

## PERHITUNGAN JUMLAH KEBUTUHAN LAMPU

### 1. RUMUS

$$E = \frac{F \cdot n \cdot N \cdot UF \cdot LLF}{A}$$

$$F = \text{Watt} \times \text{Lm/w}$$

N = Jumlah titik lampu dalam lumener

n = Jumlah lampu per N

E = Kuatpenerangan/target kuatpenerangan yang akan di capai (lux) (150-400 lux)

A = Luas ruang

F = Aliran cahaya watt lumen per watt

LLF = Light Loss Factor/faktor cahaya rugi

UF = Utilization factor /faktor pemanfaatan

### 2. LAMPU



(Downlight)

- a) Philips LED125 DN570B  
Pada ruang inap
- b) Philips LED205 DN5701B  
Pada ruang rekreasi wanita

## **PERHITUNGAN TITIK LAMPU PADA RUANG INAP VIP**

1) *Diketahui* :

$$E = 150 \text{ lux}$$

$$UF = 0.8 \text{ (Low reflectance)}$$

$$LLF = 0,85 \text{ (Average Cleanliness)}$$

$$A = 25 \text{ m}^2$$

$$F = \text{Downlight Philips } 11,2 \text{ watt} \times 103 \text{ lumen / watt}$$

$$n = \text{Downlight Philips } 1 \text{ per lumener}$$

2) *Ditanya* : N (jumlah luminaire) ?

3) *Jawaban* :

### **DOWNLIGHT PHILIPS**

$$E = \frac{F \cdot n \cdot N \cdot UF \cdot LLF}{A}$$

$$150 \text{ lux} = \frac{11,2 \text{ watt} \cdot 103 \frac{\text{lm}}{\text{watt}} \cdot 1 \cdot N \cdot 0,8 \cdot 0,85}{25 \text{ m}^2}$$

$$150 \text{ lux} = \frac{784,448 \cdot N}{25 \text{ m}^2}$$

$$N = \frac{3750}{784,448} \longrightarrow N = 4,78 \text{ luminaire (dibulatkan menjadi 5 lumener)}$$

4) *Kesimpulan* :

*Pada ruang inap VIP dibutuhkan 5 titik lampu.*

## **PERHITUNGAN TITIK LAMPU RUANG INAP KELAS 1**

1) *Diketahui* :

$$E = 150 \text{ lux}$$

$$UF = 0,80 \text{ (Low reflectance)}$$

$$LLF = 0,85 \text{ (Average Cleanliness)}$$

$$A = 25 \text{ m}^2$$

$$F = \text{Downlight Philips } 11,2 \text{ watt} \times 103 \text{ lumen / watt}$$

$$n = \text{Downlight Philips } 1 \text{ per lumener}$$

2) *Ditanya* : N (jumlah luminaire) ?

3) *Jawaban* :

### **DOWNLIGHT PHILIPS**

$$E = \frac{F \cdot n \cdot N \cdot UF \cdot LLF}{A}$$

$$150 \text{ lux} = \frac{11,2 \text{ watt} \cdot 103 \frac{\text{lm}}{\text{watt}} \cdot 1 \cdot N \cdot 0,80 \cdot 0,85}{25 \text{ m}^2}$$

$$150 \text{ lux} = \frac{784,448 \cdot N}{25 \text{ m}^2}$$

$$N = \frac{3750}{784,448} \longrightarrow N = 4,78 \text{ luminaire (dibulatkan menjadi 5 lumener)}$$

4) *Kesimpulan:*

*Pada ruang inap kelas 1 dibutuhkan 5 titiklampu. Dalam pengaplikasian menggunakan 6 lumener dengan pertimbangan estetika.*

## **PERHITUNGAN TITIK LAMPU RUANG INAP KELAS 2**

1) *Diketahui* :

$$E = 150 \text{ lux}$$

$$UF = 0,80 \text{ (Low reflectance)}$$

$$LLF = 0,80 \text{ (Average Cleanliness)}$$

$$A = 30 \text{ m}^2$$

$$F = \text{Downlight Philips } 11,2 \text{ watt} \times 103 \text{ lumen / watt}$$

$$n = \text{Downlight Philips } 1 \text{ per lumener}$$

2) *Ditanya* : N (jumlah luminaire) ?

3) *Jawaban* :

### **DOWNLIGHT PHILIPS**

$$E = \frac{F \cdot n \cdot N \cdot UF \cdot LLF}{A}$$

$$150 \text{ lux} = \frac{11,2 \text{ watt} \cdot 103 \frac{\text{lm}}{\text{watt}} \cdot 1 \cdot N \cdot 0,80 \cdot 0,80}{30 \text{ m}^2}$$

$$150 \text{ lux} = \frac{738,304 \cdot N}{30 \text{ m}^2}$$

$$N = \frac{4500}{784,448} \longrightarrow N = 5,73 \text{ luminaire (dibulatkan menjadi 6 lumener)}$$

4) *Kesimpulan:*

*Pada ruang inap kelas 2 dibutuhkan 6 titik lampu.*

### **PERHITUNGAN TITIK LAMPU RUANG INAP KELAS 3**

1) *Diketahui* :

$$E = 150 \text{ lux}$$

$$UF = 0,80 \text{ (Low reflectance)}$$

$$LLF = 0,75 \text{ (Very Dirty)}$$

$$A = 36 \text{ m}^2$$

$$F = \text{Downlight Philips } 11,2 \text{ watt} \times 103 \text{ lumen / watt}$$

$$n = \text{Downlight Philips } 1 \text{ per lumener}$$

2) *Ditanya* : N (jumlah luminaire) ?

3) *Jawaban* :

#### **DOWNLIGHT PHILIPS**

$$E = \frac{F \cdot n \cdot N \cdot UF \cdot LLF}{A}$$

$$150 \text{ lux} = \frac{11,2 \text{ watt} \cdot 103 \frac{\text{lm}}{\text{watt}} \cdot 1 \cdot N \cdot 0,80 \cdot 0,75}{36 \text{ m}^2}$$

$$150 \text{ lux} = \frac{692,16 \cdot N}{36 \text{ m}^2}$$

$$N = \frac{5400}{692,16} \longrightarrow N = 7,80 \text{ luminaire (dibulatkan menjadi 8 lumener)}$$

4) *Kesimpulan:*

*Pada ruang inap kelas 3 dibutuhkan 8 titik lampu.*

## **PERHITUNGAN TITIK LAMPU RUANG REKREASI WANITA**

1) *Diketahui* :

$$E = 150 \text{ lux}$$

$$UF = 0,80 \text{ (Low reflectance)}$$

$$LLF = 0,88 \text{ (Average Cleanliness)}$$

$$A = 144 \text{ m}^2$$

$$F = \text{Downlight Philips } 19 \text{ watt} \times 116 \text{ lumen / watt}$$

$$n = \text{Downlight Philips } 1 \text{ per lumener}$$

2) *Ditanya* : N (jumlah luminaire) ?

3) *Jawaban* :

### **DOWNLIGHT PHILIPS**

$$E = \frac{F \cdot n \cdot N \cdot UF \cdot LLF}{A}$$

$$200 \text{ lux} = \frac{19 \text{ watt} \cdot 116 \frac{\text{lm}}{\text{watt}} \cdot 1 \cdot N \cdot 0,80 \cdot 0,88}{144 \text{ m}^2}$$

$$200 \text{ lux} = \frac{1551,616 \cdot N}{144 \text{ m}^2}$$

$$N = \frac{28800}{1551,616} \longrightarrow N = 18,56 \text{ luminaire (dibulatkan menjadi 19 lumener)}$$

4) *Kesimpulan:*

*Pada ruang rekreasi wanita dibutuhkan 19 titik lampu. Dalam pengaplikasian menggunakan 20 lumener dengan pertimbangan estetika.*