**Typical Floor Calculation:**

**Sub Distribution Board-1**

**Total current rating for SDB/ESDB to MDB (Ampere) Calculation:**

Sub distribution board (SDB-1) = 90% \* Fixtures Current Rating + 50% \* power

circuit current rating

=0.9\*18.4728+0.5\*80

= 56.62552 A

**Breaker Rating:**

SDB to MDB breaker Rating = 60 A SP MCCB

**Wire Rating:**

SDB to MDB wire rating = 2 x 35 rm BYM + 35 rm BYA ECC

**Emergency Sub Distribution Board-1**

**Total current rating for SDB/ESDB to MDB (Ampere) Calculation:**

Emergency Sub distribution board (ESDB-1) = 90% \* Fixtures Current Rating +

50%\*power circuit current rating

= 0.9\*8.0434+ 0.5\*0

= 7.24 A

**Breaker Rating:**

ESDB to MDB breaker Rating = 10A SP MCCB

**Wire Rating:**

ESDB to MDB wire rating =2 x 2.5 rm BYM + 2.5 rm BYA ECC

**Ground Floor Calculation:**

**Sub Distribution Board-0L**

**Total current rating for SDB/ESDB to MDB (Ampere) Calculation:**

Emergency Sub distribution board (ESDB-1) = 90% \* Fixtures Current Rating +

50%\*power circuit current rating

= 0.9\*10.6521+ 0.5\*0

= 9.587 A

**Breaker Rating:**

ESDB to MDB breaker Rating = 10A SP MCCB

**Wire Rating:**

ESDB to MDB wire rating =2 x 2.5 rm BYM + 2.5 rm BYA ECC

**Emergency Sub Distribution Board-0L**

**Total current rating for SDB/ESDB to MDB (Ampere) Calculation:**

Emergency Sub distribution board (ESDB-1) = 90% \* Fixtures Current Rating +

50%\*power circuit current rating

= 0.9\*22.168 + 0.5\*0

= 19.944 A

**Breaker Rating:**

ESDB to MDB breaker Rating = 20A SP MCCB

**Wire Rating:**

ESDB to MDB wire rating =2 x 6 rm BYM + 6 rm BYA ECC

**UnderGround Calculation:**

**Sub Distribution Board-0R**

**Total current rating for SDB/ESDB to MDB (Ampere) Calculation:**

Emergency Sub distribution board (ESDB-1) = 90% \* Fixtures Current Rating +

50%\*power circuit current rating

= 0.9\*5.6521+ 0.5\*0

= 5.087 A

**Breaker Rating:**

ESDB to MDB breaker Rating = 10A SP MCCB

**Wire Rating:**

ESDB to MDB wire rating =2 x 2.5 rm BYM + 2.5 rm BYA ECC

**Emergency Sub Distribution Board-0R**

**Total current rating for SDB/ESDB to MDB (Ampere) Calculation:**

Emergency Sub distribution board (ESDB-1) = 90% \* Fixtures Current Rating +

50%\*power circuit current rating

= 0.9\*1.1956 + 0.5\*0

= 1.076 A

**Breaker Rating:**

ESDB to MDB breaker Rating = 5A SP MCCB

**Wire Rating:**

ESDB to MDB wire rating =2 x 1.5 rm BYM + 1.5 rm BYA ECC

**Roof Calculation:**

**Sub Distribution Board-R**

**Total current rating for SDB/ESDB to MDB (Ampere) Calculation:**

Emergency Sub distribution board (ESDB-1) = 90% \* Fixtures Current Rating +

50%\*power circuit current rating

= 0.9\*6.6281+ 0.5\*0

= 5.965A

**Breaker Rating:**

ESDB to MDB breaker Rating = 10A SP MCCB

**Wire Rating:**

ESDB to MDB wire rating =2 x 2.5 rm BYM + 2.5 rm BYA ECC

## **Main and Emergency Distribution Board Calculations**

### **Main Bus Bar**

|  |  |
| --- | --- |
| **Sub Distribution Board** | |
| Total number of sub-distribution boards | 21 |
| Total Current rating for SDB-1 to MDB | 56.62552 A |
| Sub-distribution boards per phase of MDB bus-bar | 7 |
| Total maximum current rating for phase R/Y/B from Main lines | 70% x (7 x 56.62552 A) = 237.8271 A |
| **Emergency Sub Distribution Board** | |
| Total number of Emergency-sub-distribution boards | 20 |
| Total Current rating for ESDB-1 to EMDB | 7.24 A |
| Sub-distribution boards per phase of MDB bus-bar | 7 |
| Total maximum current rating for phase R/Y/B from Generator lines | 7 x 7.24 = 43.44 A |
| Lift Breaker Rating |  |
| Pump Breaker Rating | 15 A |
| Total maximum current rating for phase R/Y/B from Generator lines (including Lift and Pump) | 70% x (43.44 + ) = 68.908A |
| **Total** | |
| Total current from main bus bar to phase | 237.8271 + 68.908 = 306.73 A |
| Thus, triple phase breaker rating for transformer to main bus bar | 425A TP MCCB |
| Line rating from transformer to main bus bar | 4x300 rm NYY + 30rm NYY ECC |

**POWER METER LINE:**

Current supply to SDB1 =56.62552 A

Current supply to ESDB1 =7.24 A

Total current for each stranded unit =56.62552 A +7.24 A =63.86552A

Wire rating from power meter to bus bar =2 x 50rm BYA + 25 rm BYA ECC

**Generator Bus Bar:**

Total maximum current rating for phase R/Y/B from Generator lines (including Lift and Pump) = = 68.908A

Total maximum current rating for phase R/Y/B from Generator lines=70A TP MCCB

Line rating from generator to Main bus bar= 4 x 50rm NYY + 1 x 25rm NYY ECC

**Transformer Calculations:**

Total current from main bus bar to phase = 306.73 A

Worst case power factor=0.9

KVA rating of DPDC to main bus bar 3-phase transformer

Since, transformer rating (225 kVA) > 200kVA, separate substation is needed

**PFI PLANT:**

|  |  |
| --- | --- |
| (For improving PFI from worst case 0.9 to best case 0.95) | |
| Total apparent power draw, S |  |
| Worst case reactive power for 0.9 pf, |  |
| Best case reactive power for 0.95 pf, |  |
| PFI plant rating = – | = |
| For PF Improvement current value |  |
| PFI breaker rating | 425A TP MCCB |
| PFI Line rating | 4x300 rm NYY + 30rm NYY ECC |

**Generator:**

Total current to generator bus bar per phase =43.44 A

KVA rating of 3-phase generator: