Circularno.898/A-Construction division Date: 04-09-2021

Subject: Capacity of cables and wires.

Cablesandwirestobeorderedbasedonthetotalpowerconsumptionrequiredatsite.Consider safety factor of 100% before ordering the cable.

1. Basic formula:
   1. Units
      1. Power (P) – VA or KVA.
      2. Power factor–no units–for3phasecurrentconsiderpowerfactorof 0.8.
      3. Power after considering power factor = power x power factor – units – watts (W) or kilowatts(kW),
      4. Current (I) – amperes(A).
      5. Voltage(V)–volts(V).Singlephasepoweris240V(phasetoneutral)and3ɸpower is 440V( i.e., difference from one phase to another).
   2. DC current
      1. P = V x I. There is no power factor in DC current.
   3. AC current single phase.
      1. P=V x I x cosɸ. Here V is RMS (root mean square) value–whichisabout240V.
   4. AC current in 3 phase cable.
      1. P = √3 x V x I x cosɸ. 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.
      2. 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. Themaximumpowerandcurrentcarryingcapacityforsinglecorecablesusedforhousewiring 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/- |

1. Themaximumpowerandcurrentcarryingcapacityfortwocorecablesusedforhousewiringis 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/- |

1. Themaximumpowerandcurrentcarryingcapacityofarmoredcablesusedforpowersupplyin 3 phase is as follows:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Sl.  No. | Item | Maximum current carrying capacity  in amps | Approximate maximum power 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/- |

1. Notes:
   1. These values are for cables buried under ground.
   2. 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
   3. InHTcableat300mtrslengthtoothevoltagedropisinsignificantandconsequentlythe changes in the max current carrying capacity / Power carrying capacity will be equally insignificant.
2. Typicalvaluesforcurrentandpowerinsinglephaseconductorareasfollows(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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