

Pathway System Sizing for Communications Cabling

A properly sized pathway system is critical to the performance of a communications cabling plant. The pathway system must be designed with future capacity in mind and such that the cabling is properly supported over its entirety. Other factors to consider include; ensuring the minimum bend radius of the cables is not exceeded, adequate access to cabling to accommodate changes, and separation from possible sources of electromagnetic interference (EMI). This article will focus on the sizing considerations. See Pathway Separation Between Telecommunications Cables and Power Cables at www.superioressex.com for additional information related to separation from EMI sources.

Cable Tray

Cable tray is manufactured in many sizes and styles. These styles include, but are not limited to; ladder style, center spine, and basket type. Each of these cable trays come in a variety of widths and depths which make cable tray an excellent choice for any size application. The US National Electric Code (NEC) and the Telecommunications Industry Association (TIA) recommend that cable trays are not filled more than 50%, based on cross-sectional area. Due to the voids between cables and their random placement within the tray, the tray will be effectively full at the 50% fill rate. TIA-569-B recommends the cable tray be designed for a maximum 25% initial fill to allow for future capacity. The cable tray should also be located beneath a raised floor or in accessible ceiling space in a manner that allows access to the tray for cabling changes. Cable tray should be installed per the manufacturer's installation instructions.



Conduit

Conduit is manufactured in multiple trade sizes. The most common trade sizes used for communications cabling pathways are ¾" (21 mm), 1" (27 mm), 1¼" (35 mm), 2" (53 mm) and 4" (103 mm). Actual conduit sizes may vary slightly by manufacturer. Local and National building codes, including the NEC, dictate maximum fill ratios for conduit. Conduit fill calculations should be performed anywhere that conduit is being utilized as part of the pathway system to ensure that maximum fill is not exceeded. Consideration should also be given to leaving capacity for cabling moves, adds and changes. Conduits that are not properly sized will result in difficult cable pulls, which may degrade or ruin the performance characteristics of the cable. It will also prevent future cabling changes. For additional information on conduit fill see [How to Calculate Conduit Fill](#) at SuperiorEssex.com.



Outlet Box

Outlet boxes are another critical component in the communications cabling pathway. Standard outlet box sizes include; single gang (4"H x 2½"W x 1¼"D), double gang (4" Square x 2½"D) and over-sized double gang (4½" Square x 2½"D). A standard single gang box will not accommodate the bend radius of category 5e, 6, 6A or optical fiber interconnect cabling and therefore it is recommended that a double gang box be utilized. If capacity dictates, or if Category 6A cabling is being installed, then an over-sized double gang box is recommended. This box will not only accept 1¼" conduit, but will also allow for a more gradual sweep of the cables entering the box from the conduit, thus ensuring the minimum bend radius is not exceeded.