



COMPASS
INTERNATIONAL INC.



2021

**Worldwide Industrial /
Commercial Construction
Schedule of Rates Yearbook**

12TH EDITION



0

1 DIVISION 0

Introduction and Calibration Factors: includes the following:
 Location (Calibration) Factors - International values compared to Washington D.C. (Base of 1.00). Calibrations in this application are used to adjust the unit prices / schedule of rates depicted in the following Divisions 1 – 17.
 188 # International Cities Location / Calibration Factors.
 General Conversion Values - Imperial to Metric Units.
 Import Duties General Sales Tax / Value. Added Tax / Consumption Tax.
 284 # USA Location (Calibration) Factors.
 Detailed Design / Engineering / Architectural and CM Fees 51 # Facility Types.
 Union Labor Costs.
 USA and Canada State & Province Sales Tax / GST.
 Inflation Cost Indexes.

00

27 DIVISION 00

Cost Models / Cost Benchmarks (19 Number) includes cost and quantity data on the following:
 Power Station Cost Model.
 Crude Oil Distillation Complex.
 High Rise Apartment Building Cost Model.
 Waste Water Treatment Cost Model.
 EPCM Home Office Billing Rate Sheet.
 Consumer Products Facility.
 Steel Production Cost Model.
 Beverage Production Facility Cost Model.
 Petro – Chemical Cost Model.
 78 # Engineering / Construction Cost Benchmarks.
 Class A Office Building
 UK Pharmaceutical Facility
 Clean Warehouse
 Regional Airport
 Shopping Mall
 Clean Warehouse Facility

01

63

DIVISION 01

General Requirements / General Conditions / Preliminaries:

includes cost data on the following:

Rules of thumb

Insurance Costs

Protection of Completed Work

Scaffolding

Temporary Utilities, Structures & Fences

Permits

Testing / Inspection

Surveys

Bonds

Site Staff / Field Personnel

Construction Equipment Costs / Rental

Temporary Construction Items

02

85

DIVISION 02

Site Construction: includes schedule of rates for:

Demolition (including asbestos)

Excavation

Rock removal

Hardcore / Stone

Shoring

Planking & Strutting / Sheet Piling

Foundation Piling

Utilities

Miscellaneous Site Improvements

Paving

Concrete Curbing

Fencing

Site Lighting

Marine Work

Underground Storage Tanks

03

105**DIVISION 03**

Concrete Work: includes schedule of rates for:

Concrete
Formwork
Reinforcement
Precast Concrete
Grouting

04

131**DIVISION 04**

Masonry: includes schedule of rates for:

Brickwork
Masonry
Refractory

05

141**DIVISION 05**

Metals: includes schedule of rates for:

Structural Steel
Metal Joists
Metal Framing
Miscellaneous Iron
Metal Decking

06

159**DIVISION 06**

Wood and Plastics: includes schedule of rates for:

Rough Carpentry
Finish Carpentry
Carpentry Specialties

07

169

DIVISION 07

Thermal and Moisture Protection: includes schedule of rates for:
Damp proofing and Waterproofing
Thermal Protection
Roofing Systems
Caulking & Sealants

08

183

DIVISION 08

Doors and Windows: includes schedule of rates for:
Wood and Plastic Doors
Metal Doors and Frames
Windows
Glazing / Glazed Curtain Walls
Hardware

09

191

DIVISION 09

Finishes: includes schedule of rates for:
Plaster and Gypsum Board
Tile
Terrazzo
Ceilings
Flooring
Wall Finishes
Acoustical Treatment
Painting and Coatings

10

203

DIVISION 10

Specialties: includes schedule of rates for:
Visual Display Boards
Compartments and Cubicles
Louvers and Vents
Wall and Corner Guards
Miscellaneous Facility Specialties

11

- 211 DIVISION 11**
Equipment: includes schedule of rates for:
Maintenance Equipment
Loading Dock Equipment
Industrial and Process Equipment
Laboratory Equipment
Material Handling Equipment

12

- 223 DIVISION 12**
Furnishings: includes schedule of rates for:
Furniture
Manufactured Casework

