

APPENDIX III

2001

**ALBERTA
MACHINERY & EQUIPMENT
ASSESSMENT MANUAL**

TABLE OF CONTENTS

MACHINERY & EQUIPMENT ASSESSMENT MANUAL

1.000 SCHEDULE A –BASE COST.....	1
1.001 MACHINERY AND EQUIPMENT NOT DESCRIBED IN SCHEDULE A.....	1
TABLE 1–Cost Factors	1
1.005 MACHINERY AND EQUIPMENT DESCRIBED IN SCHEDULE A.....	2
1.010 TANKS	2
1.010.100 Steel Bolted, Welded, or Pop Tanks–Above Ground	2
1.010.200 Stairways–Walkways–Stiles	3
1.010.300 Steel Welded Underground Tanks	3
1.010.400 Tanks–Insulation and Coatings	4
1.010.420 Steel Tanks–Fibreglass Insulation (50 mm).....	4
1.010.430 Steel Tanks–Fibreglass Insulation (76 mm).....	5
1.010.500 Steel Tanks–Urethane Insulation (25 mm).....	5
1.010.510 Steel Tanks–Urethane Insulation (38 mm).....	6
1.010.520 Steel Tanks–Urethane Insulation (50 mm).....	6
1.010.600 Fibreglass Tanks–Vertical	7
1.010.620 Fibreglass Tanks–Underground.....	7
1.010.640 Fibreglass Tanks–Insulation	7
1.010.700 Steel Pop Tanks–Rectangular	7
1.010.720 LPG Steel Tanks	8
1.010.800 Steel Chemical Storage Tanks	8
1.010.820 Plastic Chemical Storage Tanks	8
1.020 HEATERS, GAUGES, AND SWITCHES.....	9
1.020.100 Tank Heaters	9
1.020.200 Indirect Fired Line Heaters	9
1.020.300 Tank Gauges	9
1.020.400 Level Switches	10
1.030 TREATERS	10
1.030.100 Vertical	10
1.030.200 Mechanical–Horizontal.....	11
1.030.300 Electro Static/Dual Polarity–Horizontal	11
1.040 SEPARATORS	12
1.040.100 Vertical 2-Phase.....	12
1.040.200 Vertical 3-Phase.....	13
1.040.300 Horizontal 2-Phase	13
1.040.400 Horizontal 3-Phase	14
1.040.500 Vertical Centrifugal/Recycling	14
1.040.600 Environmental Low Stage Separator Tank Units	15
1.040.700 Pre-Fabricated Environmental Battery Units	15
1.050 FUEL GAS SCRUBBERS	16
1.060 FREE WATER KNOCKOUTS	17

1.070	GAS BOOTS	17
1.080	FLARE SYSTEMS	17
1.080.100	Vent Stacks 100 mm (4 in.) Stack.....	17
1.080.120	Vent Stacks 150 mm (6 in.) Stack.....	18
1.080.140	Vent Stacks 203 mm (8 in.) Stack.....	18
1.080.200	Flare Stacks Pilot & Shottube 100 mm (4 in.) Stack	18
1.080.220	Flare Stacks Pilot & Shottube 150 mm (6 in.) Stack	18
1.080.240	Flare Stacks Pilot & Shottube 200 mm (8 in.) Stack	18
1.080.300	Flare Stacks–Manual or Automatic or Solar Igniter 100 mm (4 in.) Stack....	19
1.080.320	Flare Stacks–Manual or Automatic or Solar Igniter 150 mm (6 in.) Stack....	19
1.080.340	Flare Stacks–Manual or Automatic or Solar Igniter 200 mm (8 in.) Stack....	19
1.080.500	Incinerators	19
1.090	COMPRESSORS	20
1.090.100	Vapour Recovery –Blower.....	20
1.090.200	Vapour Recovery–Single Stage	20
1.090.300	Vapour Recovery–Two Stage	20
1.090.400	Gas Compressors–Two Stage Electric Drive – Packaged.....	21
1.090.500	Gas Compressors–Two Stage Gas Drive–Packaged	21
1.100	PUMPS	22
1.100.100	Vertical Turbine Pumps	22
1.100.200	Centrifugal Pumps–End Suction	22
1.100.300	Centrifugal Pumps–Vertical Inline	23
1.100.400	Rotary Gear Pumps	23
1.100.500	Progressive Cavity Pumps	24
1.100.600	Piston / Plunger Pumps.....	24
1.100.700	Waterflood Pumps	25
1.110	AIR COMPRESSORS	25
1.110.100	Utility Air Compressors	25
1.110.200	Instrument Air Compressors–Reciprocating.....	25
1.110.300	Instrument Air Compressors–Rotary Screw.....	26
1.120	CHEMICAL INJECTORS	26
1.120.100	Electric Drive.....	26
1.120.200	Air/Gas Drivers	26
1.120.300	Oscillamatic	27
1.130	CONTROL VALVES	27
1.130.100	Emergency Shutdown Valves (ESD).....	27
1.130.200	2-Way Pneumatic Valves	27
1.130.300	Intermitter–Time Cycle Controller	28
1.140	CHOKES	28
1.140.100	Wellhead/Manifolds–Willis Manual	28
1.140.200	Wellhead/Manifolds–Master Flo Manual	28
1.140.300	Wellhead/Manifolds–Willis Pneumatic	28
1.140.400	Wellhead/Manifolds–Master Flo Pneumatic	29

1.150	ORIFICE FITTING AND METER RUNS	29
1.150.100	Senior.....	29
1.150.200	Simplex.....	29
1.160	METERING AND ANALYSIS.....	30
1.160.100	Mechanical Liquid Meters.....	30
1.160.200	Mechanical Gas Meters	30
1.160.300	Liquid Turbine Meters	30
1.160.400	Totalizers and Analyzers	31
1.160.500	Capacitance Probes	31
1.160.600	Chart Recorders	31
1.160.700	Transmitters	31
1.170	PRODUCTION MANIFOLDS	32
1.170.100	Manual-Per Well.....	32
1.170.200	Rotary Selector Valve	32
1.180	PIGGING EQUIPMENT	33
1.180.100	Pig Launcher/Receiver Traps	33
1.180.200	Pig Entry Tees.....	33
1.180.300	Pig Ball Valves-Manual Injectors	33
1.190	ELECTRICAL SERVICES	34
1.190.100	General Service Entrance on the Site	34
1.190.400	Thermo-Electric Generators	34
1.190.500	Remote System Radio Towers	34
1.190.600	Fire and Gas Detection Systems	34
1.230	DEHYDRATORS.....	35
1.230.100	Calcium Chloride Dryers	35
1.230.200	Glycol Dehydrator Package - 2 Phase.....	35
1.230.300	Glycol Dehydrator Package Options	36
1.240	FILTERS	37
1.240.100	Peco Liquid Filters	37
1.240.200	Peco Gas Filter Separations	37
1.240.300	Peco Dry Gas Filters.....	37
1.250	LACT UNITS.....	38
1.250.100	60 mm and 89 mm Piping Units.....	38
1.250.200	114 mm Piping Units.....	38
2.000	SCHEDULE B-ASSESSMENT YEAR MODIFIERS.....	39
3.000	SCHEDULE C-DEPRECIATION.....	40
3.001	TABLE 1-ANTICIPATED AGE LIFE.....	41
3.002	TABLE 2-DEPRECIATION FACTORS - ANTICIPATED AGE LIFE.....	42
4.000	SCHEDULE D-ADDITIONAL DEPRECIATION	44

1.000 SCHEDULE A –BASE COST

1.001 MACHINERY AND EQUIPMENT NOT DESCRIBED IN SCHEDULE A

The factors in Table 1 and the formula below shall be used to determine the base cost for machinery and equipment that is not described in Schedule A.

Formula: Base Cost = ac X cf

Where ac = the cost of machinery and equipment determined in accordance with Appendix V of the Minister’s Guidelines.

cf = the cost factor to convert the cost of the machinery and equipment (ac) from the year it was constructed in, to its cost in 1994.

TABLE 1–Cost Factors

Year of Construction	Cost Factor	Year of Construction	Cost Factor	Year of Construction	Cost Factor
		1942	9.99	1972	3.53
1913	18.86	1943	9.77	1973	3.31
1914	19.51	1944	9.71	1974	2.93
1915	19.88	1945	9.63	1975	2.43
1916	18.35	1946	8.93	1976	2.14
1917	15.57	1947	8.30	1977	1.96
1918	13.56	1948	7.94	1978	1.78
1919	11.97	1949	7.95	1979	1.57
1920	9.80	1950	7.73	1980	1.40
1921	10.87	1951	6.94	1981	1.24
1922	11.78	1952	6.50	1982	1.16
1923	11.48	1953	6.12	1983	1.28
1924	11.61	1954	6.05	1984	1.34
1925	11.79	1955	6.00	1985	1.30
1926	11.89	1956	5.76	1986	1.30
1927	11.90	1957	5.56	1987	1.26
1928	11.62	1958	5.45	1988	1.24
1929	11.18	1959	5.39	1989	1.18
1930	11.57	1960	5.34	1990	1.13
1931	12.46	1961	5.30	1991	1.07
1932	13.43	1962	5.29	1992	1.05
1933	14.08	1963	5.26	1993	1.03
1934	13.87	1964	5.05	1994	1.00
1935	13.73	1965	4.86	1995	0.98
1936	13.34	1966	4.68	1996	0.97
1937	12.49	1967	4.29	1997	0.94
1938	12.72	1968	4.48	1998	0.91
1939	12.60	1969	4.39	1999	0.88
1940	11.96	1970	3.97	2000	0.88
1941	10.91	1971	3.82	2001	0.85

1.005**MACHINERY AND EQUIPMENT DESCRIBED IN SCHEDULE A**

The rates in Schedule A reflect typical costs for field installations of component types. These rates apply to each component type regardless of the exact configuration of the system.

The rates for property described in Schedule A must be used to determine the base cost for that property and no changes or adjustments to the rates are permissible.

The base cost for machinery & equipment described in Schedule A is determined as follows:

- 1) Select the component category (e.g. Tanks, Steel Bolted),
- 2) Select the specific component (e.g. Size, Type),
- 3) Apply the base rate for the specific component.

1.010**TANKS****1.010.100****Steel Bolted, Welded, or Pop Tanks—Above Ground**

Size (m ³)	(bbl)	Diameter (m)	Height (m)	Base Rate (\$)
8	50	2.36	1.83	7 850
14	90	2.41	3.05	8 700
16	100	2.90	2.44	9 000
33	210	3.05	4.57	12 550
48	300	3.66	4.57	14 650
64	400	3.66	6.10	15 200
79	500 (Low)	6.55	2.44	18 050
79	500 (High)	4.72	4.88	17 100
119	750	4.72	7.32	19 900
159	1 000 (Low)	9.07	2.44	24 400
159	1 000 (High)	6.55	4.88	24 400
238	1 500	6.55	7.32	29 100
318	2 000	9.07	4.88	34 950
397	2 500	9.07	6.10	80 300
477	3 000	9.07	7.32	94 000
636	4 000	10.52	7.32	120 400
795	5 000	11.79	7.32	146 700
1 590	10 000	16.76	7.32	259 450
3 179	20 000	20.42	9.75	345 800

Rates include: flat bottom, cone deck
 flush-type cleanout door
 thief hatch and vacuum relief
 standard nozzles, manways and cleanouts
 flanges, valves and piping
 foundation bands and painting
 installation

Note: 1 barrel (Oil, 42 US Gallons) = 0.158 987 m³

1.010.200 Stairways–Walkways–Stiles

Stairway	Base Rate (\$ per m)
4.3 m of rise or less	395
Over 4.3 m of rise	370

Walkways or platforms	Base Rate (\$ per m)
1.2 m wide metal	280

Stiles	Base Rate (\$)
Per stile over berm	1 050

Rates include: paint and installation

1.010.300 Steel Welded Underground Tanks

Volume (l)	(gal.)	(bbl)	Base Rate (\$)
2 505	550	16	7 550
5 005	1 100	31	7 900
9 810	2 156	62	13 400
15 015	3 300	94	13 950
25 025	5 500	157	23 150
35 035	7 700	220	24 800
50 050	11 000	315	37 650

Rates include: excavation and backfill
hold downs and concrete
piping, flanges and valves
installation

1.010.400 Tanks–Insulation and Coatings

Insulation (mm)	Coating Type	Base Rate (\$ per m ²)
	Epoxy internal coating	45.50
50.0	Fibreglass, c/w metal cladding	76.50
76.0	Fibreglass, c/w metal cladding	89.50
51.0	Urethane for fibreglass tanks c/w	32.50
6.35	Diathon coating	
25.0	Urethane Insulation, c/w sealer	45.00
38.0	Urethane Insulation, c/w sealer	48.00
50.0	Urethane Insulation, c/w sealer	51.50
63.0	Urethane Insulation, c/w sealer	56.00
76.0	Urethane Insulation, c/w sealer	60.00

Rates include: surface preparation
installation

Note: Use the following formula to find the area of tank to be covered:

Horizontal Tank:

$$\text{Area} = (2 \times 3.14 \times r^2) + (2 \times 3.14 \times r \times l)$$

Vertical Tank:

$$\text{Area} = (1 \times 3.14 \times r^2) + (2 \times 3.14 \times r \times h)$$

Vertical Tank Area = 1 end only and cylinder

where: r = radius
l = length
h = height

1.010.420 Steel Tanks–Fibreglass Insulation (50 mm)

Size (bbl)	Diameter X Height (m x m)	Base Rate (\$ per 50 mm)
50	2.36 x 1.83	1 350
90	2.41 x 3.05	2 100
100	2.90 x 2.44	2 200
210	3.05 x 4.57	3 900
300	3.66 x 4.57	4 800
400	3.66 x 6.10	6 150
500(Low)	6.55 x 2.44	6 400
500(High)	4.72 x 4.88	6 850
750	4.72 x 7.32	9 650
1 000 (Low)	9.07 x 2.44	10 250
1 000 (High)	6.55 x 4.88	10 250
1 500	6.55 x 7.32	14 100
2 000	9.07 x 4.88	15 550
2 500	9.07 x 6.10	18 250
3 000	9.07 x 7.32	20 900
4 000	10.52 x 7.32	25 150
5 000	11.79 x 7.32	29 100
10 000	16.76 x 7.32	46 350
20 000	20.42 x 9.75	72 850

1.010.430 Steel Tanks–Fibreglass Insulation (76 mm)

Size (bbl)	Diameter X Height (m x m)	Base Rate (\$ per 76 mm)
50	2.36 x 1.83	1 600
90	2.41 x 3.05	2 450
100	2.90 x 2.44	2 600
210	3.05 x 4.57	4 550
300	3.66 x 4.57	5 650
400	3.66 x 6.10	7 200
500(Low)	6.55 x 2.44	7 500
500(High)	4.72 x 4.88	8 050
750	4.72 x 7.32	11 300
1 000 (Low)	9.07 x 2.44	12 000
1 000 (High)	6.55 x 4.88	12 000
1 500	6.55 x 7.32	16 500
2 000	9.07 x 4.88	18 200
2 500	9.07 x 6.10	21 350
3 000	9.07 x 7.32	24 450
4 000	10.52 x 7.32	29 400
5 000	11.79 x 7.32	34 000
10 000	16.76 x 7.32	54 200
20 000	20.42 x 9.75	85 250

Note: Use the following formula to calculate the area covered by the tank:

$$\text{Area} = (1 \times 3.14 \times r^2) + (2 \times 3.14 \times r \times h)$$

Where: r = radius
h = height

1.010.500 Steel Tanks–Urethane Insulation (25 mm)

Size (bbl)	Diameter X Height (m x m)	Base Rate (\$ per 25 mm)
50	2.36 x 1.83	800
90	2.41 x 3.05	1 250
100	2.90 x 2.44	1 300
210	3.05 x 4.57	2 300
300	3.66 x 4.57	2 850
400	3.66 x 6.10	3 650
500(Low)	6.55 x 2.44	3 750
500(High)	4.72 x 4.88	4 050
750	4.72 x 7.32	5 650
1 000 (Low)	9.07 x 2.44	6 050
1 000 (High)	6.55 x 4.88	6 050
1 500	6.55 x 7.32	8 300
2 000	9.07 x 4.88	9 150
2 500	9.07 x 6.10	10 700
3 000	9.07 x 7.32	12 300
4 000	10.52 x 7.32	14 800
5 000	11.79 x 7.32	17 100
10 000	16.76 x 7.32	27 250
20 000	20.42 x 9.75	42 850

