ELECTRICAL

UNIT & ASSEMBLY COST DATA

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Forward: About This Book

Author's Note:

Thank you for purchasing **e-Cost Electrical Unit and Assembly Cost Data**.

The information contained in this book is a compilation of forty years of experience combined with years of collective statistics, sources and knowledge gained by tracking millions of hours of craft productivity.

I have spent most of my adult life in the hard dollar world of competitive bidding, tracking, documenting, analyzing, and adjusting while learning more and more about why things happen and what to do about it.

The result of these findings was the development of a data base arsenal of over thirty thousand unit and assembly costs. This data has been included in this publication along with reference material I have compiled or found valuable over the years.

I have written other cost books for other people including one that remains the industry standard. But this book, I truly believe, is now the best in the industry!

Thank You for Your Patronage

Al Sauerbier

To learn more about the author and e-*Cost Estimating & Publishing* visit our site at www.e-costestimating.com.

Labor Rate:

The labor rate in this publication is based on a National Average Rate of $39.00 per craftsman man-hour. Thirty six metropolitan areas were used to derive the national average without proportional weighting based on population.

This National Average includes a signatory base hourly wage rate (equal to Davis Bacon, state prevailing wage and/or union shop). Added to that base rate is a 10% fringe benefit package and 20% for taxes and insurance. It does not contain overhead and profit.

This rate or any other labor rate published in this book is not to suggest this is what you should use in your budget, estimate or bid, or what you should be paying. The sole purpose of the National Average Rate is to establish a fixed benchmark to measure and adjust information in this book to your reality.

For example if the actual rate is $40.00 including fringes and taxes, use it! Divide the actual rate by the national average rate of $39.00 to get a labor adjustment factor of 1.025 rounded to 1.03. If your cumulative total for labor is $100,000 using this book your actual cost for labor would be $103,000 plus overhead and profit.

Crews:

The labor rate surveyed for this publication is one journeyman electrician. All of the labor costs in this publication are based on a crew of one skilled craftsman or journeyman electrician making $39.00 an hour. What are the chances of you using a crew of one electrician on a large project? Not likely! Most likely the project will be installed by a crew of craftsmen ranging from helpers or apprentices to working and non-working foremen.

Let's construct a typical crew for a small elementary school. The estimate for this school is 10,000 man-hours. The contract documents set the schedule at 350 calendar days.

The first step in the process is to find the average number of craftsmen required to complete this project on time. This analysis will be a straight average over the total duration of the project. Understand in reality more or less than the average will be required at times as work becomes available.

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The schedule is specified in calendar days not work days. To convert total calendar days to total work days divide the number of work days in a week by the number of days in the week.

$$\frac{\text{(work days in week)}}{\text{(days in week)}} = \text{work day factor}$$

$$\frac{5}{7} = .7143 \text{ work day factor}$$

To get the total work days multiply the calendar days (350) times the work day factor (.7143).

$$\text{(calendar days)} \times \text{(work day factor)} = \text{total work days}$$

$$350 \times .7143 = 250 \text{ total work days}$$

We now know we have 250 work days to complete a 10,000 man-hour job. If we divide the total man-hours by the number of work days, we get the number of man-hours per day we need to complete the project on time.

$$\frac{\text{(estimated man-hours)}}{\text{(number of work days)}} = \text{man-hours per day}$$

$$\frac{10{,}000}{250} = 40 \text{ man-hours per day}$$

Divide the total number of hours per day needed to complete this project on schedule by the number of hours each craftsman is required to work per day. Although 8 is by far the most common work day it is not unusual to find some craftsmen having a 7 or a 7-1/2 hour work day. For this example we will use eight. The result will be how many craftsmen are required to complete the project in 350 calendar days.

$$\frac{\text{(man-hours per day)}}{\text{(craft work day)}} = \text{craftsmen required}$$

$$\frac{40}{8} = 5 \text{ craftsmen required}$$

Crew Composition:

The previous example suggests our crew should be comprised of an average of five craftsmen for our sample school project. We also know that the likelihood of our entire crew being journeymen electricians is rare and not very practical. The crew composition which we will refer to as the *composite crew* should be determined after careful examination of numerous variables such as labor agreements, state, local or federal mandates, job type, schedule, complexity, labor availability, pre-negotiated step increases, raises, holidays, vacations, sick days and existing employee makeup just to name a few.

To measure the impact on our National Average Labor Rate we will examine a common five man crew without considering variables that go beyond the scope of this publication. The crew will be composed of one (1) working foreman, two (2) journeyman electricians, one (1) fourth year apprentice and one (1) second year apprentice.

Craft	Rate		#		
Working Foreman	$40.00	x	1	=	$40.00
Journeyman	$38.00	x	2	=	$76.00
Apprentice 4th year	$29.00	x	1	=	$29.00
Apprentice 2nd year	$20.00	x	1	=	$20.00
			5		$165.00

$$\frac{\$165.00}{5} = \$33.00 \text{ Crew Rate}$$

e-Cost does not include or recommend a crew to use in this publication because of the endless combinations that can be put together. Our goal is to produce a fixed labor rate by which the user knows exactly what was assumed and therefore is not chasing a moving target when applying project specific modifications to his budget, estimate or bid.

The open shop labor rates in the Labor Rate Index were derived by using a correlation analysis of union versus open shop labor rates for the thirty six cities in our index. The sample size was two open shop contractors per city or seventy two shops surveyed. Although the open shop wages varied greatly, even within the same city the best statistical fit was at 75% of the union shop. Only open shop contractors offering benefit packages including at least seventy five percent health insurance paid by the owner, paid vacations and at least eight holidays were included in our survey. In other words only legitimate licensed and bonded contractors in good standing within their respective communities were used in this publication.

As a result of this survey the open shop rate is listed as 75% of the union rate for each of the thirty six cities. The National Average Rate is derived from the union rate only.

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Material:

How many times have you sat in a meeting negotiating a change order or a time and material bid level and the owner or representative proclaims "six dollars for a receptacle? I can buy one at Home Place for forty nine cents". Is he right? Yes! but not for this project. Why? Because we in the industry abide by a set of standards, building codes and project specifications, and if a contractor makes the choice to bid within the public sector he must comply with other criteria such as minority, disadvantaged or women owned business guidelines that may impact where material is purchased and levels of discount.

So if that person still thinks he can conform to all the mandates an electrical contractor must consider and still provide a receptacle for forty nine cents, let him!

Material Quality:

The material in this publication is high end quality produced by major manufacturers conforming to buy American criteria.

Project Size:

The average e-Cost estimating project is $500,000 electrical or 5 million total project. Material has been discounted to a level (20% below trade net) that can reasonably be attained by contractors bidding projects as small as $50,000 electrical.

Knowing the base level of discount used in this publication enables the user to adjust material to any size project. Care and good judgment should be used during the adjustment process.

