What Is Electrical Systems Distribution?

Worksheet

Electrical systems distribution is the layout of switchgear, transformers, panels, feeders, and branch circuits that deliver electricity safely and efficiently from the utility source to every load in a building.

Questions

1. What does a distribution panel do?

A) Generates electricity
B) Splits incoming power into branch circuits
C) Stores backup power
D) Measures water flow

2. Why are electrical rooms usually stacked vertically in multi-story buildings?

A) To save floor area only
B) To shorten and simplify riser runs between floors
C) Because code forbids horizontal risers
D) To reduce lighting costs

3. What is voltage drop primarily caused by?

A) Circuit breaker color
B) Conductor length and resistance
C) Room temperature only
D) Panel brand

4. A demand factor is used to:

A) Increase the connected load artificially
B) Right-size feeders and panels based on realistic simultaneous usage
C) Bypass code requirements
D) Calculate paint coverage

5. A retail store has a connected lighting load of 3 W/sq ft over 5,000 sq ft. What is the estimated lighting demand load and branch current?

6. A building needs a new 100A subpanel fed from a 400A main that already serves 250A of connected load. Is there enough capacity?

7. An architect is laying out a floor plan and needs to locate the electrical room. What factors decide where it goes?

8. Define: What is a distribution panel?

9. Define: What is a feeder?

10. Define: Why do electrical rooms stack vertically?

Answer Key

1. B) Splits incoming power into branch circuits - A distribution panel takes power from a feeder and divides it into individual branch circuits.

2. B) To shorten and simplify riser runs between floors - Vertical stacking keeps the electrical riser path straight and short, cutting material and coordination effort.

3. B) Conductor length and resistance - Longer conductors and higher resistance cause more voltage to be lost along the run.

4. B) Right-size feeders and panels based on realistic simultaneous usage - Demand factors reflect that not all connected loads draw full power at the same time, allowing smaller, more economical feeders and panels.

5. Connected load = 3 W/sq ft 5,000 sq ft = 15,000 W (15 kW) Lighting demand load is typically close to the connected load for retail, so demand 15 kW At 208V, 3-phase: I 15,000 (208 1.732) 42 A This current feeds sizing of the panel and feeder serving the lighting circuits

6. Available capacity = 400A main 250A existing load = 150A remaining The new 100A subpanel fits within the 150A of spare capacity An electrician still verifies with an as-built load study and code demand factors before sign-off This is why panel schedules are kept up to date on every project

7. Stack electrical rooms vertically above each other on every floor to keep a clean riser path Place the main service entrance room near the building perimeter for utility access Keep panels within roughly 100 ft of the loads they serve to limit voltage drop Coordinate room size with the switchgear, panel, and transformer clearances required by code

8. A panel that receives power from a feeder and splits it into branch circuits serving outlets, lights, and equipment.

9. A conductor that carries power from the main switchgear or a distribution panel to another panel, without directly serving individual outlets.

10. Stacking rooms floor-to-floor keeps electrical risers short and straight, saving material and simplifying installation.