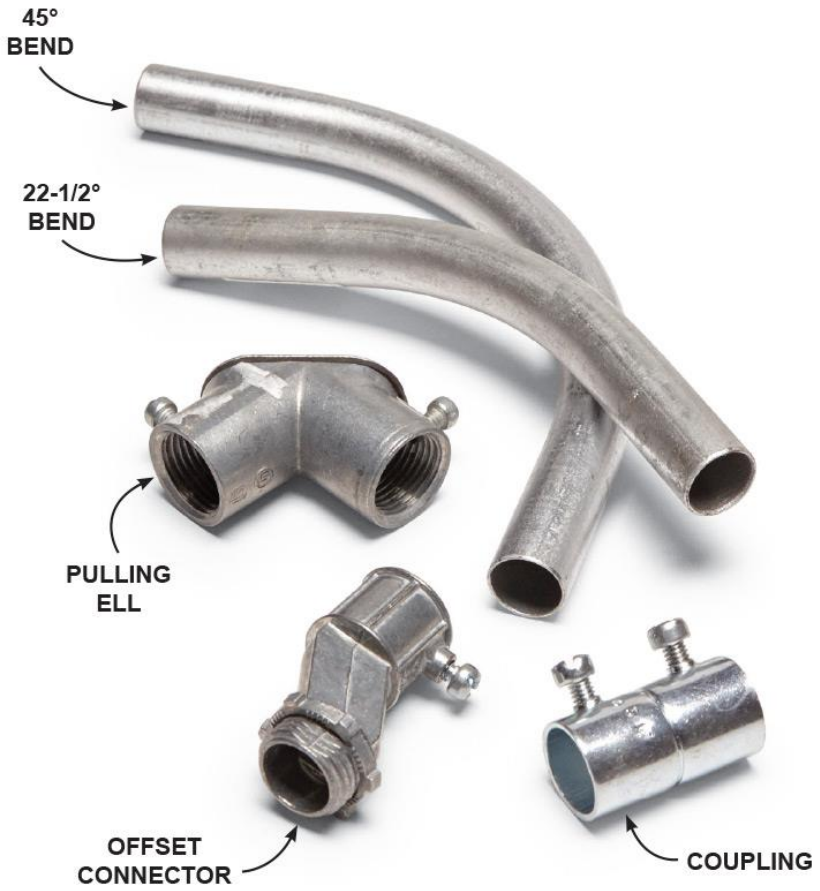
Electrical Material



Handyman

Electrical Material

National Electrical Contractors Association - NECA

http://www.necanet.org/

NECA is the voice of the $130 billion electrical construction industry that brings power, light, and communication technology to buildings and communities across the U.S.

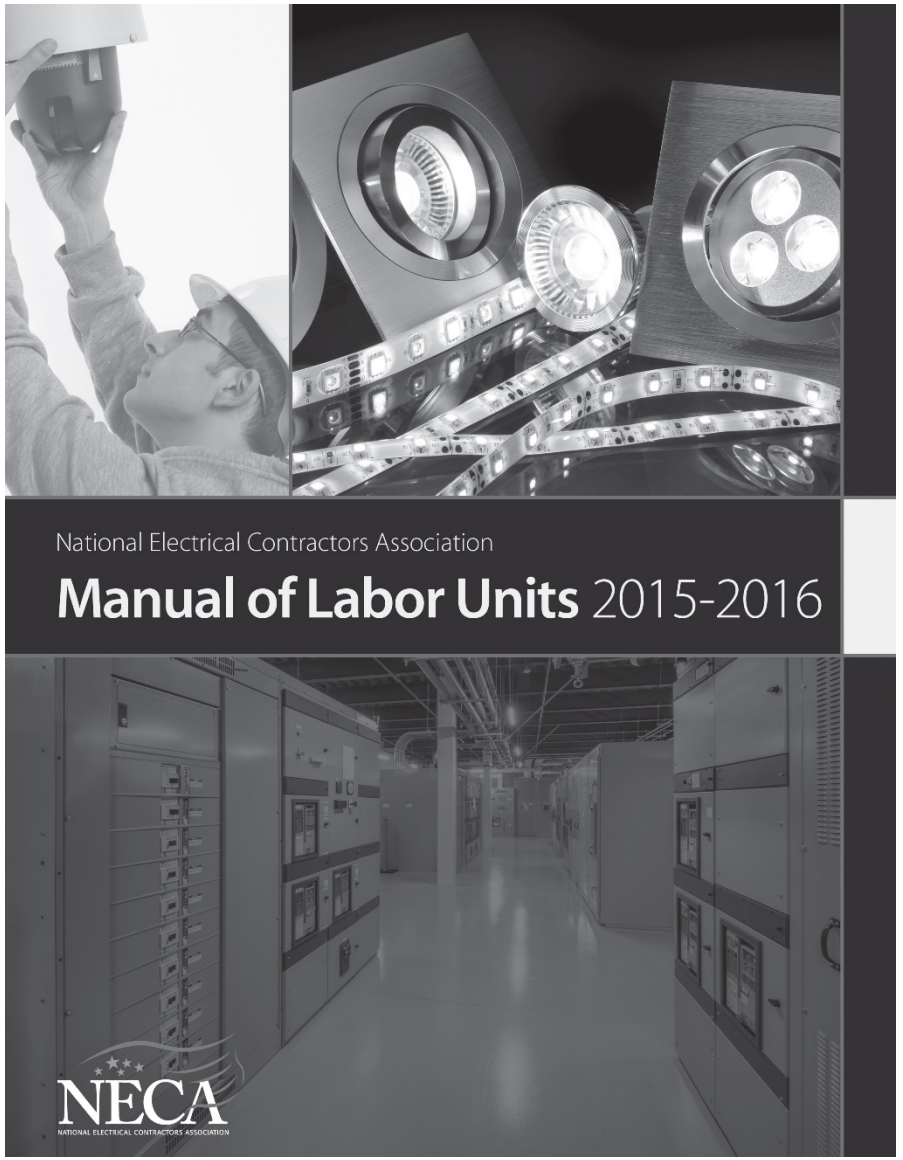
Electrical Material

NECA Manual of Labor Units

An estimate is only as good as the information it is based on, and the NECA Manual of Labor Units (MLU) has been the estimating resource of choice for electrical contractors since 1923.

