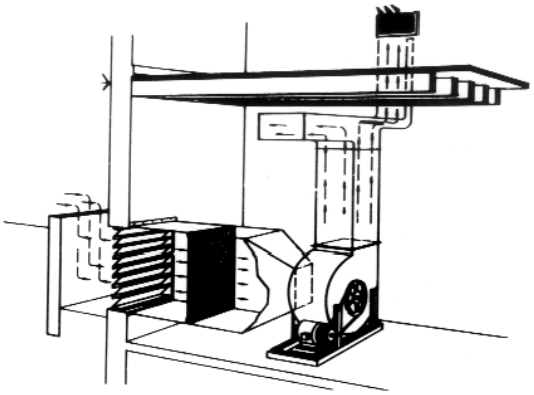
SPACE HEATERS (SUSPENDED)



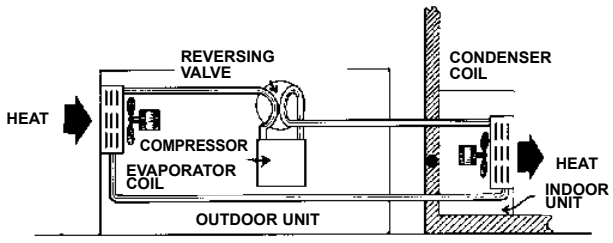
PACKAGE AIR CONDITIONING



COOLING CYCLE

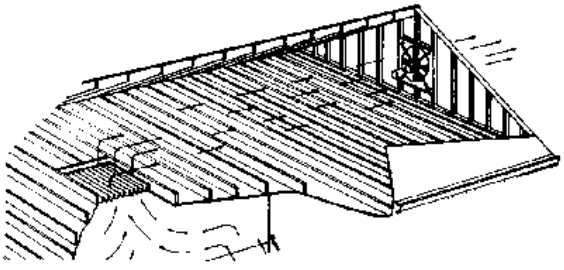


VENTILATION, BLOWER



HEATING CYCLE

HEAT PUMP



VENTILATION, FAN ONLY

MECHANICAL COSTS

SECTION UIP 3

PERCENTAGE OF TOTAL COST

The following table records the results of studies of many recently completed buildings, by occupancy, giving the percentage of total contract cost spent on the mechanical items, exclusive of elevators and sprinklers. The average used is the median, and the high and low percentages which are given, do not include extremes, but are computed to include approximately 90 percent of all cases within the given range (45% each side of the median). For electrical percentages, see Page 18.

OCCUPANCY	HEATING ONLY			HEATING & COOLING			PLUMBING		
	LOW	MEDIAN	HIGH	LOW	MEDIAN	HIGH	LOW	MEDIAN	HIGH
Apartments, Classes A and B	3.7	5.9	8.9	6.1	8.5	11.5	7.2	8.5	10.5
Apartments, Classes C and D	2.6	4.0	7.7	6.4	8.6	12.3	7.5	10.9	15.3
Auditoriums and theaters	-----	-----	-----	7.6	11.5	18.1	3.0	5.5	10.6
Banks	-----	-----	-----	4.5	7.4	12.6	2.3	4.3	7.0
Bowling alleys	-----	-----	-----	8.6	12.3	17.5	2.5	4.6	7.6
Churches	-----	-----	-----	6.6	9.8	13.9	1.8	3.6	8.3
City halls, courthouses, etc.	-----	-----	-----	7.3	10.8	15.4	5.0	7.6	9.9
Clubhouses and parish halls	3.5	6.0	10.2	8.2	10.4	14.0	5.0	7.2	11.9
Convalescent hospitals and nursing homes	4.1	6.1	8.7	7.8	11.4	17.3	8.1	10.6	13.6
Department stores	-----	-----	-----	9.1	11.8	14.9	2.8	4.0	5.8
Discount stores	3.4	5.4	9.3	8.3	10.7	13.4	2.3	4.3	7.3
Dormitories	4.7	7.1	10.6	7.0	10.1	13.8	6.6	8.4	10.9
Fraternal buildings and community centers	-----	-----	-----	8.4	12.1	17.6	4.7	7.0	10.5
Homes for the elderly	2.8	4.8	8.6	5.9	8.4	12.5	8.1	10.2	12.5
Hospitals	-----	-----	-----	11.3	16.8	22.9	7.9	10.8	15.1
Industrials	3.1*	6.2*	12.3*	11.5	16.0	23.0	3.8	6.4	11.5
Libraries and museums	4.4	6.1	8.5	8.3	12.1	17.4	3.1	5.3	7.8
Markets	-----	-----	-----	7.1	10.0	14.2	4.2	6.1	9.2
Medical office buildings and clinics	-----	-----	-----	6.2	9.7	16.4	4.6	8.5	13.0
Motels and hotels	-----	-----	-----	4.6	8.7	14.8	6.6	10.2	13.5
Office buildings	4.3	6.5	9.5	6.6	10.2	17.5	2.6	4.7	8.5
Restaurants	-----	-----	-----	8.0	12.2	15.6	5.3	9.8	13.7
Retail stores and shops	3.7	4.8	6.1	6.1	8.9	12.6	2.2	4.6	8.8
Schools, elementary	5.6**	9.0**	14.1**	10.3	13.2	16.8	4.8	7.3	11.1
Schools, secondary	-----	-----	-----	7.6	11.7	17.5	5.9	7.6	9.6
Schools, colleges	-----	-----	-----	7.4	13.4	19.8	3.8	6.7	12.1
Single-family residences	2.4	3.8	6.2	6.8	8.3	10.3	6.9	8.6	10.8
Telephone buildings	-----	-----	-----	9.5	14.0	19.2	3.7	5.5	8.0
Warehouses	1.9*	4.3*	9.1*	5.9	9.4	14.9	2.0	4.0	7.2

*With office cooling **With administrative office cooling

PLUMBING

SECTION UIP 3

EXPLANATION

In the Segregated Cost Sections, plumbing is priced on the basis of floor area or average cost per fixture. Many times, it is desirable to give a more detailed breakdown, especially in industrial occupancies. These tables will enable the assessor to detail plumbing costs by type of fixture.

The costs listed include cost of the fixture, labor, miscellaneous materials for rough and finish, and contractor's profit and overhead. Average amounts of water, gas, and waste lines within the building are included but not exterior sewer or utility lines or meters.

Industrial plumbing may be priced from this page, but long pipe and sewer runs must be added. Including all items, industrial and warehouse costs range from $2,650 to $7,550 per fixture; it is recommended that if priced from the following table, add for pipe and sewer runs of over 25' per fixture. Store and office fixtures have a normal range from $2,150 to $4,000 per fixture and may be priced from the table in a like manner. Toilet partitions and restroom accessory costs are found in Section UIP 2.

WATER HEATERS

Residential type:	20 Gal.	30 Gal.	40 Gal.	50 Gal.	70 Gal.
Minimum, competitive	$740	$760	$805	$860	-----
Average, 5 year guarantee	860	935	990	1,080	-----
Good, 10 to 15 year guarantee	-----	1,090	1,200	1,350	$1,640

For hot-water recovery expansion chamber, add $425.
Insulation jacket, add $47.
Point-of-use water heaters cost $225 – $380.

Tankless:
Gas . . . . . $1,310 – $3,150
Electric. . . . . $630 – $1,580

Commercial heater:

100 GPH recovery	$2,775 – $3,850	150 GPH recovery	$3,225 – $4,275
Storage tank, lined		Recirculating pumps	
120 gallons	2,340 – 3,225	1 inch	420 – 755
240	3,225 – 4,250	2	715 – 1,020
360	4,300 – 5,200	3	1,020 – 1,730

SOLAR HOT WATER HEATERS

Liquid heat collectors (two to three panels), 80 to 120 gallon water tank with heat exchanger and pump. Where system is integrated with space heat, reduce cost by 50%.

Sunbelt climates	$4,700 – $7,100
Northern climates	6,200 – 8,550
Hot water collector, tank combination, single unit:	2,150 – 3,150

WATER SOFTENERS

Average cost of automatic units completely installed with necessary fittings. Rated capacity is in grains of hardness converted per week. Commercial, per regeneration, add 100%.

RATED CAPACITY	COST RANGE		RATED CAPACITY	COST RANGE	
20,000	$1,600 –	$1,840	60,000	$1,840 –	$2,120
30,000	1,650 –	1,860	100,000	1,890 –	2,250
40,000	1,680 –	1,910	200,000	2,950 –	3,600

WATER FILTRATION Residential type:
complete treatment system
(filter, clarify, soften, refine) . . . . . $3,850 – $8,800

FIXTURES

	LOW	AVG.	GOOD	HIGH
Average for residential fixtures	$ 735	$ 1,120	$ 1,720	$ 2,650
high value	2,700	3,350	4,275	5,400
Bathtub	745	1,200	1,940	3,150
Handicapped, walk–in door	5,200	6,050	7,100	8,350
Fiberglass tub–shower	1,390	1,850	2,460	3,300
Handicapped unit	1,840	3,050	5,050	8,450
Deluxe or whirlpool	3,275	4,825	7,100	10,500
Environmental enclosure	29,500	33,600	38,300	43,400
Bidet	905	1,260	1,740	2,460
Deluxe	2,650	3,250	4,075	5,150
Drinking fountain	710	850	1,030	1,260
Refrigerated water coolers	1,310	1,540	1,810	2,130
Water coolers, hot and cold water	-----	1,590	1,940	2,400
Floor drain	380	500	660	880
Large sinks	880	1,010	1,180	1,350
Gas piping, residential, per unit	285	370	450	580
Hose bib	105	145	200	275
Hydrant, commercial wall	305	460	740	1,160
Laundry tray, single	425	560	730	950
Double	530	715	945	1,260
Lavatory/Sink	460	705	1,040	1,590
Deluxe (hand painted, vessel, etc.)	1,910	2,625	3,300	4,300
Polished metals (brass, Copper, etc.)	1,910	2,675	3,550	4,775
Marble or granite	2,250	3,150	4,250	5,650
Pedestal mount	1,440	1,620	1,810	2,040
Deluxe (hand painted, etc.)	2,490	3,150	3,800	4,675
Carved marble or granite	5,900	8,600	12,900	19,000
Roof drain	375	545	770	1,130
Shower, stall*	745	980	1,260	1,620
Prefabricated unit	1,030	1,390	1,850	2,460
Metal cabinet	330	425	545	665
Deluxe (add steam below)	2,490	3,600	5,150	7,400
Environmental enclosure	19,400	26,600	36,600	50,000
Handicapped unit	1,760	2,800	4,600	7,350
Shower base only	330	460	635	880
Deluxe	1,010	1,220	1,520	1,850
Shower, over tub or extra hardware	210	275	375	485
Deluxe hardware sets, each	535	745	1,070	1,480
Sink, kitchen, single	580	720	905	1,120
Multibowl	705	965	1,320	1,840
Deluxe bowls	2,625	3,550	4,900	6,750
Undersink, hot water dispenser	250	315	375	440
Water purification, faucet	395	545	740	985
Sink, service (janitor)	760	980	1,270	1,640
Steam generators, residential baths	1,730	2,000	2,270	2,600
Sump pump, 1/3 to 1/2 hp, 1–1/4 " outlet	480	585	725	895
Urinal	980	1,390	1,940	2,775
Water closet	765	1,120	1,610	2,330
Deluxe	2,490	3,300	4,400	5,900
Handicapped	880	1,090	1,350	1,680
Air compressor, add	1,180	1,390	1,640	1,940
Electric, incinerator type	2,340	2,650	2,925	3,250
Composting	2,525	2,950	3,475	4,075
Wet bar	630	740	855	1,020
Deluxe	1,260	1,810	2,600	3,700
Rough–in only, for fixture	395	475	580	705
Clean outs	125	180	235	330
Vent, dryer or appliance	145	185	250	335
Add for oil-rubbed bronze, nickel, or stainless hardware, per set	53	89	150	265

*Tile, glass doors, and enclosures are included under Interior Construction in the Segregated Cost Sections. If separate costs for these items are desired, tile showers cost $815 to $1,440; tile floor only, $185 to $275; shower doors, $200 to $720; tile tub surround, $455 to $760; and tub enclosure, $265 to $920. Custom shower or tub enclosures will cost from $1,650 to $14,700. Grab bars, see Section UIP 2.

PLUMBING AND WELL DRILLING

SECTION UIP 3

INDUSTRIAL WASH SINKS

Enameled cast iron, rectangular, 30" wide:	COST RANGE
4 feet long, four faucets	$2,120 – $2,750
8 feet long, eight faucets	3,550 – 4,650

Add 20% for stainless steel.

Circular wash fountains:	36"	54"
Polished cement (granite chips)	$3,150 – $4,025	$3,575 – $4,625
Terrazzo (marble chips)	3,250 – 4,150	3,725 – 4,775
Enameled steel	3,575 – 4,625	4,025 – 5,150
Stainless steel	3,825 – 4,900	4,400 – 5,650
Semicircular wash fountains:		
Polished cement (granite chips)	2,725 – 3,550	3,150 – 4,050
Terrazzo (marble chips)	2,800 – 3,725	3,300 – 4,275
Enameled steel	3,225 – 4,075	3,600 – 4,675
Stainless steel	3,550 – 4,550	4,050 – 5,100
Two-person wash fountains:		
Enameled steel	1,370 – 1,910	
Stainless steel	1,680 – 2,250	
For infrared control, add	920 – 1,860	

INSTALLED PIPE

In large buildings with few fixtures, some consideration must be given to the length of pipe runs from the fixture to the point where the pipe is stubbed out of the building. Cost of runs longer than an average of approximately 25' per fixture should be added from Section UIP 9, or the following abbreviated table. Costs are per linear foot of run including fittings and valves.

	GALVANIZED	COPPER	CAST IRON	PLASTIC
1/2"	$ 11.05	$ 10.35	-----	-----
3/4"	13.40	12.50	-----	-----
1"	18.30	15.65	-----	-----
1-1/2"	23.95	23.45	$ 18.85	$10.75
2"	29.50	30.25	24.45	12.15
3"	42.00	53.00	29.00	16.40
4"	58.00	86.00	34.50	21.20
6"	110.00	160.00	47.25	32.00
8"	-----	-----	74.00	-----
10"	-----	-----	105.00	-----

WATER-SUPPLY METERS

Installed costs do not include piping.

TYPE	SIZE	CAPACITY	COST RANGE
Bronze, screwed	3/4"	30 gpm	$ 230 – $ 320
	1"	50	320 – 395
	1-1/2"	100	550 – 715
	2"	160	965 – 1,200
Bronze, flanged	3"	360	3,025 – 3,600
	4"	500	4,525 – 5,200

INDUSTRIAL SHOWERS

Average cost-in-place including rough and finish plumbing.