1.010.510 Steel Tanks–Urethane Insulation (38 mm)

Size (bbl)	Diameter X Height (m x m)	Base Rate (\$ per 38 mm)
50	2.36 x 1.83	850
90	2.41 x 3.05	1 350
100	2.90 x 2.44	1 400
210	3.05 x 4.57	2 450
300	3.66 x 4.57	3 050
400	3.66 x 6.10	3 850
500(Low)	6.55 x 2.44	4 050
500(High)	4.72 x 4.88	4 300
750	4.72 x 7.32	6 050
1 000 (Low)	9.07 x 2.44	6 450
1 000 (High)	6.55 x 4.88	6 450
1 500	6.55 x 7.32	8 850
2 000	9.07 x 4.88	9 750
2 500	9.07 x 6.10	11 450
3 000	9.07 x 7.32	13 100
4 000	10.52 x 7.32	15 800
5 000	11.79 x 7.32	18 250
10 000	16.76 x 7.32	29 100
20 000	20.42 x 9.75	45 700

1.010.520 Steel Tanks–Urethane Insulation (50 mm)

Size (bbl)	Diameter X Height (m x m)	Base Rate (\$ per 50 mm)
50	2.36 x 1.83	900
90	2.41 x 3.05	1 400
100	2.90 x 2.44	1 500
210	3.05 x 4.57	2 650
300	3.66 x 4.57	3 250
400	3.66 x 6.10	4 150
500(Low)	6.55 x 2.44	4 300
500(High)	4.72 x 4.88	4 650
750	4.72 x 7.32	6 500
1 000 (Low)	9.07 x 2.44	6 900
1 000 (High)	6.55 x 4.88	6 900
1 500	6.55 x 7.32	9 500
2 000	9.07 x 4.88	10 500
2 500	9.07 x 6.10	12 250
3 000	9.07 x 7.32	14 050
4 000	10.52 x 7.32	16 950
5 000	11.79 x 7.32	19 600
10 000	16.76 x 7.32	31 200
20 000	20.42 x 9.75	49 050

Note: Use the following formula to calculate the area covered by the tank:

$$\text{Area} = (1 \times 3.14 \times r^2) \div (2 \times 3.14 \times 4 \times h)$$

where: r = radius

h = height

1.010.600 Fibreglass Tanks–Vertical

Size (m ³)	(bbl)	Base Rate (\$)
14.0	90	20 150
33.0	210	25 500
48.0	300	29 750
64.0	400	34 100
80.0	500	38 350
119.0	750	51 550

1.010.620 Fibreglass Tanks–Underground

Size (m ³)	(bbl)	Base Rate (\$)
2.3	14	9 400
4.6	29	10 200
7.9	50	13 050
16.0	100	16 500
32.0	200	26 550

Rates include: standard manway, nozzles and valves reinforcement installation

1.010.640 Fibreglass Tanks–Insulation

Size (m ³)	(bbl)	Base Rate (\$)
14.0	90	900
16.0	100	950
33.0	210	1 650
48.0	300	2 050
64.0	400	2 600
80.0	500	2 750
119.0	750	4 100

Rates include: 51.0 mm urethane with 6.35 mm Diathon coating preparation and installation

1.010.700 Steel Pop Tanks–Rectangular

Size (m ³)	(bbl)	Base Rate (\$)
8.0	50	8 900
16.0	100	10 200
33.0	210	16 350
64.0	400	19 450

Rates include: painting and steel skids

1.010.720 LPG Steel Tanks

Size (m³)	(US gal.)	Base Rate (\$)
1.9	500	3 750
3.8	1 000	6 200
5.7	1 500	18 850
8.0	2 000	22 650
19.0	5 000	49 550
34.0	9 100	55 900
45.0	12 000	63 200
68.0	18 000	76 600
114.0	30 000	96 750

Rates include: manway, piping and flanges
valves and instrumentation
foundation and installation

Note: one US gallon equals 3.8 litres

Steel ladder and Platform	Base Rate (\$)
Add	3 300

1.010.800 Steel Chemical Storage Tanks

Size (L)	(Imp. gal.)	Base Rate (\$)
1 365	300	1 550
2 275	500	1 700
4 550	1 000	2 650

Rates include: painting and installation

1.010.820 Plastic Chemical Storage Tanks

Size (L)	(Imp. gal.)	Base Rate (\$)
410	90	1 650
819	180	1 800
910	200	1 850
1 000	220	1 900
1 365	300	2 050
2 275	500	2 300
3 412	750	2 950
4 550	1 000	3 150
6 825	1 500	4 150

Rates include: piping, valves, stand, and straps
Installation

1.020 HEATERS, GAUGES, AND SWITCHES**1.020.100 Tank Heaters**

Rating (kW)	(Btu)	Base Rate (\$)
73 kW & smaller	250 000	3 300
147 kW	500 000	3 750

Rates include: flame arrestor
stack
burning equipment
installation

Note: 3412.14 Btu/h = 1 kW

1.020.200 Indirect Fired Line Heaters

Rating (kW)	(Btu/h)	Diameter (mm)	Length (m)	Base Rate (\$)
73	250 000	610	2.3	20 600
147	500 000	660	3.5	23 500
220	750 000	762	4.1	26 150
293	1 000 000	914	4.4	30 850
440	1 500 000	1 118	5.6	36 900
586	2 000 000	1 219	6.6	52 450
879	3 000 000	1 524	7.5	66 350
1 172	4 000 000	1 829	8.4	87 300
1 465	5 000 000	2 134	8.7	127 450
1 758	6 000 000	2 337	8.7	169 200

Rates include: fire tube, burners and pilot
flame arrestor, stack and fuel gas manifold
fuel gas scrubber, ball valve, PSV and pressure gauge
values, regulator, temperature controller
high temperature switch, thermometer and expansion drum
thief hatch, gauge glass and insulation
skids and installation

Note: 3412.14 Btu/h = 1 kW
Direct Heaters are considered obsolete

1.020.300 Tank Gauges

Type	Base Rate (\$)
Varec 2500 automatic	3 150

Rates include: aluminium gauge head
guide piping, elbows,
brackets and anchor bar
installation

1.020.400 Level Switches

Type	Base Rate (\$)
Roof Mount	1 600
Static Pressure Sensing	1 400

Rates include: electrical tubing, valves and flanges installation

1.030 TREATERS

1.030.100 Vertical

Diameter (m)	(ft)	Height (m)	(ft)	Pressure (kPa)	(psi)	Base Rate (\$)
1.22	4	6.1	20.0	345	50	51 000
1.22	4	8.4	27.5	345	50	56 350
1.83	6	6.1	20.0	345	50	56 950
1.83	6	8.4	27.5	345	50	63 250
2.44	8	6.1	20.0	345	50	74 050
2.44	8	8.4	27.5	345	50	83 100
3.05	10	6.1	20.0	345	50	86 700
3.05	10	8.4	27.5	345	50	98 000
1.22	4	6.1	20.0	517	75	56 300
1.22	4	8.4	27.5	517	75	62 350
1.83	6	6.1	20.0	517	75	63 100
1.83	6	8.4	27.5	517	75	70 200
2.44	8	6.1	20.0	517	75	82 400
2.44	8	8.4	27.5	517	75	92 550
3.05	10	6.1	20.0	517	75	96 800
3.05	10	8.4	27.5	517	75	109 500

Rates include: fire tube, flame arrestor, stack, anodes, fuel gas system c/w scrubber, thermostats, regulators and valves, ladder, crownsnest water siphon, thermometer, pressure gauge, gauge glass, water outlet valve, oil outlet valve, oil ,gas and water meters, gas back pressure valve, relief valve, insulation, skid, and installation

