

PENGAJUAN PENAMBAHAN FRESH AIR GEDUNG B

1 KEBUTUHAN FRESH AIR GEDUNG

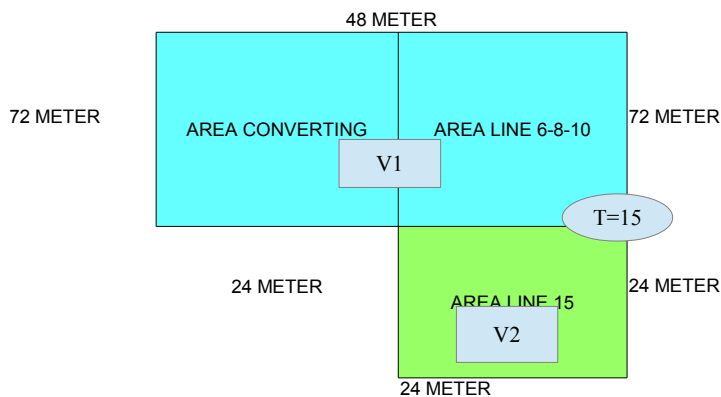
$$\text{Fresh Air \%} = [(MAT - RAT) \div (OAT - RAT)] \times 100$$

MAT	Mixed Air Temperature	Suhu Udara Campuran	28 – 30 CELCIUS
RAT	Return Air Temperature	Suhu Udara Kembali	25 CELCIUS
OAT	Outside Air Temperature	Suhu Udara Luar	38 CELCIUS

$$\begin{aligned}\text{Fresh air \%} &= ((28-25) : (38-24)) \times 100 \\ &= ((3) : (12)) \times 100 \\ &= 0.25 \times 100 \\ &= \mathbf{25.00\%}\end{aligned}$$

TOTAL KEBUTUHAN FRESH AIR DI GEDUNG B = 25 % DARI VOLUME GEDUNG PRODUKSI

2 VOLUME GEDUNG PRODUKSI



$$\begin{aligned}V1 &= P \times L \times T \\ &= 72 \times 48 \times 15 \\ &= 51840 \text{ m}^3\end{aligned}$$

$$\begin{aligned}V2 &= P \times L \times T \\ &= 24 \times 24 \times 15 \\ &= 8640 \text{ m}^3\end{aligned}$$

$$\begin{aligned}V \text{ Total} &= V1 + V2 \\ &= 51840 + 8640 \\ &= \mathbf{60480 \text{ m}^3}\end{aligned}$$

3 TOTAL CMH DALAM RUANGAN

$$Q (\text{m}^3/\text{h}) = V (\text{m}^3) \times \text{ACH} (\text{Air Charge per hour})$$

Berikut std ACH (Air Charge per hour)

Room	Purpose					System				Ventilation Volume		Remarks
	Deodorization	Heat (Thermal)	Fresh Air	Dehumidification	Dust/Gas	Natural System	Class-1 System	Class-2 System	Class-3 System	Air Change Rate (time/hr)		
Toilet	•								•	5 - 15		
Locker Room	•					Δ			•	5		
Storage, Warehouse	•	•		•		•			•	3 - 5		
Copy Room	•	•							•	10		
Shower Room	•			•					•	3 - 7		
Bathroom, Shower Room	•			•		•			Δ	3 - 7		
Pantry	•	•		•					•	8		
Musholla	•	•	•						•	5 - 10		
Office, Meeting Room	•		•				•		Δ	(1 - 3)		
Boiler Room		•	•				•	Δ		(10 - 15)		
Compressor Room		•					•		Δ	(20 - 30)		
Pump Room		•					•		Δ	5		
Water Tank Room				•			•		Δ	4		
Oil Tank Room					•		•		Δ	5		
Transformer Room		•					•		Δ	(20 - 30)		
Electrical Room (Panel)		•					Δ		Δ	10 - 15		
Battery Room					•		•		Δ	10 - 30		
Elevator Machine Room		•					•		Δ	(10 - 30)		
Generator Room		•	•				•		Δ	30 - 50		
Parking Area					•		Δ		•	10		
Kitchen	•	•	•	•	•		•		Δ	(30 - 60)		

Kami asumsikan membutuhkan ACH = 10 (std Mushola – Boiler Room)

Oleh karean itu Total CMH dalam Ruangan adalah

$$\begin{aligned}
 Q &= V \text{ TOTAL} \times \text{ACH} \\
 &= 60480 \times 10 \\
 &= 604800 \text{ m}^3/\text{h} \\
 &= \mathbf{604800 \text{ CMH}}
 \end{aligned}$$

4 PERHITUNGAN BLOWER ROOF FAN DAN EXHOUST FAN

A . BLOWER ROOF FAN

Capacity = 22000 CMH

Line	Jumlah Rooffan
Line 6	3
Line 8	3
Line 10	3
Line 15	3
Converting	2
Total	14

$$\begin{aligned}
 Q \text{ roof fan} &= N \times \text{CMH} \\
 &= 14 \times 22000 \\
 &= \mathbf{308000 \text{ CMH}}
 \end{aligned}$$

B. EXHOUST FAN

Capacity = 22000 CMH

Line	Jumlah Exhaustfan
Converting	2
Total	2

$$\begin{aligned}
 Q \text{ ext fan} &= N \times \text{CMH} \\
 &= 2 \times 22000 \\
 &= \mathbf{44000 \text{ CMH}}
 \end{aligned}$$

C. EXHOUST FAN DUST COLECTOR

Capacity = 3700 CMH

Line	Jumlah Exhaustfan
CORTEC	1
Total	1

$$\begin{aligned}
 Q \text{ dust fan} &= N \times \text{CMH} \\
 &= 1 \times 3700 \\
 &= \mathbf{3700 \text{ CMH}}
 \end{aligned}$$

$$\begin{aligned}
 Q \text{ Total FAN} &= Q \text{ roof fan} + Q \text{ ext fan} + Q \text{ dust fan} \\
 &= 308000 + 44000 + 3700 \\
 &= \mathbf{355700 \text{ CMH}}
 \end{aligned}$$

5 PERHITUNGAN FRESH AIR EXISTING

FRESH AIR	CAPACITY BLOWER	SATUAN	QTY	TOTAL CAPACITY
Line 6	75000	CMH	1	75000
Line 15	75000	CMH	1	75000
Converting	45000	CMH	2	90000
TOTAL				240000

$$Q \text{ Total Fresh Air} = \mathbf{24000 \text{ CMH}}$$

6 PENGECEKAN DOUBLE DOOR

A . DOUBLE DOOR 1 (AREA LINE 6 DAN LINE 8)

Dimensi

Panjang = 4.25 meter
Lebar = 3.75 meter
Tinggi = 3.91 meter

Open all Pintu Double Door Ukur dengan Anemometer

Hasil = **0 m/s**

B . DOUBLE DOOR 2 (AREA LINE 15 DAN CONVERTING)

Dimensi

Panjang = 3.76 meter
Lebar = 4.34 meter
Tinggi = 4.42 meter

Open all Pintu Double Door Ukur dengan Anemometer

Hasil = **0 m/s**

7 PENGECEKAN HASIL PENGUKURAN DIFFERENTIAL PRESSURE

Line	Hasil
Line 6	0 m/s
Line 15	0 m/s

8 ACTUAL PERHITUNGAN

Actual perhitungan sesuai kondisi di Lapangan di dapatkan
Perbandingan Volume Gedung Produksi dengan keluaran Blower dan fresh Air
Maka didapatkan angka

$$\begin{aligned}
 \Delta \text{ CMH} &= \text{CMH RUANG} - \text{CMH KELUARAN} \\
 &= \text{CMH GEDUNG PRODUKSI} - (\text{CMH ROOF FAN} + \text{CMH FRESH AIR}) \\
 &= 604800 - (355700 + 240000) \\
 &= 604800 - 595700 \\
 &= 9100
 \end{aligned}$$

Seharusnya di ruangan + 9100 CMH

9 STANDART KEBUTUHAN FRESH AIR DI RUANG PRODUKSI

Mengacu standart fresh air yang di rekomendasikan adalah 25 %
maka didapatkan angka

$$\begin{aligned}
 \text{Std Fresh Air} &= \text{Presentase} \times \text{Voume Ruangan} \\
 &= 25 \% \times 604800 \text{ CMH} \\
 &= 151200
 \end{aligned}$$

Kebutuhan Fresh Air Gedung B actual

$$\begin{aligned}
 \text{Kebutuhan} &= \text{Std Fresh Air} - \Delta \text{ CMH} \\
 &= 151200 - 9100 \\
 &= \mathbf{142100 \text{ CMH}}
 \end{aligned}$$

10 SPESIFIKASI PENAMBAHAN FRESH AIR

Kebutuhan = 142100 CMH

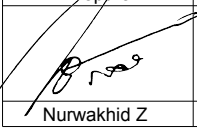
Dengan Kebutuhan Fresh Air sebesar 142100 CMH
Maka kami membulatkan Angka menjadi 150000 CMH

Sehingga Kebutuhan Fresh Air adalah :

MOTOR	CAPACITY BLOWER	SATUAN	QTY	TOTAL CAPACITY	PENEMPATAN
30 KW	75000	CMH	1	75000	CONVERTING
30 KW	75000	CMH	1	75000	CONVERTING
TOTAL				150000	

Desain disamakan dengan Fresh Air Line 6 dan Line 15

MSJ , 13. Desember 2023

Prepare	Approved
	
Nurwakhid Z	Boedy H