The MLU provides an experience-based reference for estimating the electrical construction labor required to install typical electrical and communications systems.

The labor unit data comes directly from a national average of NECA's member contractors and is reviewed and updated bi-annually to ensure you have the best information to accurately estimate.



Electrical Material

NECA Categories of Work

The NECA Manual of Labor Units divides electrical materials into 14 categories. Many electrical contractors use a different breakdown of electrical material for estimating purposes.

SECTION	TITLE
01	Integrated Building Systems
02	Conduit, Raceways, Fittings, & Related Items
03	Wire, Cable, Lugs, Terminations, Busway & Bus Duct
04	Switchboards, MCC's, Panelboards, & Power Equipment
05	Lighting Fixtures, Poles, Parking Lot Lighting
06	Wiring Devices
07	Hazardous Systems
08	Grounding & Lighting Protection Systems
09	Heating Equipment Connections
10	Temporary Power & Lighting
11	Outdoor Overhead and Underground Systems
12	Equipment Installation and Connections
13	Industrial Control and Instrumentation
14	Alternative Energy Systems

Electrical Material

Labor Units

E = One or per each item

C = Per hundred items

C = Per hundred linear feet of the item

M = Per thousand linear feet of the item

LF = Linear Foot

CY = Cubic Yard

Labor Units (Installation Conditions)

NECA 1 Normal (N)

NECA 2 Difficult (D)

NECA 3 Very Difficult (VD)

MLU 2015-16. Section 02 Conduit, Raceways, Fittings, & Related Items, Page 2-15

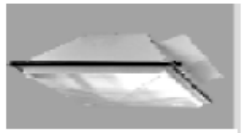
Description	Rev	Normal	Difficult	Very Difficult	Company Experience	Unit
Rigid Steel Conduit (GRC or GRS) and fittings						
Rigid Steel Conduit with Threaded Couplings						
1/2"		5.50	6.80	8.20		C
3/4"		6.00	7.50	9.00		C
1"		7.00	8.70	10.50		C
1 1/4"		8.00	10.00	12.00		C
1 1/2"		9.00	11.20	13.50		C
2"		11.00	13.70	16.50		C
2 1/2"		15.00	18.70	22.50		C
3"		20.00	25.00	30.00		C
3 1/2"		25.00	31.20	37.50		C
4"		30.00	37.50	45.00		C
5"		38.00	47.50	57.00		C
6"		48.00	60.00	72.00		C
For Stainless Steel Conduit & Fittings Add 25%						
Rigid Steel Factory Elbows						
Add 20% For Wide Sweep Elbows						
1/2"		0.35	0.43	0.52		E
3/4"		0.40	0.50	0.60		E
1"		0.50	0.62	0.75		E
1 1/4"		0.60	0.75	0.90		E
1 1/2"		0.75	0.93	1.12		E
2"		1.00	1.25	1.50		E
2 1/2"		1.50	1.85	2.25		E
3"		2.00	2.50	3.00		E
3 1/2"		2.50	3.10	3.75		E
4"		3.00	3.75	4.50		E
5"		4.00	5.00	6.00		E
6"		5.00	6.25	7.50		E
For Stainless Steel Conduit & Fittings Add 25%						

Electrical Material

What's the difference between the three columns in the MLU?

The NECA labor unit tables include three different labor units for each item. Users of the MLU are also encouraged to consider labor units between the columns, or even lower than or exceeding the columns when appropriate.

Section 5 - Lighting Fixtures, Poles and Parking Lot Lighting



Description	Rev	Normal	Difficult	Very Difficult	Company Experience	Unit
Recessed H.I.D.						
50 Watt H.I.D		1.75	2.19	2.73		E
70 Watt H.I.D		1.75	2.19	2.73		E
100 Watt H.I.D.		2.00	2.50	3.13		E
150 Watt H.I.D.		2.25	2.81	3.52		E
250 Watt H.I.D.		2.75	3.44	4.30		E
400 Watt H.I.D.		3.75	4.69	5.86		E
Fluorescent High Bay Fixture Ultra- Efficient 6 Lamp HO						
T5 HO Lamps		1.75	2.19	2.71		E
T8 HO Lamps		1.85	2.31	2.89		E
High Bay Fixtures - Multi Vapor H.I.D Fixtures -						
250 Watt - Without Lens						
18" Reflector (25 Lb)		1.75	2.19	2.73		E
20" Reflector (35 Lb)		2.00	2.50	3.13		E
24" Reflector (45 Lb)		2.25	2.81	3.52		E
30" Reflector (55 Lb)		2.50	3.13	3.91		E
High Bay Fixtures - Multi Vapor H.I.D Fixtures -						
400 Watt - Without Lens						
20" Reflector (40 Lb)		2.25	2.81	3.52		E
24" Reflector (50 Lb)		2.50	3.13	3.91		E
30" Reflector (60 Lb)		2.75	3.44	4.30		E

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Electrical Material

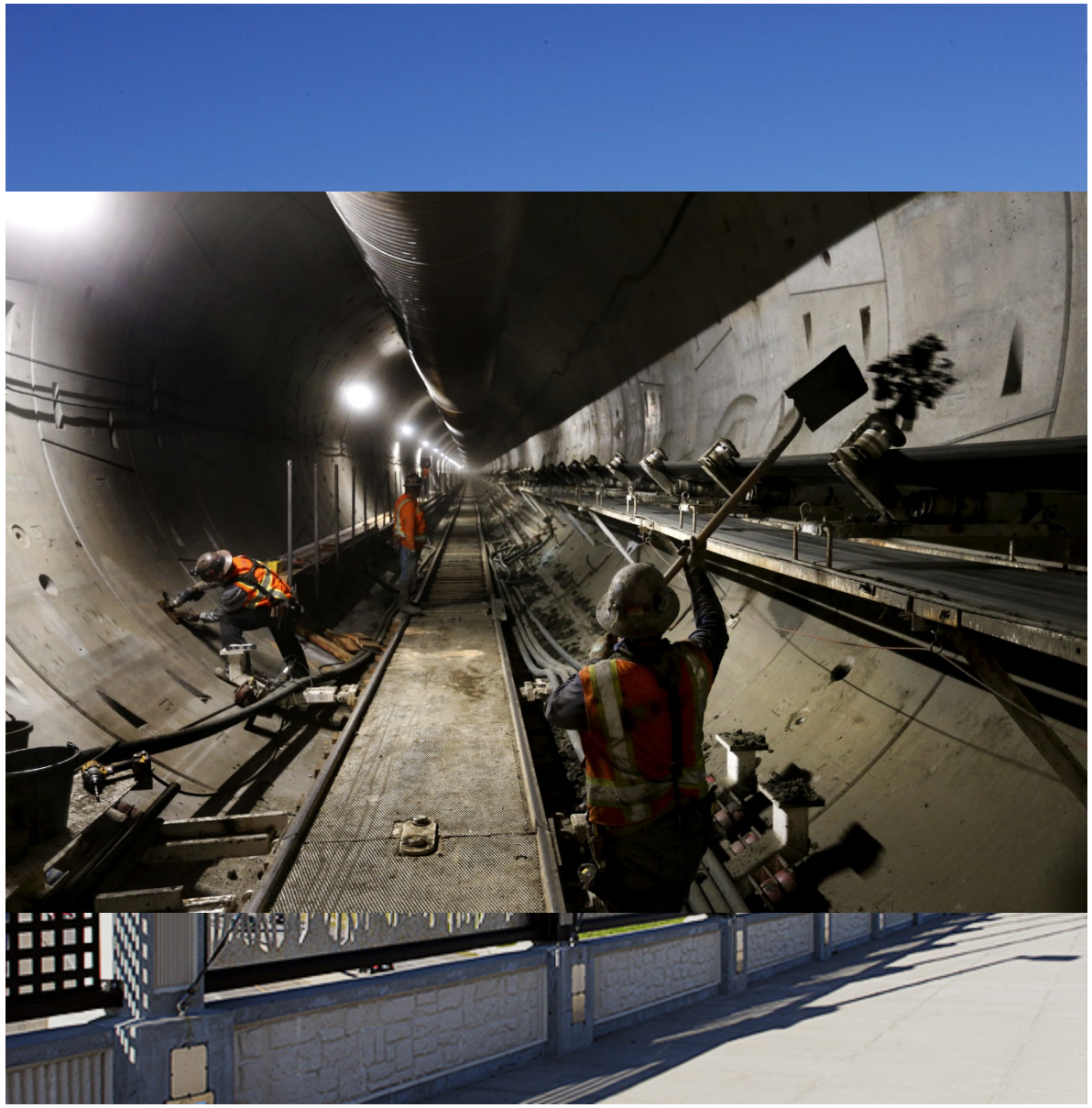
Normal Installation Conditions – When all of the conditions associated with the installation of an item will permit the maximum productivity of the electricians on a project, these “normal” column labor units are applicable.

Electrical Material

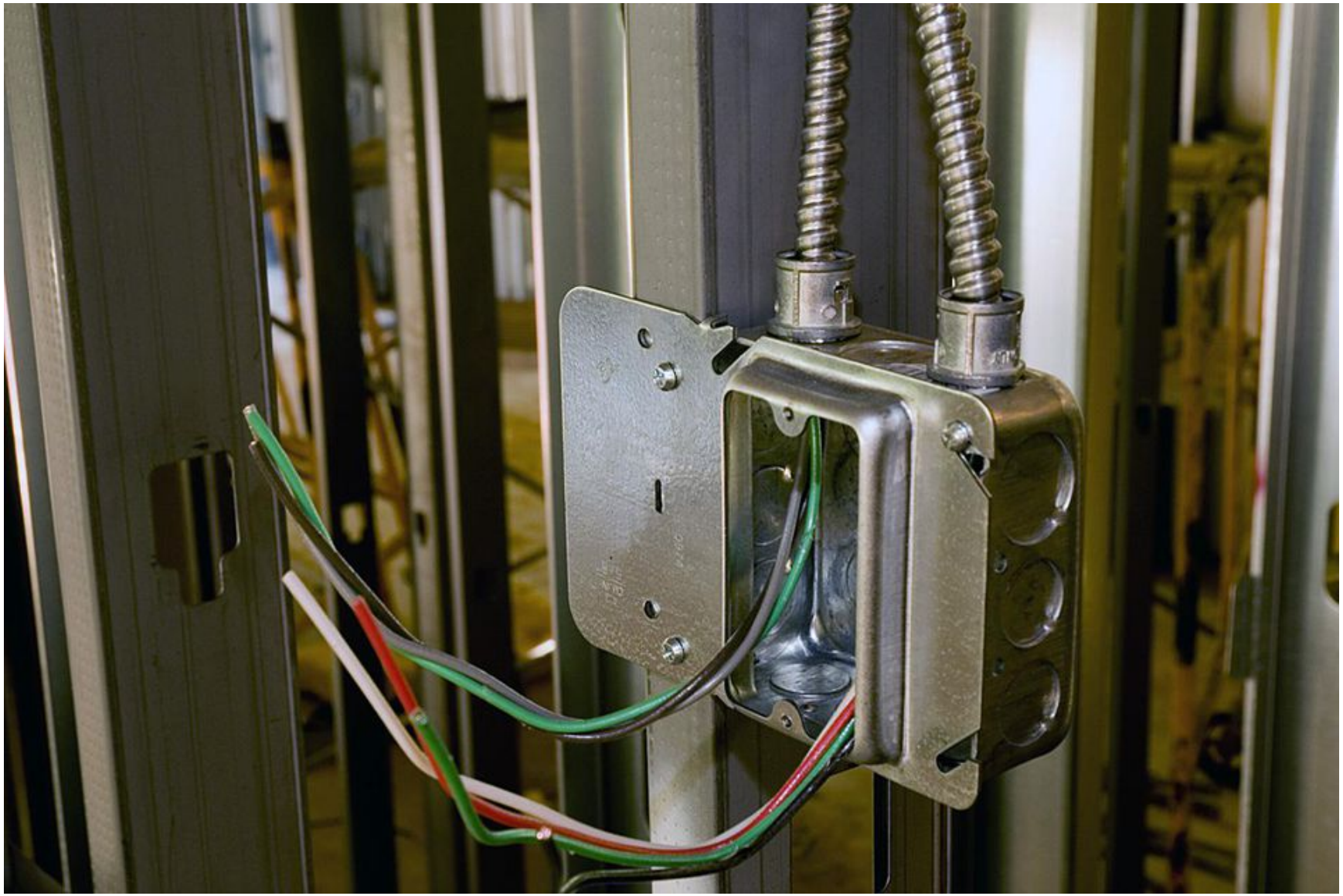
Difficult Installation Conditions – When one or more of the conditions associated with the installation of an item will permit less than maximum productivity of the electricians on a typical project, these “difficult” column labor units are applicable.

