

STAINED GLASS WINDOWS

SECTION UIP 6

GENERAL INFORMATION

Stained glass windows are in the fine arts field. Many windows, classified by age or beauty as having antique or historical value, or designed by named artists, must be valued as art objects by fine arts specialists.

The majority of stained glass which is installed today is the work of skilled artisans working in shops or studios who normally put a square foot price on their craft. The following average costs will enable the assessor to estimate the replacement cost or proposed cost within reasonable limits. Glass materials, design and studio prominence vary considerably and costs may vary from a plus 70% to minus 20%.

These costs are based on the least dimension of the dominant size of pieces making up the total window. A window, most of whose pieces of glass are 3" wide, would be priced from the 2" to 4" column, whether 3", 6" or 12" long.

Price all windows by the area of the enclosing rectangle.

INSTALLATION

Installation costs run from \$14.70 to \$36.25 per square foot, depending on geographical location, height from ground, and size and shape of window. For stained glass overlay, costs run \$26.75 to \$49.00 per square foot including materials.

RESIDENTIAL TYPE, STRAIGHT SEAMS

(Cost per Square Foot)

TYPE	DOMINANT SIZE OF INDIVIDUAL PIECES			
	14" and up	12"	8"	under 6"
Clear glass . . .	\$35.75	\$41.25	\$47.25	\$55.00
Single color . . .	51.00	58.00	67.00	75.00
Multi-color . . .	56.00	62.00	71.00	79.00

Rondels and accidental designs cost \$71.00 to \$155.00 per sq. ft.
 Blown clear restoration window glass cost \$13.90 to \$26.00 per sq. ft.
 For single glazed over, add \$5.96 to \$8.22; for double glazed; \$14.15 to \$29.75 per sq. ft.

SIMULATED ART GLASS

Acrylic resin panels cost \$72.00 to \$130.00 per square foot. For lead-ing on two sides add \$19.90 per square foot.

Art Glass	4" and up	3"	under 2"
Plain mosaics, regular pieces, few embellishments	\$ 71.00	\$ 87.00	\$ 105.00
Contemporary abstract	83.00	125.00	195.00
Minimum painted, fired field and borders (Figures 1 and 2)	105.00	145.00	185.00
Simple designs, geometric patterns silhouettes, etc. (Figure 3) . .	130.00	235.00	415.00
Simple figures and scenes, . . . little detail	265.00	390.00	575.00
Highly detailed figures and scenes (Figure 4)	575.00	880.00	1,330.00

ILLUSTRATIONS



FIGURE 1

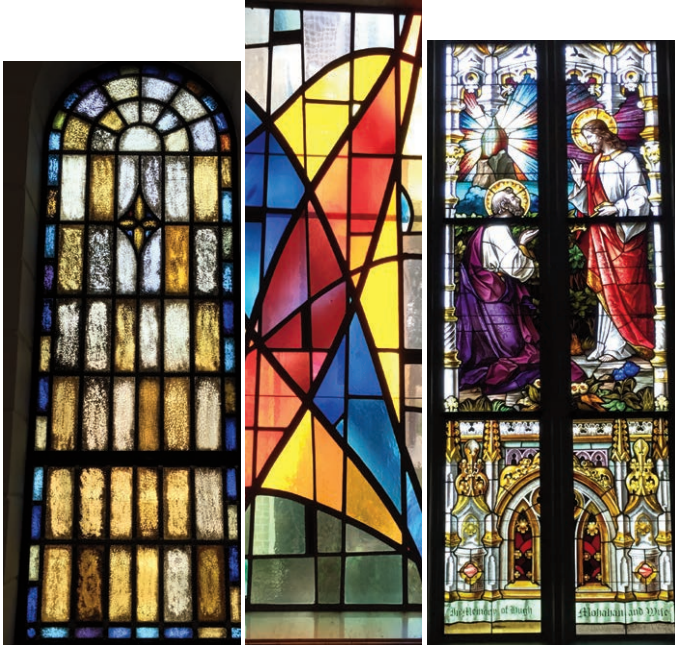


FIGURE 2

FIGURE 3

FIGURE 4

STAINED GLASS WINDOWS

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SIMULATED ART GLASS

(Cost Per Square Foot)

ILLUSTRATIONS

TYPE	DOMINANT SIZE OF INDIVIDUAL PIECES		
	4" and up	3"	under 2"
Art Glass (continued)			
Rose or wheel windows, intricate designs	\$460.00	\$760.00	\$1,300.00
Detailed figures, large decorative background areas (Figure 5)	490.00	800.00	1,330.00
Faceted glass, 1" or less thickness, cast in epoxy, contemporary abstract	145.00	200.00	285.00
Faceted glass, 1" or less thickness, cast in epoxy, figures and scenes (Figure 6)	180.00	255.00	340.00
Faceted glass, 1-1/2", bound in concrete, add 20% to epoxy cost.			
Ceiling domes, stock design up to 12' diameter including soffit, cost \$750.00 to \$1,270.00 per square foot of horizontal projection.			
Etched and Beveled Glass			
Minimum sand-etched design,			
1/4" plate	\$ 45.50	\$ 50.00	\$ 53.00
tempered	51.00	54.00	58.00
Simple figures and scenes,			
1/4" plate	92.00	105.00	115.00
tempered	99.00	110.00	125.00
Intricate designs,			
1/4" plate	165.00	210.00	275.00
tempered	175.00	215.00	280.00

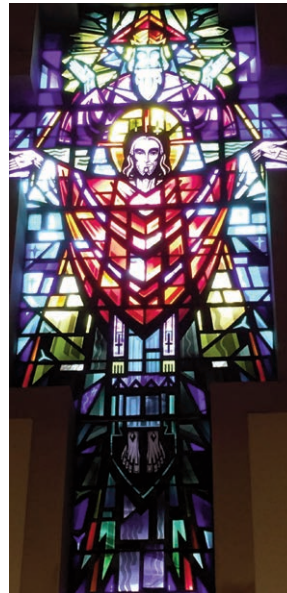


FIGURE 5



FIGURE 6

For stock designpiece assemblies, deduct 20%.
 For obscure glass, add 10%. Multilayered glass, add 15% to 35%.
 For triple glazing between clear safety glass, add \$51.00 to \$61.00 per square foot.

STOREFRONTS

SECTION UIP 6

GENERAL INFORMATION

The costs in this section are for use in computing storefronts with the Unit-in-Place and/or Segregated Cost Methods. The Calculator Costs include fronts commensurate with the quality and type of building.

The floor and ceiling areas in the display and vestibule are normally included in the building shell and are not part of the storefront, however, the display platforms and dropped display and vestibule ceilings as well as special floors are part of the front. The basic wall above the front is normally part of the building shell except for interior malls, but the ornamentation is properly computed with the storefront. Sometimes the display front is a very small part of the entire front elevation of the building and the major portion is better computed from the regular wall costs in Section UIP 5 or SEG 3 adding any front ornamentation.

If the cost of replacing an old or damaged storefront is desired, the costs of removing the old front and making any necessary structural changes must be added to the cost of the new front.

The following text and pictures illustrate some examples of estimating storefronts, while the detailed example on Page 5 covers the complete estimate.

GOOD DEPARTMENT STORE



The storefront to be computed includes the glassed areas, entrances, marquees and bulkheads. The wall to the sides of the storefront is not included since it is identical to, and priced with, the balance of the walls. The added ornamentation on this area should be priced as part of the storefront.

When computing the area of the basic storefront, include the entrances and sides of the window areas but not the bulkhead.

In the illustration above, the basic storefront is good quality: aluminum anodized tube window frame and tempered plate glass. The wall framing above windows/doors includes: steel framed, insulation, vapor barrier, gypsum board/plywood, Marble cladding.

Additional ornamental finish consists of Marble cladding around jamb (sides) and header (top) of entrance area wall opening. The lighting consists of both average and good spotlights and up-lighting, all lights in the window and marquee should be counted.

The entrance doors are clear anodized aluminum tube frame, tempered glass, push/pull hardware. The canopy is good-quality aluminum faced on a cantilevered steel frame.

Typical cost per linear foot of storefront elevation = \$1,380 to \$1,730 (Including display front to top of marquee only.)

EXCELLENT RETAIL STORE



The largest proportion of the front of this building is an ordinary E.I.F.S. (Exterior Insulation Finish System) wall, with a smaller proportion for window and door openings, and should be priced with the balance of the walls of the building. The window and doors are an average bronze aluminum tube frame and tempered plate glass for display and entrance areas.

Ornamentation finish consists of native stone over the front pillars, corners and bottom 3' of the exterior walls.

The entrance doors are good quality 1/2" tempered plate glass balanced doors and hardware.

The vestibule ceiling is a dropped ceiling with plaster finish and the vestibule floor is good marble which may be priced from Section UIP 2.

There is no special lighting for the front except in the entrance

Typical cost per front foot of building facade = \$1,940 to \$2,300 (Including entire front wall of building.)

STOREFRONTS

SECTION UIP 6

GOOD RETAIL STORE



In this storefront, most of the wall is built of E.I.F.S. (Exterior Insulation Finishing System) which may be priced with the balance of the building walls, leaving only the windows, awnings and entrance to be priced from the storefront costs.

The windows and doors are bronze-framed plate glass with average spotlights for lighting. Display platforms are carpeted. The display and vestibule ceilings are average drywall, and the sides of the entrance may be priced from the bulkhead walls and ornamentation.

Other ornamentation consists of granite faced pillars and the extended curved parapet wall at the top of the building.

Typical cost per front foot of building facade = \$845 to \$1,110 (Including entire front wall of building.)

AVERAGE RETAIL STORE



This basic storefront is average plate glass and aluminum framed entrance and windows. The front columns are imitation and the front gable sign area is E.I.F.S. (Exterior Insulation Finishing System)

There is a small metal and steel frame marquee with minimal lighting.

Typical cost per front foot of building facade = \$460 to \$630 (Including entire front wall of building.)

AVERAGE MALL STORE



This basic mall storefront is predominately glass and has some minimal wood trim. The sign area is a basic metal, painted, single face with an aluminum frame. The average plain galvanized steel roll-up grille is priced separately and is not included as an additive to the basic storefront area. The shallow display platforms with drywall ceiling and spotlights are all of average quality.

Typical cost per front foot of store entrance = \$375 to \$595 (Including entire front wall of mall.)

LOW-COST RETAIL STORE



This basic storefront has plain brick with minimal arches, 1/4" plate glass windows and an average aluminum frame, canvas covered canopy.

The ornamentation is low quality local brick and workmanship.

There is no front lighting and the entrance doors are low cost aluminum with 1/4" plate glass. There are no other items to price

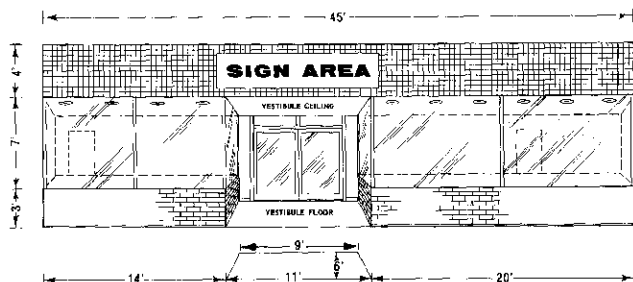
Typical cost per front foot of building facade = \$295 to \$415 (Including entire front wall of building.)

STOREFRONTS

SECTION UIP 6

EXAMPLE

The storefront illustrated is for a typical, small, average retail store and has display platforms and dropped ceilings in the display area and vestibule. The vestibule floor and the basic wall above the front were included in the cost of the building shell. Costs are found on the following pages.



COMPUTATION

Basic storefront area: (46 x 7) + (9 x 10)			
= 412 sq. ft. aluminum trim, average	@ \$ 35.25 =	\$ 14,500	
Basic bulkhead area: (14 + 6 + 6 + 20) x 3			
= 138 sq. ft. brick masonry, average	@ 21.35 =	2,950	
Ornamentation area: 45 x 4 (sign area)			
= 180 sq. ft. ceramic tile, average	@ 16.35 =	2,950	
Lighting: 10 recessed spots, average	@ 200.00 =	2,000	
Entrance doors:			
2 aluminum, 1/4" glass, average	@ 1,730.00 =	3,450	
Display platform area: $6 \times (14+15) + 6 \times (20+21)$			
..... 2 2			
= 210 sq. ft., 36"-high display, average	@ 9.49 =	1,990	
= 210 sq. ft. carpet, average, medium grade (Section UIP 2)	@ 4.05 =	850	
Display ceiling area, including vestibule, 45 x 6 = 270 sq. ft. dropped plaster ceiling, average	@ 7.02 =	1,900	
Display back area: 7 x (15 + 21) = 252 sq. ft. single wall plywood, avg.	@ 6.52 =	1,640	
Total storefront cost		<u>\$32,230</u>	
Cost per linear foot of building facade =		\$715	

BASIC STOREFRONT

Cost per square foot of actual front including door and glass area, but not bulkhead or sign areas. For display islands and bays use area of all sides. Costs include glass.

	LOW COST	AVG.	GOOD
Wood trim	\$17.90	\$22.95	\$ 29.25
Aluminum trim	26.00	35.25	46.75
Stainless steel or bronze trim	43.25	56.00	75.00
Structural glazing, no trim	70.00	98.00	145.00
Greenhouse or curved glass, aluminum	52.00	62.00	77.00

Double glazed add 40%.
Interior nonweatherized mall front, deduct 10% to 20%.

BASIC BULKHEAD WALLS

	LOW COST	AVG.	GOOD
Wood frame	\$ 5.85	\$ 7.35	\$ 9.22
Steel frame	5.96	8.39	11.80
Concrete block masonry, standard	9.27	11.90	15.55
add for face block	1.30	2.15	4.19
Concrete, formed	14.45	18.70	23.95
Concrete, precast or tilt up	10.55	13.10	16.45
add for textured finishes	1.20	2.55	5.00
Brick masonry	17.35	21.35	26.50
add for face brick	2.66	3.34	4.19

ORNAMENTATION

Costs per square foot of ornamented area.

Brick veneer	\$ 10.55	\$ 13.80	\$ 18.00
Simulated veneer or panel, 1/4" - 3/8"	9.22	12.30	16.25
Ceramic tile	13.35	16.35	20.10
*Mosaic tile	19.65	26.25	35.25
Glass block, white or aqua	38.00	44.50	51.00
Metal panels or screens	17.00	25.25	37.75
Preformed wall panels	3.11	7.29	14.80
Local stone, ashlar or panel	30.50	39.25	50.00
Rubble or rustic	23.20	30.25	38.25
Imitation veneer	9.94	15.05	21.85
Marble or granite	39.75	54.00	75.00
Terra cotta	27.50	35.25	45.00
Stucco	4.36	4.93	5.63
On masonry	3.16	3.85	4.59
add for synthetic			
On rigid insulation	2.32	3.34	4.93
*built-up (EIFS) panel relief	4.93	6.68	10.90
Wood, plywood	2.55	3.57	5.05
Shingles or shakes	3.40	4.36	5.50
Shingles, decorative panels	4.09	4.87	5.96
Siding	3.16	4.59	6.13
Ornamented molding or trim	10.20	16.45	26.00
add for treated wood51	.61	.91
*Note - For pictorial artwork, add	10.50	17.55	29.25
Carved brick, add	150.00	180.00	220.00

LIGHTING

Add for each storefront fixture in display areas, marquees, etc.

Std. open incandescent fixtures	\$ 78.00	\$100.00	\$130.00
Recessed or adj. incandescent	115.00	200.00	340.00
Fluorescent, open	215.00	330.00	475.00
Fluorescent, diffused	280.00	405.00	560.00
Illuminated exit, incandescent	110.00	195.00	340.00
Emergency light packs, see Section UIP 3.			

STOREFRONTS

SECTION UIP 6

ENTRANCE DOORS

Cost per door, including glazing, to be added to cost of basic front.

	LOW COST	AVG.	GOOD
Wood and glass	\$ 760	\$ 1,040	\$ 1,350
Aluminum frame, 1/4" glass	1,300	1,730	2,250
Bronze or stainless steel, 1/4" glass	2,925	3,650	4,500
Tempered glass, 1/2"	2,440	2,875	3,275
3/4"	2,700	3,525	4,500
Sliding glass, automatic			
two-way entry	14,900	17,900	22,000
Revolving door & cage			
(7' dia. base)	31,600	43,900	60,750
Bronze or stainless steel	49,000	64,500	85,750
add or deduct 15% for each foot variation.			
Automatic door opener, add	5,450	6,450	8,000
Balanced door, add	5,000	7,250	10,400
Panic hardware, add	610	760	1,000
Mall fronts, per sq. ft. of opening, excluding basic front cost.			
Chain or scissor closures, horizontal	16.65	22.95	31.75
Grilles, roll up, plain aluminum or steel	31.50	40.75	54.00
Bronze anodized or mirror glazed	39.75	51.00	67.00
Ornate, stainless steel	49.25	62.00	81.00
For horizontal operation, deduct 10%.			
add for motorized operation, each	1,170.00	1,630.00	2,310.00
Sliding glass panels, aluminum	25.25	34.75	46.00
Bronze, anodized	31.50	42.50	57.00

DISPLAY PLATFORMS

Cost per square foot of display floor area. Add for finish flooring from Section UIP 2.

12" high	\$5.85	\$7.90	\$10.75
24" high	6.30	8.56	11.60
36" high	7.02	9.49	13.00

DISPLAY CEILINGS

Cost per square foot of dropped ceilings not already included in main store ceiling, exclusive of lighting.

Acoustic tile, organic fiber,			
wood or cane	\$ 4.19	\$ 5.21	\$ 6.40
Mineral fiber, fiberglass	4.14	5.85	8.00
Gypsum board, taped and painted	4.31	5.21	6.30
Mirror-faced panels	20.10	24.60	30.25
Plaster, standard	5.63	7.02	8.94
Acoustical or Keene's	6.02	7.67	9.83
Plastic panels, translucent	7.95	10.35	13.35
Wood, decorative	8.39	15.65	29.25
Plywood, softwood or			
Hardboard	4.87	6.13	7.95
Hardwood	6.35	10.75	17.90

DISPLAY BACKS

Cost per square foot of back, including doors.

Masonry	\$ 9.39	\$13.25	\$18.80
Metal channels,			
2-1/4" gypsum board	10.80	11.90	13.35
Single wall, plywood	4.82	6.52	9.00
Steel studs, 2" solid plaster	11.40	12.80	14.45
Wood studs, finished both sides	6.52	9.06	12.50

AWNINGS

Metal, enameled, per sq. ft.	\$ 13.90	\$ 17.55	\$ 22.05
Fabric, per front foot	150.00	195.00	245.00
Prefab economy units	68.00	93.00	125.00

MARQUEES

Cost per square foot of marquee.

	LOW COST	AVG.	GOOD
Metal, ornamented, steel frame	\$37.50	\$48.50	\$61.00
Metal, plain, steel frame	27.25	37.50	51.00
Metal, plain, wood frame	25.25	34.75	47.00
Wood or stucco, wood frame	22.45	30.50	42.00

For light false-mansard structures, deduct 50%. For greater detail, see Section UIP 4, Page 5.

SIGNS

Signs normally are not a part of the building. They are separately purchased and often are the property of the tenant. Most signs are custom made and costs are highly variable. The costs per square foot below represent national medians and are for signs hung or mounted flush on buildings without extra structure or foundation. See Section UIP 14 for pole costs and service station signs. For oval signs use area of enclosed rectangle. Interior nonweatherized signs may cost 5% to 15% less.

