What Is Natural Lighting and Daylighting?

Worksheet

Daylighting uses windows, skylights, light shelves and reflective surfaces to distribute natural light throughout interior spaces; performance is quantified by the Daylight Factor: DF = (Ei / Eo) 100.

Questions

1. What does the Daylight Factor formula DF = (Ei/Eo) 100 measure?

A) The ratio of interior to exterior sound levels
B) The percentage of exterior illuminance reaching an interior point
C) The total lumens produced by a light fixture
D) The building's solar heat gain

2. Interior illuminance is 400 lux, exterior is 20,000 lux. What is the Daylight Factor?

A) 2%
B) 0.5%
C) 5%
D) 20%

3. As distance from a window increases, Daylight Factor typically:

A) Increases steadily
B) Stays constant
C) Decreases
D) Becomes negative

4. What device redirects daylight deeper into a room while shading the area below?

A) A light shelf
B) A thermal mass wall
C) A vapor barrier
D) An HVAC diffuser

5. A room has an interior illuminance of 500 lux while the exterior illuminance under an overcast sky is 10,000 lux. Find the Daylight Factor.

6. A deep classroom measures 150 lux at the back wall when the exterior illuminance is 15,000 lux. Find the Daylight Factor at that point.

7. A well-daylit office near a window reads 900 lux interior with 12,000 lux exterior. How does its Daylight Factor compare to a minimum recommended DF of 2%?

8. Define: What is daylighting?

9. Define: What is the Daylight Factor (DF)?

10. Define: What DF is generally considered well-daylit?

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Answer Key

1. B) The percentage of exterior illuminance reaching an interior point - DF expresses interior illuminance as a percentage of simultaneous exterior illuminance under an overcast sky.

2. A) 2% - DF = (400/20,000) 100 = 2%.

3. C) Decreases - Daylight intensity drops off with distance from the window, so DF decreases toward the back of a room.

4. A) A light shelf - A light shelf bounces daylight off its top surface onto the ceiling, pushing light farther into the space.

5. DF = (Ei / Eo) 100 DF = (500 / 10,000) 100 DF = 5%

6. DF = (150 / 15,000) 100 DF = 1%

7. DF = (900 / 12,000) 100 = 7.5% 7.5% is well above the 2% minimum recommended for adequate daylighting

8. Designing windows, skylights and layouts to bring natural light into a building, reducing the need for electric lighting.

9. The ratio of interior illuminance to exterior illuminance (under an overcast sky), expressed as a percentage: DF = (Ei/Eo) 100.

10. A DF of about 2% or higher is typically considered adequately daylit for most tasks; below 2% often feels dim and requires supplemental lighting.

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