Electrical Material

Very Difficult Installation Conditions – When one or more of the conditions associated with the installation of an item will permit substantially less than maximum productivity of the electricians on a typical project, these “very difficult” column labor units are applicable.



Electrical Material



Electrical Material

Electrical Material

Electrical Material

Electrical Material

Example 1. NECA MLU

325 feet of 3 ½" GRC is being installed in a 5" concrete slab.

Determine the total labor.

Determine the total material cost.

Electrical Material

Example 1.
325 feet of 3 ½" GRC is being installed in a 5" concrete slab.

Determine the total labor.

$$\text{Labor} = \frac{\text{QTY} \times \text{Labor hours}}{\text{unit (per)}} = \frac{325 \times 25.00}{100} = 81.25 \text{ hrs}$$

Determine the total material cost.

Electrical Material

Example 1.
325 feet of 3 ½" GRC is being installed in a 5" concrete slab.

Determine the total labor.

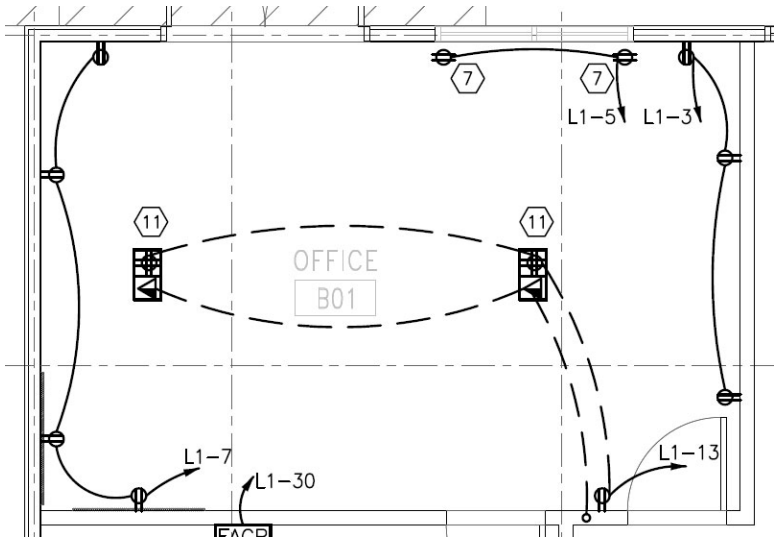
$$\text{Labor} = \frac{\text{QTY} \times \text{Labor hours}}{\text{unit (per)}} = \frac{325 \times 25.00}{100} = 81.25 \text{ hrs}$$

Determine the total material cost.

$$\text{Mtrl Cost} = \frac{\text{QTY} \times \text{Mtrl cost}}{\text{Unit (per)}} = \frac{325 \times 700}{100} = \$2,275$$

Electrical Material

Example 2.



7. PROVIDE CEILING MOUNTED RECEPTACLES IN ACCORDANCE w/ NEC 210.62.

11. PROVIDE FLOOR OUTLET w/ DATA AND DUPLEX RECEPTACLE. COORDINATE FINAL LOCATION w/ THE OWNER PRIOR TO ROUGH–IN. PROVIDE 1" PVC CONDUIT BETWEEN FLOOR BOXES, ONE FOR POWER & ONE FOR DATA. ROUTE DATA CONDUIT TO WALL AND STUB–UP INSIDE WALL TO ACCESSIBLE LOCATION ABOVE CEILING w/ STEEL CONDUIT. ROUTE POWER TO WALL RECEPTACLE.

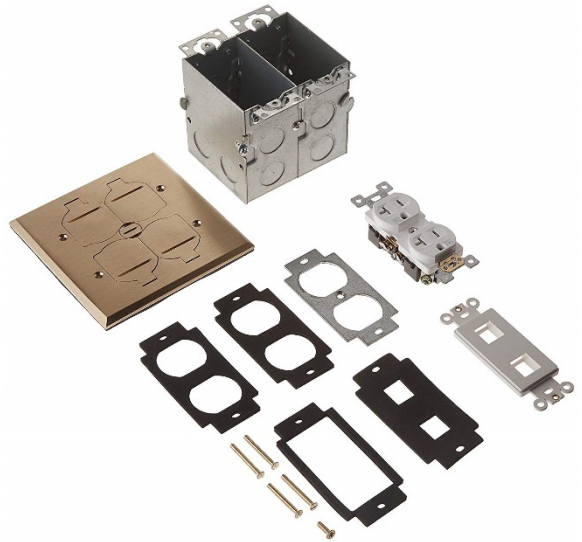
Item	Symbol	MLU PG No.	N	D	VD	Unit
20A Duplex Receptacle		6-5	30.00	37.50	45.00	C
20A Duplex Receptacle		6-5	30.00	37.50	45.00	C
Floor Outlet w/Data and 20A Double Duplex Receptacle		6-5	30.00	37.50	45.00	C

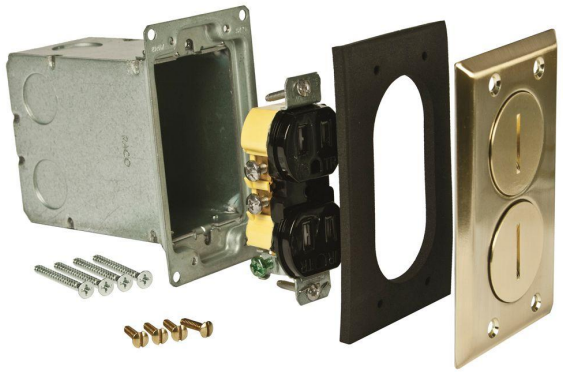
Duplex Receptacle - Straight Blade						
15 Amp 3 Wire		25.00	31.25	37.50		C
15 Amp GFCI or AFCI	X	30.00	37.50	45.00		C
20 Amp 3 Wire		30.00	37.50	45.00		C
20 Amp GFCI or AFCI	X	35.00	43.75	52.50		C
15 Amp 3 Wire with USB Ports	X	25.00	31.25	37.50		C
20 Amp 3 Wire with USB Ports	X	30.00	37.50	45.00		C
GFCI - Blank Face	X	30.00	37.50	45.00		C

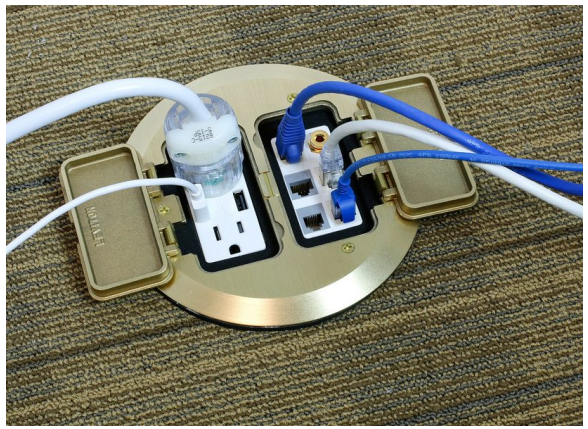
Knockout Type Steel Boxes						
Floor Boxes W/O Trim Covers						
See Section 6 for Trim Covers						
Square Floor Boxes non-adjustable		80.00	90.00	100.00		C
Octagon Floor Boxes non-adjustable		80.00	90.00	100.00		C
Square Floor Boxes adjustable		100.00	112.00	125.00		C
Octagon Floor Boxes adjustable		100.00	112.00	125.00		C
Threaded Cast Floor Boxes						
Round Boxes without Legs		1.25	1.55	1.90		E
Round Boxes with Legs		1.50	1.85	2.25		E
1-Gang with Cover		1.20	1.65	1.95		E
2-Gang with Cover		1.40	1.75	2.10		E
3-Gang with Cover		1.50	1.85	2.25		E
4-Gang with Cover		1.60	2.00	2.40		E
Floor Boxes						
Poke-Thru Floor Box Single Serv		1.00	1.50	2.00		E
Excludes Core						
Poke-Thru Floor Box Dual Service		1.25	1.75	2.25		E
Excludes Core						
P.V.C. Floor Box Cut-off type		1.00	1.50	2.00		E
Raised Floor Box		1.00	2.00	3.00		E
Cutting Raised Floor		1.50	2.00	3.00		E

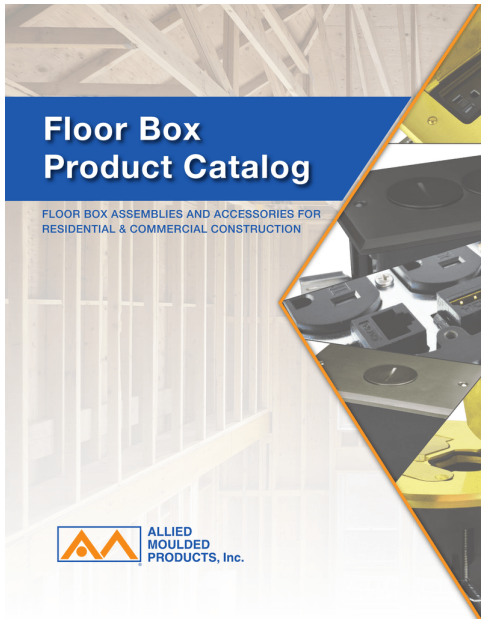
Electrical Material

Floor Boxes





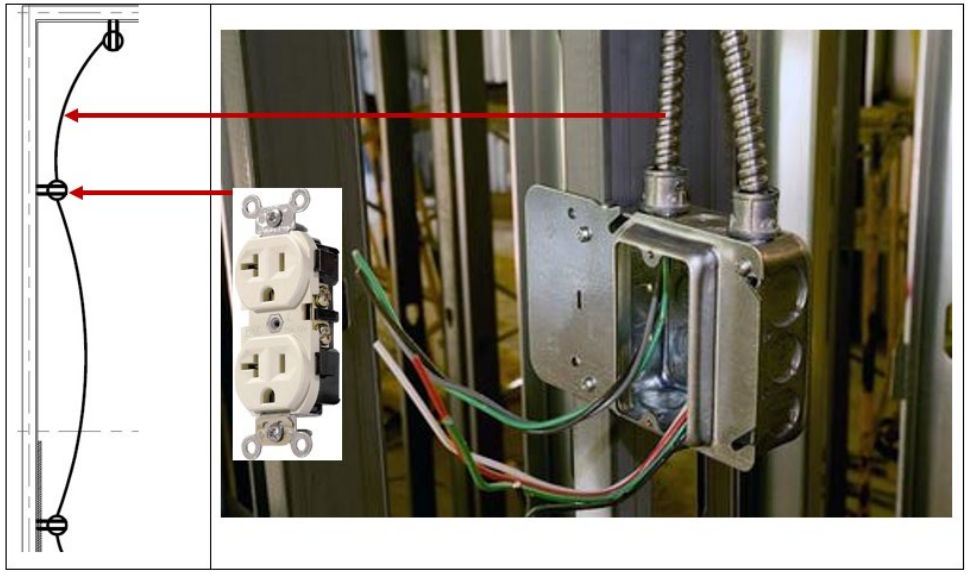




Electrical Material

Branch Wiring

- ❑ Branch wiring refers to the conduit and conductors or cable that runs power to each device (receptacles, switches, floor boxes).
- ❑ Electrical drawings indicate the branch using either solid or dashed lines. Often the lines are left off the drawings and it is up to the electrical estimator to sketch the branch onto the drawing.
- ❑ Most commercial buildings have:
  - Power Branch
  - Lighting Branch
  - Fire Alarm Branch



