2019
Worldwide Industrial / Commercial Construction Schedule of Rates Yearbook
10th Edition
2019 Worldwide Industrial / Commercial Construction Schedule of Rates Yearbook

10TH ANNUAL EDITION

- International Location Factors (139 Countries & 188 Cities)
- 284 # North American City Calibration Factors
- Numerous Historical Benchmarks & Cost Models
- General Requirements / General Conditions / Preliminaries / Construction Equipment and Plant
- Site Construction (Excavation & Demolition work)
- Concrete Work / Masonry / Brickwork
- Structural Steel
- Rough and Finish Carpentry
- Roofing Systems
- Architectural Finishes
- Doors and Windows
- Elevators / Cranes
- Building Services Piping, Plumbing Fixtures, Process Piping and Fire Protection Piping
- Heating, Ventilating & Air Conditioning Equipment / Ductwork and Insulation
- Electrical Equipment / Transformers / Cable / Control Wire / Conduit Cable Tray
- Instrumentation Devices and Controls Communications
- Process Equipment / Major Equipment: Includes Agitators, Air Handlers, Boilers, Chillers, Compressors, Condensers, Conveyors, Cooling Towers, Heat Exchangers, Pumps, Tanks & much more

Compass International Consultants Inc.
Morrisville, Pennsylvania, USA

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ABOUT THE FIRM

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.

DIVISION 00
Cost Models / Cost Benchmarks (17 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
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

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
DIVISION 03
Concrete Work: includes schedule of rates for:
Concrete
Formwork
Reinforcement
Precast Concrete
Grouting

DIVISION 04
Masonry: includes schedule of rates for:
Brickwork
Masonry
Refractory

DIVISION 05
Metals: includes schedule of rates for:
Structural Steel
Metal Joists
Metal Framing
Miscellaneous Iron
Metal Decking

DIVISION 06
Wood and Plastics: includes schedule of rates for:
Rough Carpentry
Finish Carpentry
Carpentry Specialties
DIVISION 07
Thermal and Moisture Protection: includes schedule of rates for:
Damp proofing and Waterproofing
Thermal Protection
Roofing Systems
Caulking & Sealants

DIVISION 08
Doors and Windows: includes schedule of rates for:
Wood and Plastic Doors
Metal Doors and Frames
Windows
Glazing / Glazed Curtain Walls
Hardware

DIVISION 09
Finishes: includes schedule of rates for:
Plaster and Gypsum Board
Tile
Terrazzo
Ceilings
Flooring
Wall Finishes
Acoustical Treatment
Painting and Coatings

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

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

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

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

DIVISION 16
Electrical Work: includes schedule of rates for:
Electrical Equipment / Transformers
Cable / Control wire
Conduit
Cable tray
Communications
Instrumentation and Controls

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
**About the Firm**

Compass International Consultants Inc. was founded in 1992 (C.I.C.I) and is a provider of construction estimating services, international construction cost data, location factors, training seminars, value engineering, estimating support and conceptual construction economic cost data. Compass International is backed by an excellent staff of experienced Cost Engineers, Cost Estimators, Civil / Mechanical / Chemical Engineers and Economists.

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**Acknowledgements**

This data source is the result of more than twenty years research and data collection. The information contained in this data source was collected from more than 60 + completed CAPEX projects (Refinery, Chemical and Manufacturing facilities) located in North America, the UK, Mainland Europe, Asia, Africa and South America valued between $0.30 million to over $3 billion. The data is based on Compass International’s cost library, augmented with latest cost and labor data from International Development Banks and Agencies, European Union Commission Reports, various Country National Libraries and Bibliothèques from around the world, various Government Information Agencies, Global Quasi-Governance Organizations, an assortment of Government Trade Promotion Departments / Labor Departments, numerous trade magazines, hourly and annual salary rates from US / Overseas labor trade unions, professional society articles, an assortment of newspaper / magazine articles, various international almanacs / directories / tables / reference books, internet data and various cost – construction related publications. The cost models and tables have also been augmented by a number of personal estimating libraries (that in most cases is very recent), this information has been audited, expanded upon, modified and calibrated and refined to today’s construction methods and installation applications. We would like to express our sincere thanks to the many engineers, contractors, vendors and other individuals (friends and colleagues) too many to mention who have given freely of their advice, input, time and knowledge so that this data source could be produced for the benefit of individuals that have an interest in this subject matter. We welcome any comments or data that could be used in future updates to make this database more complete and accurate.
Introduction and Calibration factors

This publication, the 2019 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 2019. 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
### (17) SHOPPING MALL 285,000 SF C/W PARKING 360,000 SF
MARYLAND USA: 2017 COST BASIS:
OPEN SHOP CONSTRUCTION
2 # BIG BOX STORES 80,000 - 100,000 SF
EACH & 10 TO 20 # SMALLER STORES / BANK / RESTAURANTS

<table>
<thead>
<tr>
<th>DESCRIPTION</th>
<th>SQUARE FEET (FOOTPRINT)</th>
<th>$ / SF LOW</th>
<th>$ / SF HIGH</th>
<th>$ TOTAL AVERAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Site Clearance / Site Work / Utilities</td>
<td>645,000</td>
<td>1.65</td>
<td>2.25</td>
<td>1,257,750</td>
</tr>
<tr>
<td>Shopping Mall (Building Shell / Roof / External Walls / Windows &amp; Doors)</td>
<td>285,000</td>
<td>55.25</td>
<td>62.50</td>
<td>16,779,375</td>
</tr>
<tr>
<td>Flooring</td>
<td>285,000</td>
<td>2.75</td>
<td>3.25</td>
<td>855,000</td>
</tr>
<tr>
<td>Ceilings</td>
<td>285,000</td>
<td>2.35</td>
<td>2.60</td>
<td>705,375</td>
</tr>
<tr>
<td>Racks / Fixture / Shelving Displays / Check Out Points</td>
<td>285,000</td>
<td>0.65</td>
<td>0.95</td>
<td>228,000</td>
</tr>
<tr>
<td>Power / Distribution / Phone / Internet / Security / Sound System</td>
<td>285,000</td>
<td>1.15</td>
<td>1.65</td>
<td>399,000</td>
</tr>
<tr>
<td>Lighting</td>
<td>285,000</td>
<td>3.15</td>
<td>3.85</td>
<td>997,500</td>
</tr>
<tr>
<td>Cold Storage / Bally Boxes</td>
<td>285,000</td>
<td>1.05</td>
<td>1.35</td>
<td>342,000</td>
</tr>
<tr>
<td>HVAC / AHU's</td>
<td>285,000</td>
<td>3.05</td>
<td>3.85</td>
<td>983,250</td>
</tr>
<tr>
<td>Fire Protection / O.S. Fire Loop</td>
<td>285,000</td>
<td>1.65</td>
<td>2.05</td>
<td>527,250</td>
</tr>
<tr>
<td>Signage internal / external</td>
<td>285,000</td>
<td>1.45</td>
<td>2.25</td>
<td>527,250</td>
</tr>
<tr>
<td>Parking Blacktop &amp; Signs (700 to 1,000 cars)</td>
<td>360,000</td>
<td>2.75</td>
<td>3.65</td>
<td>1,152,000</td>
</tr>
<tr>
<td><strong>SUB TOTAL</strong></td>
<td><strong>76.90</strong></td>
<td><strong>90.20</strong></td>
<td></td>
<td><strong>24,753,750</strong></td>
</tr>
<tr>
<td>Building Cost 285,000 SF</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Site Work / Utilities &amp; Parking</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>645,000 SF</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>TOTAL CONSTRUCTION COST</strong></td>
<td><strong>24,753,750</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Architectural / Engineering / Detailed Design Program</td>
<td></td>
<td></td>
<td></td>
<td>1,485,225</td>
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<tr>
<td>Management Cost 6%</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Construction Management Cost 3.5%</td>
<td></td>
<td></td>
<td></td>
<td>866,381</td>
</tr>
<tr>
<td><strong>TOTAL FACILITY COST</strong></td>
<td><strong>27,105,356</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>TOTAL FACILITY COST PER SF (285,000 SF)</strong></td>
<td><strong>95.11</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>TYPICAL RANGE</strong></td>
<td><strong>85 - 105</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Remarks:
- Detailed Design & Procurement = 26 weeks
- Construction = 44 weeks
- Excludes land purchase
- Values include General Conditions / Preliminaries
- Excludes Owner Costs
<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
<th>Unit</th>
<th>Material</th>
<th>Labor</th>
<th>Const</th>
<th>Equipt</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>147</td>
<td>Excavate rock by jackhammer and dispose offsite 5 mile round trip jackhammered</td>
<td>CY</td>
<td>20.25</td>
<td>86.16</td>
<td>32.14</td>
<td></td>
<td>138.55</td>
</tr>
<tr>
<td>148</td>
<td>Excavate for building swales n/e 10,000 CY</td>
<td>CY</td>
<td>0.34</td>
<td>0.97</td>
<td>0.07</td>
<td></td>
<td>1.39</td>
</tr>
<tr>
<td>149</td>
<td>Engineered fill from onsite borrow pit n/e 10,000 CY 1 miles round trip</td>
<td>CY</td>
<td>7.94</td>
<td>0.65</td>
<td>0.05</td>
<td></td>
<td>8.65</td>
</tr>
<tr>
<td>150</td>
<td>Engineered fill from onsite borrow pit n/e 10,000 CY 2.5 miles round trip</td>
