

FREE SAMPLE / CONDUIT FILL VS AMPACITY

The wires fit. Does the pull pass?

One complete exercise from the six-exercise PassPull practice pack. Use this sample in your own class or crew discussion. No email or purchase required.

Predict before using the checker

Setup	3/4 in. EMT; NEC 2023; copper THHN/THWN-2
Conductors	10 x #12 circuit conductors + 1 x #12 insulated equipment ground
Assumptions	10 current-carrying; 75 C terminals; 30 C ambient
Requirement	20 A, noncontinuous; standard raceway run over 24 in.

1. Does physical fill pass? Explain your prediction.
2. What happens to allowable ampacity with ten current-carrying conductors?
3. Would moving to a 1 in. raceway fix the controlling problem?

[Open the sample inputs at PassPull](#). Select Check my pull to calculate.

Training aid only. This is not a complete installation design, inspection guarantee or CE course. Check the adopted code, equipment and actual installation. PASS covers only the free checker's implemented scope.

Sample answer and discussion

Fill	$11 \times 0.0133 = 0.1463 \text{ sq in.}$; $0.1463 / 0.533 = 27.4\%$. Below the published 0.213 sq in. permitted area: fill passes.
Adjustment	Ten current-carrying conductors use a 50% factor. The equipment ground is in fill but not in that count.
Allowable current	$30 \text{ A} \times 0.50 \times 1.00 = 15 \text{ A}$. The 75 C terminal ceiling is 25 A; the lower 15 A controls.
Result	15 A allowable is below 20 A required. The overall field check fails even though fill passes.
Larger raceway	At 1 in., fill falls to 16.9%, but the count and temperature assumptions remain unchanged: allowable current stays 15 A.

Discuss a relevant change

A larger raceway adds space; it does not change the count-based adjustment here. Explore conductor size, load requirements or redistributing complete circuits. Each change still needs a full installation review, including grounding, protection and circuit grouping.

References: NEC 2023 Chapter 9 Tables 1, 4 and 5; 310.15(C)(1); 310.16; 110.14(C). These are original explanations, not reproduced code tables or NFPA approval.

[See the complete practice pack](#) - six exercises, worked answers, a 30-minute lesson plan and reusable worksheets. The online checker remains free.

Method: passpull.com/methodology. Questions: support@passpull.com.