

COLD STORAGE

SECTION UIP 8

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.

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.

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%.

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"	\$ 5.35	\$4.75	\$ 5.50	\$4.70	\$4.30	\$4.30	\$ 4.75	\$ 3.10
2"	6.20	4.85	6.55	5.50	4.40	4.45	5.60	4.30
4"	7.90	5.35	8.40	6.90	4.85	4.85	7.05	6.65
6"	9.75	5.70	10.40	8.40	5.30	5.40	8.70	9.25
8"	11.40	6.10	12.35	9.85	5.70	5.80	10.30	10.55
10"	13.20	6.55	14.30	-----	6.15	6.25	-----	-----
12"	14.85	7.00	16.35	-----	6.65	6.90	-----	-----

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.	16-25 Sq. Ft.	26-40 Sq. Ft.	> 40 Sq. Ft.
2"	\$101.75	\$ 87.25	\$ 73.25	\$61.50
4"	108.75	95.25	81.75	70.00
6"	116.50	103.00	91.25	79.75
8"	124.25	112.50	101.50	90.50

DOOR COST ADJUSTMENTS

Stainless steel: add 50%
 Vestibule doors: add 60%
 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 \$4,625; double, add \$5,275
 hydraulic operation, add 15% to electric
 Antifreeze heating cables: add \$28.00 per linear foot of cable
 Pneumatic door operator, swinging door, treadle-activated: add \$2,175 – \$2,950 each
 double doors: add \$3,125 – \$4,000 pair
 electric eye activation: add 10% – 12%
 sliding doors: add 30% – 50% to operator
 Observation window: add \$450 – \$595
 Hardware: locking, \$190 – \$555, panic, add \$530 – \$1,040

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.	\$1.97	\$1.64	\$1.38	\$1.16
25,000	1.71	1.40	1.16	.97
50,000	1.59	1.33	1.10	.89
100,000	1.50	1.23	1.02	.84
200,000	1.41	1.15	.95	.78
300,000	1.37	1.12	.90	.75
500,000	1.31	1.07	.86	.70
1,000,000	-----	.99	.81	.64
2,500,000	-----	.90	.75	.59
5,000,000 & up	-----	.85	.69	.54

Subsoil heating will cost \$1.25 to \$2.10 per square foot of floor area. Adjust for other sitework refinements from Segregated or Unit-in-Place cost sections.

COLD STORAGE

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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	\$9,600	\$13,550	\$16,900	\$19,550	\$23,825	\$27,825	\$31,125
5° to 31°F add	850	1,000	1,150	1,250	1,350	3,000	3,000
-15° to 5°F add	1,350	1,725	1,975	5,275	5,275	5,275	5,275
-45° to 15°F add	1,600	2,050	2,350	6,300	6,300	6,300	6,300

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 \$80 per linear foot. Partitions, including door, cost \$190 to \$350 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 \$295 to \$615 each; for interior, add 100%; stainless steel, add 35%. Shelving costs \$18 to \$40 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 \$1.25 to \$2.10 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	\$ 87,300
4 stops @ \$4,450	17,800
Cost per elevator	\$105,100
2 elevators	<u> x 2</u>
Total cost of elevators	\$210,200

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	\$ 38,450
4 stops @ \$12,425	49,700
1 rear-door opening (power door)	<u>12,163</u>
Total cost of elevator	\$100,313

MISCELLANEOUS ACCESSIBILITY EQUIPMENT

(Cost each, except where noted)

	COST RANGE
Emergency evacuation, portable lifts, wheelchair, motorized climber	\$6,550 – \$7,825
power scooters	4,000 – 4,625
chair seat, mechanical track stair climber	1,975 – 2,775
seat carriers, hand held	95 – 115
Portable ramps, inc. railing, per linear foot	130 – 160
platforms, per square foot	50 – 60
Directional signs, braille (raised markings), excluding posts	15 – 45
elevator panel, ADA, retrofit	260 – 1,045
visual signal panels, excluding alarm (smoke, fire, etc.)	170 – 235

ELEVATORS

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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	\$50,750 – \$54,500	\$58,550 – \$ 65,250	\$ 65,250 – \$ 73,100	\$ 71,300 – \$ 81,450	\$ 82,100 – \$ 96,850	\$ 91,900 – \$110,500
150	58,550 – 64,000	66,700 – 75,100	73,950 – 84,100	80,900 – 93,050	91,900 – 108,450	102,050 – 122,400
200	64,650 – 72,500	73,100 – 83,800	80,900 – 93,700	87,850 – 102,350	99,200 – 118,050	109,350 – 131,650
250	69,850 – 79,500	78,850 – 91,100	86,700 – 100,600	93,700 – 110,200	104,950 – 126,150	116,250 – 139,750
300	74,250 – 85,850	83,800 – 97,450	91,650 – 107,550	98,900 – 116,900	111,050 – 132,250	121,200 – 146,150
350	78,600 – 94,650	88,150 – 103,250	96,300 – 113,400	103,250 – 122,650	115,450 – 138,050	126,150 – 152,500
400	82,100 – 96,850	91,900 – 108,700	100,050 – 118,900	107,550 – 128,500	119,500 – 143,500	130,750 – 157,750
PLUS COST/STOP	\$ 4,250 – \$ 4,450	\$ 4,350 – \$ 4,550	\$ 4,350 – \$ 4,550	\$ 4,450 – \$ 4,600	\$ 4,550 – \$ 4,650	\$ 4,600 – \$ 4,700

HYDRAULIC

SPEED Feet/Minute	CAPACITY (Pounds)					
	1500	2000	2500	3000	4000	5000
50	\$18,850 – \$23,750	\$23,200 – \$29,300	\$26,950 – \$33,350	\$30,450 – \$37,950	\$36,850 – \$46,100	\$42,900 – \$53,650
75	23,750 – 29,300	28,400 – 34,800	32,750 – 40,000	36,250 – 44,950	43,500 – 54,500	49,900 – 62,650
100	28,150 – 33,100	32,750 – 39,750	38,550 – 45,500	41,750 – 50,450	49,000 – 60,900	55,950 – 69,850
125	31,650 – 36,850	36,850 – 43,800	42,050 – 49,900	45,850 – 55,950	53,650 – 66,450	60,900 – 76,000
150	34,800 – 40,000	40,300 – 47,550	45,500 – 54,500	50,150 – 60,600	58,300 – 71,300	65,250 – 81,450
200	40,300 – 46,100	46,950 – 54,500	51,900 – 61,750	50,150 – 68,150	65,520 – 80,050	72,750 – 90,750
PLUS COST/STOP	\$ 7,850 – \$ 8,350	\$ 8,200 – \$ 8,750	\$ 8,750 – \$ 9,250	\$ 9,150 – \$ 9,700	\$ 9,500 – \$10,300	\$10,150 – \$10,750

ELECTRIC, A.C. RHEOSTATIC CONTROL

SPEED Feet/Minute	CAPACITY (Pounds)		
	1200	1500	2000
50	\$31,300 – \$37,150	\$34,500 – \$41,200	\$38,850 – \$47,300
100	41,450 – 47,850	44,700 – 52,500	50,150 – 58,900
150	49,000 – 55,650	52,250 – 60,600	57,700 – 67,000
PLUS COST/STOP	\$ 4,100 – \$ 4,200	\$ 4,150 – \$ 4,250	\$ 4,250 – \$ 4,450

SMALL ELEVATORS

Small office and apartment elevators with simple call system and push-button control, four passenger cab, and two or three stops, cost \$38,550 to \$52,800.

OBSERVATION ELEVATORS

For glass observation cars, add \$6,400 to \$12,500 plus \$775 per

stop. Exterior installations will cost an additional \$11,900 to \$15,100. Custom-designed cars can run as much as five to ten times the cost of standardized cabs.

EXPRESS ELEVATORS

Cost per bypassed floor, without an opening, is \$1,500 to \$2,025 per floor. With openings, use cost per stop from tables.

ELEVATORS

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PASSENGER ELEVATORS – SELECTOMATIC-AUTOMATIC

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

SPEED (Feet/Minute)	CAPACITY (Pounds)		
	2000	2500	3000
300	\$115,450 – \$128,500	\$122,400 – \$135,400	\$129,300 – \$142,950
400	127,850 – 141,550	134,850 – 149,350	142,700 – 158,050
500	140,900 – 156,300	149,050 – 165,000	157,750 – 174,550
600	154,550 – 172,850	164,700 – 182,450	174,250 – 192,550
700	171,950 – 190,800	181,800 – 201,250	192,250 – 212,550
800	189,900 – 210,850	196,650 – 222,700	211,950 – 234,900
1,000	231,450 – 257,500	245,050 – 271,750	258,700 – 286,200
1,200	281,650 – 313,750	298,400 – 330,900	315,500 – 348,550
1,400	343,550 – 383,350	363,650 – 403,350	385,400 – 426,300
PLUS COST/STOP	\$ 4,350 – \$ 4,650	\$ 4,550 – \$ 4,750	\$ 4,650 – \$ 4,950

SPEED (Feet/Minute)	CAPACITY (Pounds)		
	3500	4000	5000
300	\$136,600 – \$151,350	\$143,850 – \$160,050	\$160,950 – \$178,650
400	150,250 – 167,050	159,250 – 176,600	178,150 – 196,900
500	166,450 – 184,450	175,700 – 195,150	196,750 – 217,250
600	183,850 – 203,550	194,300 – 214,900	217,300 – 239,800
700	202,700 – 225,050	214,600 – 237,200	240,050 – 264,200
800	225,050 – 248,250	237,200 – 262,150	265,300 – 292,050
1,000	274,150 – 301,600	289,700 – 319,000	324,100 – 354,900
1,200	334,100 – 368,000	353,800 – 388,300	395,700 – 431,800
1,400	407,650 – 448,350	431,250 – 472,950	483,700 – 525,450
PLUS COST/STOP	\$ 4,750 – \$ 5,100	\$ 4,950 – \$ 5,200	\$ 5,150 – \$ 5,400

EXPRESS ELEVATORS: Cost per bypassed floor, without an opening, is \$1,775 – \$2,375 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'	\$106,100	10'	\$115,450
12'	109,900	12'	118,900
14'	113,100	14'	123,250
18'	118,900	18'	131,350
22'	125,850	22'	140,650
25'	131,350	25'	147,000

For glass balustrade panels or stainless steel sides add \$445 to \$1,425 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	\$3,500	\$3,825	\$4,225	\$4,375
60	2,925	3,050	3,250	3,325
100	1,975	2,125	2,350	2,425
300	1,450	1,550	1,725	1,775
500	1,275	1,425	1,500	1,625
750	1,175	1,325	1,400	1,475
1,000	1,100	1,225	1,325	1,400
1,400	1,000	1,150	1,250	1,275
1,800	925	1,075	1,150	1,225

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 \$6,900 to \$9,750. For each additional foot of height to a maximum of twelve feet, add \$1,225 to \$1,850 per foot.

ELEVATORS

SECTION UIP 8

PASSENGER ELEVATORS – SELECTOMATIC-AUTOMATIC

MISCELLANEOUS ELEVATORS

RESIDENTIAL ELEVATORS: The small handicapped or two- or three-passenger elevators found in single-family dwellings cost \$12,750 to \$25,750 for two stops plus \$1,775 to \$2,725 for each additional stop. For custom cabs (decorative hardwood, brass and glass, etc.), add 75% to 150%.

INCLINED RAILWAYS: Inclined elevators (chairlift) cost \$5,150 to \$7,725 for normal 14' to 17' run. Add \$76.00 per foot for longer runs. Add \$1,075 to \$1,450 for a two-passenger lift. Add \$1,550 to \$2,225 for each turn. Add 50% for wheelchair capability. For exterior (hill-side) installation, add \$1,250.

SIDEWALK ELEVATORS: With sidewalk doors, 2,000# to 3,000# capacity, 25 square foot platform, the cost is \$27,750 to \$39,900.

PERSONNEL LIFTS: Revolving vertical belts with one-man platforms cost \$11,600 to \$14,500 plus \$3,100 per stop over two.

WINDOW-WASHING LIFTS: Exterior building maintenance platforms, self-powered, 24' to 26', cost \$38,850 to \$55,500. Supporting davits cost \$6,300 to \$8,325 per pair and sockets \$390 to \$525 each.

DUMBWAITERS: Automatic electric dumbwaiters, 500# capacity, 50 FPM, stainless steel cab, cost \$11,250 (manual doors) to \$29,000 (power doors) plus \$2,525 to \$3,225 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	\$19,450 – \$21,150	\$25,800 – \$28,400	\$ 29,600 – \$ 32,750	\$ 33,350 – \$ 37,700	\$5,350 – \$5,550	\$10,100 – \$10,300
3,000	22,300 – 24,650	28,700 – 30,150	31,900 – 35,350	36,250 – 40,300	5,650 – 5,900	10,550 – 10,900
4,000	24,100 – 27,250	30,450 – 33,900	34,250 – 37,950	38,300 – 42,900	6,000 – 6,200	10,900 – 11,300
5,000	26,700 – 29,300	32,450 – 35,700	35,700 – 39,750	39,750 – 44,700	6,200 – 6,650	11,300 – 11,900
6,000	28,700 – 31,000	33,900 – 37,700	37,150 – 41,450	41,450 – 46,100	6,650 – 6,900	11,750 – 12,100
8,000	31,300 – 33,900	36,250 – 40,650	38,300 – 43,800	43,500 – 48,450	7,000 – 7,350	12,200 – 12,650
10,000	46,700 – 51,900	55,100 – 60,900	59,450 – 66,100	64,650 – 71,300	7,350 – 7,550	12,550 – 13,000
12,000	55,100 – 61,150	64,400 – 71,300	69,050 – 77,700	75,100 – 84,100	7,550 – 7,900	12,900 – 13,300
15,000	67,250 – 75,100	78,300 – 87,300	83,800 – 94,250	89,900 – 101,500	8,100 – 8,350	13,200 – 13,900
20,000	87,600 – 97,450	99,750 – 113,100	106,100 – 121,200	116,650 – 130,750	8,550 – 8,900	13,750 – 14,450

ELECTRIC, VARIABLE VOLTAGE CONTROL

CAPACITY (Pounds)	SPEED (Feet/Minute)				PLUS COST PER STOP	
	100	200	300	400	Manual Doors	Power Doors
2,500	\$58,300 – \$ 64,650	\$ 65,550 – \$ 72,750	\$ 74,250 – \$ 82,650	\$ 84,350 – \$ 93,350	\$5,550 – \$5,750	\$10,450 – \$10,650
4,000	62,050 – 69,050	71,300 – 79,500	82,650 – 91,650	94,850 – 105,300	6,000 – 6,550	11,000 – 11,450
5,000	64,100 – 71,050	74,800 – 82,650	87,000 – 93,300	100,600 – 111,650	6,550 – 6,750	11,450 – 12,000
6,000	65,550 – 72,750	76,850 – 85,250	90,450 – 99,750	105,550 – 116,900	6,750 – 7,000	11,900 – 12,200
8,000	68,150 – 76,000	81,450 – 89,900	96,300 – 106,100	113,950 – 125,850	7,100 – 7,350	12,450 – 12,750
10,000	73,100 – 81,450	88,150 – 97,450	104,950 – 117,150	127,050 – 140,650	7,450 – 7,750	12,750 – 13,100
15,000	92,800 – 102,050	122,400 – 135,150	-----	-----	8,100 – 8,350	13,550 – 13,900
20,000	109,050 – 120,650	-----	-----	-----	8,550 – 8,900	14,000 – 14,550

REAR DOORS: For rear-door openings, add \$6,700 to \$7,225 for the first rear door, if manually operated, plus \$5,150 to \$5,650 for each additional manual door. For power-operated rear doors, use \$11,825 to \$12,500 for the first door and \$10,050 to \$10,825 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 \$1,125 to \$2,250 each.

COST RANGE

3,000#, electric winch	\$6,375 – \$ 6,975
4,000#, hydraulic	7,825 – 8,675
7,000#, hydraulic	9,000 – 10,425

PNEUMATIC TUBE SYSTEMS

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

3" or 4"	\$13,300 – \$18,000
6" or 4" x 7"	19,150 – 23,200

CONVEYING AND MATERIAL-HANDLING SYSTEMS

SECTION UIP 8

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 \$4,250 for minimum controls to \$15,500 for deluxe cabs with air conditioning and complete controls.

CAPACITY (Tons)	SPAN					
	20'	30'	40'	50'	75'	100'
2	\$ 54,750	\$ 60,500	\$ 67,000	\$ 74,750	\$ 96,250	\$125,000
3	56,000	62,250	68,500	76,000	98,250	126,750
5	59,750	65,750	72,250	80,250	102,000	131,250
7-1/2	63,750	70,250	77,250	84,750	108,000	137,000
10	68,500	75,250	82,250	90,250	113,500	143,000
15	79,000	85,750	93,250	101,500	125,750	156,000
20	90,750	98,250	106,250	115,000	139,500	169,750
25	104,500	112,760	120,750	129,500	154,750	184,750

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 \$35 to \$100. For boom electrification, add \$630. 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	\$1,500	\$1,675	\$2,000	\$2,725	\$3,450	\$4,175
12	1,775	2,025	2,550	3,525	4,550	5,525
16	2,175	2,550	3,225	4,600	6,000	7,350
20	2,625	3,125	4,075	5,975	7,875	9,775

CRANEWAY SPANS

Crane runways, bracketed or braced to the buildings' column framing members, cost from \$110 to \$195 per linear foot for each rail. Light monorail trolley runways cost from \$10 to \$75 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 \$15.00

to \$30.00 per linear foot. Curved conductor, add 25% to 35%. Examples including ±10% range:

BRIDGE CRANEWAY

Cost Range:	\$110 – 195
Capacity Cost Range/Lin. Ft.	
2 ton	\$100 – \$120
10	150 – 170
25	175 – 215

TROLLEYWAY

Cost Range:	\$10 – \$75
Capacity Cost Range/Lin. Ft.	
1 ton	\$ 9 – \$11
2	17 – 23
7-1/2	68 – 82

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 \$87 to \$225 per foot. For fixed-height gantries, deduct 25%. For all-aluminum construction, add 50% to 100%. Gantries with adjustable spans, add \$975 to \$1,600. Angle iron tracks cost \$11.00 to \$19.50 per linear foot. For power operation, add \$6,150 to \$9,775.

SPAN (Feet)	CAPACITY (Tons)					
	1	2	3	5	7-1/2	10
10	\$2,325	\$3,300	\$4,075	\$5,225	\$ 6,400	\$ 7,425
15	2,700	3,825	4,750	6,200	7,600	8,800
20	3,075	4,375	5,450	7,075	8,775	10,175
30	3,775	5,475	6,775	8,975	11,125	13,075

HOISTS AND TROLLEYS

Costs are averages of hoists with a maximum lift of 10 feet. For each foot over 10 feet, add \$19.75 to \$79.75 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 COST RANGE		ELECTRIC COST RANGE	
	1/2	\$ 140 – \$ 645	\$ 1,200 – \$ 1,525	
1	195 – 770	1,350 – 1,850		
2	305 – 1,100	1,725 – 2,600		
3	405 – 1,395	2,050 – 3,275		
5	600 – 2,005	2,800 – 4,725		
7-1/2	915 – 2,775	3,675 – 6,525		
10	1,170 – 3,485	4,550 – 8,300		
15	-----	6,300 – 11,825		
20	-----	8,025 – 15,400		
30	-----	11,550 – 22,525		

TROLLEYS

CAPACITY (Tons)	PLAIN (FREE WHEELING)		GEARED		MOTORIZED	
	COST RANGE		COST RANGE		COST RANGE	
1/2	\$ 100 – \$ 295	\$ 140 – \$ 645	\$1,100 – \$2,465			
1	135 – 365	195 – 735	1,150 – 2,575			
2	210 – 520	305 – 955	1,225 – 2,725			
3	280 – 665	390 – 1,110	1,325 – 2,875			
5	390 – 1,025	610 – 1,500	1,500 – 3,200			
7-1/2	575 – 1,400	25 – 1,975	1,700 – 3,575			
10	775 – 1,775	1,175 – 2,450	1,925 – 4,000			
15	1,150 – 2,575	1,725 – 3,375	2,300 – 4,825			
20	-----	-----	2,775 – 5,700			
30	-----	-----	3,625 – 7,300			

CONVEYING AND MATERIAL-HANDLING SYSTEMS

SECTION UIP 8

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. 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. 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"	\$ 425	\$ 280	\$295	\$220
	18"	16"	510	320	320	235
	20"	18"	525	335	335	240
	24"	22"	570	350	345	245
MEDIUM DUTY	12"	10"	505	310	545	395
	18"	16"	570	350	610	445
	24"	20"	640	390	635	460
	30"	28"	715	420	690	500
HEAVY DUTY	12"	10"	1,055	655	635	460
	18"	16"	1,215	740	725	525
	30"	20"	1,550	910	770	610
	42"	28"	1,865	1,075	980	710

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	5 FEET
1"	6"	5"	\$700	\$415
	12"	10-1/2"	810	465
	15"	14"	845	500
	19"	18"	900	520
2"	6"	5"	420	290
	12"	10-1/2"	460	305
	15"	14"	490	320
	19"	18"	520	335

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	\$280	\$195	----	----
	10	325	220	\$300	\$205
	12	345	235	----	----
	16	390	260	----	----
15"	8	310	220	----	----
	10	335	235	----	----
	14	390	260	----	----
	16	410	270	----	----
18"	12	370	250	----	----
	14	390	265	----	----
	16	415	280	----	----
	18	450	290	----	----
20"	16	455	300	----	----
	18	490	310	----	----
	20	510	320	395	270
	24	560	345	----	----
24"	18	515	325	----	----
	20	535	340	525	365
	24	585	360	----	----
	28	625	385	----	----

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	\$ 675	\$ 725	\$ 790
	3' - 12'	58	1,225	1,295	1,430
	5' - 18'	58	1,655	1,815	1,965
	6' - 24'	58	2,090	2,300	2,505
18"	2' - 8'	90	790	825	900
	3' - 12'	90	1,445	1,500	1,750
	5' - 18'	90	1,610	1,945	2,055
	6' - 24'	90	2,190	2,580	2,665
24"	2' - 8'	120	960	1,045	1,110
	3' - 12'	120	1,750	1,850	2,000
	5' - 18'	120	2,450	2,675	2,800
	6' - 24'	120	3,425	3,675	3,850

CONVEYING AND MATERIAL-HANDLING SYSTEMS

SECTION UIP 8

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"	\$4,300	\$4,850	\$5,450	\$6,025	\$6,575
		4-1/2"	3,975	4,400	4,850	5,275	5,750
		6"	3,850	4,900	4,650	5,025	5,450
		12"	3,725	4,050	4,375	4,725	5,025
18"	15"	3"	4,525	5,125	5,800	6,450	7,075
		4-1/2"	4,225	4,725	5,225	5,750	6,275
		6"	4,100	4,575	5,000	5,475	5,950
		12"	3,925	4,325	4,650	5,025	5,400
24"	21"	3"	4,850	5,575	6,350	7,025	7,800
		4-1/2"	4,550	5,100	5,725	6,325	6,875
		6"	4,400	4,950	5,475	6,025	6,550
		12"	4,225	4,650	5,100	5,525	6,000
30"	27"	3"	5,100	5,975	6,800	7,600	8,425
		4-1/2"	4,850	5,500	6,150	6,825	7,525
		6"	4,600	5,150	5,775	6,325	6,875
		12"	4,400	4,850	5,325	5,800	6,300
36"	33"	3"	5,400	6,350	7,300	8,225	9,175
		4-1/2"	5,075	5,800	6,525	7,250	7,975
		6"	4,825	5,475	6,075	6,725	7,375
		12"	4,600	5,100	5,600	6,100	6,625
42"	39"	3"	5,725	6,700	7,725	8,725	9,750
		4-1/2"	5,325	6,100	6,900	7,725	8,500
		6"	5,025	5,750	6,450	7,100	7,825
		12"	4,825	5,400	5,975	6,550	7,075

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"	\$4,350	\$4,600	\$5,950	\$7,250	\$8,550	\$ 9,850
34"	30"	4,600	4,825	6,125	7,525	8,775	10,150
40"	36"	4,700	4,950	6,350	7,650	8,975	10,300
46"	42"	4,850	5,075	6,600	8,175	9,525	10,825

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"	\$4,450	\$4,600	\$4,775	\$4,900	\$5,075	\$5,225	\$5,400	\$5,550
22"	18"	5,100	5,325	5,550	5,775	6,000	6,250	6,450	6,650
28"	24"	5,600	5,875	6,125	6,400	6,700	6,950	7,250	7,525
34"	30"	6,350	6,650	7,000	7,375	7,675	8,025	8,350	8,650