<td>CY</td>
<td>10.42</td>
<td>0.95</td>
<td>0.07</td>
<td></td>
<td>11.44</td>
</tr>
<tr>
<td>151</td>
<td>Engineered fill from onsite borrow pit n/e 10,000 CY 5 miles round trip</td>
<td>CY</td>
<td>14.67</td>
<td>0.95</td>
<td>0.07</td>
<td></td>
<td>15.69</td>
</tr>
<tr>
<td>152</td>
<td>Engineered fill from onsite borrow pit n/e 25,000 CY 2.5 miles round trip</td>
<td>CY</td>
<td>11.48</td>
<td>1.08</td>
<td>0.08</td>
<td></td>
<td>12.64</td>
</tr>
<tr>
<td>153</td>
<td>Engineered fill from onsite borrow pit n/e 25,000 CY 5 miles round trip</td>
<td>CY</td>
<td>15.67</td>
<td>1.08</td>
<td>0.08</td>
<td></td>
<td>16.82</td>
</tr>
<tr>
<td>154</td>
<td>Compact by sheep's foot</td>
<td>CY</td>
<td>1.40</td>
<td>1.77</td>
<td>0.13</td>
<td></td>
<td>3.30</td>
</tr>
<tr>
<td>155</td>
<td>Compact by roller</td>
<td>CY</td>
<td>1.07</td>
<td>1.35</td>
<td>0.10</td>
<td></td>
<td>2.52</td>
</tr>
<tr>
<td>156</td>
<td>Backfill, by dozer, no compaction</td>
<td>CY</td>
<td>2.44</td>
<td>14.59</td>
<td>1.02</td>
<td></td>
<td>18.06</td>
</tr>
<tr>
<td>157</td>
<td>Backfill, by dozer, machine compaction</td>
<td>CY</td>
<td>2.44</td>
<td>14.59</td>
<td>2.54</td>
<td></td>
<td>19.58</td>
</tr>
<tr>
<td>158</td>
<td>Backfill, hand, machine compaction</td>
<td>CY</td>
<td>8.40</td>
<td>41.86</td>
<td>3.12</td>
<td></td>
<td>53.38</td>
</tr>
<tr>
<td></td>
<td>Backfill and compacted engineered fill (excludes fill material)</td>
<td>CY</td>
<td>4.92</td>
<td>14.81</td>
<td>1.10</td>
<td></td>
<td>20.83</td>
</tr>
<tr>
<td>160</td>
<td>Backfill site excavated and compacted in 12&quot; layers</td>
<td>CY</td>
<td>2.72</td>
<td>13.13</td>
<td>1.11</td>
<td></td>
<td>16.96</td>
</tr>
<tr>
<td></td>
<td>Soil Stabilization &amp; Erosion Control</td>
<td>SY</td>
<td>1.31</td>
<td>0.50</td>
<td>0.15</td>
<td></td>
<td>1.96</td>
</tr>
<tr>
<td>162</td>
<td>Jute / tobacco bases mesh</td>
<td>LF</td>
<td>6.54</td>
<td>0.50</td>
<td>0.19</td>
<td></td>
<td>7.22</td>
</tr>
<tr>
<td>163</td>
<td>Bales of hay, staked to ground - inlet swale</td>
<td>LF</td>
<td>2.62</td>
<td>2.57</td>
<td>0.19</td>
<td></td>
<td>5.38</td>
</tr>
<tr>
<td>164</td>
<td>Filter barrier 18&quot; wide filter fabric</td>
<td>LF</td>
<td>1.46</td>
<td>3.08</td>
<td>0.23</td>
<td></td>
<td>4.77</td>
</tr>
<tr>
<td>165</td>
<td>Sediment fence - 24&quot; wide mesh fabric incl stakes at 10' centers</td>
<td>LF</td>
<td>4.21</td>
<td>5.76</td>
<td>0.43</td>
<td></td>
<td>10.41</td>
</tr>
<tr>
<td>166</td>
<td>Sediment fence - 36&quot; wide mesh fabric incl stakes at 10' centers</td>
<td>LF</td>
<td>5.46</td>
<td>8.24</td>
<td>0.62</td>
<td></td>
<td>14.32</td>
</tr>
<tr>
<td>167</td>
<td>Bank run draining gravel n/e 1&quot;</td>
<td>CY</td>
<td>10.60</td>
<td>20.62</td>
<td>1.55</td>
<td></td>
<td>32.76</td>
</tr>
<tr>
<td>168</td>
<td>Small river stone draining gravel</td>
<td>CY</td>
<td>24.57</td>
<td>22.33</td>
<td>1.68</td>
<td></td>
<td>48.58</td>
</tr>
<tr>
<td>169</td>
<td>Gabion boxes (stone inside steel mesh) 12&quot; deep</td>
<td>SF</td>
<td>4.61</td>
<td>15.50</td>
<td>1.16</td>
<td></td>
<td>21.27</td>
</tr>
<tr>
<td>170</td>
<td>Gabion boxes (stone inside steel mesh) 24&quot; deep</td>
<td>SF</td>
<td>6.54</td>
<td>19.53</td>
<td>1.47</td>
<td></td>
<td>27.53</td>
</tr>
<tr>
<td>171</td>
<td>Dumped stones averaging between 50 - 100 pounds</td>
<td>TON</td>
<td>35.50</td>
<td>1.49</td>
<td>0.56</td>
<td></td>
<td>37.54</td>
</tr>
<tr>
<td>172</td>
<td>Rip rap, machine installed</td>
<td>TON</td>
<td>35.50</td>
<td>27.94</td>
<td>10.49</td>
<td></td>
<td>73.93</td>
</tr>
<tr>
<td>173</td>
<td>Rip rap, hand installed</td>
<td>TON</td>
<td>35.50</td>
<td>95.65</td>
<td>7.18</td>
<td></td>
<td>138.33</td>
</tr>
<tr>
<td></td>
<td>Piles</td>
<td>LF</td>
<td>29.66</td>
<td>15.54</td>
<td>1.17</td>
<td></td>
<td>46.36</td>
</tr>
<tr>
<td>174</td>
<td>PCC Piles, 8&quot; square</td>
<td>LF</td>
<td>36.01</td>
<td>18.64</td>
<td>1.40</td>
<td></td>
<td>56.05</td>
</tr>
<tr>
<td></td>
<td>2019 Division 7 - Roofing External Closure - Union</td>
<td>Unit</td>
<td>Material</td>
<td>Labor</td>
<td>Construction Equipment</td>
<td>Total</td>
<td></td>
</tr>
<tr>
<td>---</td>
<td>-------------------------------------------------</td>
<td>------</td>
<td>----------</td>
<td>-------</td>
<td>------------------------</td>
<td>-------</td>
<td></td>
</tr>
<tr>
<td>385</td>
<td>Fire stopping (penetration sealing) 1” dia through 4” thick concrete / block wall</td>
<td>EACH</td>
<td>17.25</td>
<td>23.78</td>
<td>1.55</td>
<td>42.58</td>
<td></td>
</tr>
<tr>
<td>386</td>
<td>Ditto 2” ditto</td>
<td>EACH</td>
<td>20.16</td>
<td>23.36</td>
<td>1.52</td>
<td>45.04</td>
<td></td>
</tr>
<tr>
<td>387</td>
<td>Ditto 4” ditto</td>
<td>EACH</td>
<td>23.38</td>
<td>28.16</td>
<td>1.83</td>
<td>53.37</td>
<td></td>
</tr>
<tr>
<td>388</td>
<td>Ditto 6” ditto</td>
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<td>389</td>
<td>Fire stopping (penetration sealing) 1” dia through 6” thick concrete / block wall</td>
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<td>20.39</td>
<td>28.03</td>
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<td>Ditto 18” dia through wall 6” - 12” thick</td>
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<td>395</td>
<td>PCC 1” thick roof walk-ways</td>
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<td>396</td>
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<td>Polythene vapor barriers 4 mil</td>
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<td>Ditto 6 mil</td>
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<td>Ditto 10 mil</td>
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**NOTE:** To determine Man-Hours divide labor cost by $67.00
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<tr>
<th>2019 Division 17 - Major Equipment - Union</th>
<th>Unit</th>
<th>Material</th>
<th>Labor</th>
<th>Constr Equip</th>
<th>Total</th>
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<tbody>
<tr>
<td>Cooling tower - 500 Ton - combination / package of steel / timber / fiberglass internals includes piping, valves, controls and associated pumps, excludes foundation basin and transfer lines (Maximum)</td>
<td>EACH</td>
<td>102,428.61</td>
<td>38,185.44</td>
<td>2,848.15</td>
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<td>Cooling tower - 500 Ton - combination / package of steel / timber / fiberglass internals includes piping, valves, controls and associated pumps, excludes foundation basin and transfer lines (Minimum)</td>
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<td>72,302.55</td>
<td>26,954.43</td>
<td>2,010.46</td>
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<td>Cooling tower - 1,000 Ton - combination / package of steel / timber / fiberglass internals includes piping, valves, controls and associated pumps, excludes foundation basin and transfer lines (Maximum)</td>
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<td>156,655.52</td>
<td>58,401.26</td>
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<td>219,412.78</td>
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<tr>
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<td>230/460 60 Hz - 1,800 RPM 1/2 HP includes setting on foundation - excludes foundation and incoming electrical service</td>
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<td><strong>Heat Exchangers</strong></td>
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