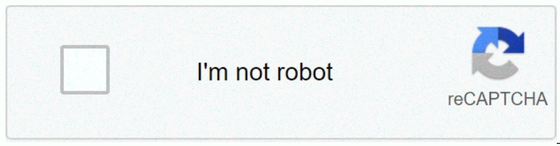

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Voltage drop calculation pdf

Voltage drop calculation nec pdf. How voltage drop is calculated.

Sample Voltage Drop Calculation Across Cable

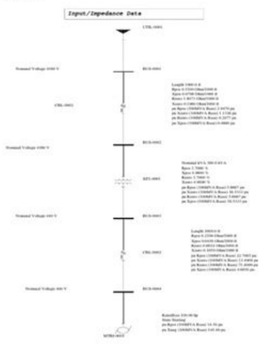
See figure 1 and figure 2 below
CBL-0001:

Given:
Length = 1000 ft. I = 79.92 A
PF = Cosθ = 0.26 Sinθ = Sin(Cos^{-1}θ) = 0.966
R = 0.51 Ω /1000 ft. X = 0.0796Ω/1000 ft.

Ract = (0.51Ω /1000 ft.)(1000ft.) = 0.51 Ω
Xact = (0.0796Ω/1000 ft.)(1000 ft.) = 0.0796 Ω

Voltage Drop Calculation:
$V_D = IRCos\theta + IXSin\theta$ ← From IEEE Red Book
$V_D = I[RCos\theta + XSin\theta]$
$V_D = 79.92\ [(0.51)(0.26) + (0.0796)(0.966)] = 16.74$ V
$V_{D3\Phi} = \sqrt{3} X\ V_D = \sqrt{3} X\ 16.74$ V = 28.99 V
$V_{D3\Phi}$ % = (28.99/4160V) X 100 = ***0.698 %*** ← Same as PTW32 result

Figure 1



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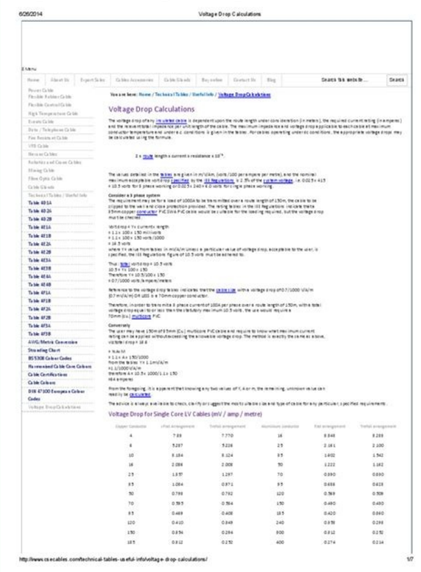

Street lighting voltage drop calculation pdf.

