

#VALUE!

:Cable Tray/Ladder Size Calculation:

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CABLE TRAY: FROM

A

TO

B

LENGTH OF CABLE TRAY (Meter):

50

Sr. No.	Cable Route (From-To)	Type & Cable Size	Size of Cable (mm ²)	No. of Cable	Overall Diameter of each Cable (mm)	Sum of Cable OD (mm)	Self Weight of Cable (Kg/Mt)	Total Weight of Cable (Kg/Mt)	Remarks
1	T/C To D.G Panel-1	3.5C x 300 Sq. mm	185	4	24.4	97.6	5.9	23.6	
2	T/C To D.G Panel-2	3.5C x 300 Sq. mm	50	4	14.1	56.4	5.9	23.6	
3	T/C To D.G Panel-3	3.5C x 300 Sq. mm	95	1		0	5.9	5.9	
4	T/C To LT Panel-1	3.5C x 300 Sq. mm	25	1		0	5.9	5.9	
5	T/C To LT Panel-2	3.5C x 300 Sq. mm				0	5.9	0	
6	T/C To LT Panel-3	3.5C x 400 Sq. mm				0	6.8	0	
7						0		0	
8						0		0	
9						0		0	
10						0		0	
11						0		0	
12						0		0	
13						0		0	
14						0		0	
15						0		0	
Total				10		154	36.3	59	

:Calculation:

Maximum Cable Diameter:
 Consider Spare Capacity of Cable Tray:
 Distance between each Cable:
 Calculated Width of Cable Tray:
 Calculated Area of Cable Tray:
 No of Layer of Cables in Cable Tray:
 Selected No of Cable Tray:
 Selected Cable Tray Width:
 Selected Cable Tray Depth:
 Selected Cable Tray Weight Capacity:
 Type of Cable Tray:
 Total Area of Cable Tray:

24.4	mm
40%	
10	mm
356	mm
8677	Sq.mm
1	
1	No
450	mm
50	mm
120	Kg/Meter
Perforated	
22500	Sq.mm



Selected Cable Tray width:
 Selected Cable Tray Depth:
 Selected Cable Tray Weight:
 Selected Cable Tray Size:

:Result:

O.K	
O.K	
O.K	Including Spare Capacity
O.K	
450X50	mm
1.00	No
120.00	Kg/Meter/Tray
Perforated	
50	Meter
21%	
61%	

Standard Ladder Type Cable Tray	Width	150/200/300/450/600 mm
	Height	50/75/100 mm
Standard Perforated Type Cable Tray	Width	150/200/300/450/600 mm
	Height	25/50 mm

- Calculate Size of Cable Tray for Following Cable Schedule. Cable Tray should be perforated and 20% spare Capacity. Distance between each Cable is 10mm. Cable are laying in Single Layer in Cable Tray.
- (1) 2 No's of 3.5Cx300 Sq.mm XLPE Cable having 59.7mm Outer Diameter and 5.9 Kg/Meter weight
 - (2) 2 No's of 3.5Cx400 Sq.mm XLPE Cable having 68.6mm Outer Diameter and 6.1 Kg/Meter weight
 - (3) 3 No's of 3.5Cx25 Sq.mm XLPE Cable having 25mm Outer Diameter and 0.5 Kg/Meter weight

Calculation:

Total Outer Diameter of all Cable Passing in to Cable Tray:

- Diameter of 300Sq.mm Cable =No of Cable X Outer Diameter of Each Cable
- Diameter of 300Sq.mm Cable =2X59.7 = 119.4 mm
- Diameter of 400Sq.mm Cable =No of Cable X Outer Diameter of Each Cable
- Diameter of 400Sq.mm Cable =2X68.6= 137.2 mm
- Diameter of 25Sq.mm Cable =No of Cable X Outer Diameter of Each Cable
- Diameter of 25Sq.mm Cable =3X28= 84 mm
- Total Diameter of All Cables laying in Tray = (119.4+137.2+84)mm
- **Total Diameter of All Cables laying in Tray = 340.6mm**

Total Weight of Cables Passing in to Cable Tray:

- Weight of 300Sq.mm Cable =No of Cable X Weight of Each Cable
- Weight of 300Sq.mm Cable =2X5.9= 11.8 Kg/Meter
- Weight of 400Sq.mm Cable = No of Cable X Weight of Each Cable
- Weight of 400Sq.mm Cable =2X6.1= 12.2 Kg/Meter
- Weight of 25Sq.mm Cable = No of Cable X Weight of Each Cable
- Weight of 25Sq.mm Cable =3X0.5= 1.5 Kg/Meter
- Total Weight of All Cables laying in Tray = (11.8+12.2+1.5) Kg/Meter
- **Total Weight of All Cables laying in Tray =25.5 Kg/Meter**

Total Width of all Cables:

- **Total Width of all Cables = (Total No of Cable X Distance between Each Cable) + Total Cable Outer Diameter**
- Total Width of all Cables = (7 X 10) + 340.6
- Total Width of all Cables = 410.6 mm
- Taking 20% Spare Capacity of Cable Tray
- Final Width of all Cables = 1.2%X410.6
- **Calculated Width of All Cables = 493 mm**

Total Area of Cable:

- **Total Area of Cable = Final width of Cables X Maximum Height Cable**
- Total Area of Cable = 493 X 69.6 =28167 Sq.mm
- Taking 20% Spare Capacity of Cable Tray
- Final Area of all Cables = 1.2%X28167
- **Calculated Area of all Cable =33801 Sq.mm**

CASE-(I):

- **Considering Single Run of Cable Tray having Size of 300X100mm, 120Kg/Meter Weight Capacity**
- Area of Cable Tray =Width of Cable Tray X Height of Cable Tray
- Area of Cable Tray =300X100 = 30000 Sq.mm
- **Checking Width of Cable Tray**
- **Calculated Width of Cable Tray as per Calculation=No of Layer of Cable X No of Cable Tray Run X Width of Cables**
- Width of Cable Tray as per Calculation=1X1X493 =493 mm
- **Checking Depth of Cable Tray**
- **Actual depth of Cable Tray = No of Layer of Cable X Maximum Diameter of Cable**
- Actual depth of Cable Tray=1X68.6 =68.6mm
- **Checking Weight of Cable Tray**
- Actual Weight of Cables=25.5 Kg/Meter

Results:

- Calculated Cable Tray width (493mm) > Actual Cable Tray width (300mm) = **Faulty Selection**
- Calculated depth of Cable Tray (68.6mm) < Actual Depth of Cable Tray (100mm) = **O.K**
- Calculated Weight of all Cables (25.5Kg/Mt) < Actual Weight of Cable Tray (125.5 Kg/Mt) = **O.K**
- **Required to select higher size Cable Tray due to small Cable Tray width.**

CASE-(II):

- Considering Single Run of Cable Tray having Size of 600X100mm, 120Kg/Meter Weight Capacity
- Area of Cable Tray = Width of Cable Tray X Height of Cable Tray
- Area of Cable Tray = 600X100 = 60000 Sq.mm
- **Checking Width of Cable Tray**
- Width of Cable Tray as per Calculation = No of Layer of Cable X No of Cable Tray Run X Width of Cables
- Width of Cable Tray as per Calculation = 1X1X493 = 493 mm
- **Checking Depth of Cable Tray**
- Actual depth of Cable Tray = No of Layer of Cable X Maximum Diameter of Cable
- Actual depth of Cable Tray = 1X68.6 = 68.6mm
- **Checking Weight of Cable Tray**
- Actual Weight of Cables = 25.5 Kg/Meter

Results:

- Calculated Cable Tray width (493mm) < Actual Cable Tray width (600mm) = **O.K**
- Calculated depth of Cable Tray (68.6mm) < Actual Depth of Cable Tray (100mm) = **O.K**
- Calculated Weight of all Cables (25.5Kg/Mt) < Actual Weight of Cable Tray (125.5 Kg/Mt) = **O.K**
- Remaining Cable Tray width Area = $100\% - (\text{Calculated Cable tray width} / \text{Actual Cable Tray Width})$
- Remaining Cable Tray width Area = $100\% - (493/600)\% = 17.9\%$
- Remaining Cable Tray Area = $100\% - (\text{Calculated Cable tray Area} / \text{Actual Cable Tray Area})$
- Remaining Cable Tray Area = $100\% - (33801/60000) = 43.7\%$
- **Selection of 600X100 Cable Tray is O.K**

Conclusion

- Size of Cable Tray = 600X100mm
- Type of Cable Tray = Perforated
- No of Cable Tray Run = 1 No
- No of layer of Cables in Cable Tray = 1 Layer
- Remaining Cable Tray width Area = 17.9%
- Remaining Cable Tray Area = 43.7%