Note: 6.894757 pound force per square inch = 1 kPa

1.030.200 Mechanical–Horizontal

Diameter (m)	(ft)	Height (m)	(ft)	Pressure (kPa)	(psi)	Base Rate (\$)
1.83	6	6.1	20	345	50	113 950
2.44	8	6.1	20	345	50	126 950
2.44	8	7.6	25	345	50	140 900
2.44	8	9.1	30	345	50	188 650
3.05	10	9.1	30	345	50	202 050
3.05	10	12.2	40	345	50	218 650
3.05	10	15.2	50	345	50	233 550
3.05	10	21.3	70	345	50	303 100
1.83	6	6.1	20	517	75	126 050
2.44	8	6.1	20	517	75	139 050
2.44	8	7.6	25	517	75	146 950
2.44	8	9.1	30	517	75	200 750
3.05	10	9.1	30	517	75	214 150
3.05	10	12.2	40	517	75	230 750
3.05	10	15.2	50	517	75	257 750
3.05	10	21.3	70	517	75	327 300

1.030.300 Electro Static/Dual Polarity–Horizontal

Diameter (m)	(ft)	Height (m)	(ft)	Pressure (kPa)	(psi)	Base Rate (\$)
1.83	6	6.1	20	345	50	134 250
2.44	8	6.1	20	345	50	147 300
2.44	8	7.6	25	345	50	161 250
2.44	8	9.1	30	345	50	208 950
3.05	10	9.1	30	345	50	228 450
3.05	10	12.2	40	345	50	245 050
3.05	10	15.2	50	345	50	263 200
3.05	10	21.3	70	345	50	332 750
1.83	6	6.1	20	517	75	146 350
2.44	8	6.1	20	517	75	159 400
2.44	8	7.6	25	517	75	167 300
2.44	8	9.1	30	517	75	221 050
3.05	10	9.1	30	517	75	240 550
3.05	10	12.2	40	517	75	257 150
3.05	10	15.2	50	517	75	287 400
3.05	10	21.3	70	517	75	356 950

Rates include: fire tube, flame arrester, stack, anodes, fuel gas system c/w scrubber, thermostats, regulators and valves ladder, crownsnest water siphon, thermometer, pressure gauge, gauge glass, water outlet valve, oil outlet valve, oil ,gas and water meters, gas back pressure valve, relief valve, insulation, skid, and installation

Note: 6.894757 pound force per square inch = 1 kPa

1.040

SEPARATORS

1.040.100

Vertical 2-Phase

862–1896 kPa (125 psi - 275 psi)				
Diameter (mm)	(in.)	Height (m)	(ft)	Base Rate (\$)
300	12	1.5	5.0	27 500
400	16	1.5	5.0	28 150
500	20	1.5	5.0	28 750
600	24	1.5	5.0	34 200
750	30	1.5	5.0	36 250
900	36	1.5	5.0	38 300
400	16	2.3	7.5	28 950
500	20	2.3	7.5	29 600
600	24	2.3	7.5	35 200
750	30	2.3	7.5	37 350
900	36	2.3	7.5	39 550

5102 kPa (740 psi)				
Diameter (mm)	(in.)	Height (m)	(ft)	Base Rate (\$)
400	16	1.5	5.0	28 750
500	20	1.5	5.0	29 950
600	24	1.5	5.0	35 400
750	30	1.5	5.0	37 600

10204 kPa (1480 psi)				
Diameter (mm)	(in.)	Height (m)	(ft)	Base Rate (\$)
400	16	1.5	5.0	29 200
500	20	1.5	5.0	30 800
600	24	1.5	5.0	37 100
750	30	1.5	5.0	39 550
400	16	2.3	7.5	29 950
500	20	2.3	7.5	31 750
600	24	2.3	7.5	37 850
750	30	2.3	7.5	40 400
900	36	2.3	7.5	42 900

1.040.200 Vertical 3-Phase

862–1896 kPa (125 psi – 275 psi)				
Diameter (mm)	(in.)	Height (m)	(ft)	Base Rate (\$)
400	16	2.3	7.5	32 700
500	20	2.3	7.5	33 300
600	24	2.3	7.5	39 750
750	30	2.3	7.5	41 900
900	36	2.3	7.5	44 100
1 200	48	2.3	7.5	49 700
500	20	3.0	10.0	34 400
600	24	3.0	10.0	41 050
900	36	3.0	10.0	45 650
1 200	48	3.0	10.0	51 400
1 500	60	3.0	10.0	56 600

10204 kPa (1480 psi)				
Diameter (mm)	(in.)	Height (m)	(ft)	Base Rate (\$)
400	16	2.3	7.5	33 650
500	20	2.3	7.5	35 500
600	24	2.3	7.5	42 400
900	36	2.3	7.5	47 450
1 200	48	2.3	7.5	75 000
400	16	3.0	10.0	35 750
600	24	3.0	10.0	45 050
900	36	3.0	10.0	50 750
1 200	48	3.0	10.0	80 950

1.040.300 Horizontal 2-Phase

862–1896 kPa (125 psi - 275 psi)				
Diameter (mm)	(in.)	Height (m)	(ft)	Base Rate (\$)
600	24	3.0	10.0	25 650
750	30	3.0	10.0	27 800
900	36	3.0	10.0	29 900

10204 kPa (1480 psi)				
Diameter (mm)	(in.)	Height (m)	(ft)	Base Rate (\$)
500	20	3.0	10.0	25 700
600	24	3.0	10.0	29 300
750	30	3.0	10.0	32 000
900	36	3.0	10.0	34 700

1.040.400 Horizontal 3-Phase

862–1896 kPa (125 psi - 275 psi)				
Diameter (mm)	(in.)	Height (m)	(ft)	Base Rate (\$)
600	24	3.0	10.0	32 600
750	30	3.0	10.0	34 750
900	36	3.0	10.0	36 850

10204 kPa (1480 psi)				
Diameter (mm)	(in.)	Height (m)	(ft)	Base Rate (\$)
600	24	3.0	10.0	36 250
750	30	3.0	10.0	39 000
900	36	3.0	10.0	41 700

Rates include: liquid dump valves, block valves and fittings
 level controllers and high level switch
 gas valve pipe and fittings
 PSV, pressure gauge and gauge glass
 water boot (on 3 Phase horizontal)
 senior orifice fitting and meter run
 flow recorder
 skids and saddles
 thermometer and installation

1.040.500 Vertical Centrifugal/Recycling

10204 kPa (1480 psi²)				
Diameter (mm)	(in.)	Height (m)	(ft)	Base Rate (\$)
150	6	1.5	5.0	30 850
200	8	1.5	5.0	36 700
300	12	1.5	5.0	41 900
400	16	2.6	8.5	51 850
600	24	3.7	12.0	90 300
800	32	4.6	15.0	114 350

Rates include: gas back pressure valve and controller
 flow recorder and valve manifold
 senior orifice fitting and meter run
 pressure relief valve
 water level controller and gauge
 water dump valve and flow meter
 temperature and pressure gauges
 gas regulators, filter and scrubber
 ball valves piping and flanges
 installation

Note: Use the following table to cross reference ANSI ratings to working pressure:

WORKING PRESSURE
Service Temperature
-28.9 to 37.8C (-20 to 100F)

ANSI	kPa	psi
150	1 896	275
300	5 102	740
600	10 204	1 480
900	14 893	2 160
1 500	24 821	3 600
2 500	41 369	6 000

Note: Pound (force) per square inch x 6.894 757 = kPa

1.040.600 Environmental Low Stage Separator Tank Units

Size (bbl)	Base Rate (\$)
50	46 750
100	71 550

Rates include: sand frac flow back vessel
 piping and frac tees
 75 or 100 mm meter run
 dry flow meter
 sand diffuser
 ladder, hatches and pad
 installation

1.040.700 Pre-Fabricated Environmental Battery Units

Low pressure Unit (48kPa)	Lines & Meter Runs (mm)	Base Rate (\$)
Standard Unit unheated	50	42 600
Standard Unit unheated	75	44 250
Heated Unit	50	47 550
Heated Unit	75	49 200
Treating Unit	50	60 750
Treating Unit	75	62 400
Companion Storage Tank	add each	25 400

Standard Unit

Rates include: 500 barrel used railway oil tank car horizontal separator
 high level and high pressure shut off valves
 dry flow recorders and fluid level indicators
 flow lines, meter, flare lines
 100mm x12.2m flare stack, ignition and arrestor
 steel skids and saddles
 weir plank pad and installation

Heated Unit

Rates include: 250mm fire tube, burner and pilot light
500 barrel used railway oil tank car horizontal separator
high level and high pressure shut off valves
dry flow recorders and fluid level indicators
flow lines, meter, flare lines
100mm x12.2m flare stack, ignition and arrestor
steel skids and saddles
weir plank pad and installation

Treating Unit

Rates include: degasers and down comers
spreader pan and baffle plates
individual fluid level gauges for oil, gas and water
500 barrel used railway oil tank car horizontal separator
high level and high pressure shut off valves
dry flow recorders and fluid level indicators
flow lines, meter, flare lines
100mm x12.2m flare stack, ignition and arrestor
steel skids and saddles
weir plank pad and installation

Companion Storage Tank

Rates include: extension of site work, weir, pad and installation
steel skids and saddles
connecting piping to main unit
meters, valves and indicators

High Pressure Unit (345kPa)	Lines & Meter Runs (mm)	Base Rate (\$)
Standard Unit Unheated	75	110 050

Rates include: 500 barrel welded tank, horizontal separator
high level and high pressure shut off valves
dry flow recorders and fluid level indicators
flow lines, meter, flare lines
100mm x12.2m flare stack, ignition and arrestor
steel skids and saddles
weir plank pad and installation

1.050

FUEL GAS SCRUBBERS

	Base Rate (\$)
All Sizes	2 500

Rates include: block valve, shutoff valve
relief valve and pressure gauge
piping and high level switch
installation

1.060

FREE WATER KNOCKOUTS

Diameter (m)	(ft)	Length (m)	(ft)	Base Rate (\$)
1.83	6.0	3.0	10.0	105 450
1.83	6.0	4.6	15.0	111 500
2.44	8.0	4.6	15.0	123 600
3.05	10.0	6.1	20.0	150 150
3.05	10.0	9.1	30.0	162 250
3.05	10.0	12.2	40.0	237 800

Rates include: dump valve
 block valve
 pipe fittings and flanges
 level controllers
 gas back pressure valve
 gauge glass and pressure gauge
 PSV and thermometer
 skids and installation

1.070

GAS BOOTS

Diameter (mm)	(in.)	Base Rate (\$)
600	24	28 700
750	30	31 500
900	36	33 500
1 050	42	38 050
1 200	48	40 600
1 500	60	45 950

Rates include: guy wires
 pressure gauge, PSV and block valve
 piping, flanges and fittings
 steel caged ladder and top platform
 foundation and installation

Note: Average heights used are 9.1 to 12.2m (30 to 40 feet)

1.080

FLARE SYSTEMS

1.080.100

Vent Stacks 100 mm (4 in.) Stack

Height (m)	(ft)	Base Rate (\$)
9.1	30	11 050
12.2	40	11 250
15.2	50	11 650
18.3	60	15 250

1.080.120 Vent Stacks 150 mm (6 in.) Stack

Height (m)	(ft)	Base Rate (\$)
9.1	30	14 250
12.2	40	14 500
15.2	50	14 850
18.3	60	16 200

1.080.140 Vent Stacks 203 mm (8 in.) Stack

Height (m)	(ft)	Base Rate (\$)
9.1	30	17 500
12.2	40	17 750
15.2	50	18 100
18.3	60	20 750

1.080.200 Flare Stacks Pilot & Shottube 100 mm (4 in.) Stack

Height (m)	(ft)	Base Rate (\$)
9.1	30	13 200
12.2	40	13 450
15.2	50	13 950
18.3	60	17 700

1.080.220 Flare Stacks Pilot & Shottube 150 mm (6 in.) Stack

Height (m)	(ft)	Base Rate (\$)
9.1	30	16 450
12.2	40	16 650
15.2	50	17 150
18.3	60	19 700

1.080.240 Flare Stacks Pilot & Shottube 200 mm (8 in.) Stack

Height (m)	(ft)	Base Rate (\$)
9.1	30	19 650
12.2	40	19 900
15.2	50	20 650
18.3	60	23 150

1.080.300 Flare Stacks—Manual or Automatic or Solar Igniter 100 mm (4 in.) Stack

Height (m)	(ft)	Base Rate (\$)
9.1	30	15 300
12.2	40	15 950
15.2	50	16 550
18.3	60	20 500

1.080.320 Flare Stacks—Manual or Automatic or Solar Igniter 150 mm (6 in.) Stack

Height (m)	(ft)	Base Rate (\$)
9.1	30	18 550
12.2	40	19 150
15.2	50	19 750
18.3	60	22 550

1.080.340 Flare Stacks—Manual or Automatic or Solar Igniter 200 mm (8 in.) Stack

Height (m)	(ft)	Base Rate (\$)
9.1	30	21 800
12.1	40	22 400
15.2	50	23 350
18.2	60	26 000

Rates include: flare tips
base and foundation
piping and flange
regulator, valve and gauge
retractable assembly
electric service, flame failure switch
guy wires and installation

1.080.500 Incinerators

Height (m)	(ft)	Base Rate (\$)
14.3	47	87 350
15.2	50	90 150
18.3	60	99 350
21.3	70	108 500
24.4	80	117 700
27.4	90	126 900
28.6	94	130 600

Rates include: stack, guy wires and incinerator
piping and flange and electric ignition and switch
base and installation

1.090**COMPRESSORS****1.090.100****Vapour Recovery –Blower**

Size (kW)	(hp)	Base Rate (\$)
1.5	2	12 500
3.7	5	19 750
7.5	10	29 600

1.090.200**Vapour Recovery–Single Stage**

Size (kW)	(hp)	Base Rate (\$)
3.7	5	40 000
11.0	15	50 200
18.7	25	68 050
37.3	50	82 700
74.6	100	119 900
111.9	150	160 550

1.090.300**Vapour Recovery–Two Stage**

Size (kW)	(hp)	Base Rate (\$)
11.0	15	76 050
18.7	25	88 650
37.3	50	120 850
56.0	75	156 700
74.6	100	192 750
93.3	125	202 600
111.9	150	212 150

Rates include: compressor package
inlet separator
piping, flanges and fittings
controls
lube system
skids and installation

Note: Horsepower (electric) x 0.746 = kW

1.090.400 Gas Compressors—Two Stage Electric Drive – Packaged

Size (kW)	(hp)	Base Rate (\$)
14.9	20	95 800
37.3	50	96 300
44.8	60	152 550
74.6	100	157 700
93.3	125	182 700
149.2	200	195 100
223.8	300	263 700
additional stages each add		30 250

Rates include: compressor package
discharge air exchanger each stage
suction scrubber
controls, control panel
electrical and switches
electric motor and drive
piping, flanges and fittings
skids and installation

1.090.500 Gas Compressors—Two Stage Gas Drive—Packaged

Size (kW)	(hp)	Base Rate (\$)
14.9	20	112 700
37.3	50	112 700
44.8	60	179 450
74.6	100	189 050
93.3	125	212 550
149.2	200	244 850
223.8	300	331 000
additional stages each add		30 250

Rates include: compressor package
discharge air exchanger each stage
suction scrubber
controls, control panel and switches
gas motor and drive
piping, flanges and fittings
skids and installation

1.100**PUMPS****1.100.100****Vertical Turbine Pumps**

Inlet (mm)	(in.)	Motor (kW)	(hp)	Base Rate (\$)
100	4	1.5	2.0	7 600
100	4	2.2	3.0	7 900
100	4	3.7	5.0	8 750
100	4	5.6	7.5	9 900
150	6	2.2	3.0	8 150
150	6	3.7	5.0	9 300
150	6	5.6	7.5	10 300
150	6	7.5	10.0	10 700
150	6	11.2	15.0	12 050
150	6	14.9	20.0	13 400
150	6	18.7	25.0	13 900
150	6	22.4	30.0	15 250

Rates include: pump and base plate
explosion proof electric motor and drive assembly
piping, couplings, flanges and valves
electrical service and motor switch
installation

1.100.200**Centrifugal Pumps–End Suction**

Inlet (mm)	(in.)	Motor (kW)	(hp)	Base Rate (\$)
38	1.5	1.5	2.0	6 050
38	1.5	2.2	3.0	6 200
38	1.5	3.7	5.0	6 300
75	3.0	1.5	2.0	6 200
75	3.0	2.2	3.0	6 350
75	3.0	3.7	5.0	6 450
100	4.0	2.2	3.0	8 450
100	4.0	3.7	5.0	8 600
100	4.0	5.6	7.5	8 850
100	4.0	7.5	10.0	9 500
100	4.0	11.2	15.0	10 300

