

Pirelli Voltage Drop Calculations

Voltage Drop Calculation	DC and single phase Systems (non-inductive $\cos \phi = 1$)	3 phase systems
with given current	$V_D = \frac{2 \times L \times I}{c \times A}$	$V_D = \frac{1.732 \times L \times I \times \cos \mathbf{j}}{c \times A}$
with given voltage	$V_D = \frac{2 \times L \times P}{c \times A \times V}$	$V_D = \frac{I \times P}{c \times A \times V}$
Conductor Cross-Section Calculations	DC and single phase Systems (non-inductive $\cos \phi = 1$)	3 phase systems
with given current	$A = \frac{2 \times L \times I}{c \times V_D}$	$A = \frac{1.732 \times L \times I \times \cos \mathbf{j}}{c \times V_D}$
with given voltage	$A = \frac{2 \times L \times I}{c \times V \times V_D}$	$A = \frac{L \times P}{c \times V \times V_D}$

Formulas	Ohm's Law	$V = I \times R$	Single phase active power	$P = V \times I \times \cos \mathbf{j}$
	Thermal effect of current	$W = I^2 \times R \times t$	Three phase active power	$P = 1.73V \times I \times \cos \mathbf{j}$
	Loop Resistance	$R = \frac{2 \times L}{c \times A}$	Efficiency	$\mathbf{h} = \frac{P_{out}}{P_{in}}$
	DC Power	$P = V \times I$		

Symbols and units	V	Operating voltage in volts	W	Work in watt-seconds
	\mathbf{j} (phi)	Power factor	V_D	Voltage drop in volts
	P	Power in watts	I	Current in amperes
	\mathbf{k} (kappa)	Conductivity in $\frac{S \times m}{mm^2}$ (e.g. approx 56 for copper)	P_{out}	Output power in watts
	R	Resistance in ohms	P_{in}	Input power in watts
	A	Cross-section of copper conductor in mm^2	\mathbf{h} (eta)	Efficiency
	L	Single length in m (x0.3048 for feet)	t	Time in seconds