

MISCELLANEOUS INDUSTRIAL COSTS

SECTION UIP 12

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	\$ 2,850	----	----
6	4,000	----	\$ 7,650
10	5,800	----	10,175
15	7,650	\$10,575	13,100
20	9,450	12,400	15,425
30	12,725	16,150	19,725
40	15,150	18,975	23,300
50	17,825	21,525	26,900
75	23,900	27,625	33,700
100	29,600	32,650	40,175
150	40,025	41,975	51,275
200	48,025	49,850	60,625
300	65,525	63,125	77,100
400	80,375	75,325	91,475
500	98,525	86,075	104,750
600	108,325	96,475	116,550

Large high-capacity packages boilers will cost \$255 to \$345 per horsepower.

Examples: 1,000 HP x \$345 = \$ 345,000;
6,000 HP x \$255 = \$1,530,000.

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

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	\$1,250	----	----
1½"	x 1¼"	1½	1,550	\$1,550	----
2"	x 1½"	3	1,775	1,975	----
		5	2,050	2,150	----
		7½	2,500	2,600	----
2½"	x 2"	5	1,600	2,400	----
		7½	2,575	2,775	----
3"	x 2½"	5	2,250	2,325	----
		7½	2,625	2,775	----
		10	2,825	3,000	----
4"	x 2"	5	2,325	2,475	----
		10	2,975	3,350	----
		15	3,600	4,150	----
		20	3,850	4,675	----
4"	x 3"	5	2,500	2,900	----
		10	3,175	3,525	----
		15	3,800	4,325	----
5"	x 4"	10	----	3,775	----
		15	----	4,325	----
		20	----	4,725	----
		30	5,050	5,800	----
6"	x 4"	40	----	6,825	----
		50	----	7,675	----
		60	6,350	8,925	\$10,700
		75	8,450	10,250	12,175
6"	x 5"	20	----	5,075	----
		30	----	7,050	5,975
		50	----	8,050	9,600
		75	8,450	10,250	----
8"	x 6"	40	----	7,425	----
		60	----	9,475	10,525
		75	----	11,125	----
		100	----	12,800	----
		125	----	13,775	----

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 12

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	\$5.30 –	\$6.10	\$6.20 –	\$7.50	\$7.35 –	\$9.05	\$8.90 –	\$11.25
Glass	-----	-----	9.65 –	18.30	12.25 –	20.75	15.60 –	24.45
Plastic	4.15 –	4.30	4.35 –	4.85	4.55 –	5.00	5.00 –	5.40
Black steel (threaded)	-----	-----	5.90 –	6.55	7.05 –	8.30	8.50 –	10.55
Steel (welded joint)	-----	-----	-----	-----	-----	-----	12.15 –	15.00
Add for trench and fill	1.55 –	1.85	1.65 –	2.05	1.85 –	2.25	1.90 –	2.65

PRESSURE PIPE	1 1/4"		1 1/2"		2"		2 1/2"	
Copper	\$10.25 –	\$15.40	\$12.65 –	\$17.25	\$18.10 –	\$21.75	\$26.55 –	\$32.45
Glass	-----	-----	8.30 –	30.95	27.90 –	37.85	-----	-----
Plastic	5.80 –	6.25	6.15 –	6.90	7.10 –	7.85	7.95 –	8.95
Black steel (threaded)	9.75 –	13.80	11.40 –	16.10	14.00 –	20.75	16.70 –	25.65
Steel (welded joint)	15.00 –	18.60	15.50 –	19.45	18.85 –	23.80	24.00 –	30.50
Add for trench and fill	2.00 –	2.85	2.05 –	3.80	2.30 –	3.60	2.65 –	3.90

PRESSURE PIPE	3"		4"		6"		8"	
Copper	\$30.95 –	\$38.65	\$52.75 –	\$67.05	\$87.10 –	\$115.25	\$155.90 –	\$213.40
Glass	36.70 –	50.60	46.35 –	70.20	53.85 –	112.25	-----	-----
Plastic	9.55 –	10.95	12.25 –	14.35	18.10 –	23.40	22.20 –	27.85
Black steel (threaded)	19.65 –	31.15	26.30 –	42.95	54.10 –	74.95	93.60 –	111.85
Steel (welded joint)	28.35 –	36.40	44.20 –	57.45	57.55 –	76.05	68.25 –	91.40
Add for trench and fill	2.85 –	4.25	3.40 –	5.20	4.15 –	7.00	5.10 –	8.85

PRESSURE PIPE	10"		12"		16"		24"	
Copper	-----	-----	-----	-----	-----	-----	-----	-----
Glass	-----	-----	-----	-----	-----	-----	-----	-----
Plastic	\$29.15 –	\$37.50	\$37.15 –	\$48.60	-----	-----	-----	-----
Black steel (threaded)	127.35 –	154.00	169.35 –	190.90	-----	-----	-----	-----
Steel (welded joint)	84.20 –	113.45	98.80 –	134.05	\$131.65 –	\$181.80	\$259.15 –	\$364.20
Add for trench and fill	6.00 –	10.55	6.90 –	12.30	8.75 –	15.90	12.40 –	22.85

DRAIN, WASTE AND VENT	1 1/4"		1 1/2"		2"		4"	
Cast iron	-----	-----	\$8.15 –	\$13.00	\$12.25 –	\$18.65	\$18.25 –	\$24.75
Copper	\$10.30 –	\$14.35	11.10 –	15.60	13.35 –	18.95	29.70 –	43.35
Glass	-----	-----	16.10 –	26.80	21.00 –	30.40	45.80 –	52.55
Plastic (standard)	5.70 –	6.30	6.30 –	7.05	7.05 –	7.95	11.75 –	13.80
Plastic (acid waste)	-----	-----	8.60 –	15.80	12.05 –	18.55	25.95 –	33.90

DRAIN, WASTE AND VENT	6"		8"		10"		12"	
Cast iron	\$25.80 –	\$33.10	\$41.55 –	\$56.35	\$61.20 –	\$75.15	\$86.45 –	\$97.30
Copper	70.70 –	106.95	188.15 –	291.75	-----	-----	-----	-----
Glass	79.85 –	91.05	-----	-----	-----	-----	-----	-----
Plastic (standard)	15.35 –	21.25	-----	-----	-----	-----	-----	-----
Plastic (acid waste)	29.45 –	42.65	-----	-----	-----	-----	-----	-----

PIPING

SECTION UIP 12

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	\$28 –	\$44	\$35 –	\$52	\$47 –	\$ 63	\$ 53 –	\$ 79
medium	36 –	48	38 –	61	51 –	80	58 –	120
Iron body, general	-----	-----	-----	-----	-----	-----	-----	-----
medium	-----	-----	-----	-----	-----	-----	-----	-----
Plastic, general	35 –	61	39 –	72	49 –	86	54 –	107
Steel, general (threaded)	-----	-----	-----	-----	86 –	118	132 –	185
medium	-----	-----	-----	-----	-----	-----	-----	-----

VALVES, EACH	1¼"		1½"		2"		2½"	
Bronze, general	\$ 62 –	\$ 97	\$ 75 –	\$119	\$107 –	\$ 135	\$152 –	\$ 287
medium	74 –	164	85 –	213	123 –	298	194 –	438
Iron body, general	-----	-----	-----	-----	310 –	425	350 –	468
medium	-----	-----	-----	-----	531 –	733	-----	-----
Plastic, general	65 –	125	76 –	150	106 –	228	209 –	433
Steel, general (threaded)	166 –	230	188 –	269	227 –	343	-----	-----
medium	-----	-----	-----	-----	706 –	1,301	975 –	1,467

VALVES, EACH	3"		4"		6"		8"	
Iron body, general	\$ 395 –	\$ 515	\$ 500 –	\$ 630	\$ 795 –	\$1,000	\$1,225 –	\$ 1,625
medium	655 –	885	940 –	1,350	1,650 –	2,500	2,450 –	3,750
Steel, general (flanged)	795 –	1,435	1,070 –	1,850	1,800 –	3,050	3,125 –	5,075
medium	1,225 –	1,675	1,800 –	2,150	3,125 –	3,525	4,600 –	5,850
heavy duty	2,250 –	2,700	4,875 –	5,650	6,375 –	7,375	9,800 –	11,350

VALVES, EACH	10"		12"		16"		24"	
Iron body, general	\$ 2,025 –	\$ 2,575	\$ 3,225 –	\$ 4,075	-----	-----	-----	-----
medium	3,300 –	5,200	4,175 –	6,700	-----	-----	-----	-----
Steel, general (flanged)	4,350 –	7,650	5,625 –	10,475	\$ 9,500 –	\$17,675	\$26,425 –	\$36,150
medium	6,300 –	8,825	7,875 –	12,450	20,075 –	21,825	-----	-----
heavy duty	13,750 –	15,750	17,875 –	20,700	-----	-----	-----	-----

PIPING

SECTION UIP 12

SERVICE PIPE HANGERS AND SUPPORTS

HANGERS, per linear foot	¼"		½"		¾"		1"	
Cast iron	-----	-----	-----	-----	-----	-----	-----	-----
Copper	\$1.45 -	\$1.80	\$1.95 -	\$2.30	\$2.25 -	\$2.90	\$2.70 -	\$3.30
Glass	-----	-----	2.85 -	3.50	2.95 -	3.60	3.10 -	3.65
Plastic	2.20 -	2.80	2.40 -	3.05	2.65 -	3.25	2.90 -	3.60
Steel (threaded)	1.20 -	1.40	1.40 -	1.60	1.60 -	1.85	1.85 -	2.00
Steel (welded joint)	-----	-----	-----	-----	-----	-----	2.50 -	2.95

HANGERS, per linear foot	1¼"		1½"		2"		2½"	
Cast iron	-----	-----	\$2.80 -	\$3.10	\$2.90 -	\$3.25	\$3.10 -	\$3.55
Copper	\$3.00 -	\$3.75	2.95 -	3.65	3.30 -	4.10	3.70 -	4.60
Glass	-----	-----	3.25 -	3.85	3.55 -	4.10	-----	-----
Plastic	3.05 -	3.75	3.25 -	4.10	3.65 -	4.50	4.00 -	5.20
Steel (threaded)	2.00 -	2.25	2.20 -	2.45	2.55 -	2.90	3.05 -	3.35
Steel (welded joint)	2.80 -	3.15	2.95 -	3.35	3.25 -	3.75	3.60 -	4.20

HANGERS, per linear foot	3"		4"		6"		8"	
Cast iron	\$3.25 -	\$3.55	\$3.55 -	\$4.00	\$4.35 -	\$4.85	\$5.40 -	\$5.90
Copper	4.45 -	5.55	5.00 -	6.35	6.10 -	7.85	6.95 -	8.90
Glass	3.95 -	4.55	4.35 -	5.10	5.35 -	6.60	-----	-----
Plastic	4.40 -	5.70	5.45 -	6.90	7.10 -	8.95	8.80 -	11.15
Steel (threaded)	3.25 -	3.55	4.00 -	4.35	5.45 -	6.00	6.95 -	7.65
Steel (welded joint)	4.00 -	4.55	4.75 -	5.50	6.20 -	7.35	7.70 -	9.10

HANGERS, per linear foot	10"		12"		16"		24"	
Cast iron	\$ 6.50 -	\$ 7.20	\$ 8.00 -	\$ 8.95	-----	-----	-----	-----
Copper	-----	-----	-----	-----	-----	-----	-----	-----
Glass	-----	-----	-----	-----	-----	-----	-----	-----
Plastic	10.35 -	13.20	12.10 -	15.40	-----	-----	-----	-----
Steel (threaded)	8.50 -	9.25	9.90 -	10.85	-----	-----	-----	-----
Steel (welded joint)	9.20 -	10.75	10.65 -	12.70	\$13.65 -	\$16.30	\$19.70 -	\$23.20

PIPING

SECTION UIP 12

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	\$21.50 –	\$ 27.30	\$26.80 –	\$34.95	\$34.60 –	\$44.30	\$57.55 –	\$71.15
Ductile iron	22.15 –	27.15	24.25 –	30.80	37.40 –	48.30	45.35 –	59.70
Concrete	-----	-----	-----	-----	-----	-----	-----	-----
Plastic	11.80 –	15.40	13.95 –	18.00	20.60 –	26.45	25.30 –	36.10
Steel	26.05 –	28.65	31.85 –	36.35	39.80 –	47.00	59.05 –	71.40
Valves, each	555 –	720	1,225 –	1,475	2,100 –	2,500	3,325 –	3,850

PIPE TYPE	12"		14"		16"		18"	
Asbestos cement	\$66.40 –	\$83.65	\$71.80 –	\$100.40	\$94.90 –	\$122.00	\$116.90 –	\$164.05
Ductile iron	50.55 –	67.35	59.05 –	79.80	86.50 –	120.05	87.15 –	120.05
Concrete	-----	-----	-----	-----	35.80 –	45.80	42.95 –	53.05
Plastic	37.30 –	46.90	-----	-----	-----	-----	-----	-----
Steel	68.35 –	84.45	71.80 –	90.20	84.45 –	108.40	102.75 –	132.35
Valves, each	4,475 –	5,425	5,850 –	7,175	7,650 –	9,250	9,550 –	11,575

PIPE TYPE	20"		24"		30"		36"	
Asbestos cement	\$132.75 –	\$189.00	\$154.50 –	\$222.50	\$190.25 –	\$283.00	\$257.50 –	\$389.25
Cast iron	94.75 –	131.50	102.75 –	144.00	117.25 –	167.25	146.75 –	213.50
Concrete	45.25 –	59.25	60.25 –	80.25	85.50 –	115.75	114.50 –	157.25
Steel (treated & wrapped)	109.25 –	142.25	127.50 –	169.25	161.75 –	219.50	225.50 –	309.75
Valves, each	11,575 –	13,950	16,450 –	20,450	25,100 –	30,050	35,350 –	42,450

PIPE TYPE	42"		48"		60"		72"	
Asbestos cement	-----	-----	-----	-----	-----	-----	-----	-----
Cast iron	\$177.75 –	\$260.25	\$202.75 –	\$297.75	-----	-----	-----	-----
Concrete	140.25 –	196.50	173.00 –	244.50	\$244.50 –	\$353.25	\$324.50 –	\$477.25
Steel (treated & wrapped)	309.75 –	435.25	347.50 –	491.00	-----	-----	-----	-----
Valves, each	47,125 –	57,350	61,700 –	72,850	-----	-----	-----	-----

PIPE TYPE	4"		6"		8"		10"	
Asbestos cement	-----	-----	\$10.90 –	\$14.10	\$12.65 –	\$16.05	\$24.00 –	\$30.50
Corrugated metal	-----	-----	12.45 –	14.35	16.35 –	19.95	24.55 –	31.20
Plastic	\$4.95 –	\$5.45	6.30 –	8.45	9.60 –	12.95	12.75 –	18.30
Plain concrete	-----	-----	13.10 –	14.15	16.30 –	18.65	20.00 –	23.70
Reinforced concrete	-----	-----	-----	-----	-----	-----	-----	-----
Vitrified clay	9.70 –	13.60	14.60 –	18.05	19.50 –	23.70	34.65 –	39.70

PIPE TYPE	12"		15"		18"		21"	
Asbestos cement	\$26.20 –	\$33.20	\$34.05 –	\$43.75	\$49.25 –	\$62.80	\$54.05 –	\$ 69.10
Corrugated metal	29.05 –	33.00	37.35 –	49.35	35.45 –	47.70	45.10 –	60.75
Plastic	15.45 –	24.25	20.45 –	37.05	-----	-----	-----	-----
Plain concrete	22.75 –	27.65	24.20 –	30.40	28.60 –	36.60	36.20 –	46.80
Reinforced concrete	23.40 –	30.00	25.65 –	33.55	32.95 –	42.65	43.75 –	56.85
Vitrified clay	38.75 –	44.80	52.25 –	61.00	68.30 –	80.35	83.60 –	100.35

