Epoch Fans
When Silence is Golden and Less is More



# Falco eMotors Pvt Ltd

## *Learning Center of HVLS fans*

## *CFM calculation and number of fan selection*

By Team Falco eMotors

21st April 2020

# Basic CFM calculation and fan selection

# What is CFM- (Cubic Feet Per Minute)

CFM = Room Volume / Minutes Per Air Change

Room Volume = L x W x H (room dimensions)

# Minutes Per Air Change

Minute Air Change Chart For Commercial And Industrial Applications

| -- | TYPICAL | RANGE | -- | TYPICAL | RANGE | -- | TYPICAL | RANGE |
|---|---|---|---|---|---|---|---|---|
| Assembly | (6) | 2-10 | Engine Rooms | (3) | 1-5 | Packing Houses | (4) | 3-5 |
| Auditoriums | (6) | 1-20 | Factories | (7) | 4-10 | Plants | (7) | 4-10 |
| Bakeries | (2) | 1-3 | Foundries | (5) | 2-8 | Plating Plants | (4) | 2-5 |
| Banks | (6) | 3-10 | Garages | (7) | 4-10 | Print Shops | (7) | 4-10 |
| Bars | (4) | 2-5 | Generating Plants | (4) | 2-5 | Restaurants | (6) | 2-10 |
| Barns | (15) | 10-20 | Glass Plants | (2) | 1-3 | Rest Rooms | (7) | 4-10 |
| Boiler Rooms | (2) | 1-3 | Gymnasiums | (6) | 2-10 | Schools | (7) | 4-10 |
| Bowling Alley | (3) | 1-5 | Hallways | (8) | 4-12 | Stores | (7) | 4-10 |
| Cafeteria | (4) | 3-5 | Kitchens (Comm.) | (3) | 1-5 | Theaters | (6) | 4-8 |
| Churches | (6) | 2-10 | Laboratories | (3) | 1-5 | Transformer Rooms | (3) | 1-5 |

# Minutes Per Air Change

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Cafeteria | (4) | 3-5 | Kitchens (Comm.) | (3) | 1-5 | Theaters | (6) | 4-8 |
| Churches | (6) | 2-10 | Laboratories | (3) | 1-5 | Transformer Rooms | (3) | 1-5 |
| Classrooms | (6) | 4-8 | Libraries | (4) | 2-5 | Turbine Rooms | (4) | 2-5 |
| Compressor Rooms | (2) | 1-3 | Laundries | (2) | 1-3 | Waiting Rooms | (12) | 10-15 |
| Dance Halls | (6) | 2-10 | Locker Rooms | (6) | 2-10 | Warehouses | (7) | 4-10 |
| Dairies | (4) | 2-5 | Machine Shops | (4) | 2-5 | Welding Rooms | (3) | 1-4 |
| Dormitories | (6) | 4-8 | Markets | (6) | 2-10 | -- | -- | -- |
| Dry Cleaning Plant | (3) | 1-5 | Mills | (4) | 2-5 | -- | -- | -- |

# CFM CALCULATOR

| | |
|---|---|
| 413.38 | Length of Area (feet) |
| 57.41 | Width of Area (feet) |
| 26.24 | Height of Area (feet) |
| 6 | Frequency of Desired Air Change (minutes) |
| CALCULATE | L x W x H / Minutes |
| 103789 | CFM Required For Desired Results |

# FAN Size and Number Selection

