CONDUIT FILL REPORT BY SIMPLY

Compliance with NEC Chapter 9-2023, IEEE STD 525, IEEE STD 1185

PROJECT INFORMATION

PROJECT NAME:	Demo	**COMPANY NAME:**	Demo	**PREPARED BY:**	Demo
CLIENT NAME:	Demo	**LOCATION:**	Demo	**DATE:**	June 10, 2026

SCOPE

This report presents a concise evaluation of conduit fill and jamming ratio parameters critical to the design and installation of electrical cable systems, referencing guidelines from IEEE Std 525, IEEE Std 1185 and the National Electrical Code (NEC). Conduit Fill refers to the percentage of the conduit's internal cross-sectional area occupied by conductors. NEC Chapter 9, Table 1, specifies maximum fill limits to ensure safe heat dissipation and ease of cable installation. Criteria for maximum allowed conduit percentage fill:

-1 conductor: 53% fill.

-2 conductors: 31% fill.

-3 or more conductors: 40% fill.

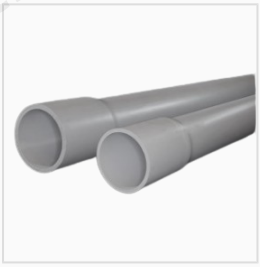
Jamming Ratio is a dimensionless value used to assess the risk of cable jamming when pulling three unbound cables through a conduit bend. IEEE 525 and supporting studies indicate that jamming probability, when:

- D/d < 2.8 : Jamming is not likely. - D/d < 3.0 : Jamming cannot occur. - 2.8 ≤ D/d ≤ 3.0 : Probability of jamming. This analysis supports safe and efficient cable system design by integrating empirical data and code-based constraints, ensuring compliance and reliability in electrical installations.

INPUT DATA

CONDUIT INFORMATION

CONDUIT TYPE:	PVC SCH 120
CONDUIT TRADE SIZE:	8.000 inch
CONDUIT INTERNAL DIAMETER (D):	7.189 inch



CABLE INFORMATION

Cable	Outer Diameter of Cable (inch)	Number of Cables (N)
A	2.000	3
B	1.000	5

CALCULATIONS

1. CONDUIT AREA (AD)

$AD = \pi/4 \times D^2$

$AD = 3.14/4 \times 7.189\ inch^2$

$Ad = 40.591\ inch^2$

2. CABLE AREA

$A1 = N \times \pi/4 \times d1^2$ … for (A) cable

$A1 = 3 \times 3.14/4 \times 2.000^2$

$A1 = 9.425\ inch^2$

3. FILL PERCENTAGE

% Fill = (Σ Ad / AD) × 100%

% Fill = 32.890%

A2 = N × π/4 × d2² … for (B) cable

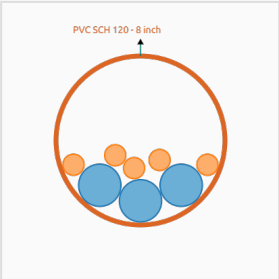
A2 = 5 × 3.14/4 × 1.000²

A2 = 3.927 inch²

Ad = 13.352 inch²

RESULTS

CONDUIT FILL STATUS



The image shown is for visualization purposes only. The actual cable laying within the conduit may follow a different configuration, depending on site conditions or as determined by the installer.

Status: Safe. Fill ratio 32.890% is within the limit (40%).

Suggestions: If conduit fill percentage is exact as shown in above table or nearest to that (e.g., for 2 cables, %fill is 31% or to 26%), then use one size bigger conduit or reduce number of cables to make space for future installations.

JAM RATIO STATUS

Jamming refers to the condition where cables are so tightly packed inside the conduit that they become difficult or impossible to pull through or install properly. This can lead to damage to cable insulation, increased friction, and safety hazards during installation and operation.

*As per NEC Chapter 9, Information Note No. 2 / IEEE Std 525 Annex J: - For mixed cable sizes, the conductor geometry does not produce the same “locking” behavior, making jam ratio calculation meaningless. - IEEE standards and cable installation guides advise that, for multiple cables of different diameters, the jamming risk is inherently lower, and no standard jam ratio applies. Instead, focus should be placed on maintaining proper conduit fill percentage and applying good cable pulling practices.

CONCLUSION

The conduit fill and jamming calculations confirm whether the selected conduit size is suitable for the cables intended to be installed, ensuring compliance with NEC, IEEE STD 525 & IEEE STD 1185 guidelines. The calculated fill percentage and jam ratio are within acceptable limits, indicating that cables will fit comfortably without risk of damage or pulling difficulties. If either fill or jamming thresholds are exceeded, it is recommended to increase conduit size or reduce cable quantity to maintain system safety, ease of installation, and long-term reliability. The analysis provides actionable insights to optimize conduit and cable selection consistent with electrical codes and industry best practices.