## How to calculate cable fill rates

**To correctly calculate cable fill rates requires knowing the circular area of the cables and factoring in the fill ratio.**

Fill ratio:
The total area of cable space to be filled needs to be reduced to 53.66% for data cables, and ~30% for larger power cords.
This is because the cable outer round and they don't lay straight. Thickness in the cable space. Think cylindrical pipes laying straight and side by side.
Cable trays are rectangular, and the cables are round. Cable trays are rectangular, and the cables are round. Even with the 90 cable is closer to 53%
As the cable with less cables start to reduce, the larger cable manufacturers recommend at 50% and the smaller ones at 60%
Suggested proportion where optimized cables routing and can be attempted, affordable by plain cable routing practices.

**These charts show the fill rates of our vertical and horizontal cable managers for many common networking cables.**
**The top grey area that references cable diameter and cable area has the circular area formula in the cable area cells.**
**circular area = (pi/4)x diameter(^2 = 0.7854**

**English Units**

| | | | | | Vertical Cable Managers | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Horizontal Cable Managers | | | | | | | | | |
| | | | | | Cable Area (in²) | | | | | | | | | |
| **Vertical Cable Managers** | **Horizontal Cable Managers** | | | | | | | | | | | | | |
| **Cable Type** | **Description** | **Cable Diameter (in)** | **Cable Area (in²)** | **Cable Quantity** | **Cable Area (in²)** | **Fill Ratio** | | | | | | | | |
| Cat5e/Cat6 | Ethernet Cable Round Cat5e | 0.24 | 0.0452 | 1000 | 45.24 | 53.66% | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 |
| Cat5e/Cat6 | Ethernet Cable Round Cat5e | 0.24 | 0.0452 | 1000 | 45.24 | 53.66% | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 |
| Cat5e/Cat6 – UltraFlexible | Ethernet Cable Round Cat5e UltraFlexible | 0.3 | 0.07 | 643 | 45.24 | 53.66% | 643 | 643 | 643 | 643 | 643 | 643 | 643 | 643 |
| Cat6a | Ethernet Cable Round Cat6a | 0.3 | 0.07 | 643 | 45.24 | 53.66% | 643 | 643 | 643 | 643 | 643 | 643 | 643 | 643 |
| Cat6a/Cat7 – UltraFlexible | Ethernet Cable Round Cat6a/Cat7 UltraFlexible | 0.3 | 0.07 | 643 | 45.24 | 53.66% | 643 | 643 | 643 | 643 | 643 | 643 | 643 | 643 |
| Cat6a/Cat7 – small diameter | Ethernet Cable Flat Cat6a/Cat7 | 0.2 | 0.03 | 1508 | 45.24 | 53.66% | 1508 | 1508 | 1508 | 1508 | 1508 | 1508 | 1508 | 1508 |
| Cat6a/Cat7 | Ethernet Cable Round Cat6a/Cat7 | 0.3 | 0.07 | 643 | 45.24 | 53.66% | 643 | 643 | 643 | 643 | 643 | 643 | 643 | 643 |
| Cat6a/Cat7 | Ethernet Cable Round Cat6a/Cat7 UltraFlexible | 0.3 | 0.07 | 643 | 45.24 | 53.66% | 643 | 643 | 643 | 643 | 643 | 643 | 643 | 643 |
| Cat6a/Cat7 | Ethernet Cable Flat Cat6a/Cat7 | 0.2 | 0.03 | 1508 | 45.24 | 53.66% | 1508 | 1508 | 1508 | 1508 | 1508 | 1508 | 1508 | 1508 |
| **Cables with Jackets** | | | | | | | | | | | | | | |
| Cat6a/Cat7 | Ethernet Cable Round Cat6a/Cat7 | 0.3 | 0.07 | 643 | 45.24 | 53.66% | 643 | 643 | 643 | 643 | 643 | 643 | 643 | 643 |
| Cat7 Flat | Ethernet Cable Flat Shielded Cat7 | 0.2 | 0.03 | 1508 | 45.24 | 53.66% | 1508 | 1508 | 1508 | 1508 | 1508 | 1508 | 1508 | 1508