What is Trade Net?

In the previous section we told you that e-Cost deducts 20% from the trade net level of discount.

Trade net is the level of discount that any licensed electrician can expect just for being an electrician or contractor. It could generally be considered the electricians list price.

Although the general public would pay more, it is rare that that public would involve themselves in the purchase of commercial quality materials for their household needs. Therefore, the true list or retail price is irrelevant except for use by the electrician or contractor as a resale guide.

Pricing Procedure:

e-Cost uses Nema (National Electrical Manufacturers Association) classifications to subdivide materials into like groupings such as residential, specification, intermediate, standard or heavy duty.

Several prices for each unit cost are surveyed and averaged at trade net levels with high and/or low extremes excluded from the equation. 20% is deducted from the trade net average cost.

e-Cost's material file is updated continuously so prices are always current. However, many manufacturers publish prices or discount levels twice a year in July and December.

Material Price Projections:

The final ingredient to the material pricing level is to predict the future. e-Cost maintains a commodity index of fifty significant materials proportionally weighted by three building designations, residential, commercial and institutional. A trend line is extended through these commodity items for 2010 and the best fit trend is established. Items that track significantly outside the trend line are examined independently. For example, the trend line for the vast majority of items suggests a 3% increase in the commodity items for the year 2010. The action based on the results of the 2010 projection was to add 3% across the board with the exception of cable and wire which was increased by 35%.

Quotables:

e-Cost makes every effort to provide current accurate and consistent pricing. There are, however, materials that we recommend should be quantified and sent out to manufacturers representatives for pricing prior to bid, most notably but not limited to switchgear, lighting, fire alarm & generators. These items can comprise 50%-60% of the material cost of a project and whoever gets the best price on bid day wins!

Many of these quotable items are custom built for a project and trade net pricing is not available from published sources.

These materials are quoted as a package price usually just minutes before the bid to prevent the contractor from shopping it around. The package price does not show unit prices or bid levels even at the time of bid.

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Through experience, statistical modeling, sampling and analysis e-Cost is able to price this equipment at levels consistent with trade net pricing. This level of pricing is extremely valuable to developers, architects, engineers and design builders but may be less than the accuracy needed for a bid competitive estimate.

Miscellaneous:

e-Cost recommends adding 5% across the board to the material cost for miscellaneous items such as nuts, bolts and washers, wire nuts, tape, pull strings, wire lube, additional supports or bracing not apparent on the bid documents and other items which can be deemed incidental.

Pilferage:

e-Cost recommends adding another 5% across the board to the material cost for anticipated losses due to theft. Receptacles, switches, boxes, metallic/non-metallic cable, romex, wire and lighting fixtures are the most common material items reported missing.

Productivity:

The man-hours in this publication are based on a electrician installing at 62.5% efficiency or installing electrical materials 5 hours out of an 8 hour day.

Author's Note: Thirty-five years ago I wrote a time and motion algorithm and called it the "anatomy of a man-hour". It was based on eight hours or a standard workday. I used this formula as a benchmark for every cost item I have developed since, including cost items written for other cost publications, articles and prelitigation claims.

Anatomy of a Man-Hour:

(Based on an 8 Hour Workday)

Description	Minutes	% of Day
Study Plans	15	3%
Material Procurement	15	3%
Receiving & Storing	15	3%
Mobilization	25	5%
Site Movement	25	5%
Measuring & Marking	40	9%
Actual Installation	300	63%
Clean-up	15	3%
Breaks	30	6%
	480	100%

As you can see by the anatomy of a man-hour 63% productivity does not mean the craftsman is sitting idol for three hours of the day. He is quite busy doing other things in addition to the actual installation. As mentioned previously the crew in this publication is based on one electrician. All the additional items, other than the actual installation, are perceived to be the job of the electrician.

This productivity may be perfectly acceptable for a small company where an electrician goes from job to job "doing it all" or for budget estimates and change orders. However, it is not unusual in a competitive bid environment for an electrical contractor to bid at 90% productivity just to be competitive.

Does this mean that he is going to lose 27% for every man-hour on the job? Absolutely not!

Enter project management and supervision. It is the job of project management and/or supervision to take as many items listed in the anatomy of a man-hour not directly attributed to the actual installation and take it away from the individual electrician. Can you imagine a crew of ten electricians each ordering their own material, studying plans, receiving and storing materials, doing individual layouts, etc. It would be chaos!

Now imagine one non-working foreman doing many of those things. This action alone can increase productivity 15%-20% because even after his time is deducted as non-productive he is still "earning his keep and then some" by saving the ten electricians a total of 800 minutes a day that can now be applied to the actual installation.

Means & Methods:

Productivity may also be increased by field supervisory personnel using "means and methods". Cost savings modifications from the original estimate are made in the field while keeping the project conforming to the original intent of the specifications, code and owners approval.

Examples of "means and methods" range from combining circuits in a single conduit to putting feeders in the slab versus running overhead to racking conduits rather than supporting them individually just to name a few. It can also involve using innovative new tools or the use of man-lifts instead of ladders

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or staging to aid high work. A good foreman can "sniff out" these cost saving opportunities and increase productivity even further.

Estimate as a Base:

The estimate is used as the specific basis for all decision making or project strategies. Consistency can not be stressed enough. Estimating procedures should be followed by everyone involved. On larger projects where several people are involved in the take-off, the chief estimator or team coordinator should set up the take-off sheet and explain exactly how he wants the takeoff done. Only one person should make all the decisions on material and labor discounts and modifications.

Equipment:

There are several areas in this publication where in addition to the material and labor columns there is an equipment column. The equipment cost has been converted into the unit of measure of the cost item such as LF, EA or CY. It includes not only the cost of renting the equipment but the cost to run the equipment (gas, propane or diesel fuel). The operator's cost is captured in the man-hour column and extended out in the labor dollar amount column.

How e-Cost arrives at an equipment cost is illustrated by the example below. In this case trenching per LF.

Rental Equipment, Backhoe, w/ 1/2 Cubic Yard Bucket

Rental Rates

Unit	Day	Week	Month
Ea	$300	$1,200	$3,100

Divide the rental cost per week by the number of work days in a work week.

$$\frac{\text{(rental cost per week)}}{\text{(days in work week)}} = \text{rent per day}$$

$$\frac{\$1,200}{5} = \$240 \text{ per day}$$

To find the operating cost per day we take, in this example, the cost per gallon for diesel fuel, times the number gallons used per hour, times the number of hours in a work

(diesel per gallon) **x** (gallons per hour) **x** (hours per day) = operating cost per day

$3.00 **x** 5 **x** 8 = $120 per day

Add the rental cost per day plus the operating cost per day to get total equipment cost per day.

$240 + $120 = $360 per day

Equipment Output:

As mentioned previously the labor (operator) cost to run the equipment is not included in the cost per day for the equipment. Our calculation thus far has calculated the cost per day for equipment doing nothing but sitting there running. To convert this cost into a meaningful form e-Cost has determined what the capability or output of this machine is with an operator. Determinations are based on criteria such as manufacturer estimates, actual observations, bucket size, etc. This output is usually calculated in cubic yards.

Once we know the maximum cubic yard output of the machine working all the time we apply the same logic we use in all other labor calculations (see anatomy of a man-hour) and reduce the output to 63% efficiency. For this piece of equipment the output per day converts to 52 cubic yards per 8 man-hours.

What is the equipment cost per cubic yard?

$$\frac{\text{(rental cost per day) + (operating cost per day)}}{\text{(output per day in cubic yards)}} = \text{(equipment cost per cubic yard)}$$

$$\frac{\$240 + \$120}{52} = \$6.92 \text{ per CY for equip}$$

What is the labor cost per cubic yard?

$$\frac{\text{(work day in hours) } \mathbf{x} \text{ (labor rate)}}{\text{(output per day in cubic yards)}} = \text{(labor cost per cubic yard)}$$

$$\frac{8 \mathbf{x} \$34.00}{52} = \$5.23 \text{ per CY for labor}$$

What is the total cost per cubic yard?

Unit	Labor	Equipment	Total
CY	$5.23	$6.92	$12.15

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State Sales Tax as of July 2010

No sales tax has been included in any of the material, labor or equipment prices in this publication.

State/Abbreviation	Tax	State/Abbreviation	Tax
Alabama - AL	4.00%	Montana - MT	n/a
Alaska - AK	n/a	Nebraska - NE	5.50%
Arizona - AZ	5.60%	Nevada - NV	6.85%
Arkansas - AK	6.00%	New Hampshire-NH	n/a
California - CA	8.25%	New Jersey - NJ	7.00%
Colorado - CO	2.90%	New Mexico - NM	5.00%
Connecticut - CT	6.00%	New York - NY	4.00%
Delaware - DE	n/a	North Carolina - NC	5.75%
District Columbia - DC	6.00%	North Dakota - ND	5.00%
Florida - FL	6.00%	Ohio - OH	5.50%
Georgia - GA	4.00%	Oklahoma - OK	4.50%
Hawaii - HI	4.00%	Oregon - OR	n/a
Idaho - ID	6.00%	Pennsylvania - PA	6.00%
Illinois - IL	6.25%	Rhode Island - RI	7.00%
Indiana - IN	7.00%	South Carolina - SC	6.00%
Iowa - IA	6.00%	South Dakota - SD	4.00%
Kansas - KS	5.30%	Tennessee - TN	7.00%
Kentucky - KY	6.00%	Texas - TX	6.25%
Louisiana - LA	4.00%	Utah - UT	4.70%
Maine - ME	5.00%	Vermont - VT	6.00%
Maryland - MD	6.00%	Virginia - VA	5.00%
Massachusetts - MA	6.25%	Washington - WA	6.50%
Michigan - MI	6.00%	West Virginia - WV	6.00%
Minnesota - MN	6.88%	Wisconsin - WI	5.00%
Mississippi -MS	7.00%	Wyoming - WY	4.00%
Missouri - MO	4.23%		

Overhead:

Overhead has not been included in unit or assembly costs because overhead is a variable percentage based on an individual company's specific profile including total sales, single and aggregate project bonding capacity, interest rates, benefit packages, rent or own practices, depreciation, backlog, project size, manner of acquiring new business (design build, competitive bid, negotiating) etc.

e-Cost can make the statement that the average overhead for an electrical contractor is 15% and ranges between 10% and 20%. This statistic is the result of a sample survey developed by e-Cost and sent to random contractors without regard to location or size of company.

The following model shows how company A arrived at their overhead percentage. It can be used as a model to determine your own company's overhead if not readily available. There are several accounting methods of determining overhead, this is only one.

Overhead Model:

Main Office Expense, Company A
Fiscal Year 2010

Salaries - Estimating (chief)	$115,000
Salaries - Administrative Staff	$100,000
Salaries - Company Officers	$225,000
Salaries - Project Managers	$210,000
Advertising	$4,500
Depreciation	$65,000
Dues & Subscriptions	$14,000
Education & Seminars	$3,000
Employees Benefits	$80,500
Estimating Expense	$30,000
Insurance	$65,000
Legal & Accounting	$75,000
Office Expense	$80,000
Payroll Taxes	$542,000
Rent Expense	$50,000
Repairs & Maintenance	$9,000
Telephone & Utilities	$22,000
Travel & Entertainment	$15,000
Vehicle Expense	$55,000
Equipment Rental	$15,000
Office Trailer Rental	$10,000
Storage Trailer Expense	$15,000
Total General & Office Expense	$1,800,000
Total Sales	$12,700,000

Overhead % Calculation:

To find the overhead percentage for Company A above divide the total overhead expense by total sales times 100.

$$\frac{\text{(total overhead expense)}}{\text{(total sales)}} \times (100) = \text{overhead \%}$$

$$\frac{\$1,800,000}{\$12,700,000} \times (100) = 14\% \text{ overhead}$$

Profit:

Profit is not included in the material, labor or equipment costs in this publication. How much should you add? In most cases your competition determines the level of profit you can add to a project. If an area has more work than qualified contractors 10% or more is not uncommon. However, when there is limited amount of work with pure competition many contractors will drop their margins and exert more effort and pressure on suppliers and subs to do the same. In the latter situation know your raw or buy cost, but always, always know where to stop. Cover your overhead and add from there.

Adjusting the Data: Tips & Traps

Author's Note:
Several years ago I negotiated a large change order for a client. The person I was negotiating with was unaware that I had written the electrical cost publication he was using to counter my position on a variety of issues. Finally, but to no avail I said, "let me explain what I meant when I wrote that book".

Years later while writing this book I remembered this incident and thought it would be a good idea to explain certain logic and assumptions made while developing the cost data for this publication and how to modify the data to your specific project and/or bid situation. I hope you find it helpful.

Impacts on Productivity Tip:
Natural Economies

A natural economy is when you get more productivity than expected without any conscious effort on your part. In other words, it's going to happen naturally. For example installing wire. Wire installation in this publication consists of the following:

Transport wire from staging area to point of installation
Setup wire on racks or reels
Measure out wire
Install snake in conduit
Attach wire to snake
Apply wire lube
Pull wire through conduit
Detach wire from snake

If only one wire was installed in the conduit all of the above elements would be required just for that one wire. Ask yourself this. If I pull three wires in the same conduit will I have to duplicate all of the elements for the second and third wire? Of course not, unless you pull one wire, then setup and pull the second wire etc. In reality you would simply attach the second, third and more wires to the same pull.