PIPE TYPE	24"		30"		36"		42"	
Asbestos cement	\$ 59.50 –	\$ 76.50	\$ 70.75 –	\$ 90.75	\$101.50 –	\$130.25	-----	-----
Corrugated metal	49.50 –	67.75	57.50 –	73.50	89.75 –	121.50	\$104.25 –	\$141.75
Reinforced concrete	53.50 –	70.25	60.50 –	78.75	95.50 –	128.75	121.25 –	160.00
Vitrified clay	101.75 –	121.25	123.50 –	148.00	161.25 –	201.00	-----	-----

PIPE TYPE	48"		54"		60"		72"	
Asbestos cement	-----	-----	-----	-----	-----	-----	-----	-----
Corrugated metal	\$125.75 –	\$169.25	\$161.25 –	\$224.50	\$208.00 –	\$288.00	\$232.00 –	\$317.25
Reinforced concrete	139.00 –	177.00	169.25 –	236.25	218.25 –	301.25	264.25 –	360.75
Vitrified clay	-----	-----	-----	-----	-----	-----	-----	-----

PIPE TYPE	78"		84"		90"		96"	
Corrugated metal	\$254.00 –	\$344.75	\$274.00 –	\$370.50	\$293.00 –	\$396.75	\$315.00 –	\$423.50
Reinforced concrete	319.25 –	420.75	368.25 –	480.75	400.75 –	531.75	440.25 –	583.50

PIPE TYPE	102"		108"		114"		120"	
Corrugated metal	\$338.00 –	\$451.75	\$357.75 –	\$478.00	\$381.00 –	\$505.00	\$405.50 –	\$531.50
Reinforced concrete	-----	-----	-----	-----	-----	-----	-----	-----

INDUSTRIAL MOTORS

SECTION UIP 12

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					4:1 VARIABLE-DRIVE MOTORS				RATED HP
	DRIP-PROOF	TOTALLY ENCLOSED	EXPLOSION-PROOF	480-VOLT POWER WIRING	ADD FOR SLIDE RAILS	DRIP-PROOF	TOTALLY ENCLOSED	EXPLOSION-PROOF		
½	\$ 310	\$ 355	\$ 495	\$ 385	\$ 55	\$ 1,475	\$1,550	\$1,625	½	
1	405	445	555	415	55	1,550	1,600	1,750	1	
1½	465	495	590	415	55	1,575	1,625	1,775	1½	
2	510	555	620	455	60	1,625	1,750	1,825	2	
3	570	655	680	515	70	1,800	1,825	1,975	3	
5	680	770	835	680	90	2,000	2,050	2,225	5	
7½	770	870	1,025	810	95	2,300	2,400	2,575	7½	
10	870	960	1,225	960	95	2,575	2,850	3,000	10	
15	1,085	1,300	1,650	1,250	105	3,050	3,375	3,600	15	
20	1,300	1,725	2,075	1,575	135	3,600	3,925	4,150	20	
25	1,550	2,050	2,550	1,900	150	4,175	4,450	4,700	25	
30	1,800	2,400	3,000	2,225	165	4,725	4,950	5,275	30	
40	2,250	3,150	3,925	2,800	180	5,850	5,975	6,375	40	
50	2,675	3,950	4,800	4,200	195	7,000	7,050	7,475	50	
75	4,175	6,500	8,900	5,000	200	9,800	-----	-----	75	
100	5,675	8,925	12,400	6,525	225	12,700	-----	-----	100	
125	7,175	11,325	15,500	8,025	270	-----	-----	-----	125	
150	8,725	13,625	17,650	9,750	270	-----	-----	-----	150	
200	11,900	18,600	21,375	12,700	300	-----	-----	-----	200	
250	15,200	23,250	24,200	15,800	315	-----	-----	-----	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.

EXAMPLE

5 HP	1800 RPM, dripproof	\$ 680
5 HP	1200 RPM, dripproof	770
5 HP	900 RPM, dripproof	870
5 HP	720 RPM, dripproof	1,085
5 HP	3600 RPM, dripproof	570

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.

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 12

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	\$124.00	\$160.00	\$194.00	\$225.00	\$260.00	\$290.00	12 gauge
10 gauge	147.00	188.00	225.00	265.00	300.00	340.00	10 gauge
8 gauge	171.00	217.00	260.00	295.00	345.00	390.00	8 gauge
3/16"	187.00	237.00	280.00	335.00	375.00	415.00	3/16"
1/4"	----	280.00	335.00	385.00	430.00	480.00	1/4"
5/16"	----	----	385.00	435.00	495.00	545.00	5/16"
3/8"	----	----	----	480.00	545.00	605.00	3/8"
1/2"	----	----	----	----	635.00	700.00	1/2"
Guy wires (In. ft.)*	.39	.45	.50	.57	.64	.66	Guy wires (In. ft.)*
Guy bands (each)	42.00	64.00	82.00	99.00	120.00	138.00	Guy bands (each)
Roof flashing	290.00	415.00	540.00	670.00	805.00	965.00	Roof flashing
Umbrella top (each)	109.00	166.00	229.00	295.00	375.00	455.00	Umbrella top (each)

THICKNESS (at base)	54"	60"	66"	72"	78"	84"	THICKNESS (at base)
12 gauge	\$ 335.00	\$ 365.00	\$ 395.00	----	----	----	12 gauge
10 gauge	380.00	415.00	450.00	\$ 475.00	----	----	10 gauge
8 gauge	420.00	460.00	495.00	535.00	\$ 565.00	----	8 gauge
3/16"	455.00	495.00	535.00	585.00	620.00	\$ 635.00	3/16"
1/4"	525.00	585.00	625.00	670.00	700.00	760.00	1/4"
5/16"	600.00	650.00	700.00	760.00	800.00	830.00	5/16"
3/8"	665.00	730.00	760.00	830.00	890.00	925.00	3/8"
1/2"	760.00	830.00	890.00	955.00	1,020.00	1,080.00	1/2"
Guy wires (In. ft.)*	.70	.77	.81	.83	.86	.90	Guy wires (In. ft.)*
Guy bands (each)	161.00	181.00	204.00	222.00	246.00	271.00	Guy bands (each)
Roof flashing	1,080.00	1,240.00	1,400.00	1,525.00	1,690.00	1,845.00	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'	\$ 675	\$ 565	16'	\$1,500	\$1,275
7'	765	620	18'	1,625	1,425
8'	855	705	20'	1,775	1,550
9'	960	790	22'	1,925	1,725
10'	1,040	845	24'	2,100	1,825
12'	1,225	1,015	28'	2,375	2,100
14'	1,375	1,175	32'	2,700	2,375

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	\$ 64.75 –	\$110.00
12" square or round flues	70.00 –	118.00
2 – 8" square or round flues	100.25 –	170.00
10" x 18" rectangular flue	96.25 –	163.50
1 – 8" and 1 – 12" square flues	114.75 –	196.25

PREFABRICATED METAL: Average cost per linear foot for round galvanized metal stacks including ancillary items. Add \$165 to \$270 for thru-the-wall installations. For box framed wood or stucco decorative chimney housing add \$17.00 to \$25.25 per linear foot and \$34.00 to \$50.50 for metal units.

SIZE	SINGLE WALL	DOUBLE WALL	TRIPLE WALL
6"	\$18.25 – \$27.50	\$21.25 – \$31.75	\$28.50 – \$41.75
8"	20.00 – 30.25	24.25 – 36.25	35.25 – 52.75
10"	21.50 – 32.25	30.50 – 47.75	44.75 – 64.75

FIREPLACES

	COST RANGE	
Metal, prefab. fireboxes or forms up to 48" . . .	\$ 565 –	\$ 1,135
see-through, 3-sided or extra large openings	1,275 –	2,275
Masonry, brick firebox	1,950 –	2,625
hearth	425 –	590
custom, extra large opening	3,275 –	7,850
hearth	555 –	980
Soapstone heaters, complete, incl. chimney . .	6,500 –	25,950
Add for glass doors	210 –	320
Circulation blowers, each	115 –	180

MANTELS

Prefabricated, wood or fiberglass	\$ 180 –	\$745
Custom, special design or antique reproductions		
cast stone (bonded limestone)	3,050 –	9,075
marble, granite or onyx	5,575 –	20,800
ornate wood	3,050 –	4,350
precast plaster or flax decorated	1,550 –	3,850

For masonry veneer wall facing, see Section UIP 5.

MISCELLANEOUS INDUSTRIAL COSTS

SECTION UIP 12

METAL WASTE CHUTES

Average cost per foot of height, including doors, roof vent and sprinklers. For electrically operated doors, add \$865 to \$1,150 each. For stainless steel, add 25%.

Diameter (inside)	15"	18"	21"	24"	30"	36"
Low cost	\$ 72.00	\$ 79.50	\$ 86.25	\$ 93.00	\$104.75	\$115.50
Average cost	86.25	96.50	105.00	114.25	129.75	144.75
High cost	103.50	116.75	128.50	139.75	161.25	181.00

COMPACTORS

COMMERCIAL OR INDUSTRIAL – STATIONARY

CAPAC. (CU. YD.)	COST	CAPAC. (CU. YD.)	COST
½ and under	\$ 5,000 – \$ 8,600	3	\$22,600 – \$26,800
1	10,600 – 13,250	5	37,800 – 42,300
2	16,800 – 20,000	7	55,450 – 61,700

NOTE: For building chute-fed compactors, add \$1,100 to \$4,425 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	\$ 8,300
20,000	48"	38"	7.5	21,100
50,000	50"	32"	10	23,400
60,000	38"	32"	10	28,150
85,000	38"	32"	10	34,000
85,000	50"	36"	10	38,650

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

For drum roll-out dolly and platform add \$1,750.

Air filter systems connected to compactors above, to filter airborne matter from the compaction chambers cost \$10,675. Air filter systems meeting ANSI-N510 hazardous air filtration standards cost \$39,850.

INCINERATORS

COMMERCIAL OR INDUSTRIAL – STEEL

Costs do not include scrubber, chimney, electrical panel or piping. Add \$11,600 to \$17,825 for feeder.

Pounds per Hour	Cost	Pounds per Hour	Cost
50	\$17,500 – \$22,000	400	\$76,200 – \$ 96,700
100	27,900 – 31,500	600	100,900 – 136,600
200	43,000 – 47,300	1,000	117,700 – 158,700

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	\$ 7,450 – \$ 9,600	1,000	\$ 25,475 – \$ 28,100
200	9,375 – 11,750	2,000	45,375 – 50,950
400	13,750 – 15,225	3,000	65,025 – 73,225
600	17,575 – 19,625	5,000	104,275 – 118,325

LARGE SAWMILL OR PLANNING MILL – STEEL

Average costs for average heights, installed.

Base Area	Cost	Base Area	Cost
500 sq. ft.	\$11,500	2,500 sq. ft.	\$45,500
1,000	21,000	3,000	52,750
1,500	30,000	4,000	68,000
2,000	38,000	5,000	81,750

Add for forced draft systems:

6" – \$3,225	10" – \$4,500	15" – \$6,125
8" – \$3,875	12" – \$5,150	

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"	\$ 176,000	\$ 323,000	\$ 589,000
8"	192,000	343,000	620,000
10"	207,000	369,000	656,000
12"	228,000	398,000	697,000
16"	308,000	538,000	948,000
20"	436,000	692,000	1,076,000
24"	538,000	846,000	1,307,000
30"	692,000	1,025,000	1,537,000
36"	999,000	1,358,000	1,845,000
42"	1,307,000	1,742,000	2,306,000