SIGN TYPE	AREA IN SQUARE FEET			
	< 20	20 - 50	50 - 100	> 100
Illuminated plastic,				
Single face	\$175.00	\$140.00	\$110.00	\$90.00
Double faced	250.00	200.00	155.00	120.00
Without illumination, deduct	26.00	19.55	15.35	12.50
Metal, painted, single face	66.00	58.00	52.00	45.50
Double faced	83.00	74.00	66.00	57.00
Porcelainized, add per face	13.90	12.70	10.50	9.94
Wood, painted, single face	30.75	27.50	24.60	22.45
Double faced	39.75	35.50	31.75	28.75
Carved, plain, single face	180.00	160.00	145.00	120.00
Double faced	275.00	235.00	195.00	160.00
Ornate artwork, add up to	40%	45%	50%	55%
Sandblasted or				
Routed, deduct	12%	14%	17%	20%
Neon tubing, add per face				
plain	45%	40%	40%	35%
Ornate lettering	70%	65%	60%	55%
Projected wall bracket				
supports, add	12.50	9.66	7.67	5.96
Rotators, add	58.00	52.00	45.25	39.75
Individual letters, cost per inch of height				
Masonite or foamboard	\$ 3.63 -	\$ 5.50		
Plastic	4.59 -	6.95		
Wood	7.67 -	9.94		
Steel	8.28 -	11.90		
Aluminum	12.50 -	19.90		
Stainless steel	16.15 -	23.50		
Bronze	18.00 -	25.50		
Illuminated, Plexiglas, metal frame	19.30 -	29.00		
Stainless steel or porcelainized frame	30.25 -	37.75		
Without illumination, deduct	4.59 -	6.02		
Window lettering, permanent	1.13 -	2.10		
Gold leaf	13.35 -	32.50		
Carved in stone (raised letters, add 100%)	3.63 -	5.05		
Time and temperature, 18" 24" display, cost per set				
Alternating, single face	12,200 -	16,300		
Double faced	18,000 -	24,800		
Continuous display, add	5,450 -	8,350		
Electronic message, 18"24" single display,				
per lin. ft.	3,350 -	4,200		
Double faced	3,675 -	5,000		

STONework

SECTION UIP 6

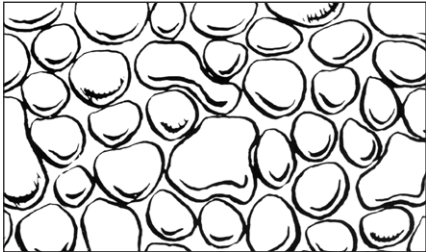
GENERAL INFORMATION

There are a number of quarries throughout the United States and Canada producing various types of building stone. The distance, typically 100 miles, from the quarries affects the cost of any of these, but most areas have one or two types of stone which are commonly used for facing or walls because of their local availability. Costs will vary by coloring, graining, texture and finish. Large quantities of matched stone or intricate jobs requiring much cutting and fitting can cost twice the averages as shown.

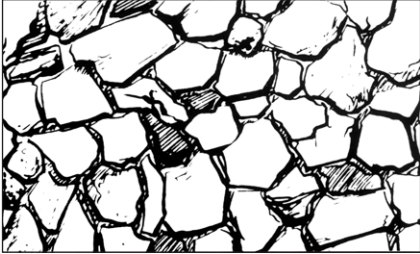
The following costs are typical ranges per square foot for locally available competitive stone, in place. For stone veneer on wood or steel studs, add \$1.84 to \$4.17 per square foot. Dry bed (hand placed) local fieldstone walls will cost 50% to 100% more. For stone carving, add \$90 to \$145 per surface square foot; hand work add 100%. Works designated as having historical or artistic merit must be valued by fine arts specialists.

RUSTIC STONE

COBBLE

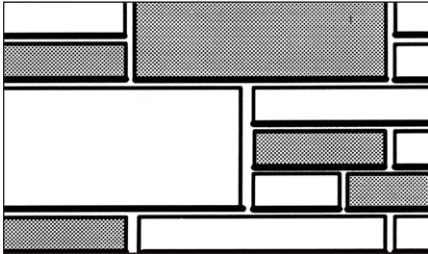


RUBBLE - FIELDSTONE

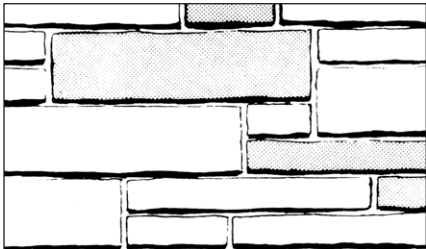


ASHLAR FACING

COURSED SAW BED



RANDOM ROUGH BED



LOCAL STONE

Cost per sq. ft., Sandstone, Brownstone, Quartzite, etc.

	LOW COST	AVG.	GOOD
Ashlar veneer, 4" - 6", rough	\$23.35	\$30.25	\$ 39.50
Sawed bed	27.25	35.50	46.50
Facing panels, 1"	28.00	38.50	52.00
Native cobblestone veneer, 4" - 6"	18.25	23.70	30.75
Rubblestone	21.10	27.25	35.00
Cobblestone walls, 12"	20.00	23.70	27.25
Each additional 6"	5.73	6.11	6.50
Rubblestone walls, 12"	26.00	31.50	36.50
Each additional 6"	7.28	7.68	8.06
Rough-cut block, per cubic foot	44.25	58.00	75.00
Miscellaneous trim, per cubic foot	61.00	83.00	110.00

LIMESTONE

Ashlar veneer, 4" - 6", rough	\$28.00	\$ 34.50	\$ 43.00
Sawed bed	33.25	42.75	57.00
Facing panels, 1"	32.00	43.00	60.00
Rubble veneer, 4" - 6"	23.15	28.00	35.50
Rough-cut block, per cubic foot	51.00	64.00	82.00
Miscellaneous trim, per cubic foot	72.00	100.00	140.00

GRANITE

Ashlar veneer, 4" - 6", rough	\$ 31.50	\$ 39.75	\$ 50.00
Polished	38.50	49.25	63.00
Facing panels, 1"	41.25	52.00	65.00
2"	46.00	58.00	73.00
4"	53.00	66.00	82.00
Rubble veneer, 4" - 6"	27.25	33.25	41.25
Rough-cut block, per cubic foot	46.50	65.00	90.00
Trim, polished, per cubic foot	125.00	170.00	245.00
Trim or steps, sawn, per cubic foot	71.00	81.00	94.00

MARBLE

Marble costs can be divided into four groups, according to the degree of color variation and structure:

GROUP A

Sound marbles with a smooth uniform surface requiring no waxing or filling, best suited for exterior walls, with little variation in texture and color. These are almost entirely local marbles and are strongly competitive in price.

GROUP B

Similar to Group A but with less favorable working qualities and a little more variation in color and texture. A few marbles in this group are imported.

GROUP C

Uncertain variations in working qualities, large flaws, voids, striations, and good color variation. Most imported marbles will fall in this category or Group D.

GROUP D

Marbles similar to Group C, but including those stones with maximum variations in working qualities, texture, and color. This group contains many of the highly colored and variegated marbles which are most prized for ornamentation.

FACING PANELS

(Cost per square foot)

GROUP	LOW COST	AVG.	GOOD
A	\$33.75	\$43.00	\$57.00
B	41.25	52.00	65.00
C	49.25	61.00	77.00
D	60.00	73.00	90.00

SLATE

Facing panels, 1"	\$30.75	\$40.50	\$58.00
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ARCHITECTURAL COLUMNS

SECTION UIP 6

GRANITE COLUMNS

Cost per linear foot of height measured from bottom of base to top of capital. The costs of architectural granite columns will vary a great deal with the distance from quarry and mill, and the following typical cost ranges should be increased where the stone must be crated for shipment over long distances or for foreign granite. For carved stone cladding, reduce costs by 50%.

DIAMETER OF SHAFT AT BASE	ROUND COST RANGE		FLUTED COST RANGE	
	8"	\$165 – 215	\$335 – 480	\$335 – 480
12"	235 – 290	435 – 480	435 – 480	480
16"	335 – 390	570 – 645	570 – 645	645
20"	455 – 540	770 – 845	770 – 845	845
24"	620 – 745	1,010 – 1,140	1,010 – 1,140	1,140
28"	845 – 1,010	1,360 – 1,480	1,360 – 1,480	1,480
32"	1,180 – 1,400	1,800 – 1,970	1,800 – 1,970	1,970
36"	1,680 – 1,860	2,460 – 2,600	2,460 – 2,600	2,600
40"	2,310 – 2,600	3,250 – 3,475	3,250 – 3,475	3,475
44"	3,200 – 3,525	4,325 – 4,675	4,325 – 4,675	4,675

BASES AND CAPITALS

Cost per base or capital to be added to total column cost. The capital forms the top most member of a column.

COLUMN DIAMETER	BASES AND CAPITALS		CAPITALS ORNATE
	PLAIN	MODERATE	
8"	\$ 590	\$1,140	\$ 2,060
12"	950	1,770	3,325
16"	1,360	2,420	4,500
20"	1,770	3,000	5,650
24"	2,200	3,650	6,950
28"	2,675	4,300	8,250
32"	3,100	5,000	9,550
36"	3,575	5,600	10,800
40"	4,050	6,350	12,200
44"	4,575	6,950	13,600

ORNAMENTAL CONCRETE COLUMNS

Costs are given per linear foot of architectural nonbearing column measured from the bottom of the base to the top of the capital. If a base and capital are used the additional cost of each may be added to the total column cost. The diameter of the column is measured at the bottom of the column above the base.

DIA. OF BASE	TYPE OF COLUMN		BASE		CAPITAL		
	ROUND	FLUTED	SQUARE	PLAIN	ORNATE	PLAIN	ORNATE
12"	\$ 43	\$ 72	\$ 53	\$ 92	\$ 135	\$ 205	\$ 470
14"	57	86	67	105	160	255	550
16"	68	100	78	130	185	290	655
20"	93	130	105	185	280	405	935
24"	125	160	140	280	390	600	1,310
28"	150	200	170	390	545	845	1,820
32"	180	230	205	550	805	1,180	2,575
36"	220	265	245	805	1,140	1,690	3,575

WOOD STAVE COLUMNS

Costs are given per linear foot of standard architectural columns measured from the bottom of the base to the top of the capital. The diameter of the column is measured at the bottom of the column above the base.

DIA. OF SHAFT AT BASE	ROUND COST RANGE		SQUARE COST RANGE	
	PLAIN	FLUTED	PLAIN	FLUTED
6"	\$ 40 – \$ 44	\$ 46 – \$ 51	\$ 42 – \$ 59	\$ 45 – \$ 63
8"	56 – 66	68 – 80	65 – 90	66 – 91
12"	94 – 115	115 – 140	110 – 155	115 – 160
16"	135 – 175	170 – 210	160 – 235	170 – 250
20"	180 – 240	225 – 295	225 – 320	230 – 345
24"	225 – 310	285 – 375	295 – 415	300 – 450
28"	255 – 365	340 – 445	350 – 525	365 – 565
32"	305 – 435	400 – 540	430 – 625	450 – 680
36"	350 – 525	465 – 635	510 – 735	525 – 805

BASES AND CAPITALS

Cost per each base or capital to be added to total column cost.

COLUMN DIAMETER	BASES AND CAPITALS		CAPITALS ORNATE
	PLAIN	MODERATE	
6"	\$ 66	\$ 205	\$ 305
8"	76	240	375
12"	115	345	525
16"	160	485	725
20"	235	705	1,040
24"	340	980	1,460
28"	485	1,410	2,000
32"	715	2,000	2,825
36"	1,030	2,825	3,900

For solid composite fiberglass and marble chip columns and bases deduct 30% to 50% from the above wood costs. For architectural interior plaster columns, add 100%.

ORNAMENTAL ALUMINUM COLUMNS

Costs are given per linear foot of architectural nonbearing column measured from the bottom of the base to the top of the capital. Add for each base or capital. The diameter of the column is measured at the bottom of the column above the base.

DIAMETER OF SHAFT AT BASE	FLUTED		BASES AND CAPITALS	
	ROUND	SQUARE	PLAIN	ORNATE
4"	\$ 12.45	\$ 13.90	\$ 29.00	\$ 125.00
6"	13.90	18.60	39.75	200.00
8"	24.30	31.75	51.00	280.00
10"	36.75	50.00	63.00	350.00
12"	52.00	70.00	70.00	430.00
14"	69.00	95.00	80.00	525.00
16"	88.00	125.00	90.00	600.00
20"	135.00	----	110.00	765.00
24"	190.00	----	125.00	915.00
30"	285.00	----	150.00	1,200.00

For hard coated, cored polystyrene columns, deduct 20% to 30% from the aluminum costs above.

COLD STORAGE

SECTION UIP 7

INSTRUCTIONS

To estimate the total cost of a cold-storage plant, determine the cost of the basic building; then add the cost of insulation, equipment, and doors as indicated on this page. Since these components represent a large proportion of the total cost, it is advisable to determine accurately the temperatures maintained, and thickness and type of insulation. The table to the right is a guide to the determination of insulation thickness for maintaining various temperatures.

The table is based upon corkboard, styrofoam, foamglas, and fiberglass board. For mineral wool batts, increase thickness by 40%. For urethane and isocyanurate insulation, decrease thickness by 40%.

TYPICAL INSULATION REQUIREMENTS

These typical thicknesses are often varied to suit the requirements of a specific installation. Some of the items which may affect the amount of insulation and refrigeration used are: the types of commodity being stored and the frequency of removal and replacement of goods being refrigerated.

ROOM TYPE	RATED TEMPERATURE	INSULATION THICKNESS
Sharp freeze	-45° to -25°	11"
	-25° to -15°	10"
Freezer	-15° to -5°	8"
	-5° to 20°	7"
Chiller	5° to 20°	6"
	20° to 32°	5"
Cooler	32° to 45°	5"
	45° to 60°	3"

INSULATION (Cost per square foot)

Costs should be applied to the actual insulated surface area: walls (no adjustment), floors (deduct 35%), and ceilings (add 35%). Costs are for installation including vapor; barriers, fasteners, furring,

framing, finishes, sealants, etc., as appropriate for each type of insulation. See Section SEG 4 for prefabricated insulated sandwich wall and/or roof panels.

Insulation Thickness	Corkboard	Fiberglass Board	Foamglas Board	Isocyanurate Board	Mineral Wool Batt	Styrene Board	Urethane Board	Urethane Spray-on
1"	\$ 7.55	\$6.65	\$ 7.70	\$ 6.55	\$5.95	\$5.95	\$ 6.65	\$ 4.30
2"	8.65	6.75	9.05	7.70	6.20	6.25	7.80	5.95
4"	11.00	7.60	11.70	9.55	6.75	6.75	9.85	9.25
6"	13.50	7.90	14.50	11.70	7.35	7.65	12.00	12.80
8"	15.90	8.50	17.20	13.70	7.90	8.10	14.40	14.70
10"	18.30	9.05	19.90	----	8.55	8.70	----	----
12"	20.60	9.70	22.70	----	9.20	9.55	----	----

PLUS COLD STORAGE DOORS (Cost per square foot)

Cold storage doors are priced by the outside surface area of each door. Costs are based on completely installed, hinged infitting doors, including hardware and gaskets. For other doors use the surface area with the adjustments given below.

Thickness	To 15 Sq. Ft.	20 Sq. Ft.	33 Sq. Ft.	> 40 Sq. Ft.
2"	\$140.00	\$120.00	\$100.00	\$ 86.00
4"	150.00	135.00	110.00	97.00
6"	160.00	145.00	125.00	110.00
8"	175.00	155.00	140.00	120.00

DOOR COST ADJUSTMENTS

Stainless steel: add 50%
 Vestibule doors: add 60%

Antifreeze heating cables:
 add \$39.00 per linear foot of cable

Track doors: add 10% to 20%
 Wood-clad doors:
 deduct 10% per side
 Sliding doors, single: add 25%
 double: add 40% to 50%

Electric door operator,
 sliding doors:
 single, add \$6,400;
 double, add \$7,350
 hydraulic operation,
 add 15% to electric

Pneumatic door operator, swinging door,
 treadle-activated:
 add \$3,075 – \$4,075 each
 double doors:
 add \$4,350 – \$5,550 pair
 electric eye activation: add 10% – 12%
 sliding doors:
 add 30% – 50% to operator
 Observation window: add \$630 – \$825
 Hardware: locking, \$270 – \$775,
 panic, add \$730 – \$1,450

PLUS REFRIGERATION (Cost per cubic foot)

Refrigeration equipment costs are based on the interior volume of the rooms which are cooled. Costs are for complete normal installation including wiring, switch panels, starters, piping, and ancillary items necessary to maintain proper temperature levels based on typical insulation. Room loads with much in and out traffic, highly controlled atmosphere, etc., will vary and costs may vary plus or minus 20%.

Room Size	Sharp Freezer	Freezer	Chiller	Cooler
5,000 cu. ft.	\$2.73	\$2.29	\$1.91	\$1.61
25,000	2.37	1.95	1.62	1.34
50,000	2.23	1.83	1.53	1.25
100,000	2.11	1.73	1.41	1.15
200,000	1.96	1.62	1.33	1.08
300,000	1.90	1.56	1.26	1.04
500,000	1.81	1.46	1.19	.98
1,000,000	----	1.37	1.12	.89
2,500,000	----	1.28	1.03	.81
5,000,000 & up	----	1.18	.97	.75

Subsoil heating will cost \$1.74 to \$2.91 per square foot of floor area. Adjust for other sitework refinements from Segregated or Unit-in-Place cost sections.

COLD STORAGE

SECTION UIP 7

WALK-IN BOXES

Large walk-in boxes containing from 50 to 500 square feet by 7 1/2 feet high, with floors. Costs are for prefabricated, galvanized smooth or embossed metal-clad insulated cooler units, including refrigeration equipment and one door. Equipment quality and ancillary items can vary and costs will vary a plus 15% to a minus 10%. For outside installations, add \$6.65 to \$13.25 per square foot of floor area.

Temperature	Square Feet						
	50	100	150	200	300	400	500
32° to 60°F base	\$13,400	\$19,100	\$23,400	\$27,000	\$33,400	\$38,700	\$43,300
5° to 31°F add	1,190	1,390	1,610	1,730	1,890	4,150	4,150
-15° to 5°F add	1,890	2,390	2,725	7,350	7,350	7,350	7,350
-45° to 15°F add	2,230	2,825	3,250	8,750	8,750	8,750	8,750

For wood exterior and interior, deduct 5% each; aluminum, add 7% each; stainless steel, add 20% to 30% each; for stainless floors, add 15%. For each additional foot of height from base, add 6%. Without floor but with screeds, deduct 17%. Where walls of the building form exterior wall of the box, deduct \$110 per linear foot. Partitions, including door, cost \$270 to \$490 per linear foot.

Air curtains, see Section UIP 3. Traffic and stripdoors, see Section UIP 5. Extra doors see Cold Storage Doors. For glass reach-in doors, use 2" doors less 10%; heated doors, add 15% to 35%.

Doorway ramps, exterior, cost \$410 to \$850 each; for interior, add 100%; stainless steel, add 35%. Shelving costs \$26.75 to \$56 per linear foot of shelf. For cantilevered, add 50%.

Small display type commercial boxes or boxes with reach in glass fronts should be priced from Section UIP 15.

Subsoil heating will cost \$1.74 to \$2.91 per square foot of floor area. Adjust for other sitework refinements from Segregated or Unit-in-Place cost sections.

ELEVATORS – ESCALATORS

GENERAL INFORMATION

1. Selective-Collective controlled elevators are the type usually found in small office buildings, hospitals and apartments. The car or cars will respond automatically to the pressure of a car or corridor button. The control system will collect and save signals and respond to them in order. They are normally used in single elevator installations and up to groups or banks of three.
2. Selectomatic-Automatic, Autotronic, Measured Demand and similar terms are used by various manufacturers as descriptive names for the type of controls on fully automatic elevators in medium and high speed operation. These controls not only collect signals and give responses to banks of three or more elevators, but distribute service among them on a balancing basis. The elevators may have auxiliary controls to allow for manual operation to reassure passengers, to allow for guides or to prevent misuse.
3. Express or penthouse elevators do not have openings at each floor. For each bypassed floor without an opening, add the Express Elevator cost per floor or stop.
4. Attended passenger elevators require full-time operator control. The high cost of operation of this type has made most of these elevators obsolete. Because they are no longer produced, the appropriate passenger operated costs can be applied, deducting 10% from the costs for manual controls.
5. Hydraulic elevators are moved by one or two hydraulic plungers under the car. They are suitable for low-speed, low-rise operation and are somewhat lower in cost than electric elevators in these applications, up to 7 floors.
6. Variable-voltage equipment includes a D.C. generator for each elevator. Varying the voltage provides a wide range of speeds and acceleration. Automatic leveling is usually included with this equipment.
7. A.C. rheostatic control equipment is suitable for low-speed, low-rise application.
8. Miscellaneous types include escalators, moving walks, vertical and inclined residential and wheelchair lifts, sidewalk elevators, dumbwaiters and open personnel lifts.