Another natural economy element involves the learning curve and/or how repetitious work impacts on productivity. Simply stated the first installation takes the longest the remainder progressively less.

In addition to the actual installation elements, the effects of both a learning curve and repetitious work have been included in e-Cost's recommended deducts.

e-Cost recommends the following percentages to adjust man-hours for the following categories of installation. These percentages are only applied to the quantities that meet the criteria not the entire project. They apply only to man-hours not the material.

Conduit Related Natural Economies:

Wire in Conduit (wire only)

Quantity	Deduct %	Multiplier
2 wires	5%	.95
3 wires	10%	.90
4 wires	15%	.85
5 wires	20%	.80
6 wires	25%	.75
7 wires	30%	.70
8+ wires	35%	.65

Conduit on Same Floor (conduit only)

Quantity	Deduct %	Multiplier
to 500'	3%	.97
to 1,000'	6%	.94
to 1,500'	9%	.91
to 2,000'	12%	.88
to 2,500'	15%	.85
to 3,000'	18%	.82
over 3000	20%	.80

Sitework Conduit in Same Area (conduit only)

Quantity	Deduct %	Multiplier
to 500'	3%	.97
to 1,000'	6%	.94
to 1,500'	9%	.91
to 2,000'	12%	.88
to 2,500'	15%	.85
to 3,000'	18%	.82
over 3000	20%	.80

Length of Conduit Run (conduit only)

Quantity	Deduct %	Multiplier
to 100'	0%	1.00
to 150'	3%	.97
to 200'	5%	.95
to 250'	8%	.92
to 300'	10%	.90
to 350'	13%	.87
over 350'	15%	.85

Adjusting the Data: Tips & Traps

Parallel Conduit Runs (conduit only)

Quantity	Deduct %	Multiplier
2	0%	1.00
3	3%	.97
4	5%	.95
5	8%	.92
6	10%	.90
7	13%	.87
8	15%	.85

Tele/Data Devices on Same Floor (device only)

Quantity	Deduct %	Multiplier
10 to 25	3%	.97
26 to 50	6%	.94
51 to 75	9%	.91
76 to 100	12%	.88
101 to 150	15%	.85
151 to 200	18%	.82
over 200	20%	.80

Device Related Natural Economies:

Tele/Data Plates on Same Floor (plate only)

Quantity	Deduct %	Multiplier
10 to 25	3%	.97
26 to 50	6%	.94
51 to 75	9%	.91
76 to 100	12%	.88
101 to 150	15%	.85
151 to 200	18%	.82
over 200	20%	.80

Switches on Same Floor (device only)

Quantity	Deduct %	Multiplier
10 to 25	3%	.97
26 to 50	6%	.94
51 to 75	9%	.91
76 to 100	12%	.88
101 to 150	15%	.85
151 to 200	18%	.82
over 200	20%	.80

Fire Alarm Device on Same Floor (device only)

Quantity	Deduct %	Multiplier
10 to 25	3%	.97
26 to 50	6%	.94
51 to 75	9%	.91
76 to 100	12%	.88
101 to 150	15%	.85
151 to 200	18%	.82
over 200	20%	.80

Switch Plates on Same Floor (plate only)

Quantity	Deduct %	Multiplier
10 to 25	3%	.97
26 to 50	6%	.94
51 to 75	9%	.91
76 to 100	12%	.88
101 to 150	15%	.85
151 to 200	18%	.82
over 200	20%	.80

Lighting Fixture Related Natural Economies:

Receptacles on Same Floor (device only)

Quantity	Deduct %	Multiplier
10 to 25	5%	.95
26 to 50	10%	.90
51 to 75	15%	.85
76 to 100	20%	.80
101 to 150	25%	.75
151 to 200	30%	.70
over 200	35%	.65

Lighting Fixture, Troffer Type on Same Floor

Quantity	Deduct %	Multiplier
to 15	0%	1.00
15 to 25	5%	.95
26 to 50	10%	.90
51 to 75	15%	.85
76 to 100	20%	.80
101 to 150	25%	.75
over 150	30%	.70

Receptacle Plates on Same Floor (plate only)

Quantity	Deduct %	Multiplier
10 to 25	5%	.95
26 to 50	10%	.90
51 to 75	15%	.85
76 to 100	20%	.80
101 to 150	25%	.75
151 to 200	30%	.70
over 200	35%	.65

Lighting Fixture, Pendant Type on Same Floor

Quantity	Deduct %	Multiplier
to 15	0%	1.00
15 to 25	5%	.95
26 to 50	10%	.90
51 to 75	15%	.85
76 to 100	20%	.80
101 to 150	25%	.75
over 150	30%	.70

Adjusting the Data: Tips & Traps

Lighting Fixture, Mixed Types on Same Floor

Quantity	Deduct %	Multiplier
to 15	0%	1.00
15 to 25	3%	.97
26 to 50	5%	.95
51 to 75	8%	.92
76 to 100	10%	.90
101 to 150	12%	.88
over 150	15%	.85

Circuit Breaker Natural Economies:

Circuit Breakers 1-Pole in Panelboard

Quantity	Deduct %	Multiplier
to 10	0%	1.00
11 to 20	3%	.97
21 to 30	5%	.95
31 to 42	8%	.92
43 to 60	10%	.90
61 to 84	12%	.88
over 84	15%	.85

Circuit Breakers 2-Pole in Panelboard

Quantity	Deduct %	Multiplier
to 5	0%	1.00
6 to 10	3%	.97
11 to 15	5%	.95
16 to 21	8%	.92
22 to 30	10%	.90
31 to 42	12%	.88
over 42	15%	.85

Circuit Breakers 3-Pole in Panelboard

Quantity	Deduct %	Multiplier
to 3	0%	1.00
4 to 7	3%	.97
8 to 10	5%	.95
11 to 14	8%	.92
15 to 20	10%	.90
21 to 28	12%	.88
over 28	15%	.85

Circuit Breakers 3-Pole in Switchboard

Quantity	Deduct %	Multiplier
to 3	0%	1.00
4 to 5	3%	.97
6 to 7	4%	.96
8 to 9	5%	.95
10 to 12	6%	.94
13 to 15	7%	.93
over 15	10%	.90

Cable Related Natural Economies:

Non-Metallic Tele/Data Cable in Tray or Wireway

Quantity	Deduct %	Multiplier
2 cables	5%	.95
3 cables	10%	.90
4 cables	15%	.85
5 cables	20%	.80
6 cables	25%	.75
7 cables	30%	.70
8+ cables	35%	.65

Non-Metallic Tele/Data Cable in Ceiling, on Same Floor

Quantity	Deduct %	Multiplier
to 500'	3%	.97
to 1,000'	6%	.94
to 1,500'	9%	.91
to 2,000'	12%	.88
to 2,500'	15%	.85
to 3,000'	18%	.82
over 3000	20%	.80