13

- 227 DIVISION 13**
Special Construction: includes schedule of rates for:
Pre-Engineered Buildings & Structures
Radiation Protection
Storage Tanks
Security Access and Surveillance

14

- 235 DIVISION 14**
Conveying Systems: includes schedule of rates for:
Elevators
Escalators and Moving Walks
Hoists and Cranes

15

243

DIVISION 15

Mechanical Work: includes schedule of rates for:

Building Services Piping

Plumbing Fixtures

Process Piping

Fire Protection Piping

Heating, Ventilating & Air Conditioning Equipment

Ductwork

Insulation

16

313

DIVISION 16

Electrical Work: includes schedule of rates for:

Electrical Equipment / Transformers

Cable / Control wire

Conduit

Cable tray

Communications

Instrumentation and Controls

17

345

DIVISION 17

Process Equipment / Major Equipment: includes schedule of rates for:

Agitators

Air Handlers

Boilers

Chillers

Compressors

Condensers

Conveyors

Cooling Towers

Ductwork

Heat Exchangers

Pumps

Tanks

383

ABOUT THE FIRM

Introduction and Calibration factors

This publication, the 2021 Worldwide Industrial / Commercial Construction Schedule of Rates Yearbook is conceivably the most authoritative and up to date estimating tool specific to the topic of Industrial and Commercial unit price (schedule of rates) estimating. The main benefits of this publication are that it is easily understood and it can be used immediately to compile accurate detailed or semi-detailed construction cost estimates. Note the Term: Construction Schedule of Rates is a term widely used in Europe and the rest of the world, in North America this methodology or approach is usually referred to as Unit Price Estimating, both these terms are interchangeable when utilizing this publication.

The following Divisions 1 - 17 contain U.S. unit costs for materials, labor (union application) and construction equipment for construction work associated with industrial and commercial construction work applicable for 2021. This publication answers the questions and issues that are needed in order to produce an accurate domestic or international cost estimate. This reference guide is appropriate for construction professionals who are familiar or who are possibly new to the topic of detailed unit price estimating (schedule of rates estimating). This method can be best described in the following manner - The total construction project (the construction effort or work items) is broken down into smaller distinct work scope items – i.e. a number of single line items (the construction project may consist of 100's or possibly 1,000's of these particular line items). A "unit price cost" (schedule of rates) is determined for

each scope item, i.e. line item, the appropriate unit price cost is selected from this publication. The unit price is then multiplied by the "take-off quantity," i.e. the actual number of doors or windows needed in the facility, the cubic yards of concrete or the length of pipe required; these quantities are more often than not depicted on the architectural / engineering drawings. They are "taken-off" the architectural / general arrangement drawings by counting each door or by measuring the footage of pipe depicted on the drawings (think of the take-off list as a shopping list of items that will need to be purchased or fabricated to complete the construction work depicted on the drawings and further described in the specifications), it is many times further described in (the scope of work

statement). This action then establishes the construction cost for each work item (line item). All of the line item costs are then summed up to obtain the total installed cost (TIC) for the project being reviewed or estimated. To summarize the above statement - the total cost of a building / facility is the summary / collection of the "taken-off" quantities multiplied by the related unit cost price detailed in this publication.

The unit cost method of estimating (schedule of rates) is a "proven" reasonably uncomplicated method of determining final construction costs; nevertheless it is a time consuming effort (there is software available and computerized tools that can significantly speed up this effort), nonetheless the end result is usually accurate, perhaps considered better than +/- 5% accurate. We are confident that this data used in concert with some of the tables and cost models depicted in Divi-

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all in rate.

- Excludes construction equipment / fueling and maintenance.
- Excludes general conditions / Division 1 / Preliminaries (trailers and scaffold etc.) / Excludes consumables (gases, rags and grease).