INSTRUCTIONS

Elevators and escalator costs are lump sums to be added to the Segregated Cost estimates or as refinements to the Calculator Method costs. In order to compute the costs, information on the number of elevators, type of control, capacity of cars, rated speeds and number of stops will usually be required. The number of elevators, their associated stops and the type of cabs will all

influence the cost rank chosen.

The cost schedules in this section are based on average installations within each class. In large, newer installations it is advisable to apply to the elevator installation company or manufacturer for actual prices, particularly where custom cabs are encountered.

EXAMPLES

EXAMPLE 1 – (Passenger Elevator)

A medical building, three stories and basement, two automatic elevators, geared, selective-collective, variable voltage control, 200 feet per minute with 2,500-pound capacity.

Base cost	\$117,000
4 stops @ \$6,350	<u>25,400</u>
Cost per elevator	\$142,400
2 elevators	<u>x 2</u>
Total cost of elevators	\$284,800

EXAMPLE 2 – (Freight Elevator)

A warehouse, four stories, one freight elevator, speed 100 feet per minute, hydraulic operation with 8,000-pound capacity, push-button controls, front and rear openings on first floor and power operation on all doors.

Base Cost	\$53,000
4 stops @ \$17,800	\$71,200
1 rear-door opening (power door)	<u>\$17,400</u>
Total cost of elevators	\$141,600

MISCELLANEOUS ACCESSIBILITY EQUIPMENT

(Cost each, except where noted)

	COST RANGE
Emergency evacuation, portable lifts, wheelchair, motorized climber	\$9,650 – \$11,400
power scooters	5,850 – 6,750
chair seat, mechanical track stair climber	2,850 – 4,050
seat carriers, hand held	130 – 170
Portable ramps, including railing, per linear foot	185 – 240
platforms, per square foot	75 – 92

ELEVATORS

SECTION UIP 7

PASSENGER ELEVATORS – SELECTIVE-COLLECTIVE

(passenger-operated geared electric and hydraulic elevators)

ELECTRIC, VARIABLE VOLTAGE CONTROL

SPEED (Feet/Minute)	CAPACITY (Pounds)					
	1500	2000	2500	3000	4000	5000
100	\$ 74,000 – \$ 79,750	\$ 85,500 – \$ 95,250	\$ 95,250 – \$107,000	\$104,000 – \$119,000	\$120,000 – \$141,000	\$134,000 – \$161,000
150	85,500 – 94,250	97,750 – 110,000	108,000 – 124,000	117,000 – 135,000	134,000 – 159,000	149,000 – 179,000
200	94,500 – 106,000	107,000 – 123,000	117,000 – 137,000	129,000 – 150,000	145,000 – 173,000	160,000 – 193,000
250	102,000 – 116,000	115,000 – 133,000	127,000 – 147,000	137,000 – 161,000	153,000 – 184,000	170,000 – 204,000
300	109,000 – 126,000	123,000 – 142,000	133,000 – 157,000	145,000 – 171,000	162,000 – 194,000	177,000 – 214,000
350	114,000 – 133,000	129,000 – 151,000	141,000 – 165,000	151,000 – 179,000	169,000 – 201,000	184,000 – 223,000
400	120,000 – 141,000	134,000 – 159,000	147,000 – 174,000	157,000 – 187,000	175,000 – 210,000	192,000 – 230,000
PLUS COST/STOP	\$ 6,300 – \$ 6,550	\$ 6,350 – \$ 6,700	\$ 6,350 – \$ 6,700	\$ 6,550 – \$ 6,750	\$ 6,700 – \$ 6,850	\$ 6,750 – \$ 6,900

HYDRAULIC

SPEED Feet/Minute	CAPACITY (Pounds)					
	1500	2000	2500	3000	4000	5000
50	\$27,600 – \$34,800	\$33,900 – \$42,900	\$39,500 – \$48,700	\$44,600 – \$55,500	\$53,750 – \$ 67,500	\$ 62,750 – \$ 78,250
75	34,800 – 42,900	41,500 – 51,000	47,800 – 58,500	53,000 – 65,500	63,500 – 79,750	72,750 – 91,750
100	41,200 – 48,400	47,800 – 58,000	56,250 – 66,500	60,750 – 73,500	71,750 – 89,000	81,750 – 102,000
125	46,300 – 53,750	53,750 – 64,000	61,500 – 72,750	67,000 – 81,750	78,250 – 96,750	89,000 – 111,000
150	51,000 – 58,500	59,000 – 69,500	66,500 – 79,750	73,250 – 88,750	85,000 – 104,000	95,250 – 119,000
200	59,000 – 67,500	68,500 – 79,750	76,000 – 90,250	83,250 – 99,750	95,250 – 116,000	107,000 – 132,000
PLUS COST/STOP	\$11,400 – \$12,100	\$12,000 – \$12,800	\$12,800 – \$13,500	\$13,300 – \$14,200	\$13,900 – \$ 15,100	\$ 14,900 – \$ 15,800

ELECTRIC, A.C. RHEOSTATIC CONTROL

SPEED Feet/Minute	CAPACITY (Pounds)		
	1200	1500	2000
50	\$45,800 – \$54,250	\$50,500 – \$60,250	\$56,500 – \$69,000
100	60,500 – 69,750	65,250 – 76,750	73,250 – 86,250
150	71,750 – 81,500	76,500 – 88,750	84,500 – 98,000
PLUS COST/STOP	\$6,000 – \$6,250	\$6,150 – \$6,300	\$6,300 – \$6,550

SMALL ELEVATORS

Small office and apartment elevators with simple call system and push button control, four passenger cab, and two or three stops, cost \$56,250 to \$77,250.

EXPRESS ELEVATORS

Cost per bypassed floor, without an opening, is \$2,200 to \$2,925 per floor. With openings, use cost per stop from tables.

OBSERVATION ELEVATORS

For glass observation cars, add \$9,250 to \$18,300 plus \$1,150 per stop. Exterior installations will cost an additional \$17,400 to \$22,000. Custom designed cars can run as much as five to ten times the cost of standardized cabs.

ELEVATORS

SECTION UIP 7

PASSENGER ELEVATORS – SELECTOMATIC-AUTOMATIC

(completely automatic, gearless machines, group-controlled elevators)

SPEED (Feet/Minute)	CAPACITY (Pounds)		
	2000	2500	3000
300	\$169,000 – \$187,000	\$179,000 – \$198,000	\$189,000 – \$209,000
400	186,000 – 206,000	197,000 – 218,000	209,000 – 231,000
500	205,000 – 228,000	218,000 – 241,000	230,000 – 254,000
600	225,000 – 252,000	241,000 – 267,000	254,000 – 282,000
700	251,000 – 279,000	266,000 – 294,000	282,000 – 311,000
800	278,000 – 308,000	288,000 – 326,000	310,000 – 343,000
1,000	338,000 – 377,000	358,000 – 397,000	378,000 – 418,000
1,200	412,000 – 459,000	436,000 – 484,000	461,000 – 509,000
1,400	503,000 – 560,000	531,000 – 590,000	563,000 – 623,000
PLUS COST/STOP	\$ 6,350 – \$ 6,850	\$ 6,700 – \$ 7,000	\$ 6,850 – \$ 7,300

SPEED (Feet/Minute)	CAPACITY (Pounds)		
	3500	4000	5000
300	\$200,000 – \$221,000	\$210,000 – \$234,000	\$236,000 – \$261,000
400	220,000 – 244,000	232,000 – 258,000	260,000 – 288,000
500	243,000 – 269,000	257,000 – 286,000	288,000 – 318,000
600	269,000 – 297,000	284,000 – 314,000	318,000 – 350,000
700	296,000 – 329,000	313,000 – 347,000	351,000 – 385,000
800	329,000 – 362,000	347,000 – 383,000	387,000 – 427,000
1,000	401,000 – 441,000	423,000 – 466,000	473,000 – 519,000
1,200	488,000 – 538,000	516,000 – 568,000	578,000 – 631,000
1,400	596,000 – 656,000	630,000 – 691,000	707,000 – 768,000
PLUS COST/STOP	\$ 7,000 – \$ 7,450	\$ 7,300 – \$ 7,650	\$ 7,550 – \$ 7,900

EXPRESS ELEVATORS: Cost per bypassed floor, without an opening, is \$2,575 – \$3,500 per floor. With openings, use cost per stop from table.

ESCALATORS

Costs are averages per each moving stairway.

32" WIDTH 5,000 persons per hour		48" WIDTH 8,000 persons per hour	
RISE	COST	RISE	COST
10'	\$156,000	10'	\$169,000
12'	161,000	12'	174,000
14'	165,000	14'	180,000
18'	174,000	18'	193,000
22'	184,000	22'	205,000
25'	193,000	25'	215,000

For glass balustrade panels or stainless steel sides add \$655 to \$2,050 per foot of rise per unit.

OBSERVATION ELEVATORS: Price with cost additives listed on Page 3.

MOVING WALKS

Costs are averages per section, up to 2% gradient.

LENGTH Linear Feet	COST PER LINEAR FOOT			
	24" WIDE	36" WIDE	48" WIDE	54" WIDE
40	\$5,100	\$5,600	\$6,200	\$6,400
60	4,250	4,450	4,775	4,875
100	2,850	3,125	3,475	3,525
300	2,070	2,280	2,500	2,575
500	1,870	2,050	2,200	2,370
750	1,700	1,940	2,020	2,170
1,000	1,640	1,790	1,940	2,020
1,400	1,470	1,680	1,820	1,870
1,800	1,350	1,590	1,680	1,790

For gradients up to 20%, add 1% for each percent over two. Costs include handrails.

VERTICAL WHEELCHAIR PORCH LIFT: For 400# capacity with 5' maximum lift, cost is \$9,950 to \$14,200. For each additional foot of height to a maximum of twelve feet, add \$1,790 to \$2,750 per foot.

ELEVATORS

SECTION UIP 7

PASSENGER ELEVATORS – SELECTOMATIC-AUTOMATIC

MISCELLANEOUS ELEVATORS

RESIDENTIAL ELEVATORS: The small handicapped or two or three passenger elevators found in single family dwellings cost \$18,600 to \$37,800 for two stops plus \$2,575 to \$4,000 for each additional stop. For larger capacities over 700 lbs. cost \$39,800 to \$55,500 for two stops plus \$9,600 to \$12,700 for each additional stop. For custom cabs (decorative hardwood, brass and glass, etc.), add 75% to 150%.

INCLINED RAILWAYS: Inclined elevators (chairlift) cost \$7,550 to \$11,300 for normal 14' to 17' run. Add \$110.00 per foot for longer runs. Add \$1,620 to \$2,070 for a two passenger lift. Add \$2,280 to \$3,275 for each turn. Add 50% for wheelchair capability. For exterior (hillside) installation, add \$1,820.

SIDEWALK ELEVATORS: With sidewalk doors, 2,000# to 3,000# capacity, 25 square foot platform, the cost is \$40,500 to \$58,500.

PERSONNEL LIFTS: Revolving vertical belts with one person platforms cost \$16,900 to \$21,200 plus \$4,500 per stop over two.

WINDOW-WASHING LIFTS: Exterior building maintenance platforms, self-powered, 24' to 26', cost \$56,500 to \$81,250. Custom engineered platforms can run as much as two to four times the cost of standard lifts. Supporting davits cost \$9,250 to \$12,100 per pair and sockets \$565 to \$765 each.

DUMBWAITERS: Automatic electric dumbwaiters, 500# capacity, 50 FPM, stainless steel cab, cost \$16,400 (manual doors) to \$42,400 (power doors) plus \$3,700 to \$4,725 per stop over two. For 100-FPM operation, add 30%; 150 FPM, add 50%. For 200# capacity, deduct 25%; 75#, deduct 50%. For hand operation, deduct 50%.

FREIGHT ELEVATORS

(push-button operation)

HYDRAULIC

CAPACITY (Pounds)	SPEED (Feet/Minute)				PLUS COST PER STOP	
	50	100	125	150	Manual Doors	Power Doors
2,000	\$ 28,400 – \$ 31,000	\$ 37,800 – \$ 41,500	\$ 43,200 – \$ 47,800	\$ 48,700 – \$ 55,000	\$ 7,800 – \$ 8,100	\$14,800 – \$15,100
3,000	32,700 – 36,000	42,000 – 44,000	46,700 – 51,750	53,000 – 59,000	8,250 – 8,550	15,500 – 15,900
4,000	35,200 – 39,800	44,600 – 49,500	50,000 – 55,500	56,000 – 62,750	8,750 – 9,050	15,900 – 16,500
5,000	39,100 – 42,900	47,400 – 52,250	52,250 – 58,000	58,000 – 65,250	9,050 – 9,700	16,500 – 17,400
6,000	42,000 – 45,300	49,500 – 55,000	54,250 – 60,500	60,500 – 67,500	9,700 – 10,000	17,100 – 17,700
8,000	45,800 – 49,500	53,000 – 59,500	56,000 – 64,000	63,500 – 71,000	10,300 – 10,700	17,800 – 18,500
10,000	68,000 – 76,000	80,750 – 89,000	87,000 – 96,500	94,500 – 104,000	10,700 – 11,000	18,300 – 19,200
12,000	80,750 – 89,500	94,250 – 104,000	101,000 – 113,000	110,000 – 124,000	11,000 – 11,500	18,900 – 19,500
15,000	98,500 – 110,000	114,000 – 128,000	123,000 – 138,000	131,000 – 148,000	11,900 – 12,100	19,400 – 20,300
20,000	128,000 – 142,000	146,000 – 164,000	156,000 – 177,000	170,000 – 192,000	12,500 – 12,900	20,100 – 21,000

ELECTRIC, VARIABLE VOLTAGE CONTROL

CAPACITY (Pounds)	SPEED (Feet/Minute)				PLUS COST PER STOP	
	100	200	300	400	Manual Doors	Power Doors
2,500	\$ 85,000 – \$ 94,500	\$ 95,750 – \$107,000	\$109,000 – \$121,000	\$124,000 – \$137,000	\$ 8,100 – \$ 8,450	\$15,300 – \$15,600
4,000	90,500 – 101,000	104,000 – 116,000	121,000 – 133,000	139,000 – 153,000	8,750 – 9,600	16,000 – 16,800
5,000	93,750 – 104,000	109,000 – 121,000	127,000 – 141,000	147,000 – 163,000	9,600 – 9,850	16,800 – 17,500
6,000	95,750 – 107,000	112,000 – 125,000	132,000 – 146,000	155,000 – 171,000	9,850 – 10,300	17,400 – 17,800
8,000	99,750 – 111,000	119,000 – 131,000	141,000 – 156,000	167,000 – 183,000	10,400 – 10,700	18,100 – 18,600
10,000	107,000 – 119,000	129,000 – 142,000	153,000 – 171,000	185,000 – 205,000	10,900 – 11,300	18,600 – 19,300
15,000	135,000 – 149,000	179,000 – 198,000	-----	-----	11,900 – 12,100	19,800 – 20,300
20,000	159,000 – 177,000	-----	-----	-----	12,500 – 12,900	20,400 – 21,200

REAR DOORS: For rear-door openings, add \$9,800 to \$10,500 for the first rear door, if manually operated, plus \$7,550 to \$8,250 for each additional manual door. For power operated rear doors, use \$17,400 to \$18,200 for the first door and \$14,700 to \$15,800 for each additional door.

SELECTIVE-COLLECTIVE OPERATION: Add 10%.

A.C. RHEOSTATIC: Use 150% to 175% of the base cost of a comparable hydraulic elevator plus 50% to 75% of the cost per stop.

MANUAL CONTROLS: Deduct 10% from base cost and use manual door cost for stops.

PARKING LIFTS

Average costs per single elevated platform stall for four column surface mounted automobile storage lifts. For additional raised stall, add \$1,870 to \$3,725 each.

COST RANGE

3,000#, electric winch	\$ 9,300 – \$10,200
4,000#, hydraulic	11,400 – 12,700
7,000#, hydraulic	13,100 – 15,200

PNEUMATIC TUBE SYSTEMS

Cost per station, complete. For simple two-station systems, deduct 50% to 75%.

3" or 4"	\$19,900 – \$26,200
6" or 4" x 7"	28,700 – 35,000

CONVEYING AND MATERIAL HANDLING SYSTEMS

SECTION UIP 7

GENERAL INFORMATION

Material handling systems can have a wide range in costs depending on the operational loads and conditions placed on the equipment. The costs listed below represent averages of standard (medium) applications. For heavy or severe service requirements, such as continuous and repetitive operations at rated capacity or with heavy attachments or operations under extreme atmospheric

conditions, the costs may run 100% above those listed, whereas very light applications (e.g. single girder bridge) can run 25% to 50% below the listed costs. For outside operations, add 10%. For multiple hoists, use the total lifting capacity of all hoists to determine crane or craneway capacity, always selecting the next higher size.

BRIDGE CRANES

Costs are averages for ground controlled, variable speed, twin-girder, overhead cranes, exclusive of craneways. For cranes with

cabs, add \$6,250 for minimum controls to \$22,600 for deluxe cabs with air conditioning and complete controls.

CAPACITY (Tons)	SPAN					
	20'	30'	40'	50'	75'	100'
2	\$ 80,000	\$ 88,500	\$ 98,000	\$109,000	\$141,000	\$182,000
3	82,000	90,500	100,000	111,000	143,000	185,000
5	87,000	96,000	105,000	117,000	149,000	193,000
7-1/2	93,500	102,000	113,000	124,000	158,000	200,000
10	100,000	110,000	120,000	132,000	165,000	209,000
15	115,000	126,000	137,000	148,000	183,000	228,000
20	132,000	143,000	156,000	168,000	204,000	248,000
25	153,000	164,000	177,000	189,000	226,000	270,000

JIB CRANES

Costs are averages for self supporting jib or pillar base cranes with a 360° rotation, completely installed including mast, foundation and miscellaneous fittings. For each foot of variation from an under-beam base height of 10 feet, add or deduct \$49 to \$150. For boom electrification, add \$920. For 200° knee brace, wall bracket or column mount installations, deduct 50% to 60%.

BOOM LENGTH (Feet)	CAPACITY (Tons)					
	1/4	1/2	1	2	3	4
8	\$2,200	\$2,420	\$2,875	\$4,000	\$5,000	\$6,050
12	2,575	2,925	3,725	5,150	6,600	8,100
16	3,175	3,725	4,725	6,700	8,750	10,700
20	3,825	4,575	6,000	8,750	11,500	14,200

CRANEWAY SPANS

Crane runways, bracketed or braced to the buildings' column framing members, cost from \$150 to \$325 per linear foot for each rail. Light monorail trolley runways cost from \$16 to \$115 per linear foot. For freestanding, self-supporting runways, add 50% to 80%. For curved runways, add 75% to 150%. Costs may vary plus or minus 10% depending on overall length and height of installation. For detailed crane- or trolleyways, use steel beam costs in Section UIP 1 plus 10% to 20%. For electrical conductor assembly add \$22.00

to \$44.00 per linear foot. Curved conductor, add 25% to 35%. Examples including ±10% range:

BRIDGE CRANEWAY		TROLLEYWAY	
Capacity	Cost Range/Lin. Ft.	Capacity	Cost Range/Lin. Ft.
2 ton	\$150 - \$185	1 ton	\$15 - \$18
10	230 - 250	2	26 - 35
25	265 - 325	7-1/2	100 - 115

GANTRY CRANES

Costs are averages of portable steel gantry cranes with a maximum adjustable height of 15 feet. For each foot of deviation from the 15-foot base, add or deduct \$125 to \$345 per foot. For fixed height gantries, deduct 25%. For all-aluminum construction, add 50% to 100%. Gantries with adjustable spans, add \$1,430 to \$2,350. Angle iron tracks cost \$16.20 to \$28.25 per linear foot. For power operation, add \$9,000 to \$14,200.