Rates include: pumps and base plates
explosion proof motor and drive assembly
piping, couplings, flanges and valves
electrical service and motor switch
installation

1.100.300 Centrifugal Pumps–Vertical Inline

Inlet (mm)	(in.)	Motor (kW)	(hp)	Base Rate (\$)
50	2.0	1.5	2.0	6 650
50	2.0	2.2	3.0	6 800
50	2.0	3.7	5.0	6 900
75	3.0	1.5	2.0	6 900
75	3.0	2.2	3.0	7 050
75	3.0	3.7	5.0	7 150
100	4.0	2.2	3.0	9 500
100	4.0	3.7	5.0	9 650
100	4.0	5.6	7.5	9 900
100	4.0	7.5	10.0	10 600
100	4.0	11.2	15.0	11 600

Rates include: pumps and base plates
explosion proof motor and drive assembly
piping, couplings, flanges and valves
electrical service and motor switch
installation

1.100.400 Rotary Gear Pumps

Inlet (mm)	(in.)	Motor (kW)	(hp)	Base Rate (\$)
38	1.5	1.5	2.0	5 250
38	1.5	2.2	3.0	5 400
38	1.5	3.7	5.0	5 500
63	2.5	1.5	2.0	7 250
63	2.5	2.2	3.0	7 400
63	2.5	3.7	5.0	7 500
75	3.0	7.5	10.0	8 250
75	3.0	11.2	15.0	8 800

Rates include: pump, base plates and mechanical seal
explosion proof motor and drive assembly
piping, couplings and flanges
valves and PSV
electrical service and motor switch
paint and installation

1.100.500 Progressive Cavity Pumps

Inlet (mm)	(in.)	Motor (kW)	(hp)	Base Rate (\$)
50	2.0	1.5	2.0	8 250
63	2.5	2.2	3.0	9 150
75	3.0	2.2	3.0	10 000
100	4.0	3.7	5.0	14 200
150	6.0	5.6	7.5	15 900
150	6.0	7.5	10.0	16 150
150	6.0	11.2	15.0	16 700

Rates include: pump, base plates and mechanical seal
steel rotor and stator, pin joints
explosion proof motor, drive assembly and guard
piping, couplings and flanges
valves and PSV
electrical service and motor switch
paint and installation

1.100.600 Piston / Plunger Pumps

Type	Motor (kW)	(hp)	Base Rate (\$)
Simplex	3.7	5.0	8 400
Duplex	7.5	10.0	11 950
Triplex	11.2	15.0	12 750
Triplex	22.4	30.0	22 250
Triplex	37.3	50.0	26 150
Triplex	74.6	100.0	40 900
Quintuplex	22.4	30.0	24 550
Quintuplex	37.3	50.0	29 750
Quintuplex	56.0	75.0	41 600
Quintuplex	74.6	100.0	49 300
Quintuplex	186.5	250.0	124 700

Rates include: pump, base plates and mechanical seal
explosion proof motor, drive assembly and guard
piping, couplings and flanges
valves and PSV
electrical service and motor switch
paint and installation
equipment skids for 30 hp and larger

1.100.700 Waterflood Pumps

Type	Motor (kW)	(hp)	Base Rate (\$)
Triplex	22.4	30	29 950
Triplex	44.8	60	36 000
Triplex	74.6	100	56 200
Triplex	123.1	165	79 250
Triplex	149.2	200	91 400
Triplex	279.8	375	231 500
Quintuplex	186.5	250	122 150
Quintuplex	223.8	300	146 800
Quintuplex	373.0	500	275 950
Quintuplex	466.3	625	298 850

Rates include: pump, base plates and mechanical seal
 explosion proof motor, drive assembly and guard
 piping, couplings and flanges
 valves and PSV
 electrical service and motor switch
 paint and installation
 equipment skids for 30 hp and larger

Note: Horsepower (electric) x 0.746 = 1 kW

1.110 AIR COMPRESSORS

1.110.100 Utility Air Compressors

Size (kW)	(hp)	Base Rate (\$)
1.5	2.0	4 950
3.7	5.0	5 550
7.5	10.0	7 350
11.2	15.0	8 000

Rates include: reciprocating compressor
 lubricated, 2 stage
 air receiver and motor
 electrical and switch
 piping, flange and installation

1.110.200 Instrument Air Compressors–Reciprocating

Size (kW)	(hp)	Base Rate (\$)
3.7	5.0	10 050
7.5	10.0	12 150
11.2	15.0	14 900

Rates include: reciprocating compressor
 air receiver and electric motor
 electrical and switch
 after cooler, air dryer package
 piping, flange and installation

1.110.300 Instrument Air Compressors–Rotary Screw

Size (kW)	(hp)	Base Rate (\$)
11.2	15.0	17 950
18.7	25.0	22 900
37.3	50.0	34 100
74.6	100.0	57 300

Rates include: lubricated oil injection compressor receiver and electric motor
 electrical and switch
 oil separator with pump
 after cooler, air dryer package
 piping, flange and installation

1.120 CHEMICAL INJECTORS

1.120.100 Electric Drive

Single Head–6 mm			
Motor (kW)	(hp)	Phases	Base Rate (\$)
0.19	0.25	1	2 200
0.19	0.25	3	3 400
0.37	0.50	1	2 300
0.37	0.50	3	3 500

Two Heads–6 mm			
Motor (kW)	(hp)	Phases	Base Rate (\$)
0.19	0.25	1	2 450
0.19	0.25	3	3 600
0.37	0.50	1	2 500
0.37	0.50	3	3 700

Rates include: pump and base
 electric motor and service
 tubing
 installation

1.120.200 Air/Gas Drivers

Plunger Size (mm)	(in.)	Base Rate (\$)
6	0.25	2 800
12	0.50	2 800
19	0.75	2 950
25	1.00	3 000
31	1.25	3 400

Rates include: pump and base
 tubing, couplings
 installation

1.120.300 Oscillamatic

Size	Base Rate (\$)
All sizes	1 900

1.130 CONTROL VALVES

1.130.100 Emergency Shutdown Valves (ESD)

Type	Size (mm)	(in.)	Base Rate (\$)
WKM Ball Valve	60	2	2 950
	89	3	4 200
	114	4	6 700
	168	6	11 200

Rates include: valve and actuator
 high/low pressure pilot switch
 flanges and tubing
 installation

1.130.200 2-Way Pneumatic Valves

Valve size (mm)	(in.)	ANSI size	Actuator size	Base Rate (\$)
25	1.0	Level	Control Valve	1 900
25	1.0	NPT	30	3 300
25	1.0	300	30	3 750
25	1.0	600	30	3 800
38	1.5	NPT	34	3 950
38	1.5	300	34	4 450
38	1.5	600	34	4 600
50	2.0	300	40	5 050
50	2.0	600	45	5 300
75	3.0	300	45	6 950
75	3.0	600	45	7 000
100	4.0	300	45	8 700
100	4.0	600	45	8 950
150	6.0	300	70	15 150
150	6.0	600	70	15 800

Rates include: valve and actuator
 level controller and pilot switch
 flanges and tubing
 installation

Note: 3-Way Pneumatic Valves are considered obsolete

2-Way Electric - valve actuation **add** **170**
3-Way Electric - valve actuation **add** **280**

1.130.300 Intermittent–Time Cycle Controller

Size (mm)	Base Rate (\$)
51	4 440
76	5 480
102	6 620
152	10 120

1.140 CHOKES

1.140.100 Wellhead/Manifolds–Willis Manual

Size (mm)	(in.)	Model	Base Rate (\$)
33	1	M-1A	1 200
60	2	M-2	2 450
89	3	M-3	5 350
114	4	M-4	5 800

Rates include: installation

1.140.200 Wellhead/Manifolds–Master Flo Manual

Size (mm)	(in.)	Model	Base Rate (\$)
33	1	P-1	1 800
60	2	P-2	2 450
89	3	P-3	4 550
114	4	P-4	13 750
168	6	P-6	29 350

Rates include: installation

1.140.300 Wellhead/Manifolds–Willis Pneumatic

Size (mm)	(in.)	Model	Base Rate (\$)
33	1	M-1A	3 200
60	2	PA-2	4 450
89	3	M-3	8 150
114	4	M-4	8 900
Pressure		add	2 120

