

Subject: Capacity of cables and wires.

Cables and wires to be ordered based on the total power consumption required at site.  
Consider safety factor of 100% before ordering the cable.

1. Basic formula:

a. Units

- i. Power (P) – VA or KVA.
- ii. Power factor – no units – for 3phase current consider power factor of 0.8.
- iii. Power after considering power factor = power x power factor – units – watts (W) or kilowatts(kW),
- iv. Current (I) – amperes(A).
- v. Voltage(V)–volts(V). Single phase power is 240V(phase to neutral) and 3 $\phi$  power is 440V( i.e., difference from one phase to another).

b. DC current

- i.  $P = V \times I$ . There is no power factor in DC current.

c. AC current single phase.

- i.  $P = V \times I \times \cos\phi$ . Here V is RMS(root mean square) value–which is about 240V.

d. AC current in 3 phase cable.

- i.  $P = \sqrt{3} \times V \times I \times \cos\phi$ . Here V is RMS (root mean square) value – which is about 440V. This formula is applicable when the current passing through the neutral is nil and current in all 3 phases is equal.
- ii. In case power passing through the 3 phases is unequal, total power can be calculated by adding current/power flow in each phase based on single phase formula.

2. The maximum power and current carrying capacity for single core cables used for house wiring is as follows:

Sl. No.	Item	Maximum current carrying capacity in amps	Approximate maximum current carrying capacity in kW (240V, PF – 0.8)	Rate in Rs. Per 90 mtr length including 18% GST
1.	1sq mm copper cable (house wiring)	11	2	Rs. 648/-
2.	2.5sq mm copper cable (house wiring)	19	3.7	Rs. 1,510/-
3.	4 sq mm copper cable (house wiring)	26	5	Rs. 2,366/-

3. The maximum power and current carrying capacity for two core cables used for house wiring is as follows:

Sl. No.	Item	Maximum current carrying capacity in amps	Approximate maximum current carrying capacity in kW (240V, PF – 0.8)	Rate in Rs. Per 100 mtr length
1	4 sq mm aluminum cable (service wire- 2 core)	42	8	Rs. 1,357/-
2	6 sq mm aluminum cable (service wire- 2 core)	55	11	Rs. 1,770/-

4. The maximum power and current carrying capacity of armored cables used for power supply in 3 phase is as follows:

Sl. No.	Item	Maximum current carrying capacity in amps	Approximate maximum current carrying capacity In kW(440V,PF-0.8)	Rate in Rs. Per mtr length
1.	4 core 4 sq mm aluminum armored cable - LT	35	21	70/-
2.	4 core 6 sq mm aluminum armored cable - LT	46	28	80/-
3.	4 core 10 sq mm aluminum armored cable - LT	57	35	100/-
4.	4 core 16 sq mm aluminum armored cable - LT	74	45	114/-
5.	3 ½ core 25 sq mm aluminum armored cable - LT	95	58	144/-
6.	3 ½ core 35 sq mm aluminum armored cable - LT	114	70	171/-
7.	3 ½ core 50 sq mm aluminum armored cable - LT	134	82	222/-
8.	3 ½ core 70 sq mm aluminum armored cable - LT	164	100	302/-
9.	3 ½ core 95 sq mm aluminum armored cable - LT	197	120	365/-
10.	3 ½ core 120 sq mm aluminum armored cable - LT	223	136	456/-
11.	3 ½ core 150 sq mm aluminum armored cable - LT	249	152	539/-
12.	3 ½ core 185 sq mm aluminum armored cable - LT	282	172	673/-

13.	3 ½ core 240 sq mm aluminum armored cable - LT	327	199	847/-
14.	3 ½ core 300 sq mm aluminum armored cable - LT	369	225	1,039/-
15.	3 core 35 sq mm aluminum armored cable HT-11KV	112	1705	396/-
16.	3 core 50 sq mm aluminum armored cable HT-11KV	131	1994	448/-
17.	3 core 70 sq mm aluminum armored cable HT-11KV	161	2451	532/-
18.	3 core 95 sq mm aluminum armored cable HT-11KV	190	2893	630/-
19.	3 core 120 sq mm aluminum armored cable HT-11KV	216	3288	726/-
20.	3 core 150 sq mm aluminum armored cable HT-11KV	242	3684	812/-
21.	3 core 185 sq mm aluminum armored cable HT-11KV	273	4156	945/-
22.	3 core 240 sq mm aluminum armored cable HT-11KV	315	4796	1,134/-
23.	3 core 300 sq mm aluminum armored cable HT-11KV	354	5389	1,318/-
24.	3 core 400 sq mm aluminum armored cable HT-11KV	404	6150	1,657/-

#### 5. Details of Transformers

S No.	11KV HT line	33KV HT line
1.	16 KVA	-
2.	25 KVA	-
3.	63 KVA	-
4.	100 KVA	100 KVA
5.	160 KVA	160 KVA
6.	200 KVA	200 KVA
7.	250 KVA	250 KVA
8.	315 KVA	315 KVA
9.	400 KVA	400 KVA
10.	500 KVA	500 KVA
11.	630 KVA	630 KVA
12.	1000 KVA	1000 KVA
13.	1250 KVA	1250 KVA
14.	1600 KVA	1600 KVA
15.	2000 KVA	2000 KVA
16.	2500 KVA	2500 KVA

6. Notes:

- a. These values are for cables buried underground.
- b. In LT cable voltage drop at 200 mtrs at the above voltage & current levels will be insignificant [approx. 0.034%] – therefore the drop in the max current carrying capacity and consequently power carrying capacity will be also insignificant
- c. In HT cable at 300mtrs length to other voltage drop is insignificant and consequently the changes in the max current carrying capacity / Power carrying capacity will be equally insignificant.

7. Typical values for current and power in single phase conductor are as follows(240V,PF–0.8):

Sl. No.	Current in amps	Power in kW
1.	1	0.24
2.	6	1.44
3.	10	2.4
4.	16	3.84
5.	20	4.8

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