SPAN (Feet)	CAPACITY (Tons)					
	1	2	3	5	7-1/2	10
10	\$3,450	\$4,850	\$6,000	\$7,650	\$9,300	\$10,800
15	3,950	5,600	6,900	9,050	11,000	12,800
20	4,475	6,400	7,950	10,300	12,800	14,900
30	5,550	8,000	9,900	13,100	16,200	19,200

HOISTS AND TROLLEYS

Costs are averages of hoists with a maximum lift of 10 feet. For each foot over 10 feet, add \$28.00 to \$115.00 per foot to the costs and add 50% to 70% to the base costs over 15 feet. Motors are single

speed. Add 10% to 30% each for two speed or variable speed or direct current operation. For high-speed trolleys (over 75 feet per minute), add 200%. For integral trolley hoists, add 15% to 25%

HOISTS

CAPACITY (Tons)	MANUAL	ELECTRIC
	COST RANGE	COST RANGE
1/2	\$ 205 - \$ 945	\$ 1,750 - \$ 2,220
1	285 - 1,120	1,990 - 2,700
2	450 - 1,600	2,500 - 3,775
3	585 - 2,040	3,000 - 4,800
5	875 - 2,900	4,125 - 6,850
7-1/2	1,340 - 4,050	5,350 - 9,600
10	1,710 - 5,100	6,600 - 12,100
15	-----	9,200 - 17,400
20	-----	11,600 - 22,400
30	-----	16,900 - 32,900

TROLLEYS

CAPACITY (Tons)	PLAIN	GEARED	MOTORIZED
	(FREE WHEELING) COST RANGE	COST RANGE	COST RANGE
1/2	\$ 145 - \$ 435	\$ 205 - \$ 945	\$1,600 - \$3,625
1	190 - 530	285 - 1,070	1,680 - 3,750
2	320 - 755	450 - 1,400	1,790 - 4,000
3	405 - 975	565 - 1,620	1,940 - 4,225
5	565 - 1,500	890 - 2,200	2,200 - 4,625
7-1/2	840 - 2,020	1,350 - 2,850	2,490 - 5,200
10	1,150 - 2,575	1,700 - 3,575	2,800 - 5,850
15	1,680 - 3,750	2,500 - 4,925	3,375 - 7,050
20	-----	-----	4,050 - 8,350
30	-----	-----	5,350 - 10,700

CONVEYING AND MATERIAL HANDLING SYSTEMS

SECTION UIP 7

GRAVITY ROLLER CONVEYORS

Costs are average costs per section for steel conveyor sections with galvanized steel rollers and include supports and installation. light duty conveyor frame capacity is 900 pounds with H-stand supports on 10' centers and 1,300 pounds with H-stand supports on 5' centers. Each 10' section consists of 40 2" OD rollers set on 3" centers. Each roller has a 50-pound load capacity.

The medium duty frame capacity is 1,400 pounds with H-stand supports on 10' centers and 3,200 pounds with H-stand supports on 5' centers. Each 10' section consists of 40 2" OD rollers set on 3" centers. Each roller has a 250-pound load capacity.

The heavy duty frame capacity is 2,500 pounds with H-stand supports on 10' centers and 7,600 pounds with H-stand supports on 5' centers. Each 10' section consists of 30 2-1/2" OD steel rollers set on 4" centers. Each roller has a 750-pound load capacity.

TYPE	OVER-ALL WIDTH	BETWEEN RAIL WIDTH	STRAIGHT SECTION		CURVED	
			10'	5'	90°	45°
LIGHT DUTY	12"	10"	\$620	\$405	\$435	\$325
	18"	16"	740	465	465	335
	20"	18"	755	480	480	340
	24"	22"	835	515	505	345
MEDIUM DUTY	12"	10"	735	455	790	570
	18"	16"	835	515	885	640
	24"	20"	920	565	915	670
	30"	28"	1,030	615	995	725
HEAVY DUTY	12"	10"	1,530	955	915	670
	18"	16"	1,770	1,070	1,040	755
	30"	20"	2,240	1,320	1,110	885
	42"	28"	2,700	1,560	1,420	1,020

MICROROLLER CONVEYORS

Costs are average costs per section for steel conveyor sections with 3/4" OD galvanized steel rollers with a 30-pound load capacity for each roller and a 350-pound load capacity per section. Supports and installation costs are included.

Aluminum conveyor sections with aluminum rollers of the same size have 40% less capacity and cost 15% more.

ROLLER CENTERS	OVERALL WIDTH	BETWEEN RAIL WIDTH	STRAIGHT SECTION 10 FEET	STRAIGHT SECTION 5 FEET
1"	6"	5"	\$1,010	\$605
	12"	10-1/2"	1,170	675
	15"	14"	1,230	725
	19"	18"	1,310	750
2"	6"	5"	615	420
	12"	10-1/2"	670	450
	15"	14"	705	465
	19"	18"	750	480

SKATE WHEEL CONVEYORS

Skate wheel conveyors are used to move lightweight cartons and packages from one station to another, in warehouses and assembly areas. Costs are average costs per section for steel conveyors with 2 x 5/8" ball bearing wheels on 1/4" axles at 3" centers. 10' section frame capacity is 900 pounds. Each wheel load capacity is 60 pounds.

Costs are average cost per section for flexible expandable skate wheel conveyors, including supports. For cost of flexible roller conveyors add 18%.

OVERALL WIDTH	WHEELS PER FT.	STRAIGHT SECTION		CURVED	
		10 FT.	5 FT.	90°	45°
12"	6	\$405	\$280	----	----
	10	470	325	\$440	\$290
	12	505	335	----	----
	16	565	375	----	----
15"	8	455	325	----	----
	10	480	335	----	----
	14	565	375	----	----
	16	600	390	----	----
18"	12	550	355	----	----
	14	565	380	----	----
	16	605	405	----	----
	18	655	420	----	----
20"	16	660	440	----	----
	18	705	455	----	----
	20	740	465	570	390
	24	810	505	----	----
24"	18	745	470	----	----
	20	765	490	755	530
	24	845	525	----	----
	28	900	560	----	----

MICROROLLER CONVEYORS

Costs are average costs per section for flexible expandable skate wheel conveyors, including supports. For cost of flexible roller conveyors add 18%

WIDTH	ADJUSTABLE LENGTH (FT.)	CAPACITY (LB./LIN. FT.)	WHEELS		
			NYLON	PLASTIC	STEEL
14"	2' - 8'	58	\$ 980	\$1,040	\$1,130
	3' - 12'	58	1,780	1,860	2,070
	5' - 18'	58	2,390	2,625	2,825
	6' - 24'	58	3,025	3,325	3,650
18"	2' - 8'	90	1,130	1,200	1,310
	3' - 12'	90	2,090	2,170	2,525
	5' - 18'	90	2,340	2,800	2,975
	6' - 24'	90	3,175	3,750	3,875
24"	2' - 8'	120	1,400	1,510	1,600
	3' - 12'	120	2,550	2,700	2,875
	5' - 18'	120	3,550	3,875	4,050
	6' - 24'	120	4,925	5,300	5,550

CONVEYING AND MATERIAL HANDLING SYSTEMS

SECTION UIP 7

BELT-DRIVEN LIVE ROLLER CONVEYORS

Belt-driven live roller conveyors are used for moving lightweight boxes and packages where product positioning is necessary. Costs are average costs per section for a 60-FPM conveyor powered by

a 1/2-HP 220/3/60 motor, with 2" OD rollers and 6" PVC belts, including supports and installations.

OVERALL WIDTH	BETWEEN RAIL WIDTH	ROLLER CENTERS	OVERALL LENGTH				
			10'	15'	20'	25'	30'
12"	9"	3"	\$6,250	\$7,050	\$ 7,900	\$ 8,750	\$ 9,600
		4-1/2"	5,650	6,400	7,050	7,650	8,350
		6"	5,550	7,100	6,750	7,300	7,900
		12"	5,350	5,850	6,350	6,850	7,300
18"	15"	3"	6,550	7,450	8,400	9,250	10,300
		4-1/2"	6,150	6,850	7,550	8,350	9,050
		6"	5,950	6,600	7,300	7,900	8,550
		12"	5,600	6,300	6,750	7,300	7,850
24"	21"	3"	7,050	8,100	9,150	10,200	11,300
		4-1/2"	6,600	7,400	8,250	9,100	9,950
		6"	6,400	7,150	7,900	8,750	9,450
		12"	6,150	6,750	7,400	8,000	8,700
30"	27"	3"	7,400	8,650	9,850	11,000	12,300
		4-1/2"	7,050	7,950	8,900	9,850	10,900
		6"	6,700	7,450	8,400	9,100	9,950
		12"	6,400	7,050	7,750	8,400	9,100
36"	33"	3"	7,850	9,150	10,600	11,900	13,300
		4-1/2"	7,350	8,400	9,450	10,500	11,500
		6"	7,000	7,900	8,850	9,700	10,700
		12"	6,700	7,400	8,100	8,850	9,650
42"	39"	3"	8,250	9,700	11,100	12,700	14,100
		4-1/2"	7,750	8,850	9,950	11,100	12,400
		6"	7,300	8,350	9,250	10,300	11,300
		12"	7,000	7,850	8,650	9,450	10,300

CHAIN DRIVEN LIVE ROLLER CONVEYORS

Chain driven live roller conveyors are used for moving heavy pallets and drums.

Costs are average for a 40-FPM conveyor powered by a 3/4-HP 220/3/60 motor, with 2-1/2" OD rollers at 6" centers, No. 50 chain, roller to roller drive, including supports and installations.

OVERALL WIDTH	BETWEEN RAIL WIDTH	OVERALL LENGTH					
		5'	10'	15'	20'	25'	30'
28"	24"	\$6,300	\$6,700	\$8,550	\$10,500	\$12,400	\$14,200
34"	30"	6,700	7,000	8,900	10,900	12,700	14,700
40"	36"	6,750	7,150	9,150	11,000	12,900	14,900
46"	42"	7,050	7,350	9,600	11,900	13,800	15,700

FLOOR TO FLOOR INCLINE CONVEYORS

Incline conveyors are used to move product from level to level or serve as a booster in a gravity system. Costs are average costs per section for a 60-FPM conveyor powered by a 1/2-HP 115/160

motor, with a rubber top belt and a 400-pound load capacity. Supports and installation are included.

OVERALL WIDTH	BELT WIDTH	FLOOR TO FLOOR HEIGHT															
		8'	9'	10'	11'	12'	13'	14'	15'	21'	23'	25'	27'	29'	31'	33'	35'
15"	12"	\$6,450	\$6,700	\$ 6,900	\$ 7,100	\$ 7,350	\$ 7,550	\$ 7,850	\$ 8,000								
22"	18"	7,400	7,750	8,000	8,400	8,700	9,050	9,250	9,650								
28"	24"	8,100	8,500	8,900	9,250	9,700	10,100	10,500	10,900								
34"	30"	9,150	9,650	10,200	10,700	11,100	11,600	12,100	12,600								

TANKS

SECTION UIP 8

DEFINITIONS AND COMMENTS

API refers to the standard specifications of the American Petroleum Institute.

ASME refers to the standard specifications for pressure tank design of the American Society of Mechanical Engineers.

WATER TANKS are normally measured in gallons.

OIL TANKS are normally measured in barrels of 42 gallons each.

STEEL RING CURB is a steel ring used to hold the foundation sand or gravel in place. The tank bottom is then placed on the sand. All tanks do not have curb rings.

HORTON SPHERE, HEMISPHEROID, DEWAR, etc., are types of large liquid- and gas-pressure vessels.

Many special tanks found in use cannot be included here, such as those for storage of exotic fuels, or those used in food or beverage processing which are in the nature of industrial processing equipment.

The costs of the tanks listed in this section are averages of total costs in place at the site including necessary foundations and tank fittings, but not pilings, pipe, fencing, site roads, etc.

The tanks included in this section are those used primarily for liquid and industrial storage.

The tank costs listed do not include an allowance for cathodic protection. Add 2% – 5% of the tank cost when found.

WEIGHTS AND MEASURES

1 gallon (water)	weighs	8.34 pounds
1 gallon	equals	.1337 cubic foot
1 gallon	equals	.1074 bushel
1 gallon	equals	.8327 Imperial gallon
1 gallon	equals	3.7853 liters
1 acre foot	equals	325,900 gallons
1 cubic foot	equals	.8032 bushel
1 barrel (oil)	equals	42 gallons
1 barrel (water)	equals	31.5 gallons

Pressure in pounds per square inch of column of water equals .434 times the height of the column in feet.

Circumference of a circle	=	3.1416 x the diameter
Area of a circle	=	.7854 x square of the diameter
Area of an ellipse	=	.7854 x product of both diameters
Volume of a sphere	=	.5236 x cube of the diameter
Volume of a cone	=	area of base x 1/3 of the altitude

Capacity in barrels (oil) = $D^2 \times .1399 \times \text{height}$
(diameter and height in feet)

Capacity in gallons = $D^2 \times 5.8748 \times \text{height}$
(diameter and height in feet)

Capacity in bushels = $D^2 \times .6308 \times \text{height}$
(diameter and height in feet)

CAPACITY OF CYLINDRICAL TANKS OR RESERVOIRS

(Per foot of depth or height.)

DIA. (feet)	U.S. (gallons)	BARRELS (42 gal.)	DIA. (feet)	U.S. (gallons)	BARRELS (42 gal.)
1	5.87	.14	32	6,016.2	143.2
2	23.50	.56	33	6,398.1	152.3
3	52.88	1.26	34	6,790.7	161.6
4	94.00	2.24	35	7,196.0	171.3
5	146.88	3.5	36	7,613.3	181.3
6	211.51	5.0	37	8,041.9	191.5
7	287.88	6.8	38	8,482.4	202.0
8	376.01	9.0	39	8,934.9	212.7
9	475.89	11.3	40	9,398.7	223.8
10	587.52	14.0	41	9,875.8	235.1
11	710.90	16.9	42	10,362.0	246.7
12	846.03	20.2	43	10,861.6	258.6
13	992.91	23.7	44	11,374.0	270.8
14	1,151.5	27.4	45	11,895.3	283.2
15	1,321.9	31.5	46	12,430.1	296.0
16	1,504.1	35.8	47	12,976.1	309.0
17	1,697.9	40.4	48	13,534.8	322.3
18	1,903.6	45.3	49	14,104.0	335.8
19	2,120.9	50.5	50	14,685.9	349.7
20	2,350.1	56.0	60	21,149.3	503.6
21	2,591.0	61.7	70	28,786.5	685.5
22	2,843.6	67.7	80	37,598.7	895.3
23	3,108.0	74.0	90	47,585.9	1,133.1
24	3,384.1	80.6	100	58,748.0	1,399.0
25	3,672.0	87.4	120	84,597.1	2,014.5
26	3,971.6	94.6	140	115,146.1	2,742.0
27	4,283.0	102.0	160	150,394.9	3,581.4
28	4,606.2	109.7	180	190,343.5	4,532.7
29	4,941.0	117.6	200	234,992.0	5,596.0
30	5,287.7	125.8	220	284,340.3	6,771.2
31	5,646.1	134.4	240	338,388.5	8,056.9

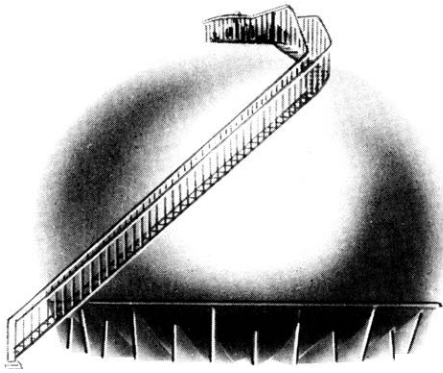
TYPICAL TANK LIVES

Tank lives can vary widely depending on the storage loads and conditions placed on the individual tank, the method of installation and appropriate maintenance and warranties. The typical lives listed below represent averages under standard applications. Lives may be shortened under severe requirements, such as extremely corrosive materials and/or atmospheric conditions or lengthened under very mild circumstances, by special coatings, double walls, etc.

	Years
Concrete tanks	30 – 55
Galvanized steel	15 – 20
Steel oil storage	25 – 30
Steel surface water storage	25 – 50
Elevated steel tanks	30 – 40
Underground steel, single wall	10 – 20
Double walled	25 – 35
Fiber coated	25 – 35
Galvanized steel chemical storage	3 – 17
Stainless steel chemical storage	15 – 30
Polyethylene chemical storage	15 – 20
Fiberglass chemical storage	15 – 20
Underground fiberglass	30 – 35
Wood	20 – 35
Steel pressure tanks	20 – 40

TANKS

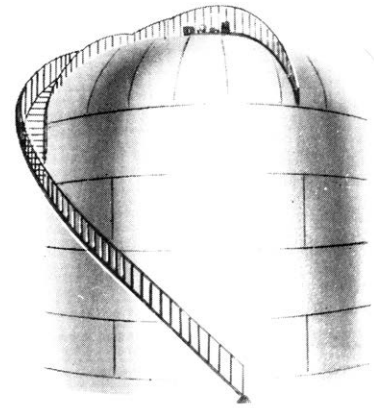
SECTION UIP 8



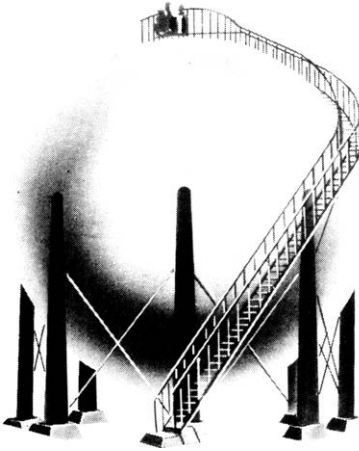
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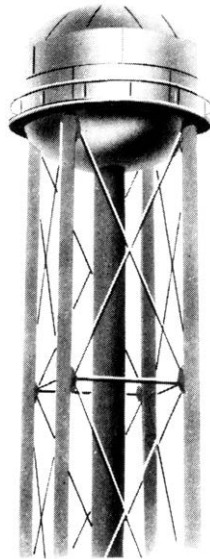
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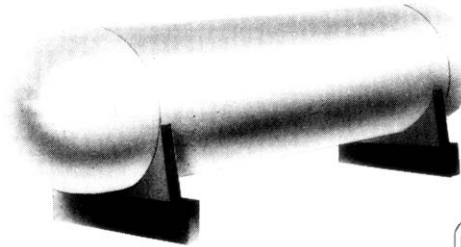
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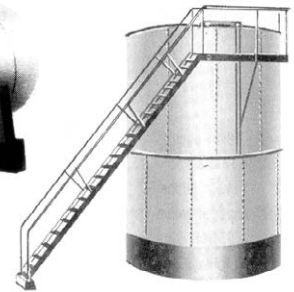
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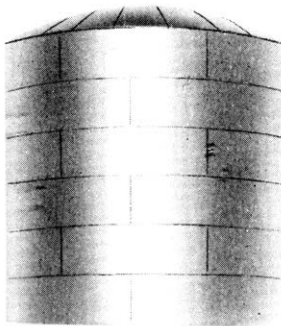
ELEVATED WATER TANK