Rates include: valve and actuator
tubing and flanges
installation

1.140.400 Wellhead/Manifolds–Master Flo Pneumatic

Size (mm)	(in.)	Model	Base Rate (\$)
33	1	P-1	3 300
60	2	P-2	4 350
89	3	P-3	8 750
114	4	P-4	19 150
168	6	P-6	34 700
Pressure		Add	2 120

Rates include: valve and actuator
tubing and flanges
installation

1.150 ORIFICE FITTING AND METER RUNS**1.150.100 Senior**

Size (mm)	(in.)	Base Rate (\$)
60	2	4 750
89	3	5 200
114	4	5 950
168	6	7 450
219	8	10 250
273	10	13 000

Rates include: orifice fittings, plate and holder
meter run and flanges
tubes and couplings
installation

1.150.200 Simplex

Size (mm)	(in.)	Base Rate (\$)
60	2	1 700
89	3	2 000
114	4	2 600
168	6	3 650
219	8	6 200
273	10	8 850

Rates include: orifice fittings and plate
meter run and flanges
plate holder
tubes and couplings
installation

1.160 METERING AND ANALYSIS

1.160.100 Mechanical Liquid Meters

Type	Size (mm)	(in.)	Base Rate (\$)
Barton FL 10	33	1.0	1 550
Barton Flotrac 306	33	1.0	1 050
Barton Flotrac 380	33	1.0	1 050
Floco F-2500	33	1.0	1 750
Floco 382 NPT	60	2.0	5 250
Floco 382 600 ANSI	60	2.0	6 950
Floco 383 NPT	89	3.0	5 250
Floco 383 600 ANSI	89	3.0	7 650
Automatic Sampler–sweet service	add		1 260
Automatic Sampler–sour service	add		1 410

Rates include: valves
pipe and fittings
installation

Note: The above meters are positive displacement meters for the measurement of brine, production water and oil production.
Model FL 10 is a flow meter.

1.160.200 Mechanical Gas Meters

Type	Size (mm)	(in.)	Base Rate (\$)
Dresser Roots	48	1.5	2 000
Dresser Roots	60	2.0	2 450

Rates include: pipe and fittings
Installation

1.160.300 Liquid Turbine Meters

Type	Size (mm)	(in.)	Base Rate (\$)
Smith Watchman	27	0.75	1 950
Smith Watchman	33	1.00	2 200
Smith Guardsman	48	1.50	3 950
Smith Guardsman	60	2.00	3 950
Smith Guardsman	89	3.00	4 750
Halliburton	10-51	0.38-2.00	1 000
Halliburton	76	3.00	2 150
Halliburton	102	4.00	2 900

Rates include: pipe and fittings
electrical
installation

1.160.400 Totalizers and Analyzers

Type	Base Rate (\$)
CMOS CTC-61 Totalizer	4 350
Halliburton LO-11 Totalizer	1 100
Halliburton MC-11 Analyzer	1 250
Halliburton Net Oil Analyzer	4 900

Rates include: remote panel mounted installation

Note: Totalizers are used with turbine meters.
Analyzers are used a probe to measure water in an oil stream

1.160.500 Capacitance Probes

Size (mm)	(in.)	Base Rate (\$)
60	2	3 650
89	3	4 950
114	4	5 700

Rates include: probe and electric cable
Installation

1.160.600 Chart Recorders

Type	Base Rate (\$)
2 Pen Circular-6900 kPa element	3 100
3 Pen Circular-6900 kPa element	3 650

Rates include: tubing, valves and manifold
pressure element
temperature element
spring chart drive
installation

1.160.700 Transmitters

Type	Base Rate (\$)
Differential Pressure Flow	2 250
Pressure	1 650
Temperature	1 100

Rates include: electrical
installation

Note: Rates are for Barton, Rosemount or Foxboro types

1.170 PRODUCTION MANIFOLDS

1.170.100 Manual-Per Well

Size (mm)	(in.)	Base Rate (\$)
60	2	8 000
89	3	10 400
114	4	12 000
168	6	16 000

Rates include: piping and fittings to headers per well
 multiple valves per well
 inlet, test, pigging and group headers per well
 installation

Note: To determine the total cost of a multiwell manual manifold, multiply the cost per well (above) by the number of wells entering the manifold.

1.170.200 Rotary Selector Valve

Type	Base Rate (\$)
Rotary Selector Valve	6 150
60 mm (2 in.) Inlets-per well, add	1 900
Electric auto-actuator add	3 750

Rates include: piping and fittings to rotary valve-per well
 piping from rotary to test header-per well
 valves-per well
 installation

Note: To determine the total cost of a rotary selector manifold:

inlet manifold cost per well X number of wells entering the rotary valve
 Add this cost to the cost of a rotary selector valve and add the cost of an auto-actuator if found.

Example: Rotary Valve Manifold-5 Wells

5 well inlet manifolds @ \$1 900	=	\$9 500
1 Rotary Selector Valve	=	\$6 150
1 Electric auto- actuator	=	\$3 750
Total Manifold Cost	=	<u>\$19 400</u>

1.180 PIGGING EQUIPMENT
1.180.100 Pig Launcher/Receiver Traps

Size (mm)	(in.)	Base Rate (\$)
60	2	5 000
89	3	5 200
114	4	6 650
168	6	12 100
219	8	13 150

Rates include: inlet, outlet and bypass valves
bleed valve and bypass
piping and fittings
structural support
installation

1.180.200 Pig Entry Tees

Size (mm)	(in.)	Base Rate (\$)
60	2	2 150
89	3	2 250
114	4	2 550

Rates include: block valves each side
bleed valve
installation

1.180.300 Pig Ball Valves–Manual Injectors

Size (mm)	(in.)	Base Rate (\$)
60	2	2 650
89	3	3 250
114	4	5 450
168	6	12 700

Rates include: bleed valve
Installation

1.190 ELECTRICAL SERVICES

1.190.100 General Service Entrance on the Site

	Base Rate (\$)
Single Phase Service, 120/240V, 101A to 200A*	2 780
Three Phase Service, 480V, 201A to 400A*	7 820
Three Phase Service, 480V, 401A to 800A*	14 850

Rates include: circuit panel, main disconnect, branch circuit breakers, splitter, disconnects and grounding trenching, cable, miscellaneous installation

*Does not include line up to and including the meter.

A Sub-Station Transformer is required to step-down a 480 Volt service to circuits of 460 Volt 3 Phase for motors and circuits of Single Phase 120/208 Volts for buildings, lights, etc.

A Sub-Station Transformer may be located inside a building or at an exterior plywood shelter and are found in association with electrical vaults, panels and switching gear.

1.190.400 Thermo-Electric Generators

Unit	Base Rate (\$)
Less than 40W	5 200
over 40W	9 750

1.190.500 Remote System Radio Towers

Self-Supporting Height (m)	(ft)	Base Rate (\$)
8.5	28	1 550
11.0	36	2 050
13.4	44	2 550
16.5	54	3 050
20.7	68	3 500
Radio Antennas—building mounted antenna		420

1.190.600 Fire and Gas Detection Systems

Unit	Base Rate (\$)
Fire detection controller	4 500
Fire detector heads add each	2 000
Gas detection controller	2 200
Gas detector heads add each	1 250
Horn	350
Warning lights add each	500

1.230

DEHYDRATORS

1.230.100

Calcium Chloride Dryers

Diameter (mm)	(in.)	Height (m)	(ft)	Base Rate (\$)
300	12	8.2	27	12 850
400	16	8.2	27	15 550
500	20	8.2	27	17 250
600	24	8.2	27	22 000
750	30	8.2	27	25 550
Pellet loading arm assembly add				2 780
Meter run and dry flow recorder add				As found

Rates include: vessel with integral scrubber
calcium chloride pellets
600 mm (24 in.) bed of glass beads
scrubber heating coil
dump valve, piping and flanges
fuel gas scrubber with controls
installation

1.230.200

Glycol Dehydrator Package - 2 Phase

Diameter (mm)	(in.)	Height (m)	(ft)	Base Rate (\$)
300	12	4.3	14	50 400
400	16	4.3	14	57 200
500	20	4.3	14	67 750
600	24	4.3	14	73 350
750	30	4.3	14	79 400
Meter run and dry flow recorder add				As found

Rates include: 4 tray vessel and 2 phase integral scrubber
glycol regenerator including reboiler
glycol/glycol exchanger
fire tube, flame arrestor, burner and pilot assembly
fuel gas scrubber and control package
standard dehydrator instrument package
glycol pump, piping, fittings, tubing and valves
process piping, controllers, gauges and glass
installation

1.230.300 Glycol Dehydrator Package Options

The following costs should be added to the glycol dehydrator rates found under Sections 1.230.200

ADDITIONAL TRAYS

Vessel Diameter (mm)	(in.)	Rate/Tray (\$)
300	12	580
400	16	810
500	20	990
600	24	1 090
750	30	1 820

Note: Each additional 450 mm (18 in.) of vessel height above 4.3 m (14 ft.) is assumed to contain one tray. Vessel heights are measured from seam to seam.

THIRD PHASE ADDITION

Vessel Diameter (mm)	(in.)	Rate/Tray (\$)
300	12	3 050
400	16	3 150
500	20	3 450
600	24	3 750
750	30	4 100

Note: For a third phase, the above rates are added to the scrubber and controls.

STANDBY GLYCOL PUMP ADDITION

Vessel Diameter (mm)	(in.)	Rate (\$)
300	12	4 100
400	16	4 100
500	20	4 900
600	24	4 900
750	30	6 650

Note: For a standby glycol pump complete with piping and valves, add the above rates.

1.240**FILTERS****1.240.100****Peco Liquid Filters**

Diameter (mm)	(in.)	Height (mm)	(in.)	Base Rate (\$)
168	6.6	787	31	1 800
168	6.6	1 168	46	1 900
219	8.6	813	32	2 150
219	8.6	1 422	56	2 350

Rates include: block valve and bypass valves
drain valve
piping and fittings
installation

1.240.200**Peco Gas Filter Separations**

Diameter (mm)	(in.)	Height (mm)	(in.)	Base Rate (\$)
168	6.6	1 391	55	4 450
168	6.6	1 772	70	4 600
168	6.6	2 002	79	4 750
219	8.6	2 178	86	6 900

Rates include: block valves, bypass valve
drain valve
piping and fittings
installation

1.240.300**Peco Dry Gas Filters**

Diameter (mm)	(in.)	Height (mm)	(in.)	Base Rate (\$)
168	6.6	660	26	3 500
168	6.6	1 041	41	3 700
168	6.6	1 270	50	3 950

Rates include: block valves, bypass valve
drain valve
piping and fittings
installation

Note: No instrumental or PSVs have been included in any of the rates. Filters may be applied in the removal of particles and liquid separation such as hydrocarbon fluids, glycols, process fluids, salt water, fresh water, and water solutions as well as filtering and separating gases. Filter pressure vessels can be vertical or horizontal with removable end closures.

1.250**LACT UNITS****1.250.100****60 mm and 89 mm Piping Units**

Pump Size (kW)	(hp)	Base Rate (\$)
7.5	10	47 350
11.2	15	54 750
14.9	20	63 400
18.6	25	76 750
22.4	30	85 000
29.8	40	107 000
37.3	50	145 700
74.6	100	151 750

1.250.200**114 mm Piping Units**

Pump Size (kW)	(hp)	Base Rate (\$)
7.5	10	49 450
11.2	15	56 850
14.9	20	65 500
18.6	25	78 800
22.4	30	87 100
29.8	40	107 650
37.3	50	146 350
74.6	100	152 350

Rates include: skids and foundation
piping, valves and fittings
suction strainer, sampler
BS & W monitor, temperature indicator
charge pump and motor
shipping pump and motor
divert valve and metering
low pressure switch, motor switches
vibration switch, PSV
high discharge pressure switch
discharge pressure transmitter
electrical, controls and panels
installation

Note: 1 hp = 0.7460 kW
LACT Units found with pump sizes exceeding 74.6 kW (100 hp) should be considered as special installations and costs obtained.

2.000**SCHEDULE B—ASSESSMENT YEAR MODIFIERS**

The following assessment year modifiers are for machinery and equipment described in the Alberta Machinery and Equipment Assessment Manual.

Assessment Year	Assessment Year Modifier
2001	1.17
2000	1.14
1999	1.14
1998	1.10

3.000**SCHEDULE C–DEPRECIATION**

Depreciation factors for machinery and equipment described in the Alberta Machinery and Equipment Assessment Manual is listed in Table 2–Depreciation Factors. Depreciation for machinery and equipment that is *not* described in the manual shall be determined in a manner that is fair and equitable with the depreciation factors listed in Table 2.

The anticipated age life for machinery and equipment described in Schedule A is 20 years. The anticipated age life for machinery and equipment located in specific classes of property is listed in Table 1.

“Age“ refers to the chronological age or the effective age, in years.

“Effective age” refers to the estimated age of machinery and equipment based on its present condition, design features and engineer amenities. Effective age may be less than, equal to, or greater than actual age. Effective age is determined by examining the present condition, design features and engineer amenities of comparable types of machinery and equipment.

3.001

TABLE 1—ANTICIPATED AGE LIFE

CLASS OF PROPERTY	ANTICIPATED AGE LIFE OF M & E
Acid Plant	20 years
Brewery	25 years
Brick Plant	25 years
Cannery	20 years
Chemical Plant	20 years
Cement Plant	20 years
Coal Processing Plant	20 years
Distillery	25 years
Dairy, Creamery	25 years
Enhanced Oil Recovery	15 years
Feed or Flour Mill	25 years
Gas Processing (including sour gas)	20 years
Gas Injection or Compression	20 years
Insulation Plant	20 years
Meat Packing Plant	25 years
Methanol Plant	15 years
Oil Sand Processing Plant	15 years
Oilfield Battery	20 years
Plywood/OSB*/Wallboard Manufacturing Plant	20 years
Pulp Mill	15 years
Pelitzing Plant (Feed)	20 years
Refinery (Metal)	15 years
Refinery (Oil)	20 years
Refinery (Sugar)	20 years
Roofing Plant	20 years
Saw or Stud Mill	20 years
Seed Cleaning Plant	25 years
Soft Drink Plant	20 years
Steel Mill	20 years
Sulphur or Fertilizer Plant	15 years
Tire Plant	15 years
Water Flood	20 years

*OSB—Oriented Strand Board

3.002

TABLE 2-DEPRECIATION FACTORS - ANTICIPATED AGE LIFE

Age (Years)	10 Years	15 Years	20 Years	25 Years	30 Years	35 Years	50 Years	60 Years
0	75	75	75	75	75	75	75	75
1	75	75	75	75	75	75	75	75
2	75	75	75	75	75	75	75	75
3	73	75	75	75	75	75	75	75
4	66	75	75	75	75	75	75	75
5	59	71	75	75	75	75	75	75
6	53	66	74	75	75	75	75	75
7	48	62	70	75	75	75	75	75
8	43	58	66	72	75	75	75	75
9	40	54	63	69	74	75	75	75
10		50	60	67	71	75	75	75
11		47	57	64	69	73	75	75
12		44	54	61	67	71	75	75
13		41	51	59	64	69	75	75
14		40	49	57	62	67	75	75
15			46	54	60	65	74	75
16			44	52	58	63	72	75
17			42	50	56	61	71	75
18			40	48	54	59	70	74
19				46	53	58	68	73
20				44	51	56	67	72
21				42	49	54	65	70
22				41	47	53	64	69
23				40	46	51	63	68
24					44	50	62	67
25					43	48	60	66
26					41	47	59	65
27					40	46	58	64
28						44	57	63
29						43	56	61
30						42	55	60
31						41	54	59
32						40	52	58
33							51	57
34							50	57
35							49	56

Note: Expressed as percentage remaining

Anticipated Age Life (cont.)

Age (Years)	10 Years	15 Years	20 Years	25 Years	30 Years	35 Years	50 Years	60 Years
36							48	55
37							47	54
38							46	53
39							46	52
40							45	51
41							44	50
42							43	49
43							42	49
44							41	48
45							40	47
46								46
47								45
48								45
49								44
50								43
51								42
52								42
53								41
54								40

Note: Expressed as percentage remaining

4.000**SCHEDULE D—ADDITIONAL DEPRECIATION**

For any depreciation that is not reflected in Schedule C, the assessor may adjust for additional depreciation provided acceptable evidence of such loss in value exists.

