

Conductor Sizing

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Why Size Conductors

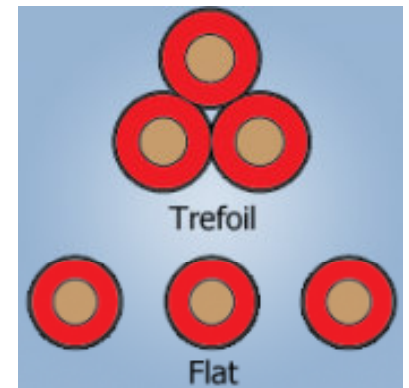
- To ensure that they can carry the required current without overheating.
- To ensure that the voltage that is supplied to the load is within acceptable levels.
- To ensure that job is completed as safely and economically as possible.

Important Sizing Specifications

- When sizing conductors the following specifications are needed
 - Maximum current required by loads
 - Acceptable voltage drop

Conductor Amp Rating

- This is the maximum continuous current a conductor can safely carry.
- It is determined by a number of factors including the conductor's material, cross-sectional area, construction, installation and the temperature of the operating environment.
- The amp rating can be determined from tables supplied by conductor manufacturers and standards organizations.

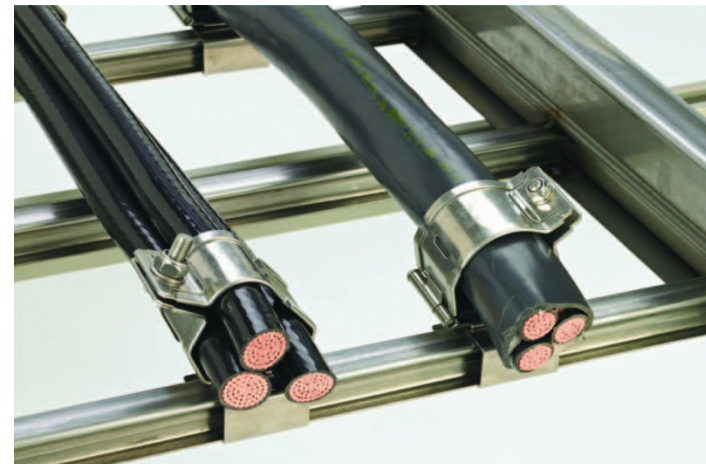
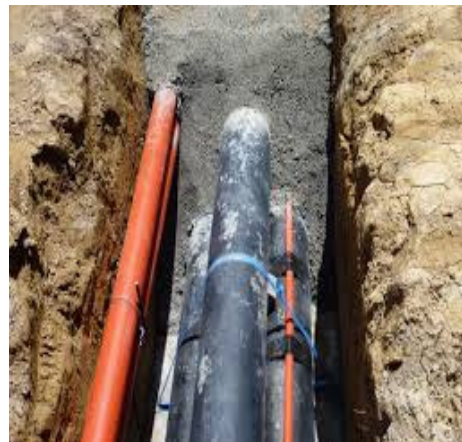


Conductor Installation

Cable Tray



Trefoil Installation



Conductor Amp Rating Table

Current-Carrying Capacities (Amp) PVC & PVC/PVC Cables

		Reference Method 4 (Enclosed in conduit in thermally insulating wall etc)		Reference Method 3 (Enclosed in conduit on a wall or in trunking etc)		Reference Method 1 (Clipped direct)		Reference Method 11 (on a perforated cable tray horizontal or vertical)		Reference Method 12 (free air)		
		2 cables single- phase ac or dc (Amp)	3 or 4 cables 3-phase ac (Amp)	2 cables single- phase ac or dc (Amp)	3 or 4 cables 3-phase ac (Amp)	2 cables single- phase ac or dc (Amp)	3 or 4 cables 3-phase ac (Amp)	2 cables single- phase ac or dc flat and touching (Amp)	3 cables 3-phase ac flat and touching (Amp)	Horizontal flat spaced	Vertical flat spaced	Trefoil
BS 6004	1	11	10.5	13.5	12	15.5	14	-	-	-	-	-
	1.5	14.5	13.5	17.5	15.5	20	18	-	-	-	-	-
	2.5	19.5	18	24	21	27	25	-	-	-	-	-
	4	26	24	32	28	37	33	-	-	-	-	-
	6	34	31	41	36	47	43	-	-	-	-	-
	10	46	42	57	50	65	59	-	-	-	-	-
	16	61	56	76	68	87	79	-	-	-	-	-
	25	80	73	101	89	114	104	126	112	146	130	110
	35	99	89	125	110	141	129	156	141	181	162	137

Amp Rating De-rating

- The amp rating of a conductor has to be reduced when the conductor is placed in a hot environment.
- The higher the temperature of the environment the lower the amp rating of the conductor.
- The new amp rating is determined by multiplying the original amp rating by a factor provided in the conductor tables.

Amp Rating De-rating Table

Technical Data Rating Factors for Other Temperature Conditions

Table A: Rating Factors for Other Ambient Air Temperatures (PVC Insulated)

Ambient Temperature	25°C	30°C	35°C	40°C	45°C	50°C	55°C	60°C	65°C	70°C
Rating Factor	1.03	1.00	0.94	0.87	0.79	0.71	0.61	0.50	0.35	-

Conductor Voltage Drop

- This is caused by the resistance of the conductors themselves.
- It is affected by the conductors material, length, and cross-sectional area.
- Voltage drops can also be determined from tables supplied by conductor manufacturers and standards organizations.

Conductor Voltage Drop

Voltage Drop (Per Amp Per Meter) PVC & PVC/PVC Cables

Conductor cross-sectional area (mm ²)	2 cables dc (mV/A/m)	2 cables-single-phase ac			3 or 4 cables-three-phase ac			
		Reference Methods 3 & 4 (Enclosed in conduit etc in or on a wall) (mV/A/m)	Reference Methods 1 & 11 (Clipped direct or on trays, touching) (mV/A/m)	Reference Methods 12 (space*) (mV/A/m)	Reference Methods 3 & 4 (Enclosed in conduit etc in or on a wall) (mV/A/m)	Reference Methods 1, 11 & 12 (in trefoil) (mV/A/m)	Reference Methods 1 & 11 (Flat touching) (mV/A/m)	Reference Methods 12 (Flat spaced*) (mV/A/m)
1	44	44	44	44	38	38	38	38
1.5	29	29	29	29	25	25	25	25
2.5	18	18	18	18	15	15	15	15
4	11	11	11	11	9.5	9.5	9.5	9.5
6	7.3	7.3	7.3	7.3	6.4	6.4	6.4	6.4
10	4.4	4.4	4.4	4.4	3.8	3.8	3.8	3.8
16	2.8	2.8	2.8	2.8	2.4	2.4	2.4	2.4

Example

- Select an appropriate conductor for the following installations:
 - 1) A 110 V, 2000W water heater.
 - 2) A 220V, 2000W water heater
- For both installations the conductor lengths are short enough so voltage drops can be ignored.

Thank you
for Listening