TRADE	BASE WAGE	"A" ALL-IN RATE
Bricklayer	52.80	97.69
Carpenter	51.30	94.86
Electrician	61.02	112.68
Laborer, General	37.93	70.23
Operating Engineer, General	53.47	99.02
Painter, General	46.39	85.92
Plumber / Pipe fitter	61.06	112.64
Roofer	46.03	85.39
Sheet Metal Worker, General	60.34	111.17
Structural Iron Worker	57.82	106.78
AVERAGE RATE	52.82	97.64

USA & Canada State and Province Sales Tax / GST: Sales tax on materials is indicated following. Typically labor is not taxed. Some businesses may be able to obtain sales tax / exemption forms (certificate) that allow them to claim the sales tax back

STATE	TAX (%)
Alabama	4
Alaska	0
Arizona	5.6
Arkansas	6.50
California	7.25
Colorado	2.9
Connecticut	6.35
Delaware	0
District of Columbia	6
Florida	6
Georgia	4
Hawaii	4
Idaho	6
Illinois	6.25
Indiana	7
Iowa	6
Kansas	6.5
Kentucky	6

STATE	TAX (%)
Louisiana	4.45
Maine	5.5
Maryland	6
Massachusetts	6.25
Michigan	6
Minnesota	6.875
Mississippi	7
Missouri	4.225
Montana	0
Nebraska	5.5
Nevada	6.85
New Hampshire	0
New Jersey	6.625
New Mexico	5.125
New York	4
North Carolina	4.75
North Dakota	5
Ohio	5.75
Oklahoma	4.5
Oregon	0
Pennsylvania	6
Rhode Island	7
South Carolina	6
South Dakota	4.5
Tennessee	7
Texas	6.25
Utah	4.7
Vermont	6
Virginia	5.30
Washington	6.5
West Virginia	6
Wisconsin	5
Wyoming	4

Canada Provinces impose QST/GST/PST & HST tax
Average - Check with each Province

Alberta	5
British Columbia	12
Manitoba	13
New Brunswick	15
Newfoundland	15
Northwest Territories	5
Nova Scotia	15
Nunavut	5
Ontario	13
PEI	14
Quebec	14.975
Saskatchewan	10
Yukon	5

(2) ESTIMATING ASSESSMENT SHEET:

The following capital cost estimate review sheet sets the ranges minimum and maximum for various activities. This data can be used as a data source to calibrate / compare specific key elements of a pro-

cess related project, this data applies to new / green field construction applications.

- (I.S.B.L.): inside battery limits (M.E.) major equipment (T.I.C.) total installed cost
- (D.L.): direct labor

NO.	RATIOS & PERCENTAGES	NORMAL RANGE
1	Site Works as a percentage of M.E. (I.S.B.L)	2 – 5%
2	Buildings / Structures as a percentage of M.E. (I.S.B.L)	5 – 12%
3	Piping material as percent M.E. (I.S.B.L)	20-50%
4	Labor as percent of T.I.C.	20-30%
5	Piping labor as percent of pipe material	40-125%
6	Indirect cost as percent D.L.	70-125%
7	Piping labor as percent D.L.	10-55%
8	Typical M.E. Multiplier to T.I.C.	3.0 – 5.50 (Typical average 4.00) Refer to Benchmark Data.
9	Instrument material as percent M.E. (I.S.B.L.)	15-20%
10	Electrical work as a percentage of M.E. (I.S.B.L)	7 – 12%
11	Electrical labor as a percentage of M.E. (I.S.B.L)	10 – 20%
12	Insulation work as a percentage of M.E. (I.S.B.L)	3 – 5%
13	Field Establishment as a percentage of field in-directs	4 – 9%
14	Small tools / consumables as percent of D.L.	0.15 – 2.25%
15	Scaffolding as percent of D.L.	0.5 – 2%
16	Spare Parts	5% to 7.5% of major equipment on complex process facilities
17	Spare parts as percent of D.L.	0.1 – 1.5%
18	Freight	3% to 5% of major equipment cost.
19	Operator Training	0.5% to 2.5% of major equipment
20	Operator Training	2.5% to 5% of major equipment on complex process facilities
21	Royalties as a percentage of M.E. (I.S.B.L)	0.25 – 3.5%
22	Vendor assistance as percent of D.L.	0.1 – 0.25%
23	Home office engineering as percent T.I.C.	8-17%
24	Field supervision as percent D.L.	5-15%
25	Construction equipment as percent D.L.	12-20%
26	Construction fee as percent D.L.	3 - 9%
27	Construction fee as percent T.I.C.	1.25 - 4.0%
28	CM cost as percentage of T.I.C.	5 - 7.5%
29	Off sites, needs to be considered as a separate issue.	If limited / or no scope or data is available use 15-70% of the (I.S.B.L.) value. If multiplier is smaller / or greater than 3.0 – 5.50 a more in depth review should take place:
30	Overtime / shift work as a percentage of D.L	0 – 10%
31	Construction Management Fee	2 – 6% on pass through value:
32	Fabricate pipe offsite	20 – 40 hours / ton
33	Erect piping (2" and above)	100 – 200 hours / ton
34	Average cost per ton to fabricate and erect piping system	Average cost \$17,000 \$25,000 per ton, average \$21,000 per ton

	2021 - Division 3 - Concrete - Union Site	Unit	Material	Labor	Construction Equipment	Total
122	Elevated Pan / Waffle Concrete work with 150 - 250 pounds of rebar per CY (Maximum)	CY	463.10	622.16	90.16	1,175.43
123	Elevated Pan / Waffle Concrete work with 150 - 250 pounds of rebar per CY (Minimum)	CY	307.46	440.55	63.84	811.85
124	Hi rise bulding elevator walls (Maximum)	CY	379.67	527.10	76.39	983.16
125	Hi rise bulding elevator walls (Minimum)	CY	252.30	405.86	58.82	716.97
126	Reinforced concrete in roads / bridges (Maximum)	CY	364.10	575.46	83.40	1,022.96
127	Reinforced concrete in roads / bridges (Minimum)	CY	232.78	266.64	38.64	538.07
128	Curved concrete walls to cooling tower (Maximum)	CY	422.44	521.14	75.52	1,019.10
129	Curved concrete walls to cooling tower (Minimum)	CY	346.20	347.79	50.40	744.39
130	Slab on grade 4" thick with 4" stone, polythene and mesh reinforcement	SF	2.58	2.72	0.39	5.70
131	Slab on grade 5" thick with 6" stone, polythene and mesh reinforcement	SF	3.09	2.95	0.43	6.47
132	Slab on grade 6" thick with 6" stone, polythene and mesh reinforcement	SF	3.76	3.18	0.46	7.40
133	Slab on grade 6" thick with 6" stone, polythene and rebar reinforcement	SF	4.04	3.53	0.51	8.09
134	Slab on grade 8" thick with 6" stone, polythene and mesh reinforcement	SF	4.20	3.53	0.51	8.24
135	Slab on grade 8" thick with 6" stone, polythene and rebar reinforcement	SF	4.62	3.84	0.56	9.02
136	Dome / Waffle construction (Minimum)	CY	215.37	257.91	37.38	510.66
137	Dome / Waffle construction (Maximum)	CY	338.81	358.56	51.96	749.33
138	18" dia columns (Minimum)	CY	238.32	273.07	39.57	550.96
139	18" dia columns (Maximum)	CY	351.94	374.29	54.24	780.47
140	Elevated spandrel beams 16" X 30" with 280 - 350 pounds of rebar per CY (Maximum)	CY	489.00	586.23	95.88	1,171.12
141	Elevated spandrel beams 16" X 30" with 280 - 350 pounds of rebar per CY (Minimum)	CY	360.88	429.46	72.13	862.47

	2021 Division 15 - Mechanical Work - Union	Unit of Measure	Material	Labor	Construction Equipment	Total
392	Ditto 6" dia x 30" long 50 - 100 GPM	EACH	2,284.78	215.94	13.58	2,514.29
393	Ditto 8" dia x 30" long 100 - 200 GPM	EACH	3,420.71	322.38	20.27	3,763.36
394	Ditto 10" dia x 30" long 200 - 400 GPM	EACH	5,085.89	477.49	30.02	5,593.40
395	Ditto 12" dia x 36" long 250 - 500 GPM	EACH	7,228.67	681.26	42.83	7,952.76
396	Ditto 18" dia x 36" long 500 - 1,000 GPM	EACH	15,283.48	1,435.52	90.25	16,809.24
397	Ditto 24" dia x 36" long 1,000 - 2,500 GPM	EACH	28,979.13	2,706.80	170.17	31,856.11
398	Air conditioning 2.5 Ton 30,000 BTU's - direct expansion - condenser c/w controls	EACH	961.67	316.30	19.89	1,297.86
399	Ditto 5 Ton 60,000 BTU's	EACH	1,400.06	364.96	22.94	1,787.97
400	Ditto 10 Ton 120,000 BTU's	EACH	3,717.60	729.92	45.89	4,493.42
401	Ditto 25 Ton 300,000 BTU's	EACH	7,796.64	2,128.95	133.84	10,059.43
402	Duct heater - electric 2.5 KW c/w controls and hook up	EACH	613.15	109.49	7.80	730.44
403	Ditto 5 KW	EACH	1,079.14	127.74	9.10	1,215.98
404	Ditto 10 KW	EACH	1,839.44	164.23	11.70	2,015.37
405	Ditto 25 KW	EACH	3,698.24	194.65	13.87	3,906.76
406	Coils - flanged - copper tube 3/8" dia c/w aluminum fins 2 tubes - fin is 4" high x 12" long	EACH	552.18	33.70	2.12	588.00
407	Ditto 4" x 18"	EACH	580.88	33.70	2.12	616.69
408	Ditto 4" x 24"	EACH	606.69	33.70	2.12	642.51
409	Ditto 4" x 30"	EACH	632.51	42.89	2.70	678.10
410	Ditto 4" x 36"	EACH	658.33	49.02	3.08	710.43
411	Ditto 4" x 42"	EACH	690.60	49.02	3.08	742.70
412	Ditto 4" x 48"	EACH	722.87	58.21	3.66	784.74
413	Ditto 6" x 18"	EACH	774.50	58.21	3.66	836.37
414	Ditto 6" x 26"	EACH	800.32	58.21	3.66	862.19
415	Ditto 6" x 30"	EACH	832.59	58.21	3.66	894.46
416	Ditto 6" x 36"	EACH	903.58	67.40	4.24	975.22
417	Ditto 6" x 42"	EACH	942.31	67.40	4.24	1,013.95
418	Ditto 6" x 48"	EACH	968.13	67.40	4.24	1,039.76
419	Ditto 12" x 48"	EACH	1,135.93	88.85	5.59	1,230.37
420	Ditto 12" x 60"	EACH	1,194.56	88.85	5.59	1,288.99
421	Ditto 12" x 72"	EACH	1,245.65	101.10	6.36	1,353.11
422	Coils - flanged - copper tube 1" dia c/w aluminum fins 1 row - fin is 12" high x 12" long	EACH	928.24	64.34	4.04	996.62
423	Ditto 12" x 24"	EACH	1,006.85	64.34	4.04	1,075.23
424	Ditto 12" x 36"	EACH	1,084.30	101.10	6.36	1,191.76
425	Ditto 12" x 48"	EACH	1,161.75	119.48	7.51	1,288.75

2021 Division 16 - Electrical Work - Union		Unit	Material	Labor	Construct Equip	Total
Demolition						
1	Rule of thumb estimating method for demolition of existing electrical scope work typically falls in the 5% - 15% of the "new" cost of the work being demolished, therefore establish the cost of installing the work shown on the drawings and use a value of 5% - 15%, consider any monies / credits related to selling demolished material for scrap.	%				5% - 15%
2	Remove existing transformers - 2.5 kva	EACH	37.74	85.25	4.30	127.28
3	Ditto 5 kva	EACH	37.72	100.65	5.07	143.45
4	Ditto 10 kva	EACH	60.25	182.67	9.21	252.13
5	Ditto 25 kva	EACH	60.19	274.01	13.82	348.02
6	Ditto 50 kva	EACH	75.24	365.35	18.42	459.01
7	Ditto 75 kva	EACH	100.78	456.68	23.03	580.49
8	Ditto 100 kva	EACH	125.61	608.91	30.70	765.22
9	Ditto 250 kva	EACH	150.73	763.28	38.48	952.50
10	Ditto 500 kva	EACH	203.31	1,221.25	61.57	1,486.13
11	Remove existing panel board - 100 amp	EACH	24.57	152.66	7.70	184.92
12	Ditto 200 amp	EACH	29.48	457.97	23.09	510.54
13	Ditto 400 amp	EACH	31.94	763.28	38.48	833.71
14	Remove existing MCC - c/w housing & starters 5 HP	EACH	25.21	45.67	2.30	73.19
15	Ditto 10 HP	EACH	25.12	60.89	3.07	89.08
16	Ditto 25 HP	EACH	25.12	73.07	3.68	101.88
17	Ditto 50 HP	EACH	75.37	127.87	6.45	209.69
18	Ditto 75 HP	EACH	75.37	182.67	9.21	267.25
19	Ditto 100 HP	EACH	75.37	213.72	10.78	299.86
20	Ditto 250 HP	EACH	125.61	305.31	15.39	446.32
21	Ditto 500 HP	EACH	127.94	549.56	27.71	705.21
22	Remove existing conduit & cable 1" dia including supports	LF		2.68	0.14	2.82
23	Ditto 2" dia	LF		3.45	0.17	3.62
24	Ditto 3" dia	LF		5.75	0.29	6.04
25	Ditto 4" dia	LF		8.05	0.41	8.45
26	Ditto 6" dia	LF		10.35	0.52	10.87
27	Remove existing EMT conduit & cable 1" dia including supports	LF		2.03	0.10	2.13
28	Ditto 2" dia	LF		2.82	0.14	2.97
29	Ditto 4" dia	LF		4.43	0.22	4.65

2021 Division 17 - Major Equipment - Union		Unit	Material	Labor	Constr Equipt	Total
47	Air handler multi-zone 25,000 CFM vertical - horizontal fan c/w vibration isolators	EACH	47,380.49	1,885.25	105.48	49,371.23
48	Air handler multi-zone 50,000 CFM vertical - horizontal fan c/w vibration isolators	EACH	85,376.58	2,796.45	156.47	88,329.50
49	Air return fans 5,000 CFM c/w controls	EACH	3,387.84	879.78	49.23	4,316.84
50	Air return fans 10,000 CFM c/w controls	EACH	4,850.77	1,193.99	66.81	6,111.56
51	Air return fans 15,000 CFM c/w controls	EACH	7,211.98	1,319.67	73.84	8,605.50
52	Air return fans 20,000 CFM c/w controls	EACH	8,764.74	1,539.62	86.15	10,390.51
53	Air return fans 25,000 CFM c/w controls	EACH	9,810.03	1,696.72	94.94	11,601.69
Air Conditioning Ductwork						
54	Air conditioning metal ductwork - includes supply and install of ductwork / hangers - testing / balancing - Low pressure ductwork - Galv steel n/e 1,000 pounds complete project (Maximum)	POUND	2.02	10.79	1.16	13.97
55	Air conditioning metal ductwork - includes supply and install of ductwork / hangers - testing / balancing - Low pressure ductwork - Galv steel n/e 1,000 pounds complete project (Minimum)	POUND	1.30	7.71	0.83	9.83
56	Air conditioning metal ductwork - includes supply and install of ductwork / hangers - testing / balancing - Low pressure ductwork - Galv steel over 1,000 pounds complete project (Maximum)	POUND	1.06	8.48	0.91	10.45
57	Air conditioning metal ductwork - includes supply and install of ductwork / hangers - testing / balancing - Low pressure ductwork - Galv steel over 1,000 pounds complete project (Minimum)	POUND	0.92	6.16	0.66	7.74
59	Air conditioning metal ductwork - includes supply and install of ductwork / hangers - testing / balancing - Medium pressure ductwork - Galv steel n/e 1,000 pounds complete project (Maximum)	POUND	2.27	11.56	1.24	15.07