

Medium Voltage XLPE Insulated Cables

Rating Factors for Cables Laid Direct in Ground

| Standard laying conditions | | Other laying conditions | |
|----------------------------|----------|---|--|
| Soil thermal resistivity | 1.2K.m/W | $I_{standard}$ = Standard current rating in ducts or pipes | |
| Depth of burial | 800mm | $I_{rated} = I_{standard} \times k_1 \times k_2 \times k_3 \times k_4$ | |
| Soil temperature | 25°C | k_1 = Table 1 k_2 = Table 2 k_3 = Table 3 k_4 = Table 4 to Table 5 | |

Table 1 – Rating factor for variation in soil temperature (k_1)

| Soil temperature °C | | | | | | |
|---------------------|------|------|------|------|------|------|
| 10 | 15 | 20 | 25 | 30 | 35 | 40 |
| 1.11 | 1.07 | 1.04 | 1.00 | 0.96 | 0.92 | 0.88 |

Table 2 – Rating factors for variation in soil thermal resistivity (k_2)

| | Conductor size | Soil thermal resistivity K.m/W | | | | | | | | |
|--------------------------|----------------|--------------------------------|------|------|------|------|------|------|------|------|
| | | mm ² | 0.7 | 0.8 | 0.9 | 1.0 | 1.2 | 1.5 | 2.0 | 2.5 |
| 3 Core cable | 16–70 | 1.16 | 1.12 | 1.09 | 1.06 | 1.00 | 0.93 | 0.84 | 0.77 | 0.72 |
| | 95–150 | 1.18 | 1.13 | 1.09 | 1.06 | 1.00 | 0.93 | 0.83 | 0.76 | 0.71 |
| | 185–300 | 1.18 | 1.14 | 1.10 | 1.06 | 1.00 | 0.92 | 0.83 | 0.76 | 0.70 |
| 3 Single Core cables | 95–185 | 1.24 | 1.18 | 1.13 | 1.08 | 1.00 | 0.91 | 0.80 | 0.73 | 0.67 |
| | 240–500 | 1.25 | 1.18 | 1.13 | 1.08 | 1.00 | 0.91 | 0.80 | 0.72 | 0.66 |
| | 630–1000 | 1.27 | 1.20 | 1.14 | 1.09 | 1.00 | 0.90 | 0.79 | 0.71 | 0.65 |
| 3 Single Core cables | 95–185 | 1.24 | 1.18 | 1.13 | 1.08 | 1.00 | 0.91 | 0.80 | 0.72 | 0.66 |
| | 240–500 | 1.26 | 1.19 | 1.13 | 1.08 | 1.00 | 0.91 | 0.79 | 0.72 | 0.66 |
| | 630–1000 | 1.28 | 1.20 | 1.14 | 1.09 | 1.00 | 0.90 | 0.79 | 0.71 | 0.65 |

Table 3 – Rating factor for variation in depth of laying (k_3)

| | | | | | | | |
|---------------------------|------|------|------|------|------|------|------|
| Depth of laying (m) | 0.80 | 1.00 | 1.25 | 1.50 | 1.75 | 2.00 | 2.50 |
| Rating factor Single core | 1.00 | 0.98 | 0.95 | 0.93 | 0.92 | 0.91 | 0.89 |
| Rating factor Three core | 1.00 | 0.98 | 0.96 | 0.95 | 0.94 | 0.93 | 0.91 |

NOTE:

The drying of soil or backfill was not taken in to consideration in these calculations.

Table 4 - Group Rating factors for 3-core cables installed Direct in Ground (k_4)