	ENAMELED STEEL	STAINLESS STEEL	ADD FOR RECEPTORS
Column showers:			
Circular, 5 person	$2,925	$4,050	$2,250
Semicircular, 3 person	2,340	3,175	1,820
Corner, 2 person	2,210	2,800	1,860
Multi-stall showers:			
Circular, 5 person	6,850	8,950	2,490
Semicircular, 3 person	5,350	7,250	2,150
Corner, 2 person	4,650	6,300	1,910
Emergency shower		1,290 –	1,820
Multi-nozzle, up to 12 spray		2,170 –	3,225
decontamination		5,550 –	6,750
Add for eye wash		655 –	925

For exterior foot and body shower towers, see Section UIP 13, Page 4.

GREASE INTERCEPTORS

As found in restaurants and meat packing houses. Installed costs do not include piping.

SIZE, GPM	CAPACITY, LB	COST RANGE
CAST IRON		
7	14	$1,050 – $1,700
15	30	1,680 – 2,800
50	100	3,600 – 5,800
FABRICATED STEEL		
100	200	$ 6,750 – $ 8,950
250	500	13,000 – 16,300
500	1,000	20,900 – 25,400

SEWAGE DISPOSAL

SEPTIC TANK Average costs installed and connected in normal soil.

750 gallon	$ 980 – $1,580	2,000 gallon	$ 2,725 – $ 3,800
1,000	1,350 – 1,960	4,000	5,950 – 7,600
1,250	1,820 – 2,420	6,000	9,050 – 11,300
1,500	2,150 – 2,925	10,000	15,200 – 19,000

Drainfields will typically cost 1 to 1.5 times the tank cost. Add 10% to 15% for elevated fields (for fill, see Section UIP 1) plus $5,450 to $12,600 for a grinder pump system.

Leaching lines, tile, per linear foot	$9.75 – $15.60
Plastic pipe, per linear foot	5.88 – 9.75
add for gravel or stone backfill, per cubic foot	.47 – 1.49

Cesspools, $760 plus $29.75 per linear foot of depth.

WATER WELLS

Average costs of water wells, 100 to 1,000 feet deep. Costs include drilling, casings, gravel pack, setup, testing, and miscellaneous costs up to point of actual operation excluding pumps. Costs of vertical turbine pumps are listed in Volume I, page 267. The low and high costs do not represent the minimum or maximum possible, but the centers of low and high cost ranges.

	COST PER FOOT OF DEPTH		
SIZE	LOW	AVERAGE	HIGH
5"	$ 23	$ 35	$ 44
9"	41	53	67
13"	58	75	92
17"	76	92	115
21"	90	110	140
25"	110	130	165
29"	125	150	185

FIRE PROTECTION

SECTION UIP 3

FIRE PUMP EQUIPMENT

HORIZONTAL SHAFT (CENTRIFUGAL, 100 PSI)

Prices include installation costs, coupling and motor or engine on a steel base, plus relief valve and waste cone. Controller must be added for electric units. Diesel engine costs include battery, trickle charger, coupling and automatic controller. Electric motors are 230/460 volt, 3 phase, 60 Hz.

GPM	HP	RPM	ELECTRIC	DIESEL
500	60	1800	$27,300	$ 84,500
750	75	1800	33,300	91,500
1000	100	1800	40,100	96,750
1500	125	1800	49,800	105,000
2000	150	1800	59,250	111,000
2500	200	1800	67,750	116,000

VERTICAL SHAFT (TURBINE, MULTISTAGE)

The following prices include a vertical electric motor with thrust bearing. Costs for diesel engines include a right angle drive, coupler, metal skid, fuel tank, battery, trickle charger and automatic controller.

GPM	HP	RPM	PUMP ONLY	ADD FOR ELECTRIC	ADD FOR DIESEL
500	50	1800	$33,500	$ 4,475	$54,750
750	75	1800	38,200	5,500	61,500
1000	100	1800	42,700	7,300	67,000
1500	125	1800	50,500	10,200	75,250
2000	150	1800	59,500	13,100	82,000
2500	200	1800	68,000	16,500	87,750

PUMP DRIVERS

Diesel engines with coupling, skid, battery, fuel tank and battery charger. For horizontal drive.

For 1000-gal., 100-psi pump	$35,200
For 2000-gal., 100-psi pump	43,300

Electric motors (squirrel-cage induction, 3-phase, 60-cycle, drip-proof).

VOLTAGE	RPM	HORSEPOWER					
		30	50	75	100	150	200
230 – 460	1800	$1,700	$2,900	$4,400	$5,900	$8,700	$11,800

ELECTRIC DRIVE CONTROLLERS

Combined Manual and Automatic, Across-the-Line

VOLTS	AMP*	HORSEPOWER					
		30	50	75	100	150	200
220	30,000	$10,200	$12,500	$16,800	$22,100	-----	-----
	75,000	18,900	20,800	21,700	23,600	$27,700	$33,000
440	25,000	9,450	10,500	11,700	12,500	13,500	15,100
	60,000	18,600	19,600	21,500	22,100	23,600	24,200

Combined Manual and Automatic, Reduced Voltage

VOLTS	AMP*	HORSEPOWER					
		30	50	75	100	150	200
220	30,000	$12,500	$15,200	$18,600	-----	-----	-----
	75,000	21,500	23,400	26,500	$28,900	$35,900	$45,400
440	25,000	10,200	12,800	16,500	18,900	23,400	27,300
	60,000	18,900	22,500	26,500	27,700	31,500	35,400

DIESEL DRIVE CONTROLLERS . . . . . $9,250 – $9,700

*Circuit breaker interrupting capacity.

FLOW METERS

PUMP SIZE	COST RANGE	PUMP SIZE	COST RANGE
500 gpm	$1,520 – $2,625	2000 gpm	$2,120 – $5,200
750	1,600 – 3,025	3000	2,625 – 6,200
1000	1,680 – 3,575	4000	3,225 – 7,300
1500	1,890 – 4,400		

SPRINKLER SYSTEMS

Costs per square foot may be found in the Segregated Cost Sections. Refer to the section applicable to the type of building under consideration (see discussion in SEG INTRO).

COST PER HEAD			
LOW	AVERAGE	GOOD	HIGH COST
$220	$285	$385	$500

AUXILIARY LIGHT PACKS

Average cost in place for emergency lighting, including ancillary connections. Low end of range applies to lead acid batteries and the high end to nickel cadmium batteries.

Single	$550 – $855
Double	$555 – $910
Multipacks	$710 – $1,130

SMOKE- AND HEAT-ACTUATED ALARM SYSTEMS

Most commercial installations are leased. The costs below represent the installation costs charged to the user. For in place costs see independent detectors under Fire Alarm Systems costs on next page. For duct type detectors use the Control Panel connected system cost range.

Commercial base cost $1,510.00 plus $ .47 per square foot of protected areas.

Residential ionization smoke detectors cost $105.00 to $195.00 installed. Residential gas detectors, carbon monoxide, radon, etc., cost $53.00 to $110.00 installed.

Residential battery operated smoke detectors cost $34.75 to $100.00 installed.

FIRE PROTECTION

SECTION UIP 3

FIRE ALARM SYSTEMS

Buildings under 75' height.	COST RANGE
Control panel at lobby	$1,160 – $1,450
Add for each zone	235 – 330
Pull station	325 – 555
Smoke detector	435 – 655
Water leak detector	460 – 550
*Pull station with horn or bell alarm	150 – 185
*Pull stations	93 – 110
*Rate of rise, heat detectors	120 – 200
*Smoke–actuated door controls	255 – 380
*Smoke detectors	125 – 220
*Water leak detectors	250 – 335

*Use same costs for independent stations and detectors in buildings over 75' high.

Buildings 75' and above.	
Control panel at fire control room (with street access for fire dept.) 75 zones	$13,100 – $19,700
Speakers connected with microphone at control panel	150 – 180
Emergency telephone, 5 jacks	320 – 530
Sprinkler water flow detector	180 – 415
Time, date, location printer	8,950 – 12,700
Battery standby system	9,250 – 13,500

STANDPIPE

Costs per story, installed with necessary fittings. Add for hydrants below.

	2"	4"	6"	8"
Outside installation	$715	$1,540	$2,370	$3,150
Add for 1st-story Siamese connection	880	1,260	1,620	3,375
Inside wet standpipe	930	1,900	2,800	3,725

HYDRANTS

1-1/2" hose connection	$270	2-1/2" hose connection	$ 440
1-1/2" gate valve	435	2-1/2" gate valve	525
2-way Siamese 4" connection	1,200	2-way Siamese 6" connection	1,590

Inside fire hydrants including 75' of 1-1/2" hose, valve, rack nozzle, installed without cabinet, cost $715 to $1,010.

HOSE CABINETS

Steel	$325 – $460	Aluminum	$380 – $555
Stainless Steel	$600 – $880		

PLAYPIPES (Each)

Short, 15"	$125	Long, 30"	$230

HOSES (Per linear foot)

1-1/2"	$2.51 – $3.20	2-1/2"	$3.73 – $4.98

HOSEHOUSES

Steel $1,350 – $1,620 Aluminum $1,810 – $2,230

Add 50% for miscellaneous hosehouse equipment.

EXTINGUISHER CABINETS

Steel	$230 – $370	Aluminum	$270 – $425
Stainless Steel	$440 – $720		

EXTINGUISHERS

	COST EACH		COST EACH
Portable, 2-1/2 gal. (pressurized) antifreeze	$250	water	$ 185
Carbon dioxide, with hose and horn, 2-1/2#	185	20#	460
5#	220	*50#	1,680
10#	275	*100#	3,225
Dry chemical, regular types 2-1/2#	89	30#	430
5#	125	*45#	1,680
10#	195	*150#	2,925
20#	285	*350#	4,400

*Costs include wheeled carts.

For all-purpose dry chemical types, add 5% to 10%. For halon type, add 100%.

CARBON DIOXIDE SYSTEMS

Flooding Systems, cost per cubic foot.

TANK SIZE	SMALL (500 cu. ft.)	MEDIUM (3,000 cu. ft.)	LARGE (30,000 cu. ft.)
Standard hazards	$3.93	$3.03	$1.98
Electric hazards	5.29	3.78	2.10
Fur vaults	7.08	4.77	2.30

Local Application, cost per square foot.

	SMALL (25 sq. ft.)	MEDIUM (250 sq. ft.)	LARGE (1,000 sq. ft.)
Coated surfaces	$150	$ 92	$65
Liquid surfaces	195	131	95

AIR FOAM SYSTEMS

High Expansion, cubic feet per minute.

5,000 cfm $5,650 10,000 cfm. $7,700

15,000 cfm $10,600

Low Expansion, (protein), cost per tank.

TANK SIZE	FUEL OIL	GASOLINE
500 sq. ft.	$10,500	$11,300
1,000	11,900	13,100
1,500	13,400	15,200
2,000	15,300	17,500
2,500	17,200	20,400
3,000	19,500	23,600

HALON 1301 SYSTEMS

Cost in place per cubic foot including ionization detection with approximately 6% total flooding of electrical hazards. Recharging of system may or may not be viable, since costs may double. Acceptable substitutes, such as FM200, will currently cost about 10% more, while Inergen systems will cost 10% to 20% less than costs listed below.

1,000 cu. ft. $9.18 – $11.50 3,000 cu. ft. $5.50 – $7.34

30,000 cu. ft. $2.36 – $3.66

DRY CHEMICAL SYSTEMS

Restaurant Hood/Duct	LOW	AVERAGE	HIGH COST
Cost per nozzle	$510	$710	$980

ELECTRICAL

SECTION UIP 3

SERVICE ENTRANCE EQUIPMENT

SINGLE PHASE, 120/240 V

Includes combination meter socket and circuit breaker panel, circuit breakers, riser conduit cables, weatherhead, ground rod, clamp, cable and fittings. For group meters, add $195 to $290 per meter. Add $100 for each ground fault interrupter breaker. For underground service, deduct 5% to 10%.

CAPACITY	LOW	AVG.	GOOD
30 amperes	$ 400	$ 480	$ 585
60	585	700	835
100	890	1,040	1,210
200	1,560	1,810	2,100

3-PHASE, 120/208 V

Cost includes meter socket, main breaker or switch, riser conduit, cable, entrance cap, ground rod, clamp, cable and fittings.

60 amperes	1,430	1,560	1,710
100	1,980	2,150	2,330
200	3,400	3,700	4,000
400	6,200	6,700	7,250
600	9,050	9,800	10,600
800	12,000	12,900	13,800
1000	14,700	15,800	17,100
1200	17,500	19,000	20,400

GROUNDING SYSTEMS

Grounding rod, complete,			
up to 10' conductor cable	$ 180.00	$ 235.00	$ 310.00
Water pipe clamp system	96.00	125.00	170.00
Foundation connector system	250.00	465.00	870.00
add for lightning terminal points	110.00	130.00	155.00
add for each additional foot of cable	1.13	2.67	6.30
add for arrestor, 175 V to 650 V	155.00	215.00	290.00
Electrolytic tube system, complete	1,280.00	2,030.00	3,250.00
add for ground resistance tester	4,850.00	5,700.00	6,750.00

SAFETY SWITCHES

Fused, single throw, 3-pole, 600-V, NEMA #1, indoor type. For weatherproof boxes, add 20% to 40%; dustproof, add 100% to 200%; explosionproof, add 300% to 400%.

SIZE	COST RANGE	SIZE	COST RANGE
30 amperes	$ 280 – $ 320	400 amperes	$2,330 – $2,775
60	400 – 465	600	3,700 – 4,475
100	650 – 790	800	6,300 – 7,350
200	1,080 – 1,300	1,200	8,350 – 9,700

SWITCHGEAR

Listed costs are typical cost ranges of standard types and styles of switch and panelboard equipment and vary with voltage, number of circuits, number of wires and phases of current, and safety features. Add costs of circuit breakers.