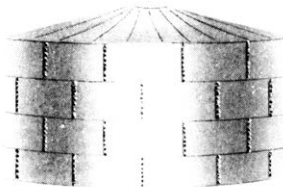
HORIZONTAL PRESSURE TANK



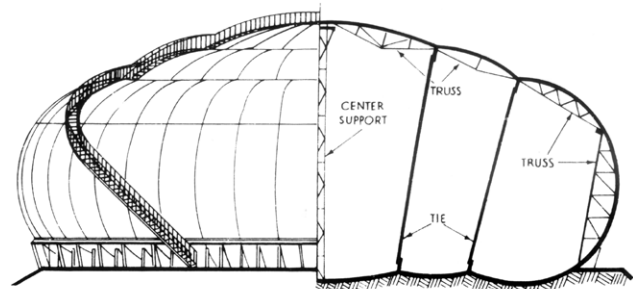
BOLTED STEEL - API



WELDED STEEL WATER TANK



GALVANIZED BULK STORAGE



HORTON SPHEROID

HEMISPHERICAL BOTTOM TANKS

CAPACITY (GALLONS)	DIAM. D	SIDE S		DEPTH T
		S	S	T
3,000	8'	5' - 5"	9' - 5"	
5,000	8'	10' - 10"	14' - 10"	
10,000	10'	13' - 9"	18' - 9"	
15,000	12'	13' - 9"	19' - 9"	
20,000	14'	12' - 9"	19' - 9"	
25,000	14'	17' - 1"	24' - 1"	
30,000	16'	14' - 9"	22' - 9"	
35,000	16'	18' - 1"	26' - 1"	
40,000	16'	21' - 7"	29' - 7"	
50,000	18'	20' - 3"	29' - 3"	
60,000	20'	18' - 11"	28' - 11"	
75,000	20'	25' - 5"	35' - 5"	
100,000	24'	21' - 7"	33' - 7"	
125,000	24'	29' - 0"	41' - 0"	
150,000	26'	29' - 2"	42' - 2"	
175,000	28'	28' - 9"	42' - 9"	
200,000	28'	34' - 2"	48' - 2"	
250,000	32'	30' - 11"	46' - 11"	
300,000	34'	32' - 11"	49' - 11"	
500,000	40'	40' - 0"	60' - 0"	

CAPACITY (GALLONS)	DIAM. D	SIDE S		TOTAL T
		S	S	T
20,000	16'	10' - 9"	14' - 9"	
25,000	18'	10' - 3"	14' - 9"	
30,000	18'	12' - 11"	17' - 5"	
35,000	20'	11' - 9"	16' - 9"	
40,000	20'	13' - 11"	18' - 11"	
50,000	22'	13' - 11"	19' - 5"	
60,000	24'	13' - 11"	19' - 11"	
75,000	26'	14' - 9"	21' - 1"	
100,000	30'	13' - 11"	21' - 5"	
125,000	30'	13' - 9"	26' - 3"	
150,000	34'	16' - 7"	25' - 1"	
175,000	36'	17' - 1"	26' - 1"	
200,000	38'	17' - 5"	26' - 11"	
250,000	40'	20' - 1"	30' - 1"	
300,000	40'	25' - 5"	35' - 5"	
400,000	47'	23' - 1"	34' - 10"	
500,000	51'	24' - 5"	37' - 2"	
600,000	54'	26' - 1"	39' - 7"	
750,000	58'	28' - 5"	42' - 11"	
1,000,000	66'	28' - 3"	44' - 9"	

TANKS

SECTION UIP 8

ELEVATED STEEL TANKS

Costs are averages for each of the high stress and low stress areas. Costs include tank, tower, riser pipe, ladder, and other equipment normally installed, completely erected as well as typical foundations and painting.

LOW STRESS AREAS

Average costs in areas not requiring earthquake (including zone 1 areas) or hurricane resistant structures.

CAPACITY (gallons)	TOWER HEIGHT			
	50'	75'	100'	150'
25,000	\$ 365,000	\$ 406,000	\$ 470,000	\$ 609,000
50,000	391,000	433,000	496,000	640,000
75,000	469,000	518,000	580,000	720,000
100,000	505,000	554,000	620,000	764,000
150,000	620,000	679,000	742,000	887,000
200,000	834,000	901,000	970,000	1,106,000
300,000	1,038,000	1,134,000	1,206,000	1,342,000
400,000	1,219,000	1,332,000	1,394,000	1,543,000
500,000	1,361,000	1,479,000	1,594,000	1,759,000
750,000	1,783,000	1,929,000	2,098,000	2,362,000
1,000,000	2,255,000	2,432,000	2,652,000	2,974,000
1,500,000	3,137,000	3,376,000	3,694,000	4,181,000
2,000,000	4,012,000	4,312,000	4,728,000	5,397,000

HIGH-STRESS AREAS

Average costs in areas requiring earthquake (zones 3 and 4) or hurricane resistant structures.

CAPACITY (gallons)	TOWER HEIGHT			
	50'	75'	100'	150'
25,000	\$ 461,000	\$ 513,000	\$ 596,000	\$ 766,000
50,000	498,000	553,000	629,000	810,000
75,000	586,000	652,000	739,000	913,000
100,000	643,000	702,000	789,000	969,000
150,000	787,000	858,000	942,000	1,121,000
200,000	1,054,000	1,142,000	1,231,000	1,404,000
300,000	1,314,000	1,443,000	1,522,000	1,702,000
400,000	1,542,000	1,687,000	1,764,000	1,957,000
500,000	1,725,000	1,874,000	2,016,000	2,225,000
750,000	2,259,000	2,444,000	2,657,000	2,993,000
1,000,000	2,860,000	3,082,000	3,361,000	3,768,000
1,500,000	3,971,000	4,278,000	4,683,000	5,294,000
2,000,000	5,086,000	5,467,000	5,994,000	6,840,000

RESERVOIRS

Average cost of cut and fill reservoirs with concrete or asphalt linings and metal, wood or concrete roof structures, per unit of rated capacity.

Roof Cover	Cost per gallon	Cost per acre foot
Floating	\$.39	\$126,000
Steel	.81	262,000
Aluminum	.91	296,000
Concrete	.95	308,000

WELDED STEEL WATER TANKS

Costs are average costs of surface reservoirs including typical tank

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ancillaries such as roofs, ladders, painting, fittings on tank, etc. Steel standpipes (height exceeds diameter) will cost 35% more. Sand and gravel foundations with steel retaining rings are included on those of 1,000,000 gallons capacity, or less, concrete foundations on larger tanks.

CAPAC. (gallons)	COST	CAPAC. (gallons)	COST	CAPAC. (gallons)	COST
10,000	\$ 52,500	200,000	\$ 314,000	2,000,000	\$1,452,000
20,000	83,750	250,000	354,000	2,500,000	1,699,000
30,000	110,000	300,000	392,000	3,000,000	1,943,000
50,000	150,000	400,000	490,000	4,000,000	2,370,000
75,000	195,000	500,000	576,000	5,000,000	2,771,000
100,000	238,000	750,000	739,000	6,000,000	3,161,000
125,000	257,000	1,000,000	854,000	7,500,000	3,691,000
150,000	278,000	1,500,000	1,192,000	10,000,000	4,510,000

BOLTED STEEL WATER TANKS

Costs are average costs for factory coated, bolted steel surface reservoirs erected on sand or gravel with a steel ring curb, including typical accessories such as roof, ladders, manways, vents, fittings on tank, and liquid level indicators, etc. Concrete foundations cost an additional \$7.41 to \$9.35 per cubic foot. Tank and foundation costs depend on seismic zone. For areas requiring earthquake resistant structures add 5% to the tank cost and use \$7.98 per cubic foot for a concrete foundation cost. Modular knockdown containment tanks with membrane liner and cover will cost 5% to 15% less.

CAPAC. (gallons)	DIMEN. (d x h)	TANK COST	CAPAC. (gallons)	DIMEN. (d x h)	TANK COST
10,000	15' x 8'	\$ 31,600	300,000	47' x 24'	\$226,000
30,000	18' x 16'	56,750	400,000	53' x 24'	285,000
100,000	26' x 20'	91,750	500,000	60' x 24'	360,000
125,000	29' x 24'	111,000	600,000	64' x 24'	419,000
150,000	32' x 24'	133,000	900,000	78' x 24'	589,000
200,000	37' x 16'	165,000	1,200,000	91' x 24'	781,000

CONCRETE WATER TANKS

Costs are averages of completely erected surface reservoirs, including foundations, dome roofs, and typical tank ancillaries. Sitework and exterior piping are extra. Small precast modular tanks, up to 30,000 gallons, cost \$7,800 to \$9,400 per 5,000 gallon module.

CAPAC. (gallons)	COST	CAPAC. (gallons)	COST	CAPAC. (gallons)	COST
10,000	\$ 62,000	200,000	\$ 389,000	2,000,000	\$1,475,000
20,000	95,000	250,000	441,000	2,500,000	1,649,000
30,000	120,000	300,000	538,000	3,000,000	1,909,000
50,000	165,000	400,000	584,000	4,000,000	2,292,000
75,000	276,000	500,000	633,000	5,000,000	2,690,000
100,000	328,000	750,000	791,000	6,000,000	3,124,000
125,000	370,000	1,000,000	909,000	7,500,000	3,645,000
150,000	419,000	1,500,000	1,116,000	10,000,000	4,686,000

TANKS

SECTION UIP 8

WOOD TANKS

Costs are averages for redwood or fir tanks completely erected on the buyer's foundation. Add 33% for cypress tanks. Sizes given are typical diameters and heights, in feet. Smaller tanks up to 10,000 gallons have 2" staves, larger tanks have 3". For elevated tanks,

add tower cost. Add \$52 to \$59 per foot of diameter for sand and gravel foundation with retaining ring. Concrete slab foundation costs an additional \$7.41 to \$9.35 per cubic foot. Add wood cover, joists, and ladders to basic tank cost as necessary.

CAPACITY (gallons)	SIZE (d x h)	TANK COST	FLAT COVER	CONICAL COVER	CHIME JOISTS	WOOD LADDER	STEEL LADDER
200	4 x 3	\$ 1,940	\$ 330	----	\$ 63	----	----
300	4 x 4	2,310	330	----	63	----	----
500	5 x 4	3,100	460	\$ 915	92	----	----
1,000	6 x 6	4,775	675	1,080	135	\$205	\$295
1,500	7 x 6	6,100	755	1,290	185	205	295
2,000	8 x 6	7,300	870	1,490	225	205	295
3,000	8 x 8	9,200	870	1,490	225	265	365
4,000	10 x 8	10,900	1,170	2,000	355	265	365
5,000	11 x 8	13,200	1,460	2,340	460	265	365
7,500	12 x 10	16,200	1,910	2,650	525	330	430
10,000	14 x 10	20,400	2,200	3,175	800	330	430
15,000	14 x 14	29,200	2,200	3,175	800	450	585
20,000	16 x 14	36,000	2,700	4,350	1,060	450	585
30,000	18 x 16	46,500	3,075	5,200	1,340	490	660
50,000	22 x 18	64,500	3,850	6,950	1,650	550	745
75,000	26 x 20	83,000	4,650	8,700	1,970	615	800
100,000	30 x 20	101,000	5,150	10,700	2,575	615	800
150,000	37 x 20	132,000	7,300	13,900	3,750	615	800
200,000	43 x 20	159,000	8,350	17,300	4,625	615	800

GALVANIZED STEEL TANKS

Costs are averages of 13 to 20 gauge, coated, corrugated steel tanks, installed or erected on the buyer's foundation. Prices include conical roof with manhole, freight and typical accessories. Deduct 15% for open tanks. Add \$52 to \$59 per foot of diameter for sand and gravel foundation with retaining ring. Add an additional \$7.41 to \$9.35 per cubic foot for concrete slab foundation. For elevated tanks, add tower cost.

TOWERS

Costs are averages of painted towers for flat bottom tanks, including added cost of erection of tank above ground, footings, piping to ground, valves, balconies, ladders to balconies, and indicator gauges.

CAPAC. (gallons)	DIMEN. (d x h)	TANK COST	CAPAC. (gallons)	DIMEN. (d x h)	TANK COST
500	4 x 5½	\$1,530	10,000	12 x 12	\$15,200
1,000	6 x 5	2,600	15,000	15 x 11	19,000
2,000	7 x 6½	4,125	20,000	18½ x 11	26,400
3,000	8 x 8	5,100	30,000	22 x 11	36,400
4,000	8 x 11	6,150	50,000	24 x 15	52,750
5,000	9 x 10	7,050	75,000	34 x 11	78,000
7,500	10 x 12	9,500	100,000	34 x 15	98,750

CAPAC. (gallons)	TOWER HEIGHT				
	12'	25'	50'	75'	100'
1,000	\$ 6,050	\$ 7,300	----	----	----
1,500	6,850	8,850	\$14,400	----	----
2,000	7,700	9,650	15,800	\$25,100	----
3,000	8,950	11,100	17,800	28,300	\$ 44,900
5,000	10,500	13,400	21,300	32,500	51,500
10,000	14,100	17,100	26,600	40,300	61,000
20,000	21,900	26,400	40,400	60,000	89,000
30,000	25,900	30,900	46,100	68,250	101,000
40,000	28,700	34,700	51,500	75,250	109,000
50,000	----	38,100	55,250	80,250	121,000
75,000	----	----	64,500	94,750	147,000

In areas subject to earthquakes or hurricanes, a rough estimate of additional cost can be obtained from the following formulas:

- 12' towers \$1,570 plus \$.046 per gallon of tank capacity
- 25' 2,310 plus \$.068 per gallon of tank capacity
- 50' 3,450 plus \$.092 per gallon of tank capacity
- 75' 5,900 plus \$.132 per gallon of tank capacity
- 100' 10,000 plus \$.172 per gallon of tank capacity

TANKS

SECTION UIP 8

VAULTED ABOVEGROUND PETROLEUM STORAGE TANKS

Costs are average for UL-listed cylindrical internal steel tanks encased inside a 6" precast concrete vault, providing a 4 hour fire wall and ballistic protection. The protective concrete outer shell is precast in two sections, allowing periodic internal tank inspection. Concrete support legs are cast monolithic with the lower section of

the concrete vault. Costs include fittings and installation on the buyer's foundation. For supplemental internal overspill containment tank (7 to 25 gallons), add \$1,370 to \$3,400. For steps and platform, add \$825 to \$3,575.

CAPACITY (gallons)	SIZE (feet)	SINGLE COMPARTMENT		DUAL COMPARTMENT	
		Single Wall	Double Wall	Single Wall	Double Wall
300	4½ x 7	\$ 15,200	\$ 22,900	----	----
550	5½ x 7	17,200	26,000	----	----
1,000	5½ x 12	22,000	33,900	\$ 25,100	\$ 38,100
2,000	7 x 14	33,800	52,500	36,900	57,250
4,000	9½ x 13	53,000	82,250	61,000	95,250
6,000	9½ x 18	68,000	106,000	77,000	120,000
8,000	9½ x 23	91,000	141,000	99,000	154,000
10,000	9½ x 29	99,000	154,000	107,000	166,000
12,000	9½ x 34	120,000	188,000	129,000	201,000

UNDERGROUND FUEL STORAGE

Costs are averages for fiberglass and steel tanks, completely installed, including fittings, access manway, excavation and backfill. For multiple installations, two or more in one hole, deduct 7% for each extra tank, considering the largest tank in the hole as the base. For difficult soil conditions, add for extra cost of excavation and bedding, as necessary.

All tanks carry Underwriters' Label. Add \$7.41 to \$9.35 per cubic foot for concrete pad. Costs do not include piping. Add \$4,250 to \$6,500 for leakage-monitoring system per tank. Sizes are approximate averages of all tank types. For multicompartment tanks, add \$6,150 to \$12,300 per tank.

NOMINAL CAPACITY (gallons)	DIAMETER (feet)	LENGTH (feet)	FIBERGLASS		STEEL (sti-P3)		FIBER COATED STEEL	
			SINGLE WALL TANK COST	DOUBLE WALL TANK COST	SINGLE WALL TANK COST	DOUBLE WALL TANK COST	SINGLE WALL TANK COST	DOUBLE WALL TANK COST
300	3	5	----	----	\$ 5,900	\$ 8,750	\$ 6,550	----
550	4	6	\$ 8,750	\$ 15,300	6,800	10,100	8,750	\$ 12,100
1,000	4	11	10,700	19,800	8,900	15,100	10,600	16,000
2,000	6	10	13,700	24,700	11,600	18,100	13,500	19,700
3,000	6	13	15,400	27,600	13,100	21,400	15,300	24,300
4,000	7	15½	17,300	31,900	15,200	23,800	17,400	25,800
5,000	8	13½	19,700	34,500	17,400	29,600	19,700	31,300
6,000	8	18	22,800	40,200	20,500	33,700	22,700	35,500
8,000	8	23	25,500	42,400	23,100	37,800	25,500	40,100
10,000	8	29	30,100	47,600	28,100	46,200	30,500	49,100
12,000	8	34	33,800	54,000	31,600	50,250	35,000	56,000
15,000	10	29	41,300	65,250	38,700	67,250	43,000	68,250
20,000	10	37	54,000	82,000	50,250	77,500	56,000	83,250
25,000	12	33	66,750	99,750	62,750	96,000	68,750	101,000
30,000	12	41	79,750	117,000	73,750	116,000	81,750	118,000
50,000	12	60	132,000	184,000	117,000	180,000	----	181,000

ABOVE GROUND FUEL STORAGE

Costs are averages for U.S. listed steel tanks, completely installed, including paint, manhole if needed, skid or saddles. Sizes are approximate averages of all tank types.

CAPACITY (gallons)	SINGLE WALL TANK COST	DOUBLE WALL TANK COST	CAPACITY (gallons)	SINGLE WALL TANK COST	DOUBLE WALL TANK COST
550	\$ 5,150	\$10,600	8,000	\$27,100	\$47,100
1,000	7,000	13,500	10,000	29,300	49,600
2,000	11,800	20,000	12,000	31,000	55,250
4,000	23,000	34,300	15,000	38,100	64,750
5,000	24,700	39,900	20,000	41,300	77,750
6,000	25,300	44,300			

TANKS

SECTION UIP 8

WELDED STEEL TANKS (API)

Costs are averages for tanks erected on sand or gravel with steel ring curb, and include cone roofs with supports as needed, outside ladder, roof and shell manholes, threaded and/or flanged openings as needed for operation, roof vents, and paint. Catwalks, stairways, and platforms are not included.

CAPAC. (barrels)	SIZE (feet)	TANK COST	CAPAC. (barrels)	SIZE (feet)	TANK COST
2,000	30 x 16	\$164,000	75,000	120 x 36	\$1,288,000
3,000	30 x 24	186,000	100,000	140 x 37	1,658,000
4,000	30 x 32	211,000	125,000	160 x 35	2,015,000
5,000	38 x 24	232,000	150,000	180 x 33	2,362,000
7,500	38 x 36	270,000	200,000	200 x 36	2,883,000
10,000	55 x 24	333,000	250,000	220 x 36	3,292,000
15,000	55 x 36	418,000	300,000	240 x 37	3,864,000
20,000	60 x 40	494,000	350,000	260 x 37	4,294,000
30,000	80 x 34	650,000	400,000	260 x 42	4,795,000
50,000	90 x 44	921,000	500,000	280 x 46	5,716,000

Add \$1,570 to \$2,825 per foot of diameter for pontoon floating roof.
Add \$2,050 to \$2,450 per foot of diameter for double-deck roof.

HORIZONTAL BULK STORAGE

Costs are averages for completely installed steel tanks, including saddles or legs, and fittings, on owners' foundations. Typical tank dimension is diameter x length.

CAPAC. (gallons)	SIZE (feet)	COST	CAPAC. (gallons)	SIZE (feet)	COST
1,000	4 x 10	\$ 4,350	7,500	7 x 26	\$12,400
1,500	5 x 9	4,825	10,000	10 x 17	15,600
2,000	5 x 12	5,450	12,500	10 x 21	18,700
3,000	5 x 18	6,800	15,000	10 x 25	21,800
4,000	6 x 19	7,950	20,000	10 x 34	28,100
5,000	6 x 24	9,250	25,000	10½ x 39	34,600
6,000	7 x 21	10,300	30,000	10½ x 46	40,100

HORIZONTAL PLASTIC TANKS

Costs are averages for completely installed fiberglass or polyethylene tanks, including saddles or legs, and fittings, on owners' foundations. Sizes are approximate diameters and length of typical tanks.