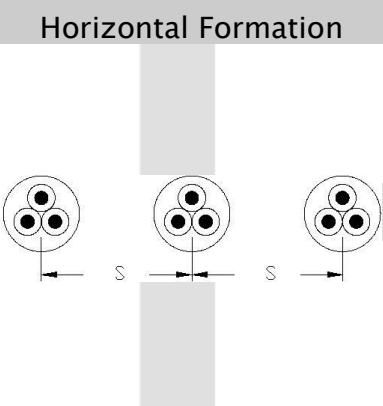
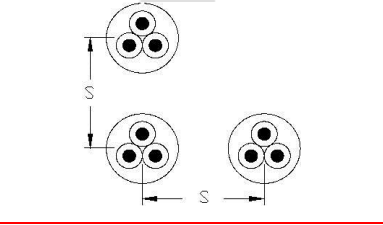
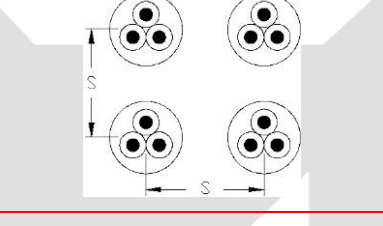
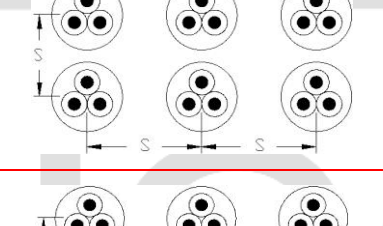
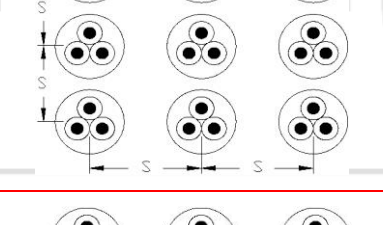
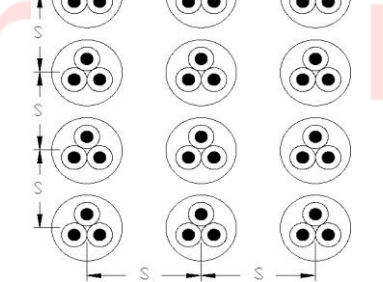
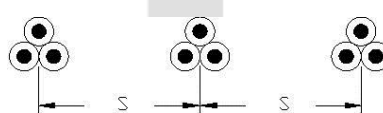
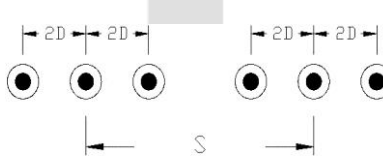
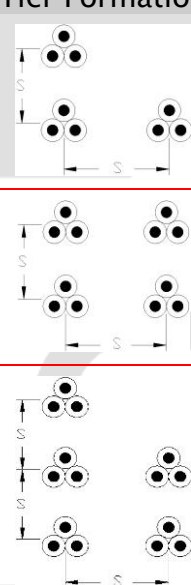
| Layout of Cable Circuits | Number of Cable Circuits | Spacing of Circuits - S (mm) | | | | |
|---|---|------------------------------|-------|-------|-------|-------|
| | | Touching | 150mm | 300mm | 450mm | 600mm |
|  | 2 | 0.8 | 0.84 | 0.88 | 0.9 | 0.92 |
| | 3 | 0.7 | 0.74 | 0.79 | 0.83 | 0.86 |
| | 4 | 0.64 | 0.69 | 0.76 | 0.79 | 0.83 |
| | 5 | 0.59 | 0.65 | 0.72 | 0.77 | 0.8 |
| | 6 | 0.56 | 0.62 | 0.7 | 0.75 | 0.79 |
| | 7 | 0.53 | 0.6 | 0.68 | 0.74 | 0.78 |
| | 8 | 0.5 | 0.58 | 0.67 | 0.73 | 0.77 |
| | 9 | 0.48 | 0.57 | 0.66 | 0.72 | 0.76 |
| | 10 | 0.47 | 0.55 | 0.65 | 0.71 | 0.76 |
| |  | 3 | 0.69 | 0.73 | 0.78 | 0.8 |
|  | | 4 | 0.62 | 0.68 | 0.72 | 0.76 |
| |  | 6 | 0.53 | 0.58 | 0.64 | 0.67 |
|  | | 9 | 0.44 | 0.49 | 0.54 | 0.57 |
| |  | 12 | 0.39 | 0.44 | 0.49 | 0.52 |

Table 5 - Group Rating Factors single core cables installed Direct in Ground (k_4)

| Layout of Cable Circuits | Number of Cable Circuits | Spacing of Circuits - S (mm) | | | | |
|--|---|------------------------------|-------|-------|-------|-------|
| | | Touching | 150mm | 300mm | 450mm | 600mm |
| Horizontal Formation  | 2 | 0.79 | 0.81 | 0.85 | 0.88 | 0.9 |
| | 3 | 0.67 | 0.71 | 0.76 | 0.8 | 0.83 |
| | 4 | 0.61 | 0.65 | 0.72 | 0.76 | 0.8 |
| | 5 | 0.56 | 0.61 | 0.68 | 0.73 | 0.77 |
| | 6 | 0.53 | 0.58 | 0.66 | 0.72 | 0.76 |
| | 7 | 0.5 | 0.55 | 0.63 | 0.7 | 0.74 |
| | 8 | 0.48 | 0.53 | 0.62 | 0.69 | 0.74 |
| | 9 | 0.46 | 0.52 | 0.61 | 0.68 | 0.73 |
| | 10 | 0.45 | 0.51 | 0.6 | 0.67 | 0.73 |
| | Horizontal Formation  | 2 | | | 0.84 | 0.87 |
| 3 | | | | 0.74 | 0.78 | 0.81 |
| 4 | | | | 0.69 | 0.74 | 0.78 |
| 5 | | | | 0.66 | 0.71 | 0.75 |
| 6 | | | | 0.63 | 0.69 | 0.73 |
| 7 | | | | 0.61 | 0.68 | 0.72 |
| 8 | | | | 0.6 | 0.67 | 0.71 |
| 9 | | | | 0.58 | 0.65 | 0.71 |
| 10 | | | | 0.58 | 0.65 | 0.7 |
| Tier Formation  | | 3 | 0.67 | 0.7 | 0.74 | 0.76 |
| | 4 | 0.6 | 0.63 | 0.68 | 0.72 | 0.74 |
| | 5 | 0.54 | 0.57 | 0.61 | 0.64 | 0.66 |
| | 6 | 0.5 | 0.53 | 0.58 | 0.61 | 0.63 |

Disclaimer: The cable rating factors are designed as a guide for calculation of a wide range of cable types and cables sizes. While single rating factors remain reasonably accurate, the more factors that are applied simultaneously, larger possible variances arise. While every effort has been made to ensure the information contained herein is correct, CBI-electric: african cables disclaim responsibility for any action, proceedings, liabilities, claims, damages, costs, losses and expense in relation to, or arising out of any use of the factors. Due to continuous improvement CBI-electric: african cables reserves the right to change the above without notice.