Wire / cable voltage drop calculator and how to calculate. * @ 68°F or 20°C ** Results may change with real wires: different resistivity of material and number of strands in wire. *** For wire length of 2x10ft, wire length should be 10ft. Wire gauge calculator ► The voltage drop V in volts (V) is equal to the wire current I in amps (A) times 2 times one way wire length L in feet (ft) times the wire resistance per 1000 feet R in ohms (Ω/kft) divided by 1000: Vdrop (V) = Iwire (A) × Rwire(Ω) = Iwire (A) × (2 × L(ft) × Rwire(Ω/kft) / 1000(ft/kft)) The voltage drop V in volts (V) is equal to the wire current I in amps (A) times 2 times one way wire length L in meters (m) times the wire resistance per 1000 meters R in ohms (Ω/km) divided by 1000: Vdrop (V) = Iwire (A) × Rwire(Ω) = Iwire (A) × (2 × L(m) × Rwire (Ω/km) / 1000(m/km)) 3 phase calculation The line to line voltage drop V in volts (V) is equal to square root of 3 times the wire current I in amps (A) times one way wire length L in feet (ft) times the wire resistance per 1000 feet R in ohms (Ω/kft) divided by 1000: Vdrop (V) = √3 × Iwire (A) × Rwire (Ω) = 1.732 × Iwire (A) × (L(ft) × Rwire (Ω/kft) / 1000(ft/kft)) The line to line voltage drop V in volts (V) is equal to square root of 3 times the wire current I in amps (A) times one way wire length L in meters (m) times the wire resistance per 1000 meters R in ohms (Ω/km) divided by 1000: Vdrop (V) = √3 × Iwire (A) × Rwire (Ω) = 1.732 × Iwire (A) × (L(m) × Rwire (Ω/km) / 1000(m/km)) Wire diameter calculations The n gauge wire diameter dn in inches (in) is equal to 0.005in times 92 raised to the power of 36 minus gauge number n, divided by 39: dn (in) = 0.005 in × 92(36-n)/39 The n gauge wire diameter dn in millimeters (mm) is equal to 0.127mm times 92 raised to the power of 36 minus gauge number n, divided by 39: dn (mm) = 0.127 mm × 92(36-n)/39 Wire cross sectional area calculations The n gauge wire's cross sercional area An in kilo-circular mils (kcmil) is equal to 1000 times the square wire diameter d in inches (in): An (kcmil) = 1000×dn2 = 0.025 in2 × 92(36-n)/19.5 The n gauge wire's cross sercional area An in square inches (in2) is equal to pi divided by 4 times the square wire diameter d in inches (in): An (in2) = (π/4)×dn2 = 0.000019635 in2 × 92(36-n)/19.5 The n gauge wire's cross sercional area An in square millimeters (mm2) is equal to pi divided by 4 times the square wire diameter d in millimeters (mm): An (mm2) = (π/4)×dn2 = 0.012668 mm2 × 92(36-n)/19.5 Wire resistance calculations The n gauge wire resistance R in ohms per kilofeet (Ω/kft) is equal to 0.3048×1000000000 times the wire's resistivity ρ in ohm-meters (Ω·m) divided by 25.42 times the cross sectional area An in square inches (in2): Rn (Ω/kft) = 0.3048 × 109 × ρ(Ω·m) / (25.42 × An (in2)) The n gauge wire resistance R in ohms per kilometer (Ω/km) is equal to 1000000000 times the wire's resistivity ρ in ohm-meters (Ω·m) divided by the cross sectional area An in square millimeters (mm2): Rn (Ω/km) = 109 × ρ(Ω·m) / An (mm2) AWG chart AWG # Diameter(inch) Diameter(mm) Area(kcmil) Area(mm2) 0000 (4/0) 0.4600 11.6840 211.6000 107.2193 000 (3/0) 0.4096 10.4049 167.8064 85.0288 00 (2/0) 0.3648 9.2658 133.0765 67.4309 0 (1/0) 0.3249 8.2515 105.5345 53.4751 1 0.2893 7.3481 83.6927 42.4077 2 0.2576 6.5437 66.3713 33.6308 3 0.2294 5.8273 52.6348 26.6705 4 0.2043 5.1894 41.7413 21.1506 5 0.1819 4.6213 33.1024 16.7732 6 0.1620 4.1154 26.2514 13.3018 7 0.1443 3.6649 20.8183 10.5488 8 0.1285 3.2636 16.5097 8.3656 9 0.1144 2.9064 13.0927 6.6342 10 0.1019 2.5882 10.3830 5.2612 11 0.0907 2.3048 8.2341 4.1723 12 0.0808 2.0525 6.5299 3.3088 13 0.0720 1.8278 5.1785 2.6240 14 0.0641 1.6277 4.1067 2.0809 15 0.0571 1.4495 3.2568 1.6502 16 0.0508 1.2908 2.5827 1.3087 17 0.0453 1.1495 2.0482 1.0378 18 0.0403 1.0237 1.6243 0.8230 19 0.0359 0.9116 1.2881 0.6527 20 0.0320 0.8118 1.0215 0.5176 21 0.0285 0.7229 0.8101 0.4105 22 0.0253 0.6438 0.6424 0.3255 23 0.0226 0.5733 0.5095 0.2582 24 0.0201 0.5106 0.4040 0.2047 25 0.0179 0.4547 0.3204 0.1624 26 0.0159 0.4049 0.2541 0.1288 27 0.0142 0.3606 0.2015 0.1021 28 0.0126 0.3211 0.1598 0.0810 29 0.0113 0.2859 0.1267 0.0642 30 0.0100 0.2546 0.1005 0.0509 31 0.0089 0.2268 0.0797 0.0404 32 0.0080 0.2019 0.0632 0.0320 33 0.0071 0.1798 0.0501 0.0254 34 0.0063 0.1601 0.0398 0.0201 35 0.0056 0.1426 0.0315 0.0160 36 0.0050 0.1270 0.0250 0.0127 37 0.0045 0.1131 0.0198 0.0100 38 0.0040 0.1007 0.0157 0.0080 39 0.0035 0.0897 0.0125 0.0063 40 0.0031 0.0799 0.0099 0.0050 See also AWG to mm SWG to mm Wire gauge chart Electrical calculators