CAPAC. (gallons)	SIZE (feet)	COST	CAPAC. (gallons)	SIZE (feet)	COST
125	2½ x 3½	\$ 425	1,000	4 x 11½	\$1,940
250	3 x 4	540	1,500	5 x 11	3,075
500	4 x 6	1,080	2,000	8 x 12	4,300
750	4 x 9	1,480	2,500	10 x 12	5,300

VERTICAL WELDED TANKS

Costs are averages for mild steel welded tanks, including sand and gravel foundations, fittings and roof. Concrete slab foundations cost an additional \$7.41 to \$9.35 per cubic foot. Sizes are approximate diameters and heights of typical tanks.

CAPAC. (gallons)	SIZE (feet)	COST	CAPAC. (gallons)	SIZE (feet)	COST
1,500	7 x 6	\$ 7,400	15,000	13 x 16	\$22,900
2,000	7 x 8	7,850	20,000	14 x 18	31,400
4,000	8 x 11	10,500	30,000	17 x 19	44,900
5,000	9 x 11	11,900	40,000	19 x 20	58,250
7,500	10 x 13	15,100	50,000	21 x 20	71,250
10,000	11 x 15	18,600	60,000	23 x 20	84,500

BOLTED STEEL TANKS (API)

Costs include roof deck and supports, sand and gravel foundation with retaining ring, painting and typical basic fittings. Sizes are approximate diameter and height of typical tanks.

CAPAC. (barrels)	SIZE (feet)	TANK COST	CAPAC. (barrels)	SIZE (feet)	TANK COST
100	9 x 8	\$13,400	2,000	30 x 16	\$129,000
200	9 x 16	21,900	3,000	30 x 24	145,000
500	16 x 16	47,000	5,000	39 x 24	168,000
750	16 x 24	61,750	7,500	39 x 36	206,000
1,000	22 x 16	77,000	10,000	55 x 24	251,000
1,500	22 x 24	105,000	15,000	55 x 36	325,000

For bulk oil loading rack platforms, see Section UIP 14.

VERTICAL BULK STORAGE

Costs are averages of 10 and 12 gauge bolted galvanized tanks, including sand and gravel foundations, fittings and roof. Concrete slab foundations cost an additional \$7.41 to \$9.34 per cubic foot. Typical tank dimension is diameter x height.

CAPAC. COST	SIZE (gallons)	(feet)	CAPAC. COST	SIZE (gallons)	(feet)
2,000	7 x 8	\$ 7,500	15,000	13 x 16	\$24,500
3,000	8 x 8	9,000	20,000	14 x 18	30,500
4,000	8 x 11	10,300	30,000	17 x 19	43,400
5,000	9 x 11	11,600	40,000	19 x 20	56,250
7,500	10 x 13	14,900	50,000	21 x 20	68,000
10,000	11 x 15	18,400	60,000	23 x 20	81,500

VERTICAL PLASTIC TANKS

Costs are averages for fiberglass or polyethylene tanks completely erected on buyers' foundations, including fittings and roof. Add \$52 to \$59 per foot of diameter for sand and gravel foundation with retaining ring. Concrete slab foundations cost an additional \$7.41 to \$9.35 per cubic foot. Sizes are approximate diameters and heights of typical tanks.

CAPAC. COST	SIZE (gallons)	(feet)	CAPAC. COST	SIZE (gallons)	(feet)
500	4 x 6	\$ 655	4,000	8 x 12	\$ 4,725
750	4 x 9	970	5,000	8½ x 12½	5,900
1,000	5 x 7	1,290	6,500	10 x 12	7,500
1,500	5 x 10½	1,880	9,000	12 x 12	10,400
2,000	7 x 7	2,220	12,000	12 x 14½	13,700
2,500	8 x 7½	2,675	16,000	14 x 14	17,900
3,000	8 x 9	3,150	20,000	15 x 15	22,000

NOTE: Plastic tank prices can vary plus or minus 15% depending on the corrosive strength of the material being stored. For fiberglass underground corrosive strength chemical storage tanks see Underground Fuel Storage/Fiberglass and add 20%.

TANKS SECTION UIP 8

BOLTED INDUSTRIAL BINS CYLINDRICAL

The following costs are averages of bolted industrial bins for dry storage, installed without bottoms on buyers' slabs. Add \$7.41 to \$9.35 per cubic foot of slab.

DIAM. (feet)	HEIGHT (feet)	CAPAC. (cu. ft.)	COST		
			to 55#/cu. ft.	to 80#/cu. ft.	to 100#/cu. ft.
9	24	1,614	\$ 10,500	\$ 11,400	\$12,100
	32	2,152	13,300	14,300	15,200
	40	2,690	15,400	16,500	17,900
	56	3,776	20,100	21,100	23,100
	72	4,842	24,100	----	----
12	24	2,873	16,200	17,000	18,500
	32	3,830	19,200	20,800	21,900
	40	4,750	26,200	27,500	29,400
	56	6,700	31,500	33,600	35,600
	72	8,620	36,800	----	----
15	24	4,485	21,700	23,200	24,500
	32	5,980	27,200	29,100	30,600
	48	8,970	37,400	39,600	41,900
	64	11,960	47,100	49,800	52,750
	80	14,966	56,250	----	----
18	24	6,456	28,300	29,500	31,100
	40	10,760	42,200	44,600	46,900
	56	15,064	55,250	58,500	61,500
	72	19,389	67,750	71,000	----
	88	23,716	79,750	----	----
21	32	11,725	46,400	48,700	51,250
	40	14,669	55,000	57,250	60,750
	56	20,531	71,000	74,000	78,000
	72	26,424	85,000	89,250	----
	88	32,315	100,000	----	----
26	32	17,284	64,500	67,000	70,500
	48	25,948	85,000	88,750	----
	64	34,635	106,000	109,000	----
	72	43,322	118,000	----	----
	88	52,009	138,000	----	----
32	32	26,378	87,500	----	----
	40	33,006	104,000	----	----
	56	46,264	134,000	----	----
	72	59,521	163,000	----	----
	88	72,778	189,000	----	----

BOLTED INDUSTRIAL BINS HOPPERS

The following costs are averages of bolted industrial bins for dry storage, installed with necessary structural members on concrete footings.

DIAM. (feet)	HEIGHT (feet)	CAPAC. (cu. ft.)	COST		
			to 55#/cu. ft.	to 80#/cu. ft.	to 100#/cu. ft.
9	16	714	\$11,700	\$13,100	\$13,700
	24	1,250	14,300	15,400	16,300
	32	1,785	16,300	17,600	18,700
	40	2,320	18,100	19,300	20,400
12	16	1,248	17,300	18,400	19,400
	24	2,200	21,400	22,900	24,500
	32	3,160	24,000	25,500	27,400
	40	4,115	27,400	29,500	31,800
	56	6,035	32,400	34,500	36,700
15	24	3,090	28,200	29,700	31,800
	32	4,545	33,700	35,500	37,900
	40	6,040	38,000	40,200	43,200
	48	7,515	42,300	44,500	47,700
	56	8,990	45,900	48,600	51,750
18	24	4,235	36,400	38,600	41,000
	32	6,380	43,800	46,900	49,600
	40	8,535	50,500	53,750	57,250
	48	10,658	56,000	60,250	63,500
	56	12,850	61,250	65,250	69,750
21	24	5,325	44,500	47,200	50,500
	32	8,295	56,000	59,500	63,250
	40	11,220	65,500	69,750	74,250
	48	14,145	73,250	78,000	83,250

TANKS

SECTION UIP 8

WELDED STEEL PRESSURE TANKS

(ASME design pressure, 250 psig)

Costs are for complete standard horizontal installation on legs or saddle pads, including normal fittings on tank but not pipe, valves, or foundation. Bulk storage pressure tank prices can vary plus or minus 10% depending on shell specifications. Individual design can add 50% to 300% to the costs, depending on size. Sizes are typical nominal diameters and lengths for storage of propane, butane or ammonium sulfate, etc. For Residential use, deduct 50%

CAPAC. (gallons)	SIZE (feet)	COST	CAPAC. (gallons)	SIZE (feet)	COST
125	2 x 5½	\$ 1,850	6,500	7 x 26	\$ 66,000
250	2½ x 8	2,450	9,000	7 x 35	79,500
500	3 x 10	4,425	12,000	7 x 45	97,500
1,000	3½ x 15	7,850	15,000	7 x 54	119,000
1,500	5 x 11	11,700	20,000	9 x 49	149,000
2,000	5 x 15	15,300	30,000	11 x 47	208,000
2,500	5 x 19	19,000	45,000	11 x 63	298,000
3,000	5 x 22	20,700	60,000	11 x 90	387,000
4,000	5 x 29	27,300	90,000	11 x 133	568,000

FABRIC PILLOW TANKS

Average costs of rubber or vinyl coated fabric pillow tanks, which lay flat when empty and assume a "pillow" configuration when full of liquid. Costs include typical tank ancillaries. Sitework and exterior piping are extra.

CAPACITY (gallons)	SIZE (feet)	POTABLE WATER, FUELS AND OILS	CHEMICALS AND MILD SOLUTIONS
100	6 x 4	\$ 885	\$ 1,650
250	9 x 5	1,140	2,000
500	10 x 7	1,480	2,450
1,000	12 x 9	2,000	3,225
2,000	13 x 12	2,975	4,750
3,000	14 x 14	3,625	5,700
5,000	17 x 16	4,950	7,650
7,500	20 x 19	6,200	9,600
10,000	21 x 22	7,350	11,300
15,000	24 x 25	9,150	13,800
20,000	30 x 25	11,100	16,600
25,000	36 x 25	13,000	19,200
50,000	65 x 25	24,200	35,900
100,000	85 x 35	40,500	62,750

LARGE PRESSURE TANKS

Costs are averages including erection, structural supports, normal foundations and appurtenant equipment. These tanks are all individually designed, and costs vary greatly. Sphere wall thickness will cause costs to vary plus or minus 20%. For areas requiring earthquake- or hurricane-resistant structures, increase costs by 15%.

SPHERES

DIAMETER (feet)	CAPAC. (cu. ft.)	COST	DIAMETER (feet)	CAPAC. (cu. ft.)	COST
20	4,190	\$191,000	40	33,510	\$ 562,000
25	8,180	271,000	45	47,715	674,000
30	14,135	361,000	50	65,450	792,000
35	22,450	458,000	60	113,095	1,052,000

HEMISPHEROIDS

CAPACITY	5 LB. W.P.	10 LB. W.P.	25 LB. W.P.
105,000 gallons	\$267,000	\$308,000	\$ 357,000
210,000 gallons	379,000	448,000	540,000
420,000 gallons	549,000	656,000	816,000
840,000 gallons	783,000	954,000	1,234,000

DEWAR TANKS (CYROGENIC, 250 LB. W.P.)

VERTICAL

CAPACITY	COST	CAPACITY	COST
500 gallons	\$ 54,000	6,000 gallons	\$146,000
1,000 gallons	72,250	9,000 gallons	201,000
3,000 gallons	100,000	12,000 gallons	238,000

HORIZONTAL

CAPACITY	COST	CAPACITY	COST
500 gallons	\$ 59,250	6,000 gallons	\$185,000
1,000 gallons	81,250	9,000 gallons	251,000
3,000 gallons	114,000	12,000 gallons	298,000

MISCELLANEOUS INDUSTRIAL COSTS

SECTION UIP 9

INDUSTRIAL BOILERS

Costs are for gas and light oil fired boilers, complete with pumps, controls and gauges, 15 pounds pressure for steam, 30 pounds for water. Costs do not include flue piping, electric wiring, pad, gas or oil piping.

Add 12% for 125# water pressure, 25% for 150# steam.

For heavy-oil- and combination oil- and gas fired units, add 15%.

HP	WATER TUBE	SCOTCH MARINE	FIRE TUBE
4	\$ 3,975	----	----
6	5,550	----	\$ 10,600
10	8,050	----	14,100
15	10,600	\$ 14,700	18,200
20	12,900	17,200	21,400
30	17,400	22,400	27,500
40	20,600	25,900	31,700
50	24,300	29,300	36,700
75	32,600	37,700	46,000
100	40,300	44,500	54,750
150	54,750	57,250	70,000
200	65,500	68,000	82,750
300	88,500	85,500	104,000
400	109,000	102,000	124,000
500	133,000	116,000	141,000
600	148,000	132,000	159,000

Large high capacity packages boilers will cost \$345 to \$465 per horsepower.

Examples: 1,000 HP x \$465 = \$ 465,000;
6,000 HP x \$345 = \$2,070,000.

DEFINITIONS

WATER TUBE is a boiler in which the tubes contain water and steam, with the heat being applied to the outside surface. These are generally small commercial boilers with steel or cast iron bodies.

SCOTCH MARINE is a cylindrical steel shell "fire tube" boiler with one or more cylindrical internal steel furnaces located generally in the lower portion, with a bank or banks (passes) of tubes attached to both end closures.

FIRE TUBE refers to a boiler with straight tubes, which are surrounded by water and steam and through which the products of combustion pass.

BOILER RATINGS

Packaged boilers are rated on the basis of maximum continuous nozzle output, in terms of boiler horsepower, B.T.U. per hour, or pounds of steam per hour at 212° F. Available information can be converted to horsepower by using the table below.

1 boiler horsepower = 33,500 B.T.U. per hour
= 139 square feet of steam radiation
= 223 square feet of water radiation
= 34.5# of steam per hour

1 pound of steam per hour = 970 B.T.U. per hour
1 square foot of equivalent steam radiation = 240 B.T.U. per hour
1 square foot of equivalent water radiation = 150 B.T.U. per hour

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INDUSTRIAL PUMPS

The costs listed here are only indications of the average installed costs, since there are too many types of pumps and service conditions to provide really accurate estimates. This list contains a few basic centrifugal pumps for water or the equivalent, in normal temperature ranges. The cost includes drip-proof motor, impeller, coupling and case.

Suction	Discharge	HP	3550 RPM	1750 RPM	1160 RPM
1¼"	x 1"	1½	\$1,680	----	----
1½"	x 1¼"	1½	2,120	\$2,120	----
2"	x 1½"	3	2,420	2,700	----
		5	2,775	2,950	----
		7½	3,425	3,500	----
2½"	x 2"	5	2,170	3,275	----
		7½	3,475	3,775	----
3"	x 2½"	5	3,075	3,175	----
		7½	3,625	3,775	----
		10	3,850	4,075	----
4"	x 2"	5	3,125	3,350	----
		10	3,975	4,475	----
		15	4,850	5,600	----
		20	5,150	6,300	----
4"	x 3"	5	3,375	3,850	----
		10	4,275	4,775	----
		15	5,100	5,750	----
5"	x 4"	10	----	5,050	----
		15	----	5,750	----
		20	----	6,350	----
		30	6,750	7,800	----
6"	x 4"	40	----	9,100	----
		50	----	10,300	----
		60	8,550	11,900	\$14,400
		75	11,300	13,700	16,300
6"	x 5"	20	----	6,800	----
		30	----	9,450	7,950
		50	----	10,800	12,900
		75	11,300	13,700	----
8"	x 6"	40	----	9,950	----
		60	----	12,800	14,000
		75	----	15,000	----
		100	----	17,200	----
		125	----	18,400	----

For costs of pumps with horsepower ratings not listed, use the proper suction and discharge size and adjust for the cost of the proper motor from Page 6, or interpolate. Add 50% for horizontal split-case pumps.

PIPING

SECTION UIP 9

GENERAL INFORMATION

The pipe costs on this and the following page are averages of installed costs per linear foot including contractors' overhead and profit, but excluding any design layout costs or fees. All sizes refer to interior diameter of the pipe.

The costs are listed under two broad categories: service piping, for pipe, fittings and valves within the building lines, and utility piping, for pipes, fittings and valves installed outside and up to the building lines.

Each category is further subdivided into pressure lines and non-pressure lines. Pressure lines generally carry water, gas, steam, etc., under constant pressure, while non-pressure lines, used for drain, waste and venting, are not subject to pressure from the materials they carry.

SERVICE PIPING

Costs for pipe under service piping represent the plumbing, HVAC and processing systems, ascending in that order. Typical fittings are included, but valves, hangers and supports, and trenching and backfill, which are all listed separately, must be added if needed.

For small or intricate installations, costs may be 15% to 25% higher. For long, straight runs with minimum fittings, costs may be 15% to 25% lower. For piping with mixed materials (e.g. steel with plastic lining) use higher end of listed costs.

For galvanized steel pipe, add 5% to 10% to black steel pipe costs. Use welded joint pipe costs for victaulic coupled or flanged steel pipe.

SERVICE PIPE

PRESSURE PIPE	1/4"		1/2"		3/4"		1"	
Copper	\$7.21	\$8.26	\$8.41	\$10.10	\$9.90	\$12.25	\$12.05	\$15.20
Glass	-----	-----	12.95	24.45	16.40	27.75	20.85	32.75
Plastic	5.99	6.21	6.28	6.94	6.55	7.21	7.21	7.70
Black steel (threaded)	-----	-----	8.26	9.24	9.90	11.80	12.00	14.90
Steel (welded joint)	-----	-----	-----	-----	-----	-----	17.15	21.10
Add for trench and fill	2.15	2.47	2.32	2.86	2.47	3.08	2.54	3.57

PRESSURE PIPE	1 1/4"		1 1/2"		2"		2 1/2"	
Copper	\$13.80	\$20.70	\$17.10	\$23.20	\$24.25	\$29.25	\$36.00	\$43.75
Glass	-----	-----	11.10	41.50	37.00	50.00	-----	-----
Plastic	8.31	9.02	8.85	9.85	10.25	11.25	11.35	12.85
Black steel (threaded)	13.80	19.55	16.10	22.75	19.80	29.25	23.60	36.50
Steel (welded joint)	21.10	26.25	21.85	27.50	26.50	33.50	33.75	43.00
Add for trench and fill	2.81	3.91	2.86	5.18	3.13	4.96	3.57	5.33

PRESSURE PIPE	3"		4"		6"		8"	
Copper	\$41.50	\$52.00	\$70.00	\$90.00	\$115.00	\$150.00	\$210.00	\$285.00
Glass	48.50	67.00	61.00	92.00	71.00	145.00	-----	-----
Plastic	13.65	15.70	17.55	20.60	26.00	33.50	32.00	39.75
Black steel (threaded)	27.75	44.00	37.25	61.00	78.00	105.00	130.00	155.00
Steel (welded joint)	40.00	52.00	63.00	82.00	82.00	110.00	97.00	130.00
Add for trench and fill	3.91	5.89	4.57	7.04	5.62	9.58	6.94	12.05

PRESSURE PIPE	10"		12"		16"		24"	
Copper	-----	-----	-----	-----	-----	-----	-----	-----
Glass	-----	-----	-----	-----	-----	-----	-----	-----
Plastic	\$ 41.75	\$ 53.00	\$ 53.00	\$ 70.00	-----	-----	-----	-----
Black steel (threaded)	185.00	220.00	240.00	270.00	-----	-----	-----	-----
Steel (welded joint)	120.00	160.00	140.00	190.00	\$190.00	\$255.00	\$365.00	\$520.00
Add for trench and fill	8.19	14.35	9.41	16.75	11.95	21.70	16.85	31.25

DRAIN, WASTE AND VENT	1 1/4"		1 1/2"		2"		4"	
Cast iron	-----	-----	\$11.40	\$18.35	\$17.25	\$26.25	\$26.00	\$35.00
Copper	\$13.90	\$19.40	14.95	21.00	17.95	25.50	39.75	58.00
Glass	-----	-----	21.40	35.75	27.75	40.25	61.00	69.00
Plastic (standard)	7.82	8.75	8.75	9.73	9.73	10.90	16.20	19.00
Plastic (acid waste)	-----	-----	11.90	21.75	16.60	25.50	36.00	46.75

DRAIN, WASTE AND VENT	6"		8"		10"		12"	
Cast iron	\$ 36.50	\$ 47.00	\$ 59.00	\$ 80.00	\$87.00	\$105.00	\$120.00	\$135.00
Copper	94.00	140.00	250.00	390.00	-----	-----	-----	-----
Glass	105.00	120.00	-----	-----	-----	-----	-----	-----
Plastic (standard)	21.10	29.25	-----	-----	-----	-----	-----	-----
Plastic (acid waste)	40.50	59.00	-----	-----	-----	-----	-----	-----

PIPING

SECTION UIP 9

SERVICE PIPE VALVES

Valve costs are averages of many types and are listed by material composition and size of pipe they serve. The costs are divided into three groups: general service (under 150 PSI), medium duty (150 - 300 PSI) and heavy duty service (over 300 PSI). These three classifications are used as descriptions of the pressure ratings of the

valves and not as technical specifications. Most plumbing and H.V.A.C. valves will be priced under general service. Medium and heavy duty valves generally represent steam and other industrial system valves only.

