Quick Tray
Fill and Load Calculations

The following tables and formulas are provided to help determine how many cables can be safely carried by each size wire mesh cable tray tray and to determine the appropriate distance between supports for the load, based on number of cables, cable tray size, and bracket type.

Wire Mesh Cable Tray Fill Ratio

$$\text{Fill ratio} = \frac{\text{Cross section of cable}}{\text{Cross section of tray}}$$

According to NEC 392.9 (B), when using ventilated tray with multiconductor control cable, the sum of the cross-sectional areas shall not exceed 50 percent of the interior cross section of the tray.

The Quick Tray Wire Mesh Cable Tray Fill Table below shows the number of cables and the load in lbf/lineal foot developed by typical 4 pair and 6 pair cable weighing 20 lb/kft and 40 lb/kft, respectively. While this table is a useful guide, actual loads must be calculated using the cable specified.

Use the following formula to calculate the number of cables that will result in a particular fill ratio, where:

A = Inside tray area, in $in.^2$

D = Cable diameter, in inches

F = Fill ratio in %

N = Number of cables

The formula is

$$N = \left(\frac{F}{100}\right) * \left(\frac{A}{[(D/2)^2 * \Pi]}\right)$$

EXAMPLE:

The installation will use CAT cable at .19 in. diameter, 20 lb per 1000 ft^2. The desired fill ratio is 40%. The wire mesh cable tray tray is 2 in. (51mm) high by 2 in. (51mm) wide.

$A = 3.5\ in.^2$

D = .19 in.

F = 40%

$$N = \left(\frac{40}{100}\right) * \left(\frac{3.5}{[(.19/2)^2 * \Pi]}\right) = 49 \text{ cables}$$

$$\text{Load/foot} = 49 \text{ cables} * \frac{20 \text{ lb}}{1000 \text{ ft.}} = 0.98 \text{ lb/ft}$$

Quick Tray Wire Mesh Cable Tray Fill Table at 50% Fill

Catalog Number	Height in.	Width in.	Area $in.^2$	CAT Cab Type (4 pair), .19 in. diameter, 20 lb/kft No. Cables at 50% Fill	CAT Cab Type (4 pair), .19 in. diameter, 20 lb/kft Load lbf/lineal ft	CAT Cab Type (6 pair), .26 in. diameter, 40 lb/kft No. Cables at 50% Fill	CAT Cab Type (6 pair), .26 in. diameter, 40 lb/kft Load lbf/lineal ft
QT2X2	2	1.75	3.5	62	1.24	32	1.28
QT2X4	2	3.75	7.5	133	2.66	70	2.8
QT2X6	2	5.5	11	195	3.9	103	4.12
QT2X8	2	7.5	15	266	5.32	141	5.64
QT2X12	2	11.5	23	408	8.16	216	8.64
QT2X16	2	15.5	31	550	11	291	11.64
QT2X18	2	17.5	35	621	12.42	329	13.16
QT2X20	2	19.5	39	692	13.84	367	14.68
QT2X24	2	23.5	47	834	16.68	442	17.68
QT4X4	4	3.75	15	266	5.32	141	5.64
QT4X8	4	7.5	30	532	10.64	282	11.28
QT4X12	4	11.5	46	816	16.32	433	17.32
QT4X16	4	15.5	62	1100	22	583	23.32
QT4X18	4	17.5	70	1242	24.84	650	26.36
QT4X20	4	19.5	78	1384	27.68	734	29.36
QT4X24	4	23.5	94	1668	33.36	885	35.4