SERVICE SWITCHGEAR COST RANGE

AMPS	RESIDENTIAL Light Commercial		COMMERCIAL Light Industrial		INDUSTRIAL Institutional	
100	$ 355 –	$ 565	-----	-----	-----	-----
200	680 –	985	-----	-----	-----	-----
225	2,500 –	3,075	$ 4,125 –	$ 4,575	-----	-----
400	4,275 –	5,050	6,500 –	7,200	-----	-----
600	6,200 –	7,200	8,700 –	9,750	$22,900 –	$ 31,300
800	8,000 –	9,150	10,900 –	12,200	28,000 –	38,300
1000	9,900 –	11,200	12,900 –	14,500	33,000 –	44,600
1200	11,700 –	13,100	14,800 –	16,600	37,700 –	50,500
1600	-----	-----	18,300 –	20,700	46,700 –	61,500
2000	-----	-----	21,700 –	24,500	54,750 –	72,000
2500	-----	-----	-----	-----	64,500 –	83,750
3000	-----	-----	-----	-----	73,750 –	95,000
4000	-----	-----	-----	-----	91,000 –	116,000

DISTRIBUTION SWITCHGEAR (Light, Heat or Power Centers)

AMPS						
100	$ 875 –	$1,160	-----	-----	-----	-----
150	1,130 –	1,430	$1,450 –	$ 1,980	-----	-----
225	1,380 –	1,930	2,080 –	2,650	$ 3,900 –	$ 5,100
400	1,980 –	2,675	2,950 –	3,950	5,700 –	7,650
600	2,550 –	3,450	4,000 –	5,100	7,650 –	10,100
800	3,025 –	4,100	4,850 –	6,200	9,350 –	12,400
1200	3,900 –	5,300	6,500 –	8,350	12,400 –	16,500
1600	-----	-----	7,900 –	10,000	15,200 –	20,400
2000	-----	-----	-----	-----	17,700 –	23,400

CIRCUIT BREAKERS FOR SWITCHGEAR

AMPS	120 VOLTS		240 – 480 VOLTS		600 VOLTS	
20 – 60	$ 68 –	$220	$ 230 –	$ 430	$ 290 –	$ 640
70 – 100	205 –	450	420 –	725	565 –	1,080
125 – 225	615 –	980	790 –	1,250	1,110 –	1,800
400 – 600	-----	-----	2,290 –	2,825	2,550 –	3,575
700 – 800	-----	-----	3,150 –	4,250	3,650 –	5,050

CIRCUIT BREAKERS FOR METALCLAD SWITCHGEAR

	600 VOLTS		
AMPS		AMPS	
800	$10,200 – $16,600	3,000	$48,500 – $ 73,250
1,600	19,300 – $32,400	4,000	78,000 – 111,000
2,000	27,400 – $42,900		

ELECTRICAL

SECTION UIP 3

TRANSFORMERS

DRY TYPE Single phase, 240/480 V primary, 120/240 secondary		OIL FILLED Three phase or Y, 5 KV or 15 KV with taps 277/480 V secondary	
SIZE	COST RANGE	SIZE	COST RANGE
3 KVA	$ 800 – $ 875	150 KVA	$ 21,600 – $ 25,600
5	1,080 – 1,240	300	31,200 – 37,000
7.5	1,360 – 1,560	500	40,900 – 48,500
10	1,660 – 1,910	750	51,750 – 60,500
15	2,100 – 2,460	1000	60,000 – 71,000
25	2,925 – 3,400	1500	75,000 – 88,250
37.5	3,825 – 4,350	2000	88,000 – 103,000
50	4,500 – 5,300	2500	99,250 – 117,000
75	5,800 – 6,750	3000	109,000 – 129,000

SUBSTATIONS

High-voltage unit substations, complete with transformers, breakers and grounding, cost from $96 to $385 per KVA.

EXAMPLES

RATING	COST	COST/ KVA	RATING	COST	COST/ KVA
150 KVA	$ 58,250	$385	1,000 KVA	$140,000	$145
500	102,000	205	2,000	193,000	96

POWER WIRING

The following tables may be used in lieu of actual costs.

The tables indicate an estimate of the average costs installed in place. They include (where applicable) wire, fittings, hangers, bends, termination, and contractor's overhead and profit. Costs are based on a maximum height above the floor of 12'.

Power wiring for motors and motor costs are found in Section UIP 9, Page 6.

RIGID CONDUIT AND WIRING (EXPOSED)

Costs include three conductors of the maximum wire size in each size conduit. They also include: tees, ells, junction boxes, bends, hangers and fittings.

SIZE	COST/FOOT	SIZE	COST/FOOT
1/2"	$10.90	2"	$ 26.50
3/4"	13.05	2-1/2"	37.50
1"	15.20	3"	52.00
1-1/4"	17.70	3-1/2"	72.00
1-1/2"	21.00	4"	100.00

WIREWAY GUTTERS

(Per linear foot, without wires)

4" x 4" .....$27.75 6" x 6" .....$38.00 8" x 8" $58.00

BUS DUCT, 3-PHASE, 600-VOLT

Cost per linear foot for indoor plug in type, including typical fittings, but not disconnect or circuit breaker type switches to machines. For weatherproof duct, add 15% – 25%.

3-POLE COST RANGE			4-POLE COST RANGE		
AMPS	ALUMINUM	COPPER	AMPS	ALUMINUM	COPPER
225	$ 84 – $110	$ 120 – $ 170	225	$100 – $135	$ 175 – $ 240
400	120 – 145	185 – 235	400	140 – 180	245 – 320
600	160 – 190	250 – 315	600	195 – 230	320 – 400
800	205 – 235	320 – 400	800	230 – 285	390 – 490
1000	250 – 280	400 – 475	1000	290 – 325	465 – 565
1350	310 – 350	530 – 615	1350	360 – 415	600 – 725
1600	355 – 400	615 – 725	1600	420 – 470	690 – 825
2000	440 – 495	765 – 870	2000	525 – 565	855 – 985
2500	545 – 590	930 – 1,080	2500	630 – 700	1,040 – 1,210
3000	640 – 700	1,120 – 1,300	3000	750 – 825	1,210 – 1,420

UNDERGROUND WIRING

Average costs per linear foot in place, in trench. Includes three conductors of the maximum wire size and terminations for each size of conduit, trenching not included.

Excavation, backfill and compaction for the trench, assuming average soil conditions, use $ .80 per cubic foot.

PLASTIC DUCT		TRANSITE DUCT		GALVANIZED RIGID CONDUIT	
SIZE	COST	SIZE	COST	SIZE	COST
2"	$17.10	2"	$17.05	2"	$23.60
3"	35.75	3"	35.00	3"	47.25
3-1/2"	51.00	3-1/2"	49.75	3-1/2"	66.00
4"	72.00	4"	71.00	4"	94.00

POWER POLE

40' high $1,280.00

5' wood cross arm with insulators and hardware ....$340.00 each

TRANSFER SWITCHES

(Automatic, single phase, 3 pole, 600 V, or indoor type.)

AMPS	COST	AMPS	COST
30	$ 3,950	600	$23,300
60	5,100	800	27,400
100	6,700	1000	33,500
150	8,700	1200	38,900
225	12,800	1600	46,000
400	18,100	2000	52,000

ELECTRICAL

SECTION UIP 3

GENERATORS

Costs of home generator sets including connection. Lower end of range is with rope starter. Upper end is with battery and automatic starter.

	COST RANGE	
1,000 watts	$1,020 –	$1,330
1,500	1,360 –	1,730
2,000	1,660 –	2,210
3,000	2,250 –	3,800
4,000	2,750 –	4,575
5,000	3,275 –	5,400
7,000	4,500 –	7,250

STANDBY POWER

Emergency generators for institutional, commercial and other buildings, complete with controls for immediate operation in the event of loss of the primary power source, cost from $385 to $1,590 per KW. The costs vary with the size and type of driver. 120-volt battery systems cost $2,210 to $3,275 per kilowatt.

EXAMPLES

RATING	GAS/ GASOLINE DRIVE	COST/ KW	RATING	DIESEL DRIVE	COST/ KW
10 KW	$15,900	$1,590	30 KW	$ 34,600	$1,140
15	20,300	1,350	100	73,250	735
30	31,000	1,040	150	94,500	630
100	64,750	650	300	148,000	495
150	82,500	550	500	198,000	400
			750	289,000	385
			1,000	387,000	385

ELECTRICAL OUTLETS

The following costs may be used to arrive at a more detailed estimate of electrical costs than is obtained by using the costs per square foot of floor area that are given in the Segregated Cost Sections. The following costs apply to convenience and lighting outlets only, not to power wiring for equipment or heating. Cost per outlet includes allowance for service, but not for fixtures, panelboards, safety switches or circuit breakers.

Normal residential wiring will usually be in the low and average ranges, and commercial and public buildings in the average to high ranges. Large industrial buildings and warehouses with relatively few outlets and long, heavy wiring runs may run much higher on a cost-per-outlet basis. Explosion proof receptacles can run 300% to 400% more.

COST PER OUTLET

TYPE	LOW	AVG.	GOOD	HIGH
Nonmetallic sheathed cable (Romex)	$ 57.00	$ 68.00	$ 83.00	$100.00
Armored cable (BX)	64.00	81.00	98.00	120.00
Flexible conduit	84.00	105.00	130.00	160.00
Thinwall conduit (EMT)	94.00	120.00	145.00	190.00
Rigid conduit	110.00	130.00	170.00	205.00
Low–voltage, telephone, TV, sound	36.75	39.75	42.75	46.25
Coaxial cable or fiber optic	41.25	47.50	54.00	62.00

For ground fault interrupter outlets, add . . . $8.24 – $16.45 each.

OTHER CIRCUITS (NONMETALLIC)

	LOW	AVG.	GOOD
Garbage disposer (includes switch and receptacle)	$140.00	$180.00	$220.00
Dishwasher	130.00	170.00	215.00
Dryer	220.00	245.00	285.00
Range and oven	250.00	305.00	365.00
Room air conditioner	255.00	290.00	315.00
Water heater	200.00	240.00	300.00

For flex conduit – add 20% to 40% to above circuits.
For EMT – add 30% to 50%.

LIGHTING FIXTURES

TYPE	LOW	AVG.	GOOD
Incandescent, surface	$ 65	$ 135	$ 405 up
Open commercial, standard	86	110	145
Recessed or adjustable	115	205	365
Pendant	50	88	170
Vaportight	160	235	340
Explosion proof	385	670	1,160
Illuminated exit	120	220	355
add for battery backup	250	290	340
Chandeliers	350	1,400	4,900
High value*	10,500	19,800	38,900 up
Fluorescent, surface or pendant			
Strip, one lamp	100	155	235
Two lamps	110	170	250
Four lamps	155	230	340
Six lamps	340	415	495
Eight lamps	495	550	625
Recessed, troffer or diffused			
Two to four lamps	155	250	385
Six to eight lamps	535	640	790
add for air–handling type	73	96	120
add for emergency lighting ballast	350	385	420
High intensity discharge			
Mercury vapor, recessed	495	725	1,070
Pendant, vaportight	585	670	790
Explosionproof	1,070	1,300	1,560
High bay	870	1,160	1,600
High pressure sodium, low bay	970	1,080	1,210
High bay	1,260	1,660	2,150
Pendant, vaportight	825	910	1,020
Explosion proof	1,320	1,420	1,500
Metal halide, low bay	790	930	1,120
High bay	1,070	1,470	1,940
add for twin bay	155	195	255
add for bay wire guards	51	90	155
Occupancy sensors,			
Photoelectric cell	320	385	475
Daylighting, automatic			
Dimming system	1,900	2,390	3,100
each extra sensor, add	420	465	535
Auto switch sensors,			
Manual dimmer	105	190	350
Track lighting, four foot track	250	310	375
Eight foot track	475	570	725

***NOTE:** Chandelier costs will vary greatly due to the materials, finish and intricacy of design. Fixtures classified by age or beauty as having antique or historical value, or designed by name artists, must be valued as art objects by the fine arts specialists, where the costs can easily run seven to ten times the listed costs.

For emergency lighting fixtures, see Page 11. For outdoor lighting, see Sections UIP 13 and 14.

SECURITY PROTECTION

SECTION UIP 3

SECURITY ALARM SYSTEMS

SENSORS:	RESIDENTIAL COST RANGE	COMMERCIAL COST RANGE
Point area detectors (per opening)		
Alarm glass (wired)	$110 – $220	$220 – $630
Screen (burglarproof, wired)	110 – 420	420 – 835
Capacitance proximity detectors	----- -----	630 – 3,150
Photoelectric, beam interrupt	465 – 1050	1050 – 3,150
Field of view changes	13 – 110	13 – 110
Stress detectors, floor	145 – 320	420 – 1,050
pressure mat	110 – 420	----- -----
Trip or pull switches (wire trap)	13 – 51	----- -----
Switch sensors,		
Magnetic, (per switch)	115 – 230	115 – 630
Mercury	115 – 230	120 – 230
Self contained (battery)	57 – 110	----- -----
Vibration detectors	62 – 160	115 – 420
Volume detectors		
Motion detectors,		
Infrared	73 – 465	160 – 835
Microwave	120 – 465	220 – 835
Ultrasonic	120 – 465	220 – 835
Self contained (battery)	120 – 420	----- -----
Sound detectors,		
Sensing units	120 – 465	220 – 835
Remote monitoring	985 – 5,250	985 – 5,250
Keypad locks, stand alone, per door	400 – 1280	960 – 1,930
ANNUNCIATORS:		
Alarms, local		
Bells	110 – 220	320 – 630
Buzzers	13 – 25	13 – 25
Horns	51 – 235	320 – 630
Sirens	51 – 235	320 – 2,100
Lights	110 – 220	320 – 630
CONTROL UNITS (TRANSMISSION–DISPLAY):		
Control panel	400 – 680	1,040 – 2,110
Remote annunciator	220 – 630	415 – 1,260
add for: event recorders	----- -----	310 – 1,070
Transponders	----- -----	525 – 2,100
Electrical switch locks	160 – 630	525 – 1,050
Remote transmitters, ea.	57 – 80	----- -----
Standby power, battery	25 – 215	160 – 4,200
Wireless key fob	68 – 235	----- -----
PERSONNEL/ID VERIFICATION SYSTEMS:		
Coded badge/card access	----- -----	$600 – $11,800

CCTV SYSTEM

	COST RANGE
Camera, fixed, standard resolution	$ 110 – $ 1,090
High resolution	1,090 – 13,600
Each simulated or dummy camera	11 – 82
Each miniature covert camera	165 – 2,180
Mounts	11 – 165
Monitor	110 – 1,210
Eecorder, video	54 – 1,090
Digital recording system	655 – 7,650
Web broadcast system	220 – 2,725
Complete systems	2,180 – 7,100

COMPLETE RESIDENTIAL UNITS

(Includes sensors, annunciators and controls)

Hardwired, basic economy system	$ 235 – $ 1,200
Extensive, deluxe unit	1,820 – 19,900
Wireless	320 – 3,200

ACCESS SYSTEMS

Metal detector, wand	$ 220 – $ 360
Walk-thru	3,800 – 8,400
Portable	9,550 – 10,800
X-ray, table top	28,700 – 33,700
Conveyerized	42,500 – 62,500
Flouroscopic letter/parcel	5,200 – 12,800
Biometrics, standalone, per station, palm	3,200 – 4,800
Finger print	1,930 – 4,175
Hand geometry	2,850 – 4,625
Retinal/iris	2,550 – 4,375
Facial recognition	7,950 – 15,900
Voice	1,610 – 4,175
System control monitor	15,900 – 80,000
Access portals, bulletproof glass,interlocking door system	
with volumetric sensing	34,700 – 63,250
add for facial/print recognition	5,200 – 7,950
add for visitor recognition system	4,800 – 5,600
ID verification, coded badge/card base cost	800 – 2,400
add for each reader	235 – 475
add per card/badge	5 – 15
add for computer system (up to 8 readers)	3,200 – 4,800
Generic, state driver license reader	1,930 – 3,500

DURESS PANIC BUTTON SYSTEMS

Push button, wall or desk, visual/audio console	800 – 2,380
add per button station	205 – 235
add per station with PA speaker	235 – 285
Wireless, location monitor/alarm console	31,900 – 80,000
add per ID/tracking pager	400 – 800

PHOTOVOLTAIC

SECTION UIP 3

PHOTOVOLTAIC POWER SUPPLY

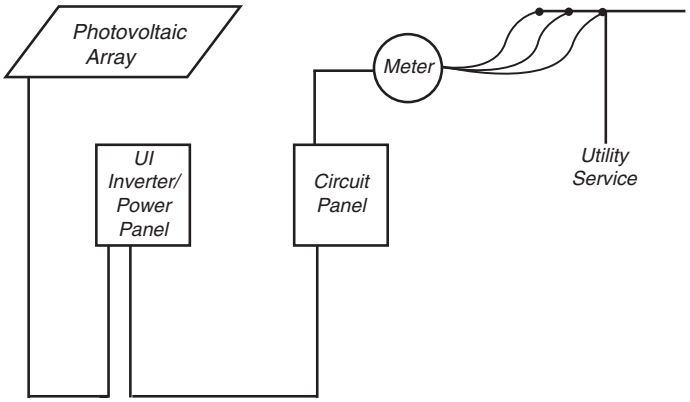
These solar power systems run from basic direct current systems, which consist of a simple solar module directly running DC equipment to Utility Inter-tie (UI) systems incorporating inverters, control panels and meters. The UI system allows the user to use the utility rather than a battery bank for storage. The excess power is sold back to the utility at a rate determined by the utility or credited to the user through the use of additional utility meters.

PRE-ENGINEERED RESIDENTIAL UTILITY INTER-TIE SYSTEM

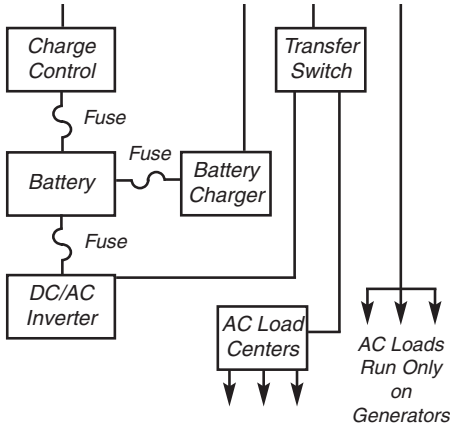
Includes solar modules, inverter, panel and meter. The number of panels required is determined by several factors including power demand, percentage of solar supplementation, and available square footage. For battery backup, additional components to be added from below.

	COST RANGE	
12 - 24 module system, installed, per module	$1,660 –	$ 2,210
36 - 48	1,430 –	1,810
72 - 96	1,280 –	1,560
Unit Costs:		
Solar Modules, 10 watt - 30 watt	220 –	475
40 watt - 60 watt	390 –	640
75 watt - 120 watt	710 –	1,180
285 watt - 300 watt	2,750 –	3,050
Module mounts, top-of-pole, 1 - 6 panels, per panel	73 –	250
8 - 16 panels	68 –	155
side-of-pole, 1 - 4 panels	155 –	290
ground/roof mounts, 1 - 6 panels	125 –	225
low - profile	110 –	215
two-tier, 6 - 12 panels	62 –	120
Automatic tracker, 4 - 12 panels, per panel	255 –	415
Power panel, includes inverter, DC disconnect, bypass switch, 1500 watt - 3000 watt	3,950 –	5,300
3600 watt - 4800 watt	5,050 –	7,350
7200 watt - 8000 watt	9,500 –	13,200

Unit Costs continued:	COST RANGE	
Inverters, true sine wave, 125 watt	$ 325 –	$ 430
250 watt	590 –	680
600 watt	865 –	945
1100 watt	1,080 –	1,370
modified sine wave, 500 watt	580 –	725
1500 watt	1,420 –	1,530
2400 watt	1,950 –	2,110
3600 watt	2,250 –	2,390
grid inter-tie only, 1000 watt	2,600 –	2,750
1500 watt	3,200 –	3,325
2000 watt	3,225 –	3,375
2500 watt	3,900 –	4,000
true sine wave grid-tie, 4000 watt - 5500 watt	5,050 –	5,800
Industrial inverter, three-phase, grid-tie, 10000 watt - 20000 watt	13,400 –	27,900
30000 watt - 50000 watt	34,400 –	59,750
100000 watt - 150000 watt	114,000 –	154,000
225000 watt - 300000 watt	178,000 –	205,000
Standard deep-cycle battery, 6 volt	155 –	325
12 volt	290 –	390
industrial deep-cycle battery packs, 12 volts	2,950 –	4,175
24 volt	5,500 –	7,900
48 volt	10,500 –	15,000
Charge controllers, 12, 24, or 48 volt, 12 - 20 amps	115 –	325
30 amp - 35 amp	195 –	430
40 amp - 60 amp	290 –	745
Battery charger, 30 amp - 40 amp	250 –	415
75 amp	535 –	655
Transfer switch, (DC) 120 amp	125 –	170
240 amp	215 –	415
Transfer switch, (AC) 120 amp	160 –	400
240 amp	565 –	835
Meters	385 –	495



UTILITY INTER-TIE BASIC COMBINATION



PHOTOVOLTAIC ARRAY / GENERATOR COMBINATION

ELECTRICAL

SECTION UIP 3

PERCENTAGE OF TOTAL COST

The following table records the results of studies of many recently completed buildings, by occupancy, giving the percentage of total contract cost spent on the electrical items. The average used is the median and the high and low percentages which are given do not include extremes, but are computed to include approximately 90 percent of all cases within the given range (45% each side of the median).

OCCUPANCY	TOTAL ELECTRICAL			SERVICE & DISTRIBUTION			LIGHTING & CONTROL			SPECIAL SYSTEMS		
	LOW	MED.	HIGH	LOW	MED.	HIGH	LOW	MED.	HIGH	FIRE ALARM & DETEC-TION MEDIAN	STANDBY POWER MEDIAN	OTHER* MEDIAN
Apartments, Classes A and B	6.6	8.9	11.9	4.1	5.2	6.8	1.5	1.9	2.7	.5	.4	.9
Apartments, Classes C and D	5.3	7.5	10.6	3.1	4.3	6.3	1.7	2.1	2.9	.5		.6
Auditoriums and theaters	6.1	9.1	13.5	2.6	4.2	7.1	2.2	2.9	4.1	.4	.7	.9
Banks	8.0	11.2	16.2	3.0	4.0	6.1	2.2	3.3	5.6	.8	.4	2.7
Bowling alleys	7.9	10.6	13.9	4.7	6.2	8.3	2.5	3.2	4.2	.5		.7
Churches	6.4	9.1	13.0	2.5	3.5	5.3	3.1	4.2	6.0	.7		.7
City halls, courthouses, etc.	7.6	10.3	13.6	4.2	5.5	7.5	2.8	3.4	4.4	.5	.6	.3
Clubhouses and parish halls	6.3	9.3	13.5	3.1	4.2	6.1	2.6	3.9	5.9	.6		.6
Convalescent hospitals and nursing homes	8.4	11.5	15.7	3.3	4.8	7.3	2.9	3.9	5.4	.9	.6	1.3
Department stores	9.4	12.3	16.6	5.1	6.9	9.7	3.4	4.1	5.3	.6	.5	.2
Discount stores	6.0	8.8	13.2	3.1	4.5	7.0	2.5	3.4	4.8	.4		.5
Dormitories	7.0	8.6	10.8	3.8	4.0	4.6	2.0	2.8	3.9	.6		1.2
Fraternal buildings and community centers	6.2	8.9	12.7	3.0	4.1	5.9	2.6	3.5	5.0	.6		.7
Homes for the Elderly	7.4	9.4	13.8	4.2	5.6	8.0	1.5	1.7	2.5	.7		1.4
Hospitals	9.8	13.5	17.9	5.6	7.4	10.0	2.6	3.5	5.0	.3	.8	1.5
Industrials†	7.3	10.9	16.9	3.7	5.4	7.8	3.2	4.6	6.2	.4		.5
Libraries and museums	8.4	12.7	18.0	4.0	5.7	8.3	3.5	4.8	6.8	.6		1.6
Markets	9.9	13.3	16.9	6.2	7.8	10.0	2.9	3.6	4.9	.4	.7	.8
Medical office buildings and clinics	7.4	10.4	13.9	4.0	5.2	7.0	2.4	3.2	4.6	.5	.6	.9
Motels and hotels	4.9	8.4	11.0	2.8	4.2	6.4	1.8	2.6	3.8	.3	.4	.9
Office buildings	6.7	10.0	15.6	3.1	4.6	7.2	2.6	4.0	6.4	.4	.5	.5
Restaurants	8.0	11.8	15.7	5.4	7.3	9.0	2.3	3.9	5.8	.3		.3
Retail stores and shops	7.1	10.0	15.5	4.0	6.0	9.4	3.0	3.8	5.1			.2
Schools, elementary	7.2	9.6	13.9	3.2	4.4	6.5	2.6	3.5	5.2	.5	.5	.7
Schools, secondary	7.0	9.3	12.7	3.0	4.2	6.1	2.4	3.0	4.2	.5	.5	1.1
Schools, colleges	6.2	9.5	13.5	3.1	4.3	6.3	2.5	3.4	5.0	.5	.6	.7
Single-family residences	4.5	5.3	7.8	3.6	3.9	4.5	.7	1.2	2.4	.2		
Telephone buildings	8.2	12.3	16.6	3.4	5.3	8.6	.9	1.2	1.9	.9	4.7	.2
Warehouses	4.5	7.5	13.0	2.2	4.3	8.6	2.0	2.7	3.8	.5		

†Lighting and utility outlet only, without power wiring.

*Other special systems include intercom, sound, TV cabling, security, etc.

ROOFS

SECTION UIP 4

EXPLANATION

The general headings for roof structures in the Segregated Cost sections include the complete roof structure: rafters, purlins, sheathing or deck, bracing and ties. If a more detailed cost is needed, use the tables in this section.

WOOD RAFTERS

Cost per square foot includes necessary ties, ridges and bracing. Ceiling joists should be added. For pitched roofs, use the multipliers in the Roof Slope table. For prefabricated trussed rafters, see Page 3, in this section.

SPACING

DIMENSIONS (inches)	12" o.c.	16" o.c.	20" o.c.	24" o.c.	32" o.c.	48" o.c.
2 x 4	$ 2.42	$1.95	$1.63	$1.45	$1.17	$ .87
2 x 6	2.87	2.32	1.97	1.75	1.43	1.03
2 x 8	3.34	2.71	2.29	2.01	1.63	1.23
2 x 10	4.22	3.43	2.92	2.57	2.09	1.57
2 x 12	4.96	4.03	3.43	3.00	2.42	1.80
3 x 4	3.91	3.16	2.70	2.37	1.94	1.45
3 x 6	5.36	4.32	3.68	3.21	2.59	1.94
3 x 8	6.77	5.49	4.66	4.06	3.32	2.46
3 x 12	9.52	7.73	6.50	5.71	4.63	3.43
4 x 6	6.44	5.17	4.39	3.85	3.13	2.29
4 x 8	7.78	6.28	5.29	4.65	3.73	2.76
4 x 12	10.85	8.79	7.45	6.50	5.26	3.91

ROOF SLOPE MULTIPLIERS

For roof components of sloping roofs, multiply by the figures given below to obtain the cost per square foot of horizontal projection.

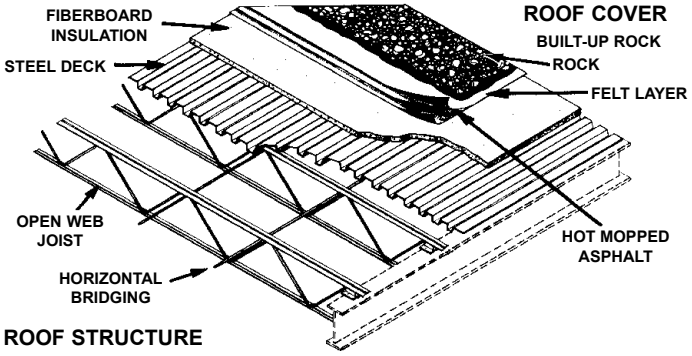
RISE	MULTIPLIER	RISE	MULTIPLIER
1½ to 12	1.01	6 to 12	1.12
2 to 12	1.01	8 to 12	1.20
3 to 12	1.03	12 to 12	1.42
4 to 12	1.06	15 to 12	1.60
5 to 12	1.08	18 to 12	1.80

These multipliers may also be used to convert the horizontal projected area to the actual roof area for sloping roofs.

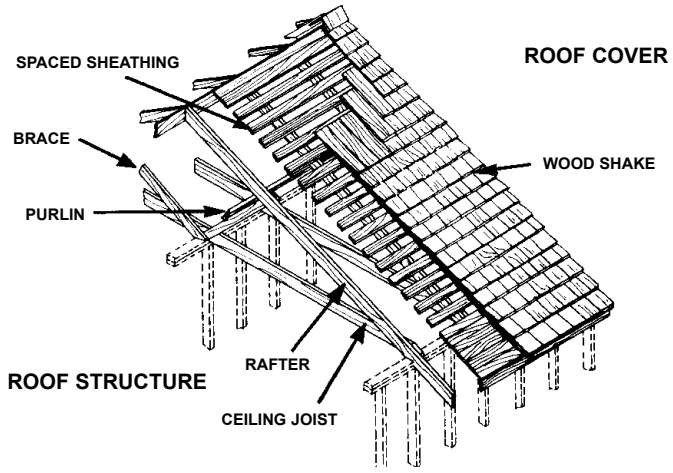
WOOD CEILING JOISTS

DIMENSIONS (inches)	SPACING 12" o.c.	16" o.c.	20" o.c.	24" o.c.
2 x 4	$1.95	$1.53	$1.24	$1.03
2 x 6	2.32	1.80	1.52	1.25
2 x 8	2.71	2.14	1.87	1.62
2 x 10	3.43	2.69	2.20	1.87
2 x 12	4.03	3.15	2.59	2.20

TYPICAL ROOFS



ROOF STRUCTURE



ROOF STRUCTURE

EXPOSED WOOD BEAMS

Costs per linear foot including sanding and finish. For rough sawn ornamental beams, add 40%. Simulated plastic beams cost $7.34 to $9.18 per linear foot.

SIZE	COST	SIZE	COST	SIZE	COST
2 x 6	$4.24	4 x 8	$10.85	6 x 12	$29.50
3 x 6	7.84	4 x 12	15.10	6 x 14	33.25
3 x 8	9.41	6 x 8	18.80	8 x 12	40.25
4 x 6	9.02	6 x 10	23.75	8 x 14	44.25

ROOFS

SECTION UIP 4

STEEL JOISTS

Costs of solid rolled or open web joists, per square foot of roof area, including connections, ties, and braces. Depth is for open web joists.

DEPTH	SPAN	LIGHT	MEDIUM	HEAVY
8”	10’ to 14’	$ 1.25	$ 1.87	-----
10”	14’ to 16’	1.29	2.12	$ 2.99
10”	18’ to 20’	2.09	3.36	4.74
12”	16’ to 20’	1.64	2.59	3.48
12”	20’ to 22’	2.33	3.55	4.87
14”	18’ to 22’	2.00	2.93	3.88
14”	22’ to 26’	2.61	3.73	4.94
16”	20’ to 24’	2.10	3.00	4.06
16”	24’ to 28’	2.52	3.57	4.73
16”	28’ to 32’	3.22	4.67	6.16
18”	22’ to 26’	2.33	3.38	4.55
18”	26’ to 30’	2.75	3.99	5.30
18”	30’ to 34’	3.51	5.11	6.77
20”	24’ to 28’	2.62	3.81	5.01
20”	28’ to 32’	3.00	4.38	5.88
20”	32’ to 36’	3.83	5.52	7.28
24”	28’ to 34’	3.10	4.54	6.05
24”	34’ to 40’	3.57	5.17	6.89
24”	40’ to 46’	4.35	6.28	8.34
28”	40’ to 48’	3.33	5.88	7.62
28”	48’ to 54’	4.23	7.45	9.74
32”	50’ to 56’	3.88	6.50	8.63
32”	56’ to 62’	4.74	7.90	10.65
36”	58’ to 64’	4.23	7.06	9.47
36”	64’ to 70’	5.01	8.46	11.30
40”	66’ to 72’	4.58	7.62	10.45
40”	72’ to 78’	5.32	8.79	12.10
48”	82’ to 88’	5.20	8.79	12.00
48”	88’ to 94’	5.88	9.69	13.30

WOOD-TRUSSED JOISTS

Costs of light wood flange with solid plywood web or open tubular steel web joists, per linear foot, including ancillary connections.

TYPE	SPAN	LIGHT	MEDIUM	HEAVY
Plywood	15' to 30'	$6.21	$7.50	$9.24
Tubular steel	40' to 70'	5.77	7.06	9.52

PURLINS

Costs per linear foot of purlin including connections or hangers. Light Z or C flanges for pre-engineered metal buildings may run 30% to 50% of the structural channel costs. Light wood nailing strips for wood pole frame buildings may run 65% to 85% of the purlin costs.

LIGHTWEIGHT STEEL CHANNELS		LIGHTWEIGHT I-BEAMS			WOOD WITHOUT STRUTS	WITH STRUTS
SIZE	COST	SIZE	COST	SIZE	COST	COST
4”	$20.50	4"	$24.15	1 x 6	$1.54	-----
6”	27.50	6”	31.75	2 x 4	1.90	$4.90
8”	34.50	8”	40.00	2 x 6	2.31	5.43
10”	41.00	10”	47.75	2 x 8	2.89	6.21
12”	48.25	12”	56.00	2 x 10	3.24	7.28
15”	58.00	15”	67.00	2 x 12	4.24	8.17

STEEL SPACE FRAMES

The following square foot costs are averages of typical three dimensional roof structures for buildings requiring long two way spans. They do not apply to architectural embellishments or patented systems primarily designed for appearance and skylight areas. Costs include sheathing.

LIGHT	MEDIUM	HEAVY
$17.60 – $26.50	$25.50 – $33.25	$31.75 – $48.50

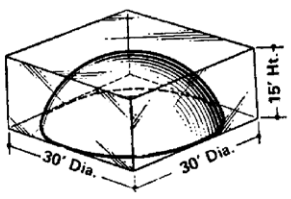
DOMES

Typical range of costs of dome structures where the dome forms both roof and walls. Cost per square foot of horizontal area which is covered, for dome structure only, excluding floor, finish, lighting, etc.

Skylight cover on metal frame, D = 5' to 40'	$59.00 – $125.00
Metal geodesic, D > 70'	26.50 – 49.75
Reinforced concrete, cast-in-place	36.00 – 54.00
Thin shell, concrete	23.55 – 38.75
Wood deck and frame	18.25 – 40.00

Domes may also be estimated by adding up the unit costs of the component parts and multiplying by an area calculated by converting the dome into a rectangular structure as shown in the illustration.

30' x 30' = 900 sq. ft.
4 x 30' x 15' = +1,800 sq. ft.
Apply unit cost to 2,700 sq. ft.



ROOFS

SECTION UIP 4

STEEL ROOF TRUSSES

Tapered steel girders will cost from 15% to 30% less for short spans to 25% to 35% less for long spans (over 80'). Costs include end connections.

SPAN	COST FOR EACH TRUSS		
	LIGHT	MEDIUM	HEAVY
30'	$ 3,075	$ 3,775	$ 4,575
40'	4,125	5,000	6,100
60'	6,350	7,650	9,150
80'	8,600	10,200	12,300
100'	10,700	13,000	15,500
120'	-----	15,500	18,600
140'	-----	18,200	21,700
160'	-----	-----	24,800

WOOD-TRUSSED RAFTERS

Costs are for prefabricated roof trusses common to light wood framing (12" to 48" on center) using 2" x 4" and 2" x 6" (up to 45' span) and 2" x 8", 2" x 10" and 2" x 12" (over 45' span) members, attached with steel plates or plywood gussets, including ancillary items and ties.

For pole-frame construction (8' to 14' spacing) with members 2" x 8" and larger with spans below 50', add 20%. Add 10% for site-built trusses. For double trusses, count both and deduct 5% from the total.

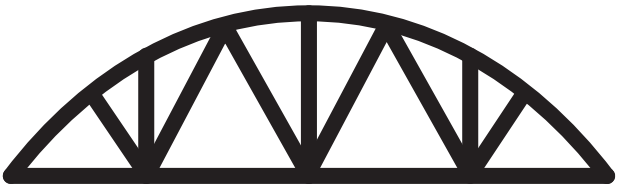
SPAN	COST FOR EACH TRUSS		
	LIGHT	MEDIUM	HEAVY
20'	$ 92.00	$ 98.00	$105.00
30'	145.00	160.00	175.00
40'	205.00	235.00	270.00
50'	280.00	330.00	385.00
60'	365.00	430.00	510.00

INDUSTRIAL WOOD TRUSSES

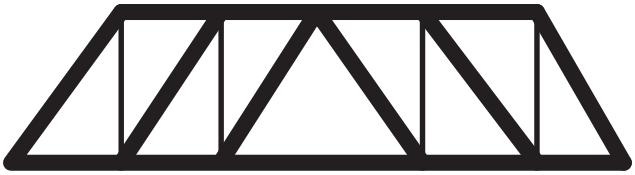
Costs are for timber or glulam industrial trusses, including end connections. For finished commercial trusses add 20% to 25%. Glued, laminated wood girders will cost approximately 25% to 50% less than bowstring trusses for short spans (up to 25'), 20% more for mid-range spans (up to 45'), to 50% to 75% more for long-span girders (up to 75'). Glued, laminated arches with ties, will cost approximately 15% to 20% less than bowstring trusses for short spans to 10% more for long spans (over 80'). Cost ranges are for trusses bearing roof loads only, not for those carrying hoists or cranes.

BOWSTRING SPAN	COST FOR EACH TRUSS		
	LIGHT	MEDIUM	HEAVY
20'	$ 1,140	$ 1,340	$ 1,490
40'	2,825	3,250	3,800
60'	4,600	5,500	6,550
80'	6,700	8,000	9,650
100'	8,850	10,700	13,000
120'	11,100	13,700	16,500
140'	13,600	16,500	20,500

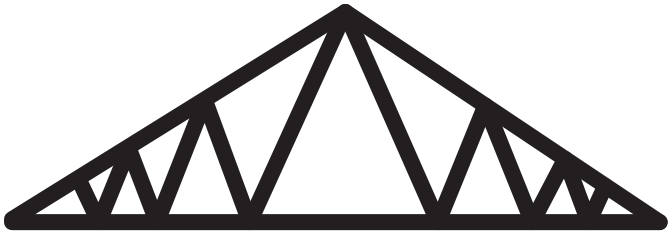
BELGIAN OR HOWE SPAN	COST FOR EACH TRUSS		
	LIGHT	MEDIUM	HEAVY
20'	$ 725	$ 880	$ 1,220
40'	2,290	2,900	3,675
60'	4,500	5,650	7,150
80'	7,300	9,100	11,400
100'	10,700	13,400	16,300



BOWSTRING TRUSS



FLAT HOWE



BELGIAN TRIANGULAR

ROOFS

SECTION UIP 4

ROOF DECKS AND SHEATHING

Per square foot of decking or sheathing

TYPE	COST RANGE	
Concrete: hollow precast plank	$8.17 –	$12.90
Lift slab	9.74 –	15.20
Lightweight channels, 2”3”	6.67 –	10.10
Plank, 2”3” T&G	7.56 –	10.10
Reinforced slab, 4”6”	9.96 –	15.80
Topping, 1 3/4” 2 1/2” foamed concrete	1.46 –	3.04
Lighweight concrete, reinforced, 2”3”	3.22 –	4.35
Prestressed tees or double tees	8.85 –	14.70
Fiberboard, prefinished one side,		
2” T&G	3.22 –	4.58
3” T&G	4.29 –	5.34
Gypsum: 2” plank with metal edge	4.58 –	7.17
2”-3” poured over gypsum board	3.58 –	4.98
2”-3” poured over fiberglass	4.29 –	5.40
Steel:18 gauge, corrugated or crimped	2.98 –	5.77
26 gauge	1.98 –	3.98
Cellular	7.62 –	13.65
Tectum, 2”, prefinished one side	4.52 –	6.16
Wood sheathing: 5/16” plywood	1.10 –	1.36
3/8” plywood	1.20 –	1.54
1/2” plywood	1.34 –	1.74
5/8” plywood	1.57 –	2.13
3/4” plywood	1.84 –	2.35
1-1/8” plywood, T&G	2.81 –	3.82
1” spaced board	1.25 –	2.20
1” solid board	1.95 –	2.99
1” T&G	2.01 –	3.25
2” T&G	3.35 –	5.66
3” T&G	5.60 –	8.34
2” plank	3.24 –	6.55
3” plank	5.43 –	9.24
for oriented strand waferboard, deduct	.08 –	.19
for fire treated wood, add	.47 –	.85
Wood Stresskin sandwich panels	6.55 –	14.35

ROOF COVER

Cost per square foot of roof area, including typical flashing, valleys and underlayment as required by the roofing type. Extremely steep or cut-up roofs may be 20% above the high end of the range. For vertical or mansard applications, add 20%. Curved metal panels, add $1.05 to $2.94.

Aluminum, sheet, corrugated, crimped or tile panels		
preformed, light (.0175” .024” thick)	$2.34 –	$ 4.28
heavy (.032” .050” thick)		
including prefab lock and seam	3.99 –	6.21
formed seam, flat or standing	4.11 –	10.25
batten seam	4.80 –	11.65
shingles	3.12 –	6.72
Built up, 2–ply	1.23 –	1.96
3–ply	1.45 –	2.42
4–ply	1.69 –	2.80
5–ply	2.01 –	3.49
add for gravel or small rock	.28 –	.45
add for large rock	.33 –	.56
Cement fiber, shingles	3.15 –	6.84
corrugated or sheet (Transite)	2.71 –	10.90
Composition, roll	.77 –	1.72
Composition shingle, light, to 235#	1.38 –	2.37
heavy, over 235# or laminated	1.75 –	4.16

ROOF COVER

(Continued)

TYPE	COST RANGE	
Copper, flat or standing seam	$ 9.86 –	$18.25
Batten seam	10.70 –	19.70
Shingles	10.05 –	14.00
Elastomeric, single ply	2.52 –	7.39
Reinforced sheet or spray fluid coat	4.57 –	8.85
Fiberglass, corrugated or sheet	1.64 –	3.12
Structural or FRP panels over 8 oz.	3.12 –	7.95
Modified bitumen, single ply	2.58 –	7.62
Reinforced sheet	4.28 –	8.68
Slate (red slate, add 100%)	6.16 –	13.10
Steel, corrugated, crimped or tile panels, galvanized		
Preformed, light (30 26 gauge)	1.64 –	4.17
Heavy (24 18 gauge)		
Including prefab lock and seam	3.52 –	6.11
Formed seam, flat or standing	3.75 –	9.35
Batten seam	4.57 –	10.75
Shingles	2.99 –	6.55
add for porcelain enamel finish	2.81 –	4.80
add for sandwich panels	3.22 –	11.00
add for interior metal liner	1.64 –	2.99
add for stainless steel	2.94 –	6.05
Terne, flat or standing seam	9.18 –	16.90
Batten seam	9.91 –	18.25
Tile, clay	4.98 –	14.80
Concrete	4.22 –	7.78
Plastic or rubber	3.64 –	6.55
Wood, shakes	3.04 –	5.66
Shingles	2.81 –	5.16
Fiber shingles	1.76 –	3.70
add for fire–resistant finish	.47 –	.94
Roof walkways	4.57 –	6.16
Bird spikes, per linear foot	3.12 –	10.90

INSULATION

(Per square foot of insulated area)

Aluminum foil, single ply	R 5 – R 9	$ .34 –	$ .41
add, per additional ply		.14 –	.22
Expanded mica, 3-1/2”	R 7 – R 9	1.23 –	1.72
Fiberboard, 1/2” wood	R 1 – R 2	.94 –	1.10
1”	R 2 – R 3	1.11 –	1.52
2”	R 5 – R 6	1.74 –	2.25
Fiberglass or rock wool:			
For blown–in, use appropriate batt Rvalue plus 20%.			
1” board	R 3 – R 4	1.35 –	2.05
2” board	R 7 – R 8	2.00 –	2.88
batts or roll, 2-1/2”	R 7 – R 9	.63 –	.87
3 1/2”	R11 – R13	.71 –	.94
6”	R19 – R22	1.00 –	1.34
9”	R28 – R30	1.36 –	1.82
12”	R36 – R38	1.77 –	2.39
add for vinyl faced or wire support		.20 –	.38
add for colored band support		.29 –	.58
Foamglass, 1” board	R 2 – R 3	3.18 –	3.79
2” board	R 4 – R 6	3.98 –	5.00
3” board	R 7 – R 8	5.20 –	6.16
Polyurethane, 1” board	R 7 – R 8	1.64 –	2.06
2” board	R14 – R17	2.15 –	3.04
3” board	R22 – R25	3.07 –	3.70
Polystyrene, 1” board	R 5 – R 6	1.24 –	1.74
2” board	R10 – R12	1.87 –	2.45

ROOFS

SECTION UIP 4

SKYLIGHTS

Costs are given per square foot of framed area.

TYPE	PLAIN GLASS OR PLASTIC	WIRE GLASS
Flat	$38.25 – $51.00	$41.00 – $57.00
Pitched, without vent	41.50 – 59.00	44.25 – 72.00
Pitched, with vent	42.75 – 74.00	46.75 – 83.00
	Small	**Large**
Plastic domes, fixed	$53.00 – $91.00	$39.25 – $67.00
Roof windows or		
Vented domes	95.00 – 155.00	67.00 – 110.00
add for blinds	7.90 – 12.00	4.52 – 7.90
Screens	13.20 – 16.50	10.60 – 13.20
Electric controls, cost $460 to $560 per opening.		
Tubular, cost each, 10' ... $590	14" ... $790	21" ... 880
add $115 for each light kit and $315 for each ventilation kit		

ROOF HATCHES AND FIRE VENTS

Cost per square foot of framed area.

	COST RANGE
Small (under 10 sq. ft.)	$115.00 – $160.00
Medium	95.00 – 135.00
Large (over 25 sq. ft.)	71.00 – 110.00

VENTILATORS

Cost for each range includes galvanized steel (lowest), aluminum, and stainless steel or copper (highest). For light residential installations, deduct 50%.

DIAMETER	STATIONARY COST RANGE	ROTARY COST RANGE
6”	$ 120.00 – $ 295.00	$ 160.00 – $ 400.00
12”	240.00 – 515.00	325.00 – 725.00
18”	375.00 – 715.00	500.00 – 1,040.00
24”	500.00 – 910.00	675.00 – 1,350.00
30”	630.00 – 1,080.00	870.00 – 1,620.00
36”	785.00 – 1,260.00	1,050.00 – 1,920.00
48”	1,070.00 – 1,590.00	1,430.00 – 2,450.00

CONTINUOUS RIDGE VENTS

Cost range per linear foot including screen and damper.

THROAT SIZE (inches)	COST RANGE	THROAT SIZE (inches)	COST RANGE
4"	$52.00 – $71.00	12"	$81.00 – $105.00
9"	68.00 – 88.00	14"	90.00 – 110.00

EXHAUST VENTS

Costs each are for propeller type in galvanized housings, including installation. For residential attic fans, deduct 50%.

SIZE (inches)	CAPACITY (CFM)	MOTOR SIZE	FLAT ROOF	PITCHED ROOF
12”	800	1/20 HP	$ 690.00	$ 845.00
15”	1,200	1/15 HP	815.00	990.00
18”	2,400	1/10 HP	970.00	1,170.00
24”	4,200	1/4 HP	1,340.00	1,590.00
30”	6,000	1/2 HP	1,860.00	2,160.00
36”	11,000	3/4 HP	2,575.00	3,025.00
42”	15,000	1 HP	3,575.00	4,100.00
48”	20,000	2 HP	4,950.00	5,650.00

GUTTERS AND DOWNSPOUTS

Costs are given per linear foot of gutter or downspout. For scupper and conductor head, add $160.00 to $270.00 each.

TYPE	COST RANGE
Aluminum	$ 6.33 – $13.55
Copper or stainless steel	14.45 – 22.05
Fiberglass or vinyl	5.94 – 9.18
Galvanized steel	5.82 – 11.65
Wood	11.55 – 16.70
Add for mesh guard	1.49 – 1.96
Add for solid guard	4.70 – 7.78

FALSE-MANSARD FASCIA

False mansard framework is not normally a part of the roof structure. It can be priced on a cost per square foot of vertical projection, exclusive of sheathing and cover which can be added from Page 4.

TYPE	COST RANGE
Metal frame	$7.67 – $14.45
Wood frame	5.26 – 9.81

For finished soffit, add $4.70 to $7.39 for plaster or stucco, $2.99 to $6.67 for wood, $4.28 (residential) to $7.73 for metal or vinyl, per square foot of soffit area.

FASCIA BOARD

Cost per linear foot for wood, metal or vinyl fascia boards. For residential construction, use low end of range. For 1" wood material reduce costs by 50%.

	COST RANGE		COST RANGE
6" and less	$2.94 – $3.75	8" and over	$3.12 – $5.66

STEEPLES

Costs are given per linear foot of height except where noted.

CUPOLAS

TYPE	SMALL (up to 10') COST RANGE	MEDIUM COST RANGE	LARGE (over 20') COST RANGE
Copper or terne	$630 – $1,490	$985 – $2,360	$1,490 – $3,675
Aluminum or steel	230 – 945	330 – 1,310	515 – 1,790
Fiberglass	175 – 680	295 – 1,070	480 – 1,700
Wood	235 – 460	365 – 725	550 – 1,120

SPIRES

Copper or terne	$535 – $845	$850 – $1,330	$1,330 – $2,160
Aluminum or steel	175 – 450	230 – 680	270 – 1,030
Fiberglass	165 – 300	200 – 510	270 – 870
Wood	135 – 200	170 – 300	280 – 440

DOMES

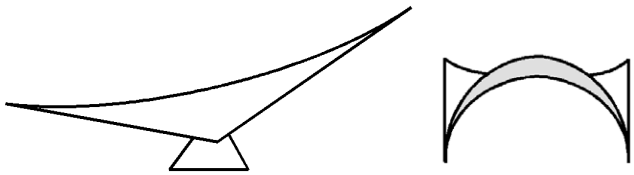
Cost per linear foot of dome diameter, up to 8'

	COST RANGE
Copper or terne	$ 380 – $ 715
Aluminum or steel	165 – 280
Fiberglass	105 – 165
Wood or stucco	105 – 200
Add for cupola clocks, per face (three to eight feet)	2,100 – 10,900
Crosses, per linear foot of height	200 – 885
Spikes, per linear foot of height	160 – 460
Balls, cost each	170 – 845
Weather vanes, cost each	205 – 1,230

ROOFS

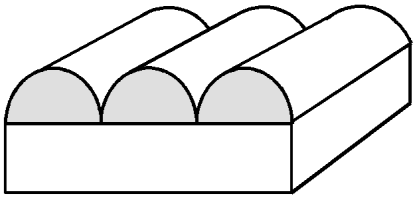
SECTION UIP 4

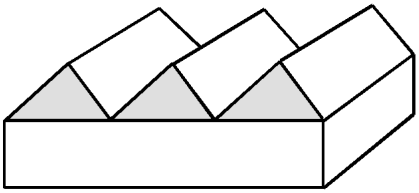
ROOF SHAPES



HYPERBOLIC PARABOLOIDS

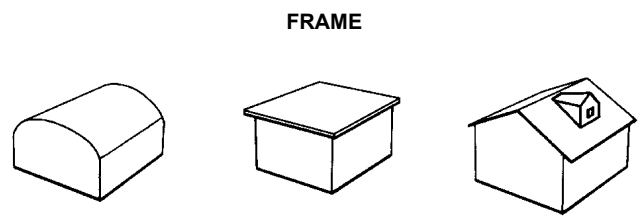
BARREL SHELL





FOLDED PLATE

ROOF SHAPES



THIN-SHELL REINFORCED CONCRETE

Cost ranges per square foot of horizontal area. For domes, see page 2.

	COST RANGE	
Barrel shell	$17.60 –	$31.25
Folded plate	16.10 –	29.25
Hyperbolic-paraboloid, small bays	15.60 –	30.25
Large span	17.60 –	33.25

FABRIC ROOF STRUCTURES

Costs per square foot of floor area for permanent single layer fabric structures completely installed. For interior thermal liners, add $3.65 to $7.15 per square foot.

	COST RANGE	
Air supported	$38.25 –	$53.00
Tension supported	43.00 –	65.00

DORMERS

Costs of exterior construction of dormer windows and necessary dormer structure vary greatly with the size of the dormer. It may be approximated by applying 1/3 to 2/3 of the dwelling square foot cost to the horizontal area of the dormer at the dormer eave line.

MONITOR AND SAWTOOTH ROOFS

Costs of monitor and sawtooth roofs may be built up as with any other roof structure, adding for trusses if they exist and then pricing the vertical window sections as follows:

	FIXED WINDOWS	VENTED WINDOWS
Fiberglass	$17.00 – $21.30	$22.95 – $28.50
Glass	19.15 – 23.85	25.50 – 31.25
Wire glass	23.30 – 29.00	30.25 – 38.00

WALL COSTS

EXPLANATION

This section is not a part of the Segregated Cost Method. It is presented here to provide a detailed cost buildup where it is felt that a specific wall being valued varies significantly from the typical walls on the Segregated Cost pages or where such detail is demanded. The costs in this section differ from the Segregated Costs of Sections SEG 1 through SEG 6 in that each individual wall component is priced separately, while the segregated wall costs include, in the one cost, an allowance for each of the following components:

1. **BASIC WALL**
2. **EXTERIOR COVER**
3. **INTERIOR FACING**
4. **FINISH (exterior and interior)**
5. **OPENINGS (windows and doors)**

Some walls will be made up of many component parts, while others may have only two or three. The examples, on the next page, illustrate the method to use in building up a total wall cost. The costs are given per square foot of actual area of the various components except as otherwise stated. If any component, such as windows or doors, does not occupy the total wall area, the unit price should be multiplied by the proportion of the area of the component to the total wall area. Costs include full allowance for the general contractor's overhead and profit however, the architect's fee must be added.

Wall costs are the sum of the costs of all their parts. Basic wall costs for wood frame, brick, stone, etc., and for wall coverings such as face brick, wood shingles, and many others, are priced for the entire wall area regardless of the number and size of openings. To these costs are added the unit costs for windows and doors. These unit costs are applied in the proportion the windows and doors bear to the entire wall area.

This principle is demonstrated in the examples. In Example 1, for instance, where 10% of the total wall area consists of windows, 10% of the unit cost for windows is applied to the total wall area. There are exceptions to the above rule. For instance, in the building elevation illustrated in Figure A, the basic wall cost would be applied only to the lower half of the wall which is shown and the window costs applied to the upper half.

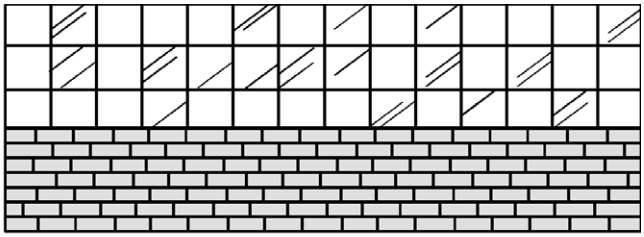


FIGURE A

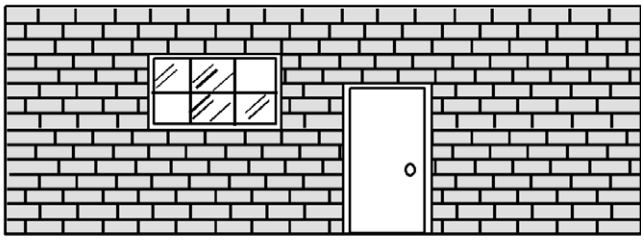


FIGURE B

Between this type of wall and the completely blank wall, there is a complete chain of gradations, which leaves much to the experience and judgment of the assessor.

Figure B shows the front elevation of a typical industrial building, where the basic wall costs are applied to the entire wall and the cost of the windows and door is applied to the actual area of the openings.

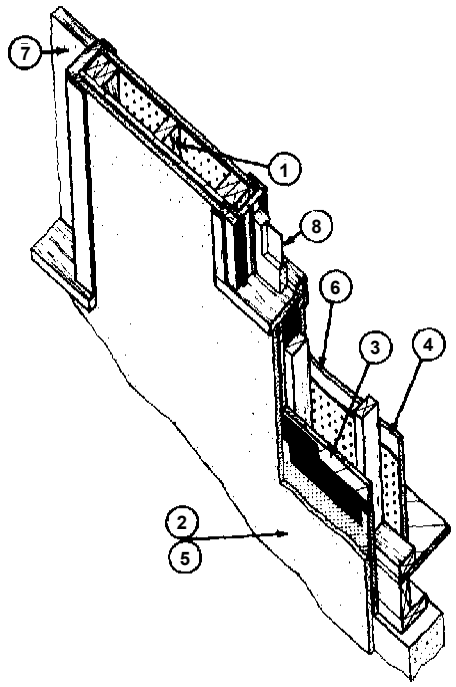
This so called doubling of areas for computation, as in Figure B, provides an allowance for the added cost of building the wall around openings.

This section can also be used to test the proper rating choice in the Segregated Cost section. For example, the assessor may encounter a wall which is not typical either in the number of openings, type of interior finish, or some other feature. They may profitably build up the cost of that particular wall in detail and not only use the cost for that particular appraisal, but also could use it as a guide in choosing the proper rating number in the Segregated Costs when a similar wall is encountered in the future.

It is sometimes desirable to build up the cost of interior partitions instead of pricing them on a square foot basis. Some of the component parts for interior construction may be priced from this section; however, interior doors and built in cabinets should be priced from Section UIP 2.

WALL COSTS

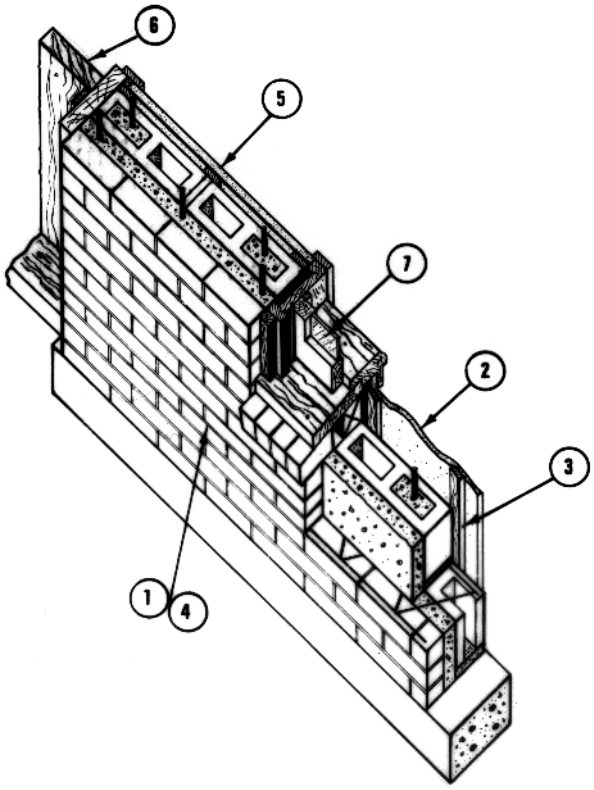
	Cost per Square Foot of Total Wall Area
BASIC WALL	
1. 2 x 4, 16 in. o.c.	$ 2.04
EXTERIOR COVER	
2. Stucco, three coats on wire and paper	4.48
*3. Sheathing, 1" polystyrene, extruded	1.43
INTERIOR FACING	
4. Plaster, two coats on gypsum lath, Keene's cement finish	4.56
FINISH	
EXTERIOR	
5. Stucco paint, two coats	.98
INTERIOR	
6. Paint, flat wall, two coats	.85
OPENINGS	
DOORS	
7. Wood, exterior, raised panel (5% of total wall area) .05 x $31.40 =	1.57
WINDOWS	
8. Wood, double hung, insulated, double glazed, (15% of total wall area) .15 x $29.08 = ...	4.36
TOTAL COST PER SQ. FT. OF WALL AREA	$20.26



NOTE: *Costs are the midpoint averages between the minimum and maximum costs listed. Insulation is an additive.*

EXAMPLE 1

	Cost per Square Foot of Total Wall Area
BASIC WALL	
1. Common brick, 10" grouted, reinforced, block backup	$22.45
INTERIOR FACING	
2. Gypsum board, 1/2"	1.65
3. Furring, wood	1.37
FINISH	
EXTERIOR	
4. Waterproofing, 2 coats	.80
INTERIOR	
5. Paint, flat wall, 2 coats	.85
OPENINGS	
DOORS	
6. Wood, exterior, flat panel (5% of total wall area) .05 x $27.23 = ...	1.36
WINDOWS	
7. Wood, double hung (10% of total wall area) .10 x $21.15 = ...	2.12
TOTAL COST PER SQ. FT. OF WALL AREA	$30.58



NOTE: *Costs are the midpoint averages between the minimum and maximum costs listed.*

EXAMPLE 2

WALL COSTS

COSTS PER SQUARE FOOT OF WALL AREA

MASONRY CONSTRUCTION

	COST RANGE
Adobe, grouted, reinforced, 9"11"	$19.10 – $24.85
Post and girder construction, 8"	15.75 – 20.10
Brick, common, 8"	18.95 – 27.25
12"	24.95 – 35.75
8", block backup	16.80 – 23.55
12", block backup	18.75 – 27.25
16", block backup	20.95 – 31.50
9" – 10" cavity	20.40 – 27.75
9" – 10" cavity, block backup	17.35 – 24.40
9" – 10" grouted, reinforced	21.15 – 31.75
9" – 10" grouted, reinforced, block backup	18.15 – 26.75
12" – 14" grouted, reinforced, block backup	20.20 – 30.75
8", tile backup	18.35 – 26.50
12", tile backup	19.60 – 29.25
6", SCR or hollow brick	13.15 – 18.45
8"	14.95 – 20.40
For brick pilasters, add to wall cost	1.78 – 2.28
For each 4" additional thickness of common brick, add	5.40 – 7.81
For each tier or wythe of face brick in lieu of common, add	2.73 – 4.23
For each wythe of oversized brick in lieu of common, deduct	1.28 – 3.78
Concrete, formed, reinforced, 6"	13.90 – 23.20
8"	15.65 – 25.25
12"	18.35 – 29.25
add for stay–in–place forming	.50 – 2.34
Precast panels, 2"- 3", gray	10.95 – 17.00
4"- 5", gray	12.15 – 18.35
6"- 7", gray	13.65 – 20.40
add for white	5.85 – 8.35
add for ribbed or fluted openings	8.35 – 16.80
add for exposed aggregate	3.78 – 7.54
add for insulated sandwich	1.61 – 3.23
deduct 10% for tees or double tees	
Tilt–up panels, 5"- 6", gray	10.15 – 12.65
add for each 2" of additional thickness	.94 – 1.28
add for textured finishes	1.17 – 4.90
Concrete block, reinforced, 6"	8.13 – 11.30
8"	8.79 – 12.75
12"	11.20 – 16.80
Unreinforced, 8"	8.24 – 10.25
12"	10.25 – 13.90
add for split, slumpstone, fluted or ground face	1.28 – 4.52
add for sound block	1.51 – 3.00
For concrete or block pilasters, add to wall cost	1.28 – 2.00
For concrete or block bond beams, add to wall cost	1.39 – 2.11
Glass block, white or aqua	37.75 – 54.00
Colors and solar reflective	54.00 – 74.00
Gunite reinforced, each 1'' of thickness	3.84 – 5.53
Gypsum block, 4''	7.48 – 9.71
6"	8.02 – 10.35
Tile, clay, 4"	9.28 – 11.20
6"	10.65 – 14.10
8"	12.05 – 16.15
Add for tile or block glazing, each side	6.02 – 9.11

Stone masonry – see stonework tables at end of Section UIP 6, Page 7.

WALL INSULATION

				COST RANGE
Aluminum foil, reflective,				
Single ply	R5	–	R9	$.33 – $.40
Two ply	R13	–	R14	.47 – .56
Three ply	R16	–	R17	.61 – .76
Four ply	R18	–	R20	.74 – .92
Five ply	R20	–	R22	.88 – 1.10
Batts or roll, fiberglass,				
1 1/2"	R4	–	R6	.46 – .65
2 1/2"	R7	–	R9	.56 – .83
3 1/2"	R11	–	R13	.66 – .88
6"	R19	–	R22	.92 – 1.25
add for vinyl–faced high density or mineral fiber				.30 – .39
Loose fill, expanded mica,				
in cavity wall, 1"	R2	–	R3	.41 – .56
2"	R4	–	R5	.76 – 1.07
3"	R6	–	R8	1.08 – 1.48
4"	R8	–	R10	1.38 – 1.94
In block wall, 4"	R.65	–	R.75	.39 – .69
6"	R1.25	–	R1.35	.70 – 1.16
8"	R2	–	R3	1.05 – 1.78
12"	R4	–	R5	1.86 – 3.36
Rigid board, cork, 1/2"	R1	–	R2	1.38 – 2.14
1"	R3	–	R4	2.14 – 3.79
2"	R7	–	R8	3.40 – 5.59
Fiberboard, 1"	R2	–	R3	1.06 – 1.43
2"	R5	–	R6	1.66 – 2.14
Fiberglass, 1"	R3	–	R4	1.28 – 1.96
2"	R7	–	R8	1.93 – 2.73
Foamglass, 1"	R2	–	R3	3.01 – 3.60
2"	R4	–	R6	3.79 – 4.78
Perlite board, 1"	R2	–	R3	1.19 – 1.60
2"	R4	–	R6	1.76 – 2.44
Polystyrene, extruded, 1"	R5	–	R6	1.19 – 1.66
2"	R10	–	R12	1.78 – 2.34
2 1/2"	R12	–	R15	2.09 – 2.73
3"	R15	–	R18	2.33 – 3.13
Beadboard, 1"	R3	–	R4	.91 – 1.26
2"	R6	–	R8	1.29 – 1.86
3"	R9	–	R12	1.64 – 2.23
4"	R12	–	R16	1.93 – 2.44
Polyurethane, 1/2"	R3	–	R4	1.27 – 1.49
1"	R7	–	R8	1.56 – 1.96
1 1/2"	R10	–	R12	1.76 – 2.63
2"	R14	–	R16	2.02 – 2.92

Sprayed or foamed-in-place (urethane, styrene, etc.) use appropriate R-value rating above and add 100% to the cost. For wet-sprayed cellulose, add 50%.

AIR AND VAPOR BARRIER

Aluminum foil, paperbacked	$.33 – $.40
Air infiltration fiberwrap	.32 – .40
Air space/drainage meshwrap	.59 – .96
Building paper	.22 – .35
Polyethylene	.19 – .31

For belowgrade application see waterproofing costs in Section UIP 1.

WALL COSTS

COSTS PER SQUARE FOOT OF WALL AREA

STUD CONSTRUCTION

WOOD

	COST RANGE		COST RANGE
2" x 3" 12" o.c.	$1.90 – $2.11	2" x 8" 12" o.c.	$4.40 – $5.29
2" x 3" 16" o.c.	1.51 – 1.73	2" x 8" 16" o.c.	3.34 – 4.02
2" x 3" 24" o.c.	1.00 – 1.44	2" x 8" 24" o.c.	2.11 – 2.55
2" x 4" 12" o.c.	2.45 – 2.73	2" x 10" 16" o.c.	3.89 – 4.57
2" x 4" 16" o.c.	1.73 – 2.34	2" x 10" 24" o.c.	2.79 – 3.34
2" x 4" 24" o.c.	1.28 – 1.61	2" x 10" 36" o.c.	2.11 – 2.50
2" x 6" 12" o.c.	3.00 – 3.78	4" x 4" 24" o.c.	3.00 – 3.78
2" x 6" 16" o.c.	2.50 – 2.84	4" x 4" 36" o.c.	2.45 – 2.84
2" x 6" 24" o.c.	1.73 – 2.34	4" x 4" 48" o.c.	1.90 – 2.50
For hurricane or seismic bracing and connectors, add			.45 – 1.00

METAL

Dimen. o.c.	Light (to 25 gauge)	Medium (to 20 gauge)	Heavy (to 16 gauge)	Extra Heavy (C-Stud)
4" –16" o.c.	$1.90 – $2.28	$2.45 – $2.84	$2.79 – $3.29	$3.12 – $4.84
4" –24" o.c.	1.56 – 1.90	1.95 – 2.45	2.28 – 2.79	2.73 – 3.84
6" –16" o.c.	2.11 – 2.62	2.84 – 3.29	3.23 – 3.84	3.68 – 5.40
6" –24" o.c.	1.90 – 2.11	2.45 – 2.79	2.73 – 3.23	3.12 – 4.40

EXTERIOR WALL COVER

	COST RANGE
Aluminum siding, corrugated or crimped,	
Light (.0175".024" thick)	$ 2.28 – $ 3.34
Heavy (.032" to .050" thick)	3.84 – 5.75
residential type, painted	3.50 – 4.90
add for sandwich panels	4.84 – 14.75
add for enameled paint	.33 – .94
add for curved panels	1.00 – 2.84
add for wall girts, metal	.94 – 2.45
Wood	.45 – 1.28
Cement fiber shingle or plank, 5/32"	2.62 – 3.84
Sheet siding, residential type	2.55 – 3.50
Heavy corrugated or sheet (Transite)	3.78 – 5.29
Sandwich panels, insulated	11.30 – 19.95
Board and batten, 1" cedar or redwood	3.34 – 6.29
Plywood with batts	2.45 – 3.29
Composition siding	1.61 – 2.55
Fiberglass, corrugated or sheet (4 – 5 oz.)	1.56 – 2.62
Sandwich panels	2.95 – 3.29
Structural or F.R.P. panels	3.23 – 8.73
Hardboard, exterior grade, 3/8" 1/2", sheet siding	2.06 – 3.23
Lap siding or shingles	2.28 – 3.57
Masonry veneer, single wythe, select common brick	9.28 – 15.85
Face brick, standard	10.55 – 17.80
Split face brick, Roman or Norman	9.76 – 16.15
Mortarless brick	10.75 – 17.25
Used brick	10.15 – 17.00
Adobe	7.87 – 12.05
Cast stone, ornamental	22.60 – 37.25
Ornamental face concrete block, 4"	8.95 – 15.25
Simulated brick veneer or panel, 1/4" 3/8"	7.48 – 16.90
Imitation precast stone	8.24 – 20.50

Pictorial carved artwork, see Section UIP 6, Page 5.
Natural stone veneers, see under Stonework, Section UIP 6.

WALL COVER (Continued)

	COST RANGE
Plywood, exterior grade, 3/8" 5/8", plain	$ 1.95 – $ 2.62
Textured	2.45 – 3.23
Fiber overlay	2.50 – 3.45
Redwood or select cedar	3.00 – 4.96
Exposed aggregates, fine	5.91 – 7.38
Medium	7.43 – 9.97
Large	9.11 – 13.35
Rustic or log siding, veneer	4.84 – 13.90
Half round with full corners	13.15 – 17.80
Full logs, 6" - 7" diameter	12.35 – 19.20
8"	14.65 – 22.60
9"	16.15 – 24.50
10"	17.55 – 27.00
Hand hewn or oversized logs	21.45 – 37.75
Shakes, wood	3.23 – 4.62
Shingles, wood	2.84 – 4.34
Wood panels	3.45 – 5.91
Siding, vinyl	3.29 – 4.62
Wood, 1/2" 1" boards	2.45 – 3.50
Select cedar or redwood	2.95 – 7.48
Steel, galvanized, corrugated or crimped,	
Light (30 to 26 gauge)	1.73 – 3.05
Heavy (24 to 18 gauge)	3.34 – 5.53
Residential type, painted	3.29 – 4.40
add for sandwich panels	4.78 – 14.50
add for curved panels	1.00 – 2.84
add for enameled paint	.19 – .94
add for porcelain enamel	2.73 – 4.62
add for stainless steel	2.79 – 5.80
add for textured protective cover (Galbestos)	3.34 – 5.29
add for wall girts, metal	.94 – 2.45
Wood	.45 – 1.28
Stucco, on paper and wire mesh, three coats	4.12 – 4.84
On metal lath, three coats	4.23 – 5.53
On masonry, two coats	2.84 – 4.52
Synthetic plaster, on fabric and rigid	
Insulation board, 1"	6.18 – 9.49
For decorative texture or aggregate finish, add	1.61 – 5.34
Each inch of insulation over 1", add	.55 – 1.39
On fiber cement board	4.96 – 6.18
Add for heavy fiberglass reinforcement	1.78 – 3.29
Pictorial artwork, see Section 56, Page 5.	
Terra cotta, 2"- 4"	23.65 – 42.50
Tile, ceramic	11.95 – 20.10
Tile, mosaic panels, minimum artwork	16.70 – 35.75
Pictorial, excluding name art	26.50 – 65.00
Hand–painted	87.00 – 295.00
Vitrolite (structural glass)	19.20 – 34.50
Sheathing, asphalt composition, 1/2"	1.17 – 1.51
Ballistic shielding fiberglass panels, 1/2" – 5/8"	21.15 – 26.25
1" – 1 1/2"	63.00 – 80.00
Fiberboard, 1/2"	1.11 – 1.44
Gypsum board, water–resistant, 1/2" 5/8"	1.51 – 1.95
Oriented strand–waferboard, 3/8" 1/2"	1.44 – 1.73
Plywood, 3/8" 1/2"	1.56 – 1.78
5/8" 3/4"	1.78 – 2.06
For structural shear walls, add	.12 – .19
Wood, solid 1" boards	1.90 – 2.55
Spaced 1" boards	1.51 – 1.90
Stresskin sandwich panels	5.80 – 9.87
add for treated wood	.45 – .94

WALL COSTS

COSTS PER SQUARE FOOT OF WALL AREA OR OPENING

EXTERIOR FINISH

	COST RANGE	
Epoxy or urethane	$1.60 –	$4.78
Masonry paint, prime coat	.38 –	.65
Each additional coat	.24 –	.40
Silicone waterproofing for masonry, two coats	.69 –	.90
Stain, on shingles or wood siding, two coats	.74 –	1.12
Structural steel paint, shop coat	.31 –	.51
Prime field coat	.32 –	.58
Each additional coat	.32 –	.52
Stucco paint, prime coat	.49 –	.69
Each additional coat	.31 –	.46
Textured coat, one heavy coat or acrylic mod./		
Polymer–based	1.05 –	1.57
Sealer coat	.22 –	.38
Wood siding, prime coat	.50 –	.69
Each additional coat	.31 –	.40

INTERIOR FACING

Chalkboard, hardboard	$ 7.48 –	$ 11.95
Slate	17.25 –	26.00
Vinyl finish	12.75 –	16.50
Furring, wood on masonry	1.00 –	1.73
Wood on wood	.86 –	1.44
Metal	1.51 –	2.45
Gypsum board, 1/2", taped	1.51 –	1.78
5/8"	1.56 –	1.95
add for water–resistant or embossed	.15 –	.31
Hardboard, plastic finish, patterned	2.50 –	4.40
Pegboard	2.00 –	4.02
Tempered, plain	1.51 –	2.55
Insulation board, prefinished	1.51 –	2.45
Plaster, two coats, on metal lath	3.34 –	4.57
On gypsum lath	3.29 –	4.12
On masonry	2.84 –	3.57
Plaster, three coats, on metal lath	4.12 –	4.90
Add for Keene's finish	.60 –	1.11
Plywood paneling, softwood	2.00 –	3.78
Hardwood	3.34 –	6.94
Custom panels and trim	7.38 –	16.50
Polylaminated panels	2.55 –	4.78
Tile, acoustical	1.73 –	2.73
Ceramic or quarry	8.51 –	23.95
Custom mosaics	16.50 –	36.25
Hand–painted	82.00 –	285.00
Metal, enameled	7.75 –	10.45
Plastic	5.91 –	7.87
Wood paneling, 1/2"-1" boards, softwood	4.02 –	6.02
Hardwood	6.02 –	12.35
Custom plank decorative	11.70 –	23.95
3/8" cedar closet lining	5.64 –	7.38

Masonry veneers – use exterior costs plus 5% to 10%.

INTERIOR FINISH

	COST RANGE	
Canvas, cloth, and other specialties	$2.84 –	$ 6.34
Copper and wood veneer sheets	8.02 –	10.70
Gypsum impregnated jute fabric	1.95 –	3.29
Laminates, plastic, standard grades	4.40 –	6.29
Custom grades, leather, stone, wood	7.81 –	17.45
Natural wood finish	.94 –	1.39
Paint, prime coat or sealer	.35 –	.65
Each additional coat	.24 –	.46
add for enamel, per coat of enamel	.10 –	.27
Textured finish, sprayed on	.30 –	.47
Vinyl wall covering	1.73 –	4.28
Wallpaper, standard grades	1.27 –	2.67
Custom grades	2.95 –	6.46
Hand painted, embroidered	5.80 –	19.70
Mural and aluminum specialties	3.29 –	7.38
Removal	.32 –	.61
Zolotone, primer and one coat	1.11 –	2.28

DOORS

COMMERCIAL AND INDUSTRIAL

(Cost per square foot of door area or opening.)

All costs include hardware and installation.

Fire doors, hollow metal, 1 3/4"	$ 49.00 –	$ 74.00
Kalamein, 1 3/4"	42.75 –	58.00
Kalamein, 2 1/2"	48.25 –	64.00
Metal clad, swinging	44.25	68.00
Metal clad, rolling	44.00	58.00
Weatherstripping	4.18 –	12.75
add for mechanical operation, each	695.00 –	975.00
add for electric operation, each	1,630.00 –	2,450.00
add for underwriter's label	5.59 –	12.75
For paired doors, add 35% to 50% for second door.		
Gates, steel, folding	26.75 –	34.75
Overhead doors, sectionals, manual operation	13.65 –	20.60
Roll up	19.20 –	29.75
add for mechanical operation, each	715.00 –	1,040.00
add for electric operation, each	1,610.00 –	2,280.00
Strip doors, plastic	8.62 –	17.25
Traffic doors, rubber, swinging	44.00 –	64.00

For entrance doors, see Storefront costs in Section UIP 6.

For air curtains, see Section UIP 3.

For hangar doors, see Section SEG 4, page 7.

WALL COSTS

COSTS PER SQUARE FOOT OF DOOR AREA OR OPENING

DOORS

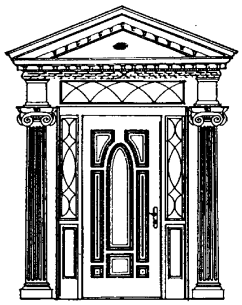
RESIDENTIAL STYLE

All costs include hardware and installation.

	COST RANGE
Metal, hollow core	$ 18.35 – $ 26.50
Insulated	22.60 – 31.75
Aluminum storm and screen, stock	13.15 – 21.70
Deluxe	21.45 – 31.50
Aluminum screen	7.48 – 13.15
Plastic, laminated, solid core	46.75 – 82.00
Security, ballistic resistant	78.00 – 155.00
Raised panel	230.00 – 295.00
Wood, hardboard, slab, solid core	16.40 23.65
Pine or fir, flat panel	21.70 – 32.75
Raised panel	22.80 – 40.00
French	30.00 – 46.75
Dutch	28.50 – 42.25
Natural finish hardwood or plastic–faced overlay	
Flush, hollow core	14.95 – 34.25
Solid core	17.25 – 37.00
Decorative, standard pattern or carved	39.00 – 51.00
Deluxe pattern or carved	53.00 – 82.00
For sidelites, use 50% of decorative door costs	
Custom hardwood, solid core, flat panel, oak	82.00 – 105.00
Raised panel, oak	100.00 – 250.00
Teak	120.00 – 270.00
White ash	135.00 – 205.00
Philippine mahogany	180.00 – 380.00
Walnut	170.00 – 425.00
Decorative, glass lites, standard pattern	230.00 – 300.00
For plastic or metal, deduct 40%.	
Custom carved	275.00 – 465.00
For triple–insulated beveled glass, add	32.75 – 49.25
For 3/4”–thick sculptured crystal glass, add	52.00 – 69.00
Solid brass adjustable sill	16.70 – 31.00
Sidelites, sq. ft. of panel area	140.00 – 230.00
Falf round or ellipse toplites	190.00 – 415.00
Rectangular toplites	110.00 – 190.00
Wood storm and screen	16.70 – 21.45
Deluxe	21.45 – 28.50
Weatherstripping, compression	1.51 – 4.12
magnetic	2.62 – 4.84
Glass patio doors, sliding or prefabricated swinging	
Aluminum, single glazed, 3/16”	14.95 – 24.50
double glazed, 5/8”	24.70 – 40.00
triple glazed	27.50 – 44.25
Wood, softwood	42.25 – 55.00
Deluxe hardwood	63.00 – 90.00
For exterior metal or vinyl cladding, add	7.16 – 10.45
For diamond grilles, add	8.95 – 12.75
For curved–top grilles, add	24.50 – 29.75
For insulated glass, add	16.15 – 21.15
For insulated Low E glass with Argon gas, add	28.50 – 32.00
For solar bronze or solar gray insulating Glass, add	10.45 – 14.65

For special glass treatments, use additives from Page 7.

ORNAMENTAL DOORWAYS



Cost per square foot of ornamental opening, excluding the entry door area.

	COST RANGE
Fiberglass, stock (no lites)	$ 39.00 – $ 69.00
Wood, Stock trim	50.00 – 98.00
Custom wood, hand carved, including lites	180.00 – 370.00

GARAGE DOORS

	SINGLE	DOUBLE
Overhead, single panel,		
Plastic	$11.30 – $15.75	$ 7.54 – $14.10
Metal	10.15 – 17.65	6.94 – 15.25
Wood, plywood or Hardboard	9.05 – 13.80	5.91 – 13.55
Redwood or select cedar	14.10 – 22.70	11.30 – 20.10
Custom, red oak or cherry	22.10 – 34.25	18.55 – 31.50
Sectional, plastic	12.45 – 18.35	8.73 – 15.75
Metal	11.30 – 20.50	8.13 – 17.25
Wood or hardboard	10.15 – 16.15	6.94 – 15.25
Redwood or select cedar	16.50 – 30.25	14.50 – 26.00
Custom, red oak or cherry	28.50 – 43.25	26.50 – 38.25
Raised panels	35.25 – 50.00	32.50 – 45.00
Fan top, door headers,		
Plastic, add	4.52 – 8.51	4.12 – 7.75
Custom wood	5.40 – 9.54	4.90 – 8.95

	COST RANGE
Add for electronic operator, radio control, each	$ 460.00 – $ 845.00
Extra remote controls, each	53.00 – 120.00
Add for electric operator, key or pushbutton, each	435.00 – 715.00
Extra remote stations, each	65.00 – 140.00
Weatherstripping	1.95 – 4.34
MISCELLANEOUS	
Entry gates, metal	20.10 – 40.00
Custom estate, aluminum	48.25 – 72.00
Hand–wrought iron	80.00 – 205.00
Add for spear tops	2.95 – 8.84
Scrolls	14.75 – 25.50
Gold leaves	2.84 – 12.65
Add for electronic operator, up to 1 H.P., sliding, each	3,425.00 – 6,900.00
Swinging	2,310.00 – 5,800.00
Add for control accessories, each, digital or magnetic card unit	1,280.00 – 1,610.00
Key or single push button	785.00 – 1,040.00
Magnetic vehicle detector	980.00 – 1,390.00
Basement entry, prefabricated steel bulkhead, each	715.00 – 1,040.00
Pet doors, each	110.00 – 330.00
Automatic, each	600.00 – 1,120.00

WALL COSTS

COSTS PER SQUARE FOOT OF WALL AREA OR OPENING

WINDOWS

All costs include single glazing, trim, hardware, and installation. Add 25% to 50% for double glazed, 45% to 75% for triple glazed, or see glass additives below.

	COST RANGE
Aluminum sash, projected (awning/hopper)	$ 18.45 – $ 30.50
Basement	14.50 – 20.60
Casement	15.15 – 26.25
Double hung	14.50 – 22.10
Fixed, acrylic glass block	30.00 – 39.50
Greenhouse	27.25 – 44.50
Jalousie	17.55 – 28.50
Single hung	12.45 – 19.20
Sliding, horizontal	10.10 – 18.65
For bronze or white finish add 15%.	
Vinyl sash, solid, add 20% to aluminum costs above.	
Steel sash, casement	14.30 – 28.25
Fixed, industrial	11.50 – 26.00
Vented, industrial	13.15 – 32.25
Wood sash, projected (awning/hopper)	23.75 – 40.00
Basement	17.55 – 23.30
Casement	20.50 – 32.75
Double hung	16.80 – 25.50
Greenhouse	35.25 – 58.00
Single hung	15.85 – 21.70
Sliding, horizontal	13.90 – 21.25
For metal or vinyl clad, add	8.51 – 12.65
Large windows, crystal glass, fixed	12.65 – 20.50
add for metal or vinyl–clad wood or solid vinyl	2.84 – 6.89
Bay or bow, prefabricated units	32.25 – 51.00
Greenhouse, window wall, 1’ to 3’ projection	51.00 – 68.00
Polygon or round windows, small	88.00 – 120.00
add for curved glass	120.00 – 160.00
add for bent (90?) glass	470.00 – 550.00
add for opaque glass	2.00 – 2.84
add for wire glass, clear	13.55 – 16.25
add for 1/4’’ plate glass, polished	2.79 – 5.80
add for 1/4’’ tempered plate glass	6.89 – 14.30
add for painted trim	1.44 – 1.73
add for aluminized reflective glass or solar film	6.89 – 8.51
add for double glazing (insulating glass)	5.34 – 8.24
add for impact (storm) resistant	18.75 – 33.25
add for transparent heat–reflective filament	6.46 – 10.65
add for Low E insulated with Argon gas	13.05 – 20.10

FIRE ESCAPES

Two-story building, with ladder to roof, each	$5,350.00 – $6,850.00
add for counterbalance	2,925.00 – 4,400.00
Each additional story	2,925.00 – 3,900.00

GLASS

Cost per square foot of glass, including material and installation. For sloped glazing, add 10%.

PLATE GLASS	LIGHT AREA (Square Feet)				
1/4"	10 – 50	50 – 75	75 – 100	100 – 125	125 – 150
Clear	$ 9.92	$12.75	$15.55	$18.75	$22.70
Tinted (bronze or grey)	11.95	15.15	17.80	21.45	25.50

Single strength	$ 6.77	Obscure, 1/8”	$12.75
Double strength	7.16	Obscure, wire, 1/4”	16.50
Crystal, 3/16"	8.95	Polished wire, 1/4” plate	22.80
Double-glazed, 1/2"	23.65	Tempered plate, 1/4”	15.75
Bullet resistant, 1-3/16"	135.00	Acrylic sheet, 3/16”	14.95
Impact resistant	52.00	Polycarbonate, 3/16”	29.75
Liquid crystal, 1" insulated	150.00		

MISCELLANEOUS

	COST RANGE
Security mesh or iron bars	$ 10.45 – $ 21.45
Wrought–iron grilles, decorative	16.40 – 29.75
Security shutters, rolling metal, small windows	64.00 – 95.00
large windows	48.25 – 60.00
Doors	29.25 – 56.00
add for motorized operation, each	410.00 – 1,190.00
for plastic, deduct 10% – 30%.	
For security sensors, see Section UIP 3, Page 16.	
Shades, cotton	1.51 – 2.28
Vinyl coated	2.06 – 3.84
Matchstick	2.00 – 3.29
Foil faced, insulated layers	8.13 – 12.90
add for motorized operation, each	5.40 – 12.75
Shutters, exterior, plain	8.13 – 16.15
Louvered	8.51 – 22.10
Interior, movable louvers	13.55 – 27.75
For custom hardwood, add 100% – 200%.	
Storm windows	4.62 – 8.84
Venetian blinds, horizontal slats	3.29 – 18.85
Vertical steel slats	5.34 – 32.25
For custom or mirror finish, add 100%.	
Window grilles, snap–in	7.43 – 15.15
Window screens, aluminum frame and mesh	2.45 – 3.34
White frame and mesh	2.95 – 4.23
Bronze frame and mesh	3.29 – 4.34
Aluminum solar screen	4.28 – 5.91
Bronze solar screen	12.25 – 20.10
Wood frame and mesh	5.91 – 8.51
Basement window wells, corrugated metal, each	42.75 – 70.00
add for grate cover	49.50 – 58.00
4’ escape well	160.00 – 210.00

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