VALVES, EACH	¼"	½"	¾"	1"
Bronze, general	\$40.50 – \$62.00	\$49.50 – \$ 72.00	\$ 66.00 – \$ 89.00	\$ 74.00 – \$110.00
medium	51.00 – 67.00	53.00 – 87.00	71.00 – 110.00	81.00 – 170.00
Iron body, general	-----	-----	-----	-----
medium	-----	-----	-----	-----
Plastic, general	48.50 – 85.00	53.00 – 100.00	67.00 – 120.00	74.00 – 145.00
Steel, general (threaded)	-----	-----	120.00 – 170.00	185.00 – 260.00
medium	-----	-----	-----	-----

VALVES, EACH	1¼"	1½"	2"	2½"
Bronze, general	\$ 87.00 – \$135.00	\$105.00 – \$170.00	\$ 150.00 – \$ 190.00	\$ 215.00 – \$ 405.00
medium	105.00 – 230.00	120.00 – 300.00	175.00 – 420.00	270.00 – 615.00
Iron body, general	-----	-----	435.00 – 595.00	500.00 – 665.00
medium	-----	-----	565.00 – 740.00	750.00 – 1,040.00
Plastic, general	89.00 – 175.00	105.00 – 205.00	145.00 – 315.00	290.00 – 595.00
Steel, general (threaded)	235.00 – 325.00	265.00 – 375.00	320.00 – 485.00	-----
medium	-----	-----	1,000.00 – 1,830.00	1,380.00 – 2,070.00

VALVES, EACH	3"	4"	6"	8"
Iron body, general	\$ 555 – \$ 735	\$ 700 – \$ 895	\$1,120 – \$ 1,410	\$ 1,750 – \$ 2,320
medium	925 – 1,270	1,330 – 1,900	2,350 – 3,525	3,450 – 5,300
Steel, general (flanged)	1,120 – 2,030	1,520 – 2,600	2,600 – 4,325	4,425 – 7,200
medium	1,750 – 2,380	2,575 – 3,050	4,425 – 5,000	6,550 – 8,350
heavy duty	3,200 – 3,825	6,900 – 8,000	9,050 – 10,500	13,900 – 16,100

VALVES, EACH	10"	12"	16"	24"
Iron body, general	\$ 2,875 – \$ 3,650	\$ 4,575 – \$ 5,750	-----	-----
medium	4,725 – 7,400	5,950 – 9,550	-----	-----
Steel, general (flanged)	6,200 – 10,900	7,950 – 14,900	\$13,500 – \$25,100	\$37,600 – \$51,500
medium	8,950 – 12,600	11,200 – 17,700	28,600 – 31,000	-----
heavy duty	19,600 – 22,400	25,500 – 29,400	-----	-----

PIPING

SECTION UIP 9

SERVICE PIPE HANGERS AND SUPPORTS

HANGERS, per linear foot	¼"		½"		¾"		1"	
Cast iron	-----	-----	-----	-----	-----	-----	-----	-----
Copper	\$2.03 –	\$2.42	\$2.59 –	\$3.13	\$3.08 –	\$3.91	\$3.64 –	\$4.45
Glass	-----	-----	3.86 –	4.67	3.96 –	4.79	4.08 –	4.84
Plastic	3.13 –	3.96	3.47 –	4.35	3.86 –	4.57	4.08 –	5.18
Steel (threaded)	1.76 –	2.03	2.03 –	2.20	2.20 –	2.59	2.59 –	2.86
Steel (welded joint)	-----	-----	-----	-----	-----	-----	3.57 –	4.08

HANGERS, per linear foot	1¼"		1½"		2"		2½"	
Cast iron	-----	-----	\$3.86 –	\$4.23	\$3.96 –	\$4.45	\$4.30 –	\$4.84
Copper	\$4.01 –	\$5.06	4.30 –	5.33	4.79 –	5.99	5.40 –	6.72
Glass	-----	-----	4.35 –	5.11	4.73 –	5.45	-----	-----
Plastic	4.35 –	5.40	4.57 –	5.94	5.28 –	6.50	5.77 –	7.43
Steel (threaded)	2.86 –	3.13	3.08 –	3.52	3.64 –	4.01	4.35 –	4.73
Steel (welded joint)	3.91 –	4.40	4.08 –	4.73	4.57 –	5.33	5.18 –	5.94

HANGERS, per linear foot	3"		4"		6"		8"	
Cast iron	\$4.57 –	\$5.06	\$5.06 –	\$5.62	\$6.21 –	\$ 6.82	\$ 7.65 –	\$ 8.31
Copper	5.94 –	7.43	6.77 –	8.53	8.14 –	10.45	-----	-----
Glass	5.28 –	5.99	5.84 –	6.72	6.99 –	8.75	-----	-----
Plastic	6.06 –	7.82	7.48 –	9.51	9.80 –	12.30	12.15 –	15.35
Steel (threaded)	4.57 –	5.06	5.62 –	6.21	7.75 –	8.53	9.85 –	10.85
Steel (welded joint)	5.62 –	6.50	6.72 –	7.75	8.85 –	10.45	10.90 –	12.95

HANGERS, per linear foot	10"		12"		16"		24"	
Cast iron	\$ 9.29 –	\$10.30	\$11.30 –	\$12.75	-----	-----	-----	-----
Copper	-----	-----	-----	-----	-----	-----	-----	-----
Glass	-----	-----	-----	-----	-----	-----	-----	-----
Plastic	14.25 –	18.15	16.65 –	21.15	-----	-----	-----	-----
Steel (threaded)	12.15 –	13.15	14.15 –	15.45	-----	-----	-----	-----
Steel (welded joint)	13.10 –	15.30	15.20 –	18.05	\$19.45 –	\$23.15	\$28.00 –	\$33.00

PIPING

SECTION UIP 9

UTILITY PIPING

Cost per linear foot for underground utility lines, including fittings, an allowance for trenching and backfill and contractors' overhead and

profit. For non circular pipe, use the average diameter of the smallest and largest dimension.

PIPE TYPE	4"		6"		8"		10"	
Asbestos cement	\$ 29.00 –	\$ 37.00	\$ 36.25 –	\$ 47.25	\$ 46.75 –	\$ 60.00	\$ 78.00 –	\$ 95.00
Ductile iron	31.50 –	38.50	34.25 –	43.75	53.00 –	68.00	65.00 –	85.00
Concrete	-----	-----	-----	-----	-----	-----	-----	-----
Plastic	16.85 –	22.10	19.95 –	25.75	29.50 –	38.00	36.25 –	52.00
Steel	37.00 –	40.50	45.00 –	51.00	57.00 –	67.00	84.00 –	100.00
Valves, each	765 –	990	1,680 –	2,040	2,925 –	3,450	4,575 –	5,350

PIPE TYPE	12"		14"		16"		18"	
Asbestos cement	\$ 89 –	\$ 110	\$ 96 –	\$ 135	\$ 125 –	\$ 160	\$ 155 –	\$ 220
Ductile iron	72 –	96	84 –	115	105 –	140	125 –	175
Concrete	-----	-----	-----	-----	48 –	61	58 –	71
Plastic	53 –	67	-----	-----	-----	-----	-----	-----
Steel	97 –	120	105 –	125	120 –	150	145 –	190
Valves, each	6,200 –	7,500	8,050 –	9,950	10,600 –	12,800	13,200 –	16,000

PIPE TYPE	20"		24"		30"		36"	
Asbestos cement	\$ 180 –	\$ 250	\$ 205 –	\$ 300	\$ 255 –	\$ 375	\$ 345 –	\$ 520
Cast iron	135 –	190	145 –	205	170 –	235	210 –	305
Concrete	61 –	80	81 –	105	115 –	155	150 –	210
Steel (treated & wrapped)	155 –	205	185 –	240	230 –	315	320 –	440
Valves, each	16,000 –	19,400	22,700 –	28,300	34,800 –	41,600	48,900 –	58,750

PIPE TYPE	42"		48"		60"		72"	
Asbestos cement	-----	-----	-----	-----	-----	-----	-----	-----
Cast iron	\$ 250 –	\$ 370	\$ 290 –	\$ 425	-----	-----	-----	-----
Concrete	190 –	260	230 –	330	\$330 –	\$470	\$435 –	\$640
Steel (treated & wrapped)	440 –	620	490 –	695	-----	-----	-----	-----
Valves, each	65,250 –	79,250	85,500 –	101,000	-----	-----	-----	-----

PIPE TYPE	4"		6"		8"		10"	
Asbestos cement	-----	-----	\$14.60 –	\$18.90	\$17.10 –	\$21.60	\$32.00 –	\$40.75
Corrugated metal	-----	-----	17.20 –	19.75	22.35 –	27.25	33.75 –	42.75
Plastic	\$ 7.04 –	\$ 7.75	9.07 –	12.05	13.80 –	18.65	18.25 –	26.25
Plain concrete	-----	-----	17.60 –	19.00	22.00 –	25.00	26.75 –	31.75
Reinforced concrete	-----	-----	-----	-----	-----	-----	-----	-----
Vitrified clay	12.95 –	18.05	19.40 –	23.95	25.75 –	31.50	46.00 –	52.00

PIPE TYPE	12"		15"		18"		21"	
Asbestos cement	\$35.00 –	\$44.50	\$45.50 –	\$59.00	\$66.00 –	\$ 84.00	\$ 72.00 –	\$ 92.00
Corrugated metal	39.75 –	45.25	43.50 –	54.00	48.25 –	65.00	62.00 –	83.00
Plastic	22.15 –	34.75	29.25 –	53.00	-----	-----	-----	-----
Plain concrete	30.50 –	37.00	32.50 –	40.50	38.25 –	49.00	48.50 –	63.00
Reinforced concrete	31.50 –	40.25	34.25 –	44.75	44.00 –	58.00	59.00 –	76.00
Vitrified clay	51.00 –	60.00	69.00 –	81.00	90.00 –	105.00	110.00 –	130.00

PIPE TYPE	24"		30"		36"		42"	
Asbestos cement	\$ 80 –	\$105	\$ 95 –	\$120	\$135 –	\$175	-----	-----
Corrugated metal	68 –	92	79 –	100	120 –	170	\$140 –	\$195
Reinforced concrete	71 –	94	81 –	105	125 –	175	160 –	215
Vitrified clay	135 –	160	160 –	195	215 –	265	-----	-----

PIPE TYPE	48"		54"		60"		72"	
Asbestos cement	-----	-----	-----	-----	-----	-----	-----	-----
Corrugated metal	\$175 –	\$230	\$220 –	\$305	\$285 –	\$395	\$315 –	\$435
Reinforced concrete	190 –	235	225 –	315	295 –	405	355 –	480
Vitrified clay	-----	-----	-----	-----	-----	-----	-----	-----

PIPE TYPE	78"		84"		90"		96"	
Corrugated metal	\$345 –	\$470	\$370 –	\$505	\$400 –	\$540	\$430 –	\$575
Reinforced concrete	430 –	565	490 –	645	535 –	715	590 –	780

PIPE TYPE	102"		108"		114"		120"	
Corrugated metal	\$460 –	\$620	\$485 –	\$650	\$520 –	\$685	\$555 –	\$725
Reinforced concrete	-----	-----	-----	-----	-----	-----	-----	-----

INDUSTRIAL MOTORS

SECTION UIP 9

EXPLANATION

The following table includes average costs of completely installed standard motors, including connections and anchors, based on normal industrial installations of 500 to 1,500 total horsepower. For variations and adjustments, see notes and example below table. High efficiency motors can run 20% to 50% more.

POWER WIRING

For total electrical cost estimates, the average cost of power wiring for a 480-volt system is listed. Costs include wiring, starters and/or control panels. The cost for 230-volt power wiring will be up to 75% more than a 480-volt system in normal industrial installations.

ELECTRIC MOTORS

RATED HP	1800-RPM MOTORS				ADD FOR SLIDE RAILS	4:1 VARIABLE-DRIVE MOTORS			RATED HP
	DRIP-PROOF	TOTALLY ENCLOSED	EXPLOSION-PROOF	480-VOLT POWER WIRING		DRIP-PROOF	TOTALLY ENCLOSED	EXPLOSION-PROOF	
½	\$ 410	\$ 470	\$ 670	\$ 520	\$ 78	\$ 1,980	\$2,030	\$ 2,170	½
1	545	590	745	555	78	2,030	2,150	2,340	1
1½	625	670	780	555	78	2,120	2,170	2,370	1½
2	680	745	835	610	83	2,170	2,340	2,420	2
3	765	880	905	685	93	2,390	2,420	2,675	3
5	905	1,030	1,120	905	125	2,700	2,750	2,950	5
7½	1,030	1,160	1,370	1,080	130	3,075	3,200	3,425	7½
10	1,160	1,290	1,620	1,290	130	3,425	3,825	4,000	10
15	1,460	1,730	2,200	1,660	135	4,075	4,500	4,850	15
20	1,730	2,280	2,775	2,120	185	4,850	5,250	5,600	20
25	2,030	2,750	3,400	2,550	205	5,600	5,950	6,350	25
30	2,390	3,200	4,000	2,950	230	6,350	6,650	7,050	30
40	2,975	4,250	5,250	3,750	240	7,850	7,950	8,550	40
50	3,625	5,250	6,450	5,650	255	9,400	9,450	10,100	50
75	5,600	8,700	11,900	6,700	265	13,100	----	----	75
100	7,600	11,900	16,600	8,750	305	17,000	----	----	100
125	9,600	15,200	20,700	10,700	360	----	----	----	125
150	11,600	18,200	23,700	13,100	360	----	----	----	150
200	15,900	24,900	28,600	17,000	405	----	----	----	200
250	20,300	31,100	32,400	21,200	425	----	----	----	250

ADJUSTMENTS

CONSTANT-SPEED MOTORS

For constant motor speeds other than 1800 RPM follow the following rules:

- 1200 RPM Use the price of the next larger size motor.
- 900 RPM Use the price of a motor two sizes larger.
- 720 RPM Use the price of the third size larger.
- 3600 RPM Use the price of the next smaller size motor for motors between 5 and 75 HP

Under 5 HP and over 100 HP, use the price of the next larger motor.

VARIABLE-DRIVE MOTORS

Variable drive motors come in a great many combinations of output speeds, and the actual costs will vary from those above by a minus 30 percent for extremely high-speed (780-RPM) output to a plus 60 percent for an extremely low-speed (45-RPM) output. The costs above are averages for typical motors with maximum outputs of approximately 100 to 400 RPM. For more accurate figures, it is recommended that manufacturers' costs be obtained.

EXAMPLE

5 HP	1800 RPM, dripproof	\$ 905
5 HP	1200 RPM, dripproof	1,030
5 HP	900 RPM, dripproof	1,160
5 HP	720 RPM, dripproof	1,460
5 HP	3600 RPM, dripproof	765

COST MULTIPLIERS – VARIABLE DRIVE

For drive ratios other than 4:1, use the following cost multipliers:
 Ratio 2:1, multiply by 1.07 Ratio 3:1, multiply by 1.03
 Ratio 5:1, multiply by .98

MISCELLANEOUS INDUSTRIAL STRUCTURES

SECTION UIP 9

STEEL STACKS

(Average costs per foot of height, including foundation; painted outside only)

DIAMETER AT BASE

THICKNESS (at base)	18"	24"	30"	36"	42"	48"	THICKNESS (at base)
12 gauge	\$175.00	\$220.00	\$265.00	\$315.00	\$ 355.00	\$ 405.00	12 gauge
10 gauge	205.00	255.00	315.00	365.00	415.00	465.00	10 gauge
8 gauge	235.00	300.00	355.00	410.00	475.00	535.00	8 gauge
3/16"	255.00	325.00	390.00	460.00	515.00	570.00	3/16"
1/4"	-----	390.00	460.00	530.00	590.00	660.00	1/4"
5/16"	-----	-----	530.00	600.00	685.00	750.00	5/16"
3/8"	-----	-----	-----	660.00	750.00	835.00	3/8"
1/2"	-----	-----	-----	-----	875.00	965.00	1/2"
Guy wires (In. ft.)*	.56	.63	.70	.80	.88	.90	Guy wires (In. ft.)*
Guy bands (each)	59.00	88.00	110.00	135.00	170.00	190.00	Guy bands (each)
Roof flashing	400.00	575.00	745.00	920.00	1,110.00	1,330.00	Roof flashing
Umbrella top (each)	150.00	225.00	315.00	410.00	515.00	625.00	Umbrella top (each)

THICKNESS (at base)	54"	60"	66"	72"	78"	84"	THICKNESS (at base)
12 gauge	\$ 460.00	\$ 505.00	\$ 545.00	-----	-----	-----	12 gauge
10 gauge	520.00	570.00	620.00	\$ 655.00	-----	-----	10 gauge
8 gauge	580.00	635.00	685.00	740.00	\$ 780.00	-----	8 gauge
3/16"	625.00	685.00	740.00	800.00	855.00	\$ 875.00	3/16"
1/4"	725.00	800.00	865.00	920.00	965.00	1,050.00	1/4"
5/16"	830.00	890.00	965.00	1,050.00	1,100.00	1,140.00	5/16"
3/8"	915.00	1,010.00	1,050.00	1,140.00	1,230.00	1,270.00	3/8"
1/2"	1,050.00	1,140.00	1,230.00	1,320.00	1,400.00	1,490.00	1/2"
Guy wires (In. ft.)*	.95	1.07	1.11	1.15	1.18	1.25	Guy wires (In. ft.)*
Guy bands (each)	220.00	250.00	285.00	305.00	335.00	370.00	Guy bands (each)
Roof flashing	1,490.00	1,710.00	1,930.00	2,110.00	2,330.00	2,550.00	Roof flashing
Umbrella top (each)	-----	-----	-----	-----	-----	-----	Umbrella top (each)

For double wall band type, prefabricated refractory lined, add 25% to 50%; welded jacket type, add 75% to 100%.

*For guy cable, add cost per strand. For stainless steel cable, add 100%.

BRICK AND CONCRETE STACKS

Average costs per foot of height, including foundations up to 100 feet in height. Add 1% for each additional foot of height to all costs up to 200'; over 200' add .25% per foot. For square or rectangular chimneys, use 1/3 the perimeter in place of the diameter. For refractory lining, increase cost by 100% to 200% of lined area.

Base Diam. (outside)	Brick	Concrete	Base Diam. (outside)	Brick	Concrete
6'	\$ 930	\$ 795	16'	\$2,070	\$1,780
7'	1,060	875	18'	2,290	2,000
8'	1,180	980	20'	2,450	2,170
9'	1,330	1,110	22'	2,675	2,390
10'	1,440	1,180	24'	2,925	2,575
12'	1,690	1,410	28'	3,275	2,925
14'	1,890	1,640	32'	3,750	3,325

CHIMNEYS

MASONRY: Average cost per foot of height with tile flues, including foundation. For custom designs, add 50% to 100%.