Material Items

4S Box
Box Holder
Box Connectors
MC Cable

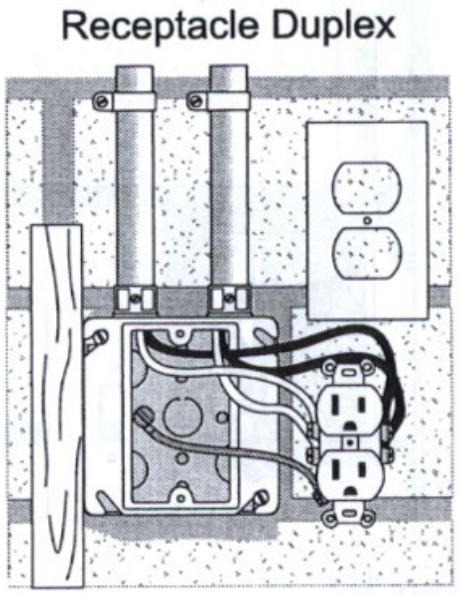
→ **Power Branch**

20A Duplex Receptacle
Receptacle Plate

→ **Wiring Device**

Groups of items that make up the installation are called an assembly.

IF MC Cable is not allowed or the specs call for conduit and Conductors (pipe and wire) the most commonly used conduit For indoor receptacles is EMT.

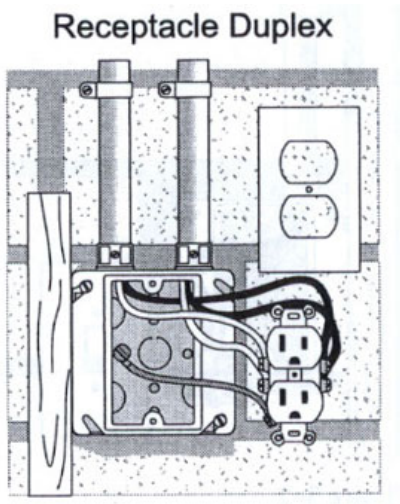


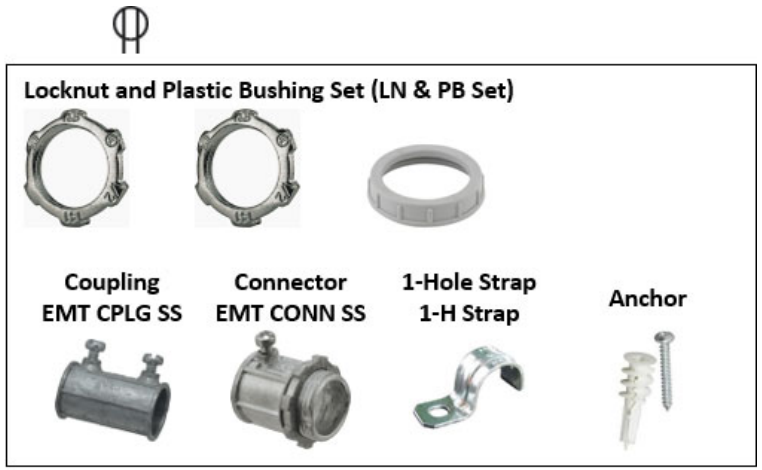
Electrical Material

Example 3. 20A Duplex Receptacle

20A 125 Volt Duplex Receptacle with ½" EMT							
MATERIAL	QUANTITY	MATERIAL PRICE	PER	MATERIAL EXTENSION	LABOR UNIT	PER	LABOR EXTENSION
4S BOX 3/4" K.O.							
4S SG P-RING							
1/2" EMT							
1/2" EMT CPLG SS							
1/2" EMT CONN SS							
1/2" LN & PB SET							
1/2" 1-H STRAP							
3/8" SELF DRILL ANCHOR							
#12 THHN WIRE							
20A DPLX RECEP							
1-G PLATE							
Total							

Labor Cost at $25.00		$
Material Cost + 15%		$
Total Prime Cost	Σ	$
Overhead at $15.00 Per hour		$
Break Even Cost	Σ	$
Profit, +15%		$
Unit Price		