Non-Metallic Romex Cable in Ceiling, on Same Floor

Quantity	Deduct %	Multiplier
to 500'	3%	.97
to 1,000'	6%	.94
to 1,500'	9%	.91
to 2,000'	12%	.88
to 2,500'	15%	.85
to 3,000'	18%	.82
over 3000	20%	.80

Metallic Cable (MC) in Tray or Wireway

Quantity	Deduct %	Multiplier
2 cables	5%	.95
3 cables	10%	.90
4 cables	15%	.85
5 cables	20%	.80
6 cables	25%	.75
7 cables	30%	.70
8+ cables	35%	.65

Metallic Cable (MC) in Ceiling, on Same Floor

Quantity	Deduct %	Multiplier
to 500'	3%	.97
to 1,000'	6%	.94
to 1,500'	9%	.91
to 2,000'	12%	.88
to 2,500'	15%	.85
to 3,000'	18%	.82
over 3000	20%	.80

Adjusting the Data: Tips & Traps

Miscellaneous Natural Economies:

Cable Tray on Same Floor (tray only)

Quantity	Deduct %	Multiplier
to 100'	0%	1.00
to 200'	3%	.97
to 300'	5%	.95
to 400'	8%	.92
to 500'	10%	.90
to 600'	13%	.87
over 600'	15%	.85

Busway on Same Floor (busway only)

Quantity	Deduct %	Multiplier
to 100'	0%	1.00
to 200'	2%	.98
to 300'	5%	.95
to 400'	7%	.93
to 500'	10%	.90
to 600'	12%	.88
over 600'	15%	.85

Height Adjustment Tip:

Productivity declines the higher you work. No surprise there, but what you should know is e-Cost's man-hours are based on working to a height of 15'. For heights above 15' use the "Height Adjustment Add" chart to adjust your man-hours. Use this chart for all categories of work.

Exception: High Bay lighting fixtures assume an installation height of 30'. If your High Bay fixtures are to be installed over 30' add 10% to man-hours for every 5' above 30'.

The increased man-hours compensates for the additional time it takes to move craftsmen, equipment and materials to the adjusted work height.

It does not include any additional ladders, staging or man lifts because it has been our experience that in the vast majority of cases the general contractor is required by specifications to provide the lifting equipment. When properly scheduled the general contractor supplied equipment can be utilized by other crafts or sub-contractors avoiding a congestion of staging and man lifts that is often a duplication of effort.

Prior to the bid and as part of an estimating checklist determine who provides height adjusting equipment.

Height Adjustment Add:

Add to Man-hours for Heights

Quantity	Add %	Multiplier
to 15'	0%	1.00
to 20'	10%	1.10
to 25'	20%	1.20
to 30'	30%	1.30
to 35'	40%	1.40
to 40'	50%	1.50
to 50'	60%	1.60

Tip:

The height adjustment pertains to the installation of all materials at the adjusted levels, conduit, wire, fixtures etc.

You can have both natural economies man-hour deducts along with height adjustment adds. On does not supersede the other.

What's Included! .... What's Not?

The following is intended to inform the user of many of the assumptions made while putting together unit cost items. The more you know the less risk you take making those bid day decisions, or negotiating with someone who thinks he knows.

Wire Terminations: All wire and/or cable terminations are included in the man-hours for the switchgear, switchboard, panelboard, load center, circuit breaker, transformer, lighting fixture, receptacle etc. it feeds.

Wire Termination Rule of Thumb: If the equipment has lugs, terminations are included.

Wire Termination Exceptions: If the equipment served has been installed by others, add the terminations.

Rigid Conduit Terminations: If a conduit run starts with a threaded end requiring locknuts and a bushing, and ends with a threaded end requiring locknuts and a bushing it is assumed that the starting point is already threaded and the man-hours for locknuts and bushings are to secure the already threaded end. If locknuts and a bushing are used to terminate the ending point of the conduit it is assumed that the conduit end will need to be cut, reamed and threaded to complete the termination. In short, add one cut, ream and thread conduit termination to each home run in your estimate.

Adjusting the Data: Tips & Traps

Rigid Conduit Terminations at Fittings: All rigid conduit that terminates at fittings that have only one female threaded opening, such as a hub or a reducing coupling etc., include the man-hours for one conduit termination (cut, ream & thread). This allowance of time is included in the man-hours for the fitting.

Fittings that have more than one female threaded opening such as an LB, LR, T, factory elbow, FS boxes, explosion proof junctions etc. include one less conduit termination (cut, ream & thread) than the number of female threaded openings to a maximum of two per fitting or box. The remainder of the female threaded openings are assumed to be new starting points for conduit and are assumed to be already threaded. In short, you don't have to add any additional conduit terminations at threaded fittings. It's all in the labor for the fitting.

Rigid Conduit Termination Rule of Thumb: Do not add conduit terminations at any fitting with a female threaded opening, it has already been included in the fitting labor.

Rigid Conduit Termination Exceptions: If you are cutting a junction box or fitting into an existing conduit run or replacing a damaged fitting or junction, add a (cut, ream & thread) conduit termination to each conduit end without exception.

Panelboards with Breakers: Panelboards in this publication are shown two ways, with breakers and without. The panelboards with breakers include a "full deck" of breakers. If it is a 30 circuit panelboard it will contain 30 single pole breakers including the installation and termination of all the breakers. A 42 circuit panelboard will contain 42 single pole breakers etc. It assumes that the breakers are installed in the field by electricians not at the factory. It also includes the termination of the branch circuit wire to the breaker, 30 breakers, 30 terminations etc.

Tip: If you are looking for a competitive edge no matter how small, you can adjust the material and labor of Panelboards with Breakers by deducting the excess amount of breakers you actually have in the panelboard. For example, if you have included the unit cost for a 30 circuit panelboard including breakers in your estimate, and in reality you have only 26 you would deduct from the Panelboard with Breakers, the cost in your estimate of the material and man-hours for 4 single pole breakers using the unit cost line item for a single pole breaker.

If you have all 30 breakers in the panelboard, but 10 of the 30 are spares, adjust the labor for your panelboard by deducting the labor for 10 wire terminations. This line item is located in the terminations section of this publication. Do not deduct the breakers themselves you still need to buy and install the breakers in the panelboard.

Don't forget to include the deducts for natural economies for circuit breakers as explained in the previous section.

Panelboards with Breakers Rule of Thumb: All breakers are assumed to be installed in the field by electricians not at the factory.

If a 30 circuit panelboard is included in your estimate, it includes 30 breakers and the tie-in of branch circuits for the entire panelboard including the neutrals and ground wires.

Panelboards with Breakers includes all the material and labor for a complete installation. You don't need to add anything. It is assumed it will be installed on a backboard provided by others.

Panelboards with Breakers Exceptions: If you do not include 5% across the board for incidental or discretionary materials as recommended by e-Cost previously, you should add the material for fasteners where required.

If the backboards are part of the electrical scope you must add both material and labor costs for backboards and related fasteners. Check your specifications.

Panelboards without Breakers: A panelboard without breakers is exactly that, you must add the breakers in order to capture the total material and labor cost of the panelboard. The benefit to adding the breakers separately is that you can include only what is required in your estimate. If you need only 10 breakers in a 30 circuit panelboard the total cost of material and labor for that particular panelboard will be properly assessed.

Equipment: Equipment in this publication is based on the cost per day of a weekly rental. It does not include mobilization or demobilization of the rental equipment and assumes the weekly cost will be apportioned over other electrical tasks during the rental period.

Adjusting the Data: Tips & Traps

Trap: Make sure you have enough work on your project to absorb the rental cost for a week, including mobilization and demobilization. If you don't and just use the equipment cost in a unit cost line item, you will not cover your actual costs. An example would be if you use a line item for a backhoe and only have 10 cubic yards on the entire project to excavate the unit cost line item would say your total cost equipment would be 10 cubic yards x $7 equipment cost per CY = $70 total for equipment.. In reality your cost will actually be closer to $1200.

How Unit Cost Data Is Arranged

The cost data used in this publication is arranged in a modified Master Format classification developed by the Construction Specifications Institute (CSI). This classification divides material and corresponding labor into sixteen divisions.

Division 16 is Electrical. Although the majority of data in this publication is devoted to electrical construction there are other related divisions that are identified in the table of contents.

Division 16 is the broad-brush category for Electrical. At the top left of each page are modified (CSI) subdivisions and headings such as Division 16110 Cable Tray & Fittings.

The first column contains SECTION numbers. These numbers are a combination of the CSI subdivision number (first five digits) and the e-Cost reference number (last five digits).

The second column or DESCRIPTION column contains unit cost items related to the subject heading Division 16110 Cable Tray & Fittings. The bold face full description line items contain all the pertinent information to describe the unit cost item completely with additional sizes indented below the full description line.

The UNIT column contains the unit of measure. The price for material and labor is based on this unit of measure. The units of measure are abbreviated and are described in the abbreviation section of this book.

The MAN-HOURS column is the amount of time it takes to install one (1) unit of the item being described. Man hours are based on productivity of approximately 65% or five hours out of an eight hour day.

The Material (MAT'L) column is the unit price for one (1) unit of the item being described. The price is based on trade net pricing. It does not take into consideration large quantity discounts.

The LABOR column is the cost of labor in dollars for one (1) unit of the item being described. The price is derived by multiplying the unit man hour(s) in column 5 by the National Average Labor Rate, in this case $34.00 per man-hour.

The last column, TOTAL, is the cost of adding the material and labor column together. The result is the cost of the described item based on the National Average Labor Rate of $34.00, with 65% productivity, and material based on trade net small quantity buys.

16110 CABLE TRAY & FITTINGS

SECTION	DESCRIPTION	UNIT	MAN HOURS	MAT'L	LABOR	TOTAL
1611005000	CABLETRAY HANGER, ALUMINUM WALL BRACKET, 9"W TRAY	EA	.330	$13.66	$10.56	$24.22
1611005010	12"W TRAY	EA	.350	15.03	11.20	26.23
1611005020	18"W TRAY	EA	.360	16.40	11.52	27.92
1611005030	24"W TRAY	EA	.380	19.13	12.16	31.29
1611005040	30"W TRAY	EA	.400	23.23	12.80	36.03
1611005050	36"W TRAY	EA	.420	27.33	13.44	40.77
1611005060	VERTICAL	EA	.380	15.03	12.16	27.19
1611005070	**CABLETRAY HANGER, STEEL WALL BRACKET, 6"W TRAY**	**EA**	**.320**	**11.61**	**10.24**	**21.85**
1611005080	9"W TRAY	EA	.330	12.98	10.56	23.54
1611005090	12"W TRAY	EA	.350	14.35	11.20	25.55
1611005100	18"W TRAY	EA	.360	15.03	11.52	26.55
1611005110	24"W TRAY	EA	.380	15.71	12.16	27.87
1611005120	30"W TRAY	EA	.400	17.76	12.80	30.56
1611005130	36"W TRAY	EA	.420	20.50	13.44	33.94
1611005140	VERTICAL	EA	.380	14.35	12.16	26.51
1611005150	**CABLETRAY REDUCER, ALUMINUM LADDER TYPE, 9" TO 6"W**	**EA**	**.950**	**43.72**	**30.40**	**74.12**
1611005160	12" TO 9"W	EA	1.10	43.72	35.20	78.92
1611005170	18" TO 12"W	EA	1.20	45.09	38.40	83.49
1611005180	24" TO 18"W	EA	1.40	47.82	44.80	92.62
1611005190	30" TO 24"W	EA	1.40	50.56	54.40	105
1611005200	36" TO 30"W	EA	1.40	50.56	60.80	111
1611005210	**CABLETRAY REDUCER, ALUMINUM SOLID BOTTOM, 12" TO 6"W**	**EA**	**1.40**	**54.66**	**35.20**	**89.86**
1611005220	18" TO 12"W	EA	1.40	58.76	41.60	100
1611005230	18" TO 6"W	EA	1.30	60.12	41.60	102
1611005240	24" TO 18"W	EA	1.40	62.85	44.80	108
1611005250	24" TO 12"W	EA	1.40	62.85	44.80	108
1611005260	30" TO 24"W	EA	1.70	65.59	54.40	120
1611005270	30" TO 18"W	EA	1.70	65.59	54.40	120
1611005280	30" TO 12"W	EA	1.70	68.78	54.40	123
1611005290	36" TO 30"W	EA	1.90	69.80	60.80	130
1611005300	36" TO 24"W	EA	1.90	71.12	60.80	132
1611005310	36" TO 18"W	EA	1.90	71.12	60.80	132
1611005320	36" TO 12"W	EA	1.90	72.42	60.80	133
1611005330	**CABLETRAY REDUCER, ALUMINUM VENTED TYPE, 9" TO 6"W**	**EA**	**1.25**	**57.39**	**40.00**	**97.39**
1611005340	12" TO 6"W	EA	1.30	60.12	41.60	102
1611005350	12" TO 9"W	EA	1.30	60.12	41.60	102
1611005360	18" TO 12"W	EA	1.60	62.85	51.20	114
1611005370	18" TO 6"W	EA	1.60	62.85	51.20	114
1611005380	18" TO 9"W	EA	1.60	62.85	51.20	114
1611005390	24" TO 18"W	EA	1.80	68.32	57.60	126
1611005400	24" TO 12"W	EA	1.80	68.32	57.60	126
1611005410	24" TO 9"W	EA	1.80	69.69	57.60	127
1611005420	30" TO 24"W	EA	2.10	71.05	67.20	138
1611005430	24" TO 6"W	EA	1.80	69.69	57.60	127
1611005440	30" TO 18"W	EA	2.10	71.05	67.20	138
1611005450	30" TO 12"W	EA	2.10	73.79	67.20	141
1611005460	36" TO 30"W	EA	2.40	75.15	76.80	152

How Assembly Data Is Arranged

1. Assembly cost data in this publication is arranged in a modified four level Uniformat II arrangement developed by the Construction Specification Institute (CSI).

2. The MODEL COMPONENTS section describes all of the Unit Cost components used by e-Cost to build an assemble. Only one model per assembly section is shown but every assembly contains the same level of detail. All Unit Costs used in the assembly can be found in the unit cost section of this book.

3. The GRAPHIC illustrates the model used in the sample assembly. In this instance a 3-phase 3-wire plus ground 4,000A feeder using (10) 4" PVC Schedule 40 conduits. Illustrations are just a visual guide and are not to scale and do not represent or show all of the components in the model assembly.

4. The ASSEMBLY LOGIC shows the assumptions made when creating each assembly. It explains such things as total length of the assembly cost model, how the model is terminated, what it includes, what it does not include, etc. Although the logic may be material and labor specific to the cost model illustrated, it may be applied to all assemblies in the section.

5. The model assemble in based on a 100 linear foot run (CLF) This section shows the extended quantities, manhours, material price, labor, equipment and total cost of each component in the assembly model. It is important to not that this is the extended cost not the unit cost for each item.

6. The TOTALS in this section are the cummulative costs/man-hours of the extended components in the model assembly. There may be two totals. The top price is always the cost of the assembly model and the bottom is the price of the unit of measure used in the remainder of the assemblies in the section. In this case the bottom is the price per linear foot (LF) based on a 100 linear foot (CLF) model.

7. The ASSEMBLY NUMBER is used as a reference code for a particular assembly.

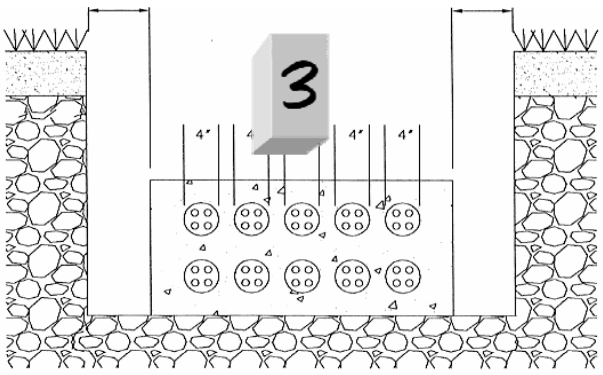
8. The DESCRIPTION column is the summary description of the assembly without the exploded view of all its unit cost components. A vertical arrow indicates that portion of the assembly description is identical.

9. The UNIT heading in this sample indicates that all assemblies in this column are based on cost per linear foot (LF). The Unit of Measure column may change depending on the assembly.

10. The MAN HOURS column is the number of manhours per Unit of Measure or in the case of assembly number 1001065 it would be .880 manhours per linear foot (LF).

G4013 Ductbank, Feeders by Amps, 3Ø, 3 & 4 Wire, PVC 40, Incl Civil

005



Assembly Logic:
The following assemblies [illegible] both civil and electrical requirements for a comple[illegible]ank system.

The assembly is based o[illegible] underground lateral conduit run 30" deep to the top of the ductbank. The width of the trench is 4' wider than the width of the concrete. Each end of the run is turned up using a factory manufactured 90º elbow and terminated using a PVC male adapter. Conduits are separated using PVC or fiberglass base and intermediate spacers every 8'. Wire is included. *Terminations are not included.*

The linear foot cost of the below assemblies include the total amount of conduit, spacers, elbows, terminal adapters and wire required for parallel runs.

DUCTBANK, FEEDERS BY AMPS, 3-PHASE, 3 & 4 WIRE, PVC 40, INCL CIVIL WORK	PRICE PER 100 LINEAR FEET (CLF)						
MODEL COMPONENTS	**QUAN**	**UNIT**	**MAN HOURS**	**MAT'L**	**LABOR**	**EQUIP**	**TOTAL**
Ductbank, 4" PVC Schedule 40, 3-Phase 3-Wire, 10-Way, 4000A							
Utility Trench Excavating, w/ Backhoe, to 3' Deep, 3/8 C.Y. Bucket	88.9	CY	9.78		$333	$267	$600
Utility Trench Excavating, by Hand, Trim Side & Bottom of Trench	1,500	SF	18.0		612		612
Utility Trench Excavating, b[illegible] Add For Truck Loading	21.5	CY	21.5		731		731
Utility Trench Excavating, M[illegible] lauling, w/ 6 C.Y. Dump, 4-Mile	21.5	CY	2.02		68.68	58.00	127
Conduit, PVC #40 In Ductb[illegible] Fittings & Support, 4"	1,000	LF	53.0		1,802		11,618
Conduit Elbow, PVC #40, 4[illegible]	20	EA	25.2		857		1,344
Conduit Terminal Adapter Male, PVC #40, 4"	20	EA	13.7		465		619
Conduit Spacer Base Type, for PVC Utility Duct Type EB, 4"	63	EA	6.30	[illegible]8	214		372
Conduit Spacer Intermediate, for PVC Utility Duct Type EB, 4"	63	EA	6.30	158	214		372
Ductbank Form, 4-Use	400	SFCA	26.8	133	911	32.00	1,076
Ductbank Concrete, Normal Weight Ready Mix, 3000 PSI	15.6	CY		1,342			1,342
Placing Concrete, Ductbank, Continuous, Direct Chute	15.6	CY	6.30		214	9.00	223
Trench Backfill, w/ Front End Loader, 1 CY Bucket, 50' Haul Compacted	67.4	CY	7.40		252	79.00	331
Wire, Copper THHN, 600V, Stranded, 500MCM	1,050	LF	39.9	25,279	1,357		26,636
Wire, Copper THHN, 600V, Stranded, 600MCM	3,150	LF	145	91,088	4,927		96,015
PER C.L.F.			**381**	**$128,615**	**$12,95[illegible]**	**[illegible]**	**$142,017**
PER L.F.			**3.81**	**$1,286**	**$13[illegible]**	**[illegible]**	**$1,420**

005	DUCTBANK, FEEDERS BY AMPS, 3-PHASE, 3 & 4 WIRE, PVC 40, INCL CIVIL WORK	PRICE PER LINEAR FOOT (LF)					
ASSEMBLY NO.	**DESCRIPTION**	**UNIT**	**MAN HOURS**	**MAT'L**	**LABOR**	**EQUIP**	**TOTAL**
1001000	Ductbank 4" PVC Schedule 40, 3-Phase 3-Wire, 1-Way, 100A	LF	.540	$30.44	$18.36	$2.07	$50.87
[illegible]5	1-Way, 110A	LF	.540	30.44	18.36	2.07	50.87
[illegible]0	1-Way, 125A	LF	.540	30.44	18.36	2.07	50.87
[illegible]5	1-Way, 150A	LF	.550	32.45	18.70	2.07	53.22
1001020	1-Way, 175A	LF	.560	36.69	19.04	2.07	57.80
1001025	1-Way, 200A	LF	.560	42.07	19.04	2.07	63.18
1001030	1-Way, 225A	LF	.570	48.82	19.38	2.07	70.27
1001035	1-Way, 250A	LF	.590	54.83	20.06	2.07	76.96
1001040	1-Way, 300A	LF	.600	70.05	20.40	2.07	92.52
1001045	1-Way, 350A	LF	[illegible]	92.83	20.74	2.07	116
1001050	1-Way, 400A	LF	[illegible]	92.83	20.74	2.07	116
1001055	2-Way, 450A	LF	[illegible]	101	28.56	2.39	132
1001060	2-Way, 500A	LF	.860	111	29.24	2.39	143
1001065	2-Way, 600A	LF	.880	144	29.92	2.39	176

How Assembly Data Is Arranged

The Material (MAT'L) column is the price for one (1) unit of measure described in the UNIT column. In this case it is linear feet (LF). The price is based on trade net pricing. It does not take into consideration large quantity discounts.

An assembly with bold print and horizontal gray shading across the entire row indicates that this is the assembly illustrated in the COST MODEL. The price may vary slightly because of computer generated rounding.

The LABOR column is the cost of labor in dollars for one unit of the item being described. The price is derived by multiplying the unit man hour(s) in the MAN HOURS column by the National Average Labor Rate. In this case $34.00 per man-hour.

The Equipment (EQUIP) column is the price of rental equipment plus operating expense to install one (1) unit of measure described in the UNIT column, in this case per linear foot (LF). The cost for the equipment operator is included in the labor column. Not all assemblies have an equipment cost.

The last column, TOTAL, is the sum of the material, labor and equipment columns. The result is the cost of the described item based on the National Average Labor Rate of $34.00, with 65% productivity and material based on trade net small quantity buys.

This area is used to inform the user of any pertinent information or NOTES pertaining to the assemblies in that section. It is also a useful area for the user to post notes, formulas or modifications for future reference.

G4013 Ductbank, Feeders by Amps, 3Ø, 3 & 4 Wire, PVC 40, Incl Civil

005	DUCTBANK, FEEDERS BY AMPS, 3-PHASE, 3 & 4 WIRE, PVC 40, INCL CIVIL WORK	PRICE PER LINEAR FOOT (LF)					
ASSEMBLY NO.	DESCRIPTION	UNIT	MAN HOURS	MAT'L	LABOR	EQUIP	TOTAL
1001070	Ductbank 4" PVC Schedule 40, 3-Phase 3-Wire, 2-Way, 700A	LF	.920	[illegible]9	$31.28	$2.39	$223
1001075	2-Way, 800A	LF	.970	[illegible]0	32.98	2.39	255
1001080	3-Way, 900A	LF	1.18	[illegible]0	40.12	2.97	293
1001085	3-Way, 1000A	LF	1.22	[illegible]85	41.48	2.97	330
1001090	3-Way, 1200A	LF	1.31	338	44.54	2.97	386
1001095	4-Way, 1600A	LF	1.76	450	59.84	2.97	513
1001100	5-Way, 2000A	LF	2.14	564	72.76	3.56	640
1001105	6-Way, 2500A	LF	2.40	674	81.60	3.56	759
1001110	8-Way, 3000A	LF	2.94	908	99.96	3.98	1,012
1001115	8-Way, 3200A	LF	3.15	1,030	107	3.98	1,141
1001120	**Ductbank 4" PVC Schedule 40, 3-Phase 3-Wire,10-Way, 4000A**	**LF**	**3.80**	**1,286**	**129**	**4.34**	**1,420**
1001125	Ductbank 4" PVC Schedule 40, 3-Phase 4-Wire, 1-Way, 100A	LF	.550	35.44	18.70	2.07	56.21
1001130	1-Way, 110A	LF	.550	35.44	18.70	2.07	56.21
1001135	1-Way, 125A	LF	.550	35.44	18.70	2.07	56.21
1001140	1-Way, 150A	LF	.570	38.12	19.38	2.07	59.57
1001145	1-Way, 175A	LF	.580	43.77	19.72	2.07	65.56
1001150	1-Way, 200A	LF	.590	50.95	20.06	2.07	73.08
1001155	1-Way, 225A	LF	.600	59.94	[illegible]	2.07	82.41
1001160	1-Way, 250A	LF	.620	67.65	[illegible]	2.07	90.80
1001165	1-Way, 300A	LF	.630	87.94	[illegible]	2.07	111
1001170	1-Way, 350A	LF	.650	118	22.10	2.07	142
1001175	1-Way, 400A	LF	.650	118	22.10	2.07	142
1001180	2-Way, 450A	LF	.900	123	30.60	2.39	156
1001185	2-Way, 500A	LF	.920	137	31.28	2.39	171
1001190	2-Way, 600A	LF	.950	180	32.3[illegible]	[illegible]	214
1001195	2-Way, 700A	LF	.990	240	33.6[illegible]	[illegible]	276
1001200	2-Way, 800A	LF	1.06	281	36.0[illegible]	[illegible]	319
1001205	3-Way, 900A	LF	1.29	311	43.86	2.97	358
1001210	3-Way, 1000A	LF	1.34	363	45.56	2.97	411
1001215	3-Way, 1200A	LF	1.34	363	45.56	2.97	411
1001220	4-Way, 1600A	LF	1.95	572	66.30	2.97	641
1001225	5-Way, 2000A	LF	2.38	715	80.92	3.56	[illegible]
1001230	6-Way, 2500A	LF	2.69	856	91.46	3.56	[illegible]
1001235	8-Way, 3000A	LF	3.25	1,111	111	3.98	[illegible]
1001240	8-Way, 3200A	LF	3.53	1,273	120	3.98	1,397
1001245	10-Way, 4000A	LF	4.28	1,590	146	4.34	1,740

Note 1: All craft labor is based on $34.00 per man-hour.

Note 2: Disposal or dump charges *have not* been included in the assemblies

Note 3: Craft or equipment mobilization *have not* been included in the cost of any of the assemblies in this section. It is assumed that this scope of work is part of a larger project and the craftsmen and equipment are already mobilized and on site.

ELECTRICAL ASSEMBLIES

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