8" square or round flues	\$ 90.00 – \$150.00
12" square or round flues	97.00 – 160.00
2 – 8" square or round flues	140.00 – 240.00
10" x 18" rectangular flue	135.00 – 225.00
1 – 8" and 1 – 12" square flues	155.00 – 270.00

PREFABRICATED METAL: Average cost per linear foot for round galvanized metal stacks including ancillary items. Add \$220 to \$390 for thru the wall installations. For box framed wood or stucco decorative chimney housing add \$23.10 to \$34.50 per linear foot and \$46.00 to \$69.00 for metal units.

SIZE	SINGLE WALL	DOUBLE WALL	TRIPLE WALL
6"	\$25.25 – \$37.50	\$29.25 – \$43.75	\$38.75 – \$57.00
8"	27.25 – 41.50	33.00 – 49.25	48.50 – 72.00
10"	29.50 – 44.00	41.75 – 65.00	62.00 – 88.00

FIREPLACES

	COST RANGE
Metal, prefab. fireboxes or forms up to 48" ...	\$ 770 – \$ 1,560
see through, 3 sided or extra large openings	1,730 – 3,125
Masonry, brick firebox	2,725 – 3,625
Hearth	610 – 820
Custom, extra large opening	4,525 – 10,900
Hearth	785 – 1,360
Soapstone heaters, complete, including chimney	9,050 – 36,300
Add for glass doors	295 – 450
Circulation blowers, each	155 – 255
Draft inducer fans	2,130 – 3,200

MANTELS

Prefabricated, wood or fiberglass	\$ 255 – \$ 1,050
Custom, special design or antique reproductions	
Cast stone (bonded limestone)	4,275 – 12,700
Marble, granite or onyx	7,850 – 29,000
Ornate wood	4,275 – 6,100
Precast plaster or flax decorated	2,180 – 5,350

For masonry veneer wall facing, see Section UIP 5.

MISCELLANEOUS INDUSTRIAL COSTS

SECTION UIP 9

METAL WASTE CHUTES

Average cost per foot of height, including doors, roof vent and sprinklers. For electrically operated doors, add \$1,170 to \$1,560 each. For stainless steel, add 25%.

Diameter (inside)	15"	18"	21"	24"	30"	36"
Low cost	\$ 98	\$110	\$115	\$125	\$140	\$155
Average cost	115	130	140	155	180	200
High cost	140	155	175	190	220	245

COMPACTORS

COMMERCIAL OR INDUSTRIAL – STATIONARY

CAPAC. (CU. YD.)	COST	CAPAC. (CU. YD.)	COST
½ and under	\$ 6,800 – \$11,600	3	\$30,400 – \$36,000
1	14,400 – 17,900	5	50,750 – 56,750
2	22,600 – 26,900	7	74,750 – 83,000

NOTE: For building chute-fed compactors, add \$1,510 to \$6,000 for each container; small bag chute compactors, add 50% to costs above.

DRUM COMPACTORS

Costs are average for compactors with cylindrical chambers, used to crush pails or drums and to compact within drum waste material. The costs include totally enclosed, fan cooled motors and starters, NEMA 1 control cabinets and 115-volt, pushbutton controls. Costs include installation. For compactors with pneumatic controls, cost of 60-psi air is not included.

Compaction Force (Pounds)	Compaction (Height)	Chamber (Diameter)	Electric Motor (HP)	Cost
12,000	17"	16"	3	\$11,200
20,000	48"	38"	7.5	28,500
50,000	50"	32"	10	31,500
60,000	38"	32"	10	37,800
85,000	38"	32"	10	45,800
85,000	50"	36"	10	52,000

For explosion proof motors and pneumatic or hydraulic controls, add 20% to 30%.

For drum roll-out dolly and platform add \$2,410.

Air filter systems connected to compactors above, to filter airborne matter from the compaction chambers cost \$14,600. Air filter systems meeting ANSI-N510 hazardous air filtration standards cost \$54,250.

INCINERATORS

COMMERCIAL OR INDUSTRIAL – STEEL

Costs do not include scrubber, chimney, electrical panel or piping. Add \$12,700 to \$19,400 for feeder.

Pounds per Hour	Cost	Pounds per Hour	Cost
50	\$25,400 – \$31,600	400	\$109,000 – \$139,000
100	40,100 – 45,300	600	145,000 – 196,000
200	61,750 – 67,750	1,000	169,000 – 228,000

MASONRY

Costs include brickwork but do not include chimney or air pollution control. For refractory lining add 200%.

Pounds per Hour	Cost	Pounds per Hour	Cost
100	\$10,600 – \$13,700	1,000	\$ 36,400 – \$ 40,000
200	13,300 – 16,800	2,000	64,750 – 72,500
400	19,600 – 21,700	3,000	92,750 – 104,000
600	25,000 – 28,000	5,000	149,000 – 169,000

LARGE SAWMILL OR PLANNING MILL – STEEL

Average costs for average heights, installed.

Base Area	Cost	Base Area	Cost
500 sq. ft.	\$16,600	2,500 sq. ft.	\$ 65,500
1,000	30,300	3,000	76,000
1,500	43,200	4,000	98,000
2,000	54,500	5,000	117,000

Add for forced draft systems:

6" – \$4,625	10" – \$6,450	15" – \$8,800
8" – \$5,600	12" – \$7,400	

PIPELINE COSTS

Moderate pressure, long run (over 5 miles in length), cross country, welded steel, underground oil and gas transmission lines, not including compressors, pumping stations, bridges, etc. Costs are smoothed averages of contract costs excluding extremes. The normal range is from 75% to 150% of the listed cost ranges, depending on length and type of pipe and pipe protection, terrain and geology, climate, location, etc.: e.g., the shorter the run, the more difficult, complex or urbanized the site, the higher the costs. Right-of-way costs are not included.

SIZE (Diam.)	COST RANGE (Per Mile)		
	Low Cost	Avg.	Good
6"	\$ 247,000	\$ 452,000	\$ 826,000
8"	281,000	479,000	853,000
10"	298,000	528,000	929,000
12"	308,000	555,000	995,000
16"	445,000	787,000	1,414,000
20"	655,000	1,034,000	1,618,000
24"	787,000	1,276,000	2,030,000
30"	1,034,000	1,557,000	2,344,000
36"	1,442,000	1,997,000	2,751,000
42"	1,865,000	2,508,000	3,378,000

TRAILER AND MANUFACTURED HOUSING PARKS

SECTION UIP 10

INTRODUCTION

The park costs in this section are divided into five quality classifications and give a range from the cheap transient park to the highly developed manufactured housing park designed for permanent living. Many parks will be mixed in quality and may have good quality buildings, recreational facilities and low cost utilities or roads, or they may have few extra facilities and large patios but average roads. For these hybrid parks, the costs of the various items should be chosen from the quality of park where they would normally be found and built up to fit the subject park specifically. For example, a low cost park in a cold climate may have concrete paved homesteads completely under the trailers. One could either price the patio and walk costs from the excellent category or divide the low-quality lump sum cost by the typical square footage and thus develop a square foot cost to apply to the specific average area of flatwork for the park in question.

The costs are for organized commercial parks and do not include the poorest resort types, which merely provide a parking space and some common facilities such as restrooms and a water source. The costs listed are medians for each classification, excluding extremes.

The costs are broken into major cost items on a cost-per-trailer-space basis, and miscellaneous costs such as the cost of normal financing and contractors' profit and overhead are prorated to each item. Architects' and designers' fees are included in the engineering costs for all items except buildings, whose costs will include all fees applicable to the structural improvements. Developers' overhead and profit, advertising and other promotional expenses are not included. Local jurisdictional fees or assessments are not included and must be obtained locally.

Off-site costs are not included. These may be costs of bringing utilities to the site, storm drains, access roads, bridges, traffic control, environmental impact studies, etc.

For hillside parks, the cost of grading and terracing the hillside sites must be added. Also, other costs such as paving, sewers and water will be higher for hillside installation. All excluded costs must be examined, as, in some cases, special local assessments and fees, off-site costs, developers' overhead and profit, etc., have equalled as much as an additional 40% of total project costs.

COST MODIFIERS

Costs for each park quality have been adjusted to a base number of units and gross area per unit which are roughly normal for that quality. Under the base costs for each quality, multipliers are given to adjust costs for deviations from the base. To determine the gross area per unit, divide the entire improved area of the park by the number of units.

DESCRIPTION OF COST ITEMS

ENGINEERING includes plans, engineering, permits and design and specifications of the park, exclusive of buildings.

GRADING includes leveling the site for drainage and roughing out roads but does not include excavation and terracing for hillside sites. It will normally include some leveling of the trailer sites in the Average and Good qualities.

STREET PAVING includes base preparation and paving.

PATIOS AND WALKS include all flat work except street paving.

SEWER includes all on-site work and laterals but does not include sewage disposal systems, off-site connections to a trunk line, or connection charges, except for septic tanks and cesspools, which are included in the Cheap quality. Storm sewers are not included.

WATER includes all on-site mains, site services (laterals) and sprinkler systems but does not include wells, storage tanks, pumps, off-site connections to other sources or connection fees.

GAS includes all on-site piping and site connections (laterals) as well as connections to buildings, but does not include gas plumbing in buildings or off-site mains.

ELECTRICAL includes all on-site conduit, electrical and telephone wiring, trailer site outlets, street lighting commensurate with the quality, and area lighting. It does not include building lighting or off-site connections.

BUILDINGS include structures commensurate with the quality and size of the parks. It is often better to compute these from other sections of the manual, since the age and lifestyle of the occupants will dictate the type of amenities offered. For example, an upscale resort retirement project may have a large, high cost activities clubhouse, while first-time family park design may stress outdoor recreation with a smaller, very limited, low cost clubhouse facility. These costs also include all building design costs, and plumbing and electrical items for the buildings. Built-in appliances and all furnishings must be added separately.

MISCELLANEOUS includes an average amount of entrance ornamentation, signs and common landscaping commensurate with the park quality. Outdoor recreational facilities, swimming pools, tennis courts, etc. and ornamental lakes and ponds should always be computed as extras. Recreational equipment, game tables, kitchen equipment, etc. are not included. Off site signs are not included.

TRAILER AND RECREATIONAL VEHICLE PARKS

SECTION UIP 10

CHEAP

Typical sites developed for transient use in outlying rural or resort areas where there are either no building codes or minimal code enforcement. They will be closely spaced, have few facilities beyond the minimum subsistence level and be designed for smaller trailers and recreational vehicles. The base area per trailer space is 1,600 square feet and the base number of spaces is 50.

ENGINEERING –	
Minimum plans, engineering and permits	\$ 330.00
GRADING –	
Minimum leveling, graded for drainage, cleared	280.00
STREET PAVING –	
Minimum asphalt, natural base, 15' to 20' wide, paved parking area	660.00
PATIOS AND WALKS –	
Average 135 square feet of small asphalt patio or hardstand, few walks near buildings	370.00
SEWER –	
3" to 4" clay, few traps or vents. Cesspool and septic tank are included	515.00
WATER –	
2" mains, service to common hydrants and buildings, no trailer hookups	405.00
GAS – None, except bottled gas (not included)	----
ELECTRICAL –	
Low amperage circuits, overhead wiring, simple outlets at trailer sites. No telephones or speaker systems	550.00
BUILDINGS –	
Restrooms and showers, laundry, office, lowest-cost frame or concrete block, cheap fixtures and partitions	1,480.00
MISCELLANEOUS –	
Signboard, minimum landscape and entrance	<u>220.00</u>
CHEAP PARK – Cost per space	\$4,810.00

LOW COST

Typical sites developed for transient or semipermanent occupancy in seasonal resort areas or near industrial or military areas. Usually designed to hold car drawn trailers up to 40 to 45 feet long. The base area per site is 2,400 square feet and the base number of spaces is 80.

ENGINEERING –	
Limited plans and specifications, survey of site and permits	\$ 635.00
GRADING –	
Graded for drainage, roads roughed in, site cleared and minimum site leveling	520.00
STREET PAVING –	
18' to 22' roadway, 2" asphalt on natural base, no curbs or edging, common parking area	1,030.00
PATIOS AND WALKS –	
Average 205 square feet of low cost concrete or asphalt for hardstand, patio or parking, some walks near buildings	665.00
SEWER –	
4" lines, 6" mains, minimum code, simple layout	745.00
WATER –	
3" mains, 3/4" service, hydrant every two spaces	665.00
GAS –	
None to trailer spaces. Low pressure gas to utility buildings and office	315.00
ELECTRICAL –	
Overhead wiring, 30 to 80 amperes per space. Some street lights. Speaker system. Telephone booth (not included)	995.00
BUILDINGS –	
Utility, showers and restrooms, laundry and office	1,980.00
MISCELLANEOUS –	
Sign, low cost landscape, some masonry or concrete work around entrance. Swimming pool costs should be added from Section UIP 13.	<u>530.00</u>
LOW COST PARK – Cost per space	\$8,080.00

MODIFIERS

NUMBER OF SPACES	10	20	30	40	50	60	80	100	120
MULTIPLIER	1.12	1.08	1.05	1.02	1.00	.98	.95	.93	.91

GROSS AREA PER SPACE	800	1,000	1,200	1,400	1,600	1,800	2,000	2,400	2,800
MULTIPLIER	.86	.89	.93	.96	1.00	1.03	1.06	1.12	1.18

MODIFIERS

NUMBER OF SPACES	30	40	50	60	80	100	120	140	160
MULTIPLIER	1.10	1.07	1.05	1.03	1.00	.97	.95	.93	.91

GROSS AREA PER SPACE	1,200	1,600	2,000	2,200	2,400	2,600	2,800	3,200	3,600
MULTIPLIER	.83	.89	.95	.97	1.00	1.02	1.05	1.09	1.12

MANUFACTURED HOUSING PARKS

SECTION UIP 10

AVERAGE

These are average costs of parks built more or less for permanent occupancy and represent the low end midpoint for permanent parks. They will have spaces to accommodate the manufactured house up to 55 or 60 feet long, as well as large transient trailers. They will have utility buildings, offices, recreation buildings and other recreational facilities, which may be computed from other sections of the service. The base area per site is 3,200 square feet, and the base number of spaces is 100.

ENGINEERING –	
Well detailed plans, site survey, simple specifications, permits and bonds	\$ 900.00
GRADING –	
Graded for drainage, roads roughed in, some trailer site leveling	775.00
STREET PAVING –	
22' to 26' wide, 2" asphalt on good base, some edging or curb, some common parking	1,340.00
PATIOS AND WALKS –	
Average 310 square feet of concrete for patios, hard-stands and walks near buildings	990.00
SEWER –	
4" service, 6" mains, adequate vents, good code installation	1,090.00
WATER –	
3" to 4" mains, valve connections and hydrants at sites	890.00
GAS – Low-pressure gas to all sites and buildings	
	475.00
ELECTRICAL –	
Underground conduit, 60 to 100 amperes per site. Telephone extensions in buildings and most sites. Speaker system. Lighted recreation areas and street	1,430.00
BUILDINGS –	
Utility, laundry, recreation, public restrooms	2,525.00
MISCELLANEOUS –	
Adequate landscaping and sprinklers, some masonry ornamentation, average sign and entrance. Outdoor recreational facilities are not included and should be added from Sections UIP 13 and UIP 14.	<u>865.00</u>
AVERAGE PARK – Cost per space	\$11,280.00

GOOD

The typical good park is a manufactured housing park catering to the larger manufactured homes and represents the median for permanent parks. It will accommodate large manufactured homes with private patios and gardens, and offers complete recreational facilities. The base area per site is 4,400 square feet, and the base number of spaces is 175.

ENGINEERING –	
Complete detailed plans and specifications, permits, bonds and survey	\$1,310.00
GRADING –	
Graded for drainage, view, and appearance, roads roughed in	1,190.00
STREET PAVING –	
Good 3" asphalt roadways on prepared base, 26' to 32' wide, edged or curbs, parking areas for visitors and extra cars	1,890.00
PATIOS AND WALKS –	
Home stands, patios, and car stands. Average 465 square feet of concrete per space, including walks around buildings and recreation areas	1,480.00
SEWER –	
4" service, 6" mains, 8" trunk, good code installation, well vented and trapped	1,390.00
WATER –	
4" to 6" mains, good valve connections and hydrants at sites	1,240.00
GAS –	
Low-pressure gas to all sites and buildings	760.00
ELECTRICAL –	
Underground conduit, 80 to 150 amperes per space. Good street lighting and lighted recreation areas. Costs include telephone connection boxes at sites and cable TV systems	2,060.00
BUILDINGS –	
Office, recreation, laundry	3,200.00
MISCELLANEOUS –	
Above-average landscaping and sprinklers, signs, masonry ornamentation and walls. Outdoor recreational facilities are not included and should be added from Sections UIP 13 and 14.	<u>1,530.00</u>
GOOD PARK – Cost per space	\$16,050.00

MODIFIERS

NUMBER OF SPACES	40	60	80	100	125	150	175	200	250
MULTIPLIER	1.10	1.06	1.03	1.00	.97	.95	.93	.91	.89
GROSS AREA PER SPACE	2,000	2,400	2,800	3,200	3,600	4,000	4,400	4,800	5,200
MULTIPLIER	.89	.93	.97	1.00	1.03	1.05	1.08	1.10	1.12

MODIFIERS

NUMBER OF SPACES	50	75	100	125	150	175	200	250	300
MULTIPLIER	1.17	1.12	1.08	1.05	1.02	1.00	.98	.96	.95
GROSS AREA PER SPACE	2,800	3,200	3,600	4,000	4,400	4,800	5,200	5,600	6,000
MULTIPLIER	.91	.93	.96	.98	1.00	1.01	1.03	1.05	1.06

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MANUFACTURED HOUSING PARKS

SECTION UIP 10

EXCELLENT

The excellent manufactured housing park provides deluxe accommodations for the largest site erected manufactured home units and represents the high end midpoint for permanent parks. It will have complete and varied recreational facilities of top quality. The base area per site is 5,600 square feet, and the base number of spaces is 200.

ENGINEERING –	
Complete detailed plans and specifications, permits, bonds and survey	\$1,740.00
GRADING –	
Graded for drainage, view, and appearance, roads roughed in	1,650.00
STREET PAVING –	
Good 3" asphalt roadways on prepared base, 32' to 40' wide, curbs, finished parking areas for visitors and extra cars	2,490.00
PATIOS AND WALKS –	
Home stands, patios, and car stands. Average 700 square feet of concrete per space, including walks around buildings and recreation areas	2,180.00
SEWER –	
4" service, 6" mains, 8" trunk, good code installation, well vented and trapped	1,650.00
WATER –	
4" to 6" mains, good valve connections and hydrants at sites ...	1,630.00
GAS –	
Low-pressure gas to all home sites and buildings	1,050.00
ELECTRICAL –	
Underground conduit, 100 to 200 amperes per space. Good street lighting, floodlighted recreation areas. Costs include telephone connection boxes at sites and cable TV systems	2,750.00
BUILDINGS –	
Office, recreation, arts and crafts, laundromat	3,625.00
MISCELLANEOUS –	
Generous amounts of landscaping and sprinklers, large signs, masonry ornamentation and walls. Outdoor recreational facilities and ornamental lakes and ponds should be added from Sections UIP 13 and 14	<u>2,200.00</u>
EXCELLENT PARK – Cost per space	\$20,965.00

MODIFIERS

NUMBER OF SPACES	50	100	150	175	200	225	250	300	350
MULTIPLIER	1.18	1.10	1.04	1.02	1.00	.99	.98	.97	.97
 GROSS AREA PER SPACE	 4,000	 4,400	 4,800	 5,200	 5,600	 6,000	 6,400	 6,800	 7,200
MULTIPLIER	.95	.97	.98	.99	1.00	1.01	1.01	1.02	1.03