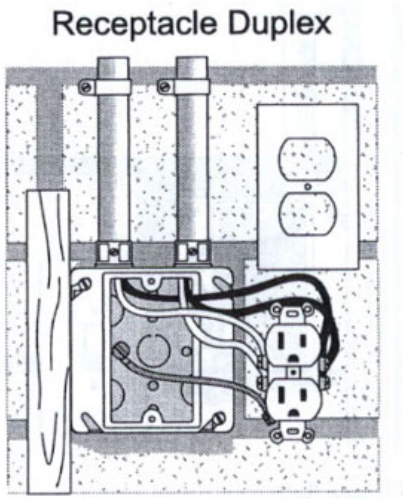


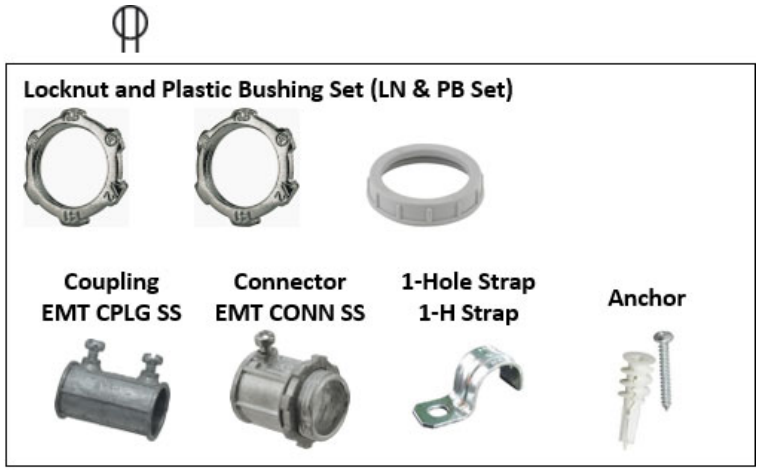
Electrical Material

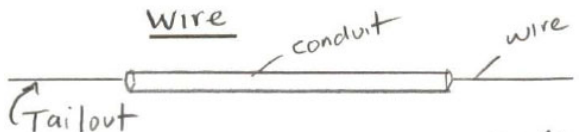
Example 3. 20A Duplex Receptacle

20A 125 Volt Duplex Receptacle with ½" EMT							
MATERIAL	QUANTITY	MATERIAL PRICE	PER	MATERIAL EXTENSION	LABOR UNIT	PER	LABOR EXTENSION
4S BOX 3/4" K.O.	1	59.00	C	0.59	30.00	C	0.30
4S SG P-RING	1	39.00	C	0.39	15.00	C	0.15
1/2" EMT	30	13.00	C	3.90	4.50	C	1.35
1/2" EMT CPLG SS	4	24.00	C	0.96	0.04	E	0.16
1/2" EMT CONN SS	2	21.00	C	0.42	0.08	E	0.16
1/2" LN & PB SET	2	97.00	C	1.94	0.30	E	0.60
1/2" 1-H STRAP	4	6.00	C	0.24	4.00	C	0.16
3/8" SELF DRILL ANCHOR	4	22.00	C	0.88	24.00	C	0.96
#12 THHN WIRE	102	48.00	M	4.90	6.00	M	0.61
20A DPLX RECEP	1	180.00	C	1.80	30.00	C	0.30
1-G PLATE	1	47.00	C	0.47	10.00	C	0.10
Total				$ 16.49			4.85

Labor Cost at $25.00	4.85 × $25.00		$ 121.25
Material Cost + 15%	$16.47 × 1.15		$ 18.96
Total Prime Cost		Σ	$ 140.21
Overhead at $15.00 Per hour	4.85 × $15.00		$ 72.75
Break Even Cost		Σ	$ 221.96
Profit, +15%	$221.96 × 0.15		$ 33.29
Unit Price			$255.25







3 conductors × 30 ft = 90 ft
+ 12 tailouts × 1 ft = 12 ft
Total 102 ft

½" LN & PB Set
½" LN 15.00 C
½" PB 67.00 C
2 × 15.00 = 30.00
1 × 67.00 = 67.00
$ 97.00 C

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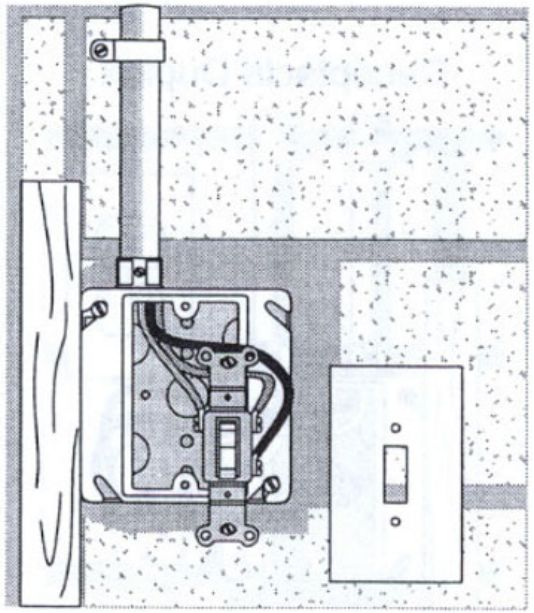
Electrical Material

Example 4. 20A Single Pole Switch

20A SINGLE POLE SWITCH w/ 1/2" EMT							
MATERIAL	QUANTITY	MATERIAL PRICE	PER	MATERIAL EXTENSION	LABOR UNIT	PER	LABOR EXTENSION
4S BOX 3/4" K.O.							
4S SG P-RING							
1/2" EMT							
1/2" EMT CPLG SS							
1/2" EMT CONN SS							
1/2" LN & PB SET							
1/2" 1-H STRAP							
3/8" SELF DRILL ANCHOR							
#12 THHN WIRE							
20A SP SW							
1-G PLATE							
Total							

Labor Cost at $25.00		$
Material Cost + 15%		$
Total Prime Cost	Σ	$
Overhead at $15.00 Per hour		$
Break Even Cost	Σ	$
Profit, +15%		$
Unit Price		

