

CABLE VOLTAGE DROP AND SIZE SELECTION CALCULATOR

Project: Pump P 101 feeder

Calc no: CALC EL 001

Rev: 0

Yellow cells: enter data. Grey cells: calculated automatically. Free template from instrumentationblog.in

Circuit

System	Three phase	Voltage (V, line to line for 3 phase)	415
Load current (A)	45	Power factor	0.85
Route length, one way (m)	120	Conductor	Copper
Conductor temperature (°C)	70	Allowed voltage drop (%)	3
Reactance (Ω/km)	0.08		

Voltage drop for each size

Size (mm²)	Copper R20 (Ω/km)	Aluminium R20 (Ω/km)	R at temperature (Ω/km)	Voltage drop (V)	Voltage drop (%)	Within limit
1.5	12.1		14.4777	115.49	27.83	CHECK
2.5	7.41		8.8661	70.88	17.08	CHECK
4	4.61		5.5159	44.25	10.66	CHECK
6	3.08		3.6852	29.69	7.15	CHECK
10	1.83		2.1896	17.80	4.29	CHECK
16	1.15	1.91	1.3760	11.33	2.73	OK
25	0.727	1.2	0.8699	7.31	1.76	OK
35	0.524	0.868	0.6270	5.38	1.30	OK
50	0.387	0.641	0.4630	4.08	0.98	OK
70	0.268	0.443	0.3207	2.94	0.71	OK
95	0.193	0.32	0.2309	2.23	0.54	OK
120	0.153	0.253	0.1831	1.85	0.45	OK
150	0.124	0.206	0.1484	1.57	0.38	OK
185	0.0991	0.164	0.1186	1.34	0.32	OK
240	0.0754	0.125	0.0902	1.11	0.27	OK
300	0.0601	0.1	0.0719	0.97	0.23	OK
Smallest size within the voltage drop limit (mm²)						16
Voltage drop with that size (%)						2.73

$\Delta V = k \times I \times L \times (R \cos \phi + X \sin \phi)$ with $k = \sqrt{3}$ for three phase and 2 for single phase and DC. Always also check current rating, short circuit withstand and earth fault loop impedance.

Prepared by	Checked by
Name:	Name:
Signature:	Signature:
Date:	Date: