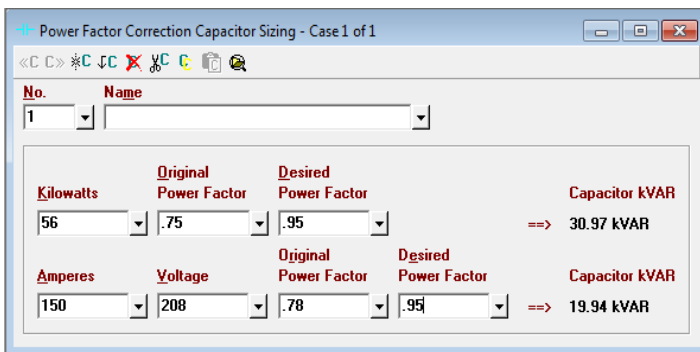Elec Tools
14 Common Electrical Calculations

ELEC TOOLS OVERVIEW

The Elite Software Elec Tools program allows the quick calculation of 14 common electrical design tasks. Minimal input is required for each function and results are instantly displayed on the same screen as the input data. These tasks include wire sizing, conduit sizing, motor equipment sizing, panel sizing, lighting requirements (in metric or Imperial units), current to power conversion, Ohm's Law calculator, capacitor sizing, voltage drop, short circuit, and the quick look-up of many electrical formulas and conversion factors. Results are instantly displayed on the screen as data is entered. Some of the functions in Elec Tools are also covered by other Elite programs. For example, Elec Tools will calculate the voltage drop for up to five components with their associated kVA loads. Elite's V-Drop program will calculate the voltage drop for networks containing up to 2,000 components and kVA loads. The same situation exists with the short circuit and luminaire requirement calculations. Elite has other programs you may want to consider that address those applications on a complete system basis. Elec Tools is a simple and easy to use Windows programs designed for both engineers and contractors.

DEMONSTRATION VERSION

If you would like to evaluate Elec Tools in further detail, you can read more info and *download free of charge* a demo of Elec Tools from Elite's web site, **www.elitesoft.com**

ELEC TOOLS FEATURES

- Automates 14 electrical calculation & data look-up tasks
- Follows NEC and IES procedures
- Sizes wire based on ampacity and % voltage drop
- Sizes conduits
- Calculates voltage drop for up to five components
- Calculates short circuit for up to five nodes
- Calculates single room luminaire requirements
- Sizes service entrance panel equipment
- Sizes motor equipment
- Sizes power factor correction capacitors
- Performs current to power conversions
- Automatic Ohm's Law calculator
- Quick look-up of common electrical formulas
- Quick look-up of conductor resistance & reactance
- Every Tool Uses Simple One Screen Data Input

CALCULATION METHOD

The primary sources for the calculation methods in Elec Tools are the National Electrical Code Handbook and the IES Lighting Handbook. The Elec Tools user's manual includes a complete list of references where the methodology and equations used by the program can be found.

PROGRAM INPUT

Elec Tools is a true Windows program complete with toolbars and hyperlinked help. All data is checked at the time of entry so that no improper data can be entered. Most of the functions in Elec Tools require only a few items of input data. For example, the Wire Sizing function requires the load in either amps, horsepower, or kVA. Given the voltage, wire length, material (aluminum or copper) and conduit type, E-Tools sizes the smallest wire that does not exceed NEC ampacity ratings or the user specified allowable percent voltage drop.

SYSTEM REQUIREMENTS

Elec Tools is a Windows program and will run on any computer with Windows XP or higher, including Windows 7 and 8.

Wire Sizing - Case 1 of 1

No. 1   **Name** Example

Load

Amperes:	15
Horsepower:	7.096
kVA:	6.228
Efficiency:	100.0
Power Factor:	0.85
Voltage Drop Limit:	3
Current Type:	AC
Frequency:	60
Voltage:	240
Phase:	Three Phase Circuit
Load Duty:	Non-Continuous

Conductor

Material:	Copper
Conduit Type:	Steel
One Conduit or Cable:	Yes
Conductors Per Phase:	1
Length:	390
Ambient Temperature:	86
Conductor Temperature:	75
Temperature Rise:	0
Three Conductor Cable:	No
Minimum Wire Size:	14 AWG
Maximum Wire Size:	1000 kcmil

Buried:	No
Triplexed:	No
Messenger:	No
Wind 2 ft/s:	No

Results

Wire Size:	8 AWG	Rated Current (A):	50.0	Allowed Volt. Drop (%):	3.0	Nominal Volt. (V):	240
# of Conductors:	3	Actual Current (A):	15.0	Actual Volt. Drop (%):	2.944	Actual Volt. (V):	232.934
kVA Losses:	0.106	kW Losses:	0.09	kVAR Losses:	0.056	Voltage Drop (V):	7.066

Voltage Drop - Case 1 of 1

No. 1   **Name** Example

Initial Voltage:	480
Power Factor:	0.8
Frequency:	60
Temp Deviation:	0
Phase:	Three Phase Circuit

Network Components

1. Bus Duct 45.0' 225 A Al Plugin
2. Special R = 0.4 X = -0.02
3. Cable 55.0' 6 AWG Cu 1 con/ph
4. Ov. Cable 70.0' 6 AWG Cu
5. None

Circuit Loads

1. 0.0
2. 0.0
3. 0.0
4. 60.0 A Motor
5. 0.0

Results

Segment	Segm. % VDrop / Cuml. % VDrop / kVA Loss	Segm. VDrop / Cuml. VDrop / kVAR Loss	Nom. Voltage / Act. Voltage / kW Loss
1	0.05 / 0.05 / 0.03	0.25 / 0.25 / 0.02	480.00 / 479.75 / 0.02
2	6.67 / 6.72 / 3.33	32.01 / 32.26 / 2.00	480.00 / 447.74 / 2.66
3	0.54 / 7.26 / 0.27	2.60 / 34.86 / 0.16	480.00 / 445.14 / 0.22
4	0.66 / 7.92 / 0.33	3.16 / 38.03 / 0.20	480.00 / 441.97 / 0.26

Summary

Worst Percent Voltage Drop Occurs At Segment 2 With 6.67% Voltage Drop
Total Voltage Drop For All Segments Is 7.92% Or 38.03 Volts

Total Network Losses:	3.96 kVA	2.38 kVAR	3.16 kW