One Gang Switch $ s



Electrical Material

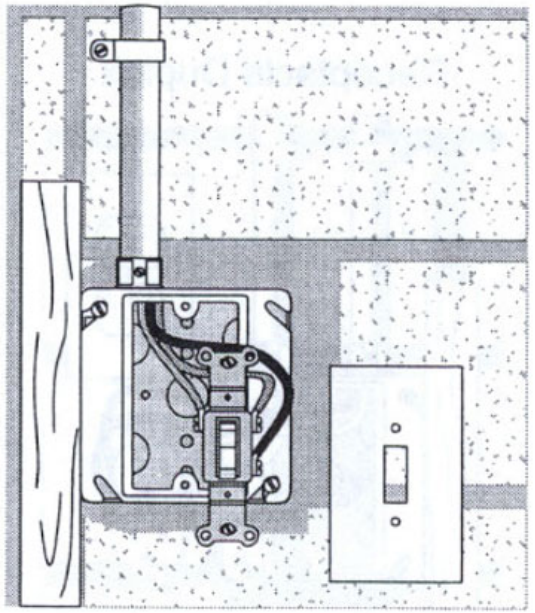
Example 4. 20A Single Pole Switch

20A SINGLE POLE SWITCH w/ 1/2" EMT							
MATERIAL	QUANTITY	MATERIAL PRICE	PER	MATERIAL EXTENSION	LABOR UNIT	PER	LABOR EXTENSION
4S BOX 3/4" K.O.	1	59.00	C	0.59	30.00	C	0.30
4S SG P-RING	1	39.00	C	0.39	15.00	C	0.15
1/2" EMT	15	13.00	C	1.95	4.50	C	0.68
1/2" EMT CPLG SS	2	24.00	C	0.48	0.04	E	0.08
1/2" EMT CONN SS	1	21.00	C	0.21	0.08	E	0.08
1/2" LN & PB SET	1	97.00	C	0.97	0.30	E	0.30
1/2" 1-H STRAP	2	6.00	C	0.12	4.00	C	0.08
3/8" SELF DRILL ANCHOR	2	22.00	C	0.44	24.00	C	0.48
#12 THHN WIRE	21	48.00	M	1.01	6.00	M	0.13
20A SP SW	1	258.00	C	2.58	15.00	C	0.15
1-G PLATE	1	47.00	C	0.47	10.00	C	0.10
Total				$ 9.21			2.52

Labor Cost at $25.00	2.52 x $25.00		$ 63.00
Material Cost + 15%	$ 9.21 x 1.15		$ 10.59
Total Prime Cost		Σ	$ 73.59
Overhead at $15.00 Per hour	2.52 x $15.00		$ 37.80
Break Even Cost		Σ	$ 111.39
Profit, +15%	$111.39 x 0.15		$ 16.70
Unit Price			$ 128.09

One Gang Switch

$ s

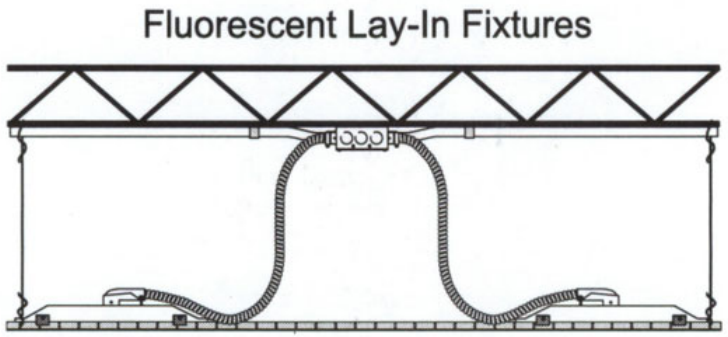


Electrical Material

Example 5. 2x4 FL 4L Lay-In Fixture

	2X4 FL 4L LAY-IN FIXTURE							
	MATERIAL	QUANTITY	MATERIAL PRICE	PER	MATERIAL EXTENSION	LABOR UNIT	PER	LABOR EXTENSION
Lighting Branch	4S BOX 3/4" K.O.							
	4S COVER							
	1/2" EMT							
	1/2" EMT CPLG SS							
	1/2" EMT CONN SS							
	1/2" LN & PB SET							
	1/2" 1-H STRAP							
	3/8" SELF DRILL ANCHOR							
	#12 THHN WIRE							
	Total							
Fixture	2X4 FL 4L LAY-IN FIXTURE							
	WHIP FL							
	WIRE CONN YELLOW							
	CEILING CLIPS							
	SEISMIC WIRE							
	T-BAR FIXTURE CLIPS							
	48" 3500K 78 CRI 32W LAMP (T8)							
	Total							

Labor Cost at $25.00		$
Material Cost + 15%		$
Total Prime Cost	Σ	$
Overhead at $15.00 Per hour		$
Break Even Cost	Σ	$
Profit, +15%		$
Unit Price		



Electrical Material

Example 5. 2x4 FL 4L Lay-In Fixture

	2X4 FL 4L LAY-IN FIXTURE							
	MATERIAL	QUANTITY	MATERIAL PRICE	PER	MATERIAL EXTENSION	LABOR UNIT	PER	LABOR EXTENSION
Lighting Branch	4S BOX 3/4" K.O.	1	59.00	C	0.59	30.00	C	0.30
	4S COVER	1	43.00	C	0.43	8.00	C	0.08
	1/2" EMT	10	13.00	C	1.30	4.50	C	0.45
	1/2" EMT CPLG SS	2	24.00	C	0.48	0.04	E	0.08
	1/2" EMT CONN SS	1	21.00	C	0.21	0.08	E	0.08
	1/2" LN & PB SET	1	97.00	C	0.97	0.30	E	0.30
	1/2" 1-H STRAP	1	6.00	C	0.06	4.00	C	0.04
	3/8" SELF DRILL ANCHOR	1	22.00	C	0.22	24.00	C	0.24
	#12 THHN WIRE	36	48.00	M	1.73	6.00	M	0.22
	Total				$ 5.99			1.79
Fixture	2X4 FL 4L LAY-IN FIXTURE	1	62.00	E	62.00	0.80	E	0.80
	WHIP FL	1	3.50	E	3.50	0.25	E	0.25
	WIRE CONN YELLOW	3	5.00	C	0.15	0.05	E	0.15
	CEILING CLIPS	2	FBO		—	0.15	E	0.30
	SEISMIC WIRE	2	FBO		—	0.25	E	0.50
	T-BAR FIXTURE CLIPS	4	31.66	C	1.27	0.10	E	0.40
	48" 3500K 78 CRI 32W LAMP (T8)	4	2.00	E	8.00	0.10	E	0.40
	Total				$ 80.91			4.59

Labor Cost at $25.00	4.59 × $25.00		$ 114.75
Material Cost + 15%	$ 80.91 × 1.15		$ 93.05
Total Prime Cost		Σ	$ 207.80
Overhead at $15.00 Per hour	4.59 × $15.00		$ 68.85
Break Even Cost		Σ	$ 276.65
Profit, +15%	$ 276.65 × 0.15		$ 41.50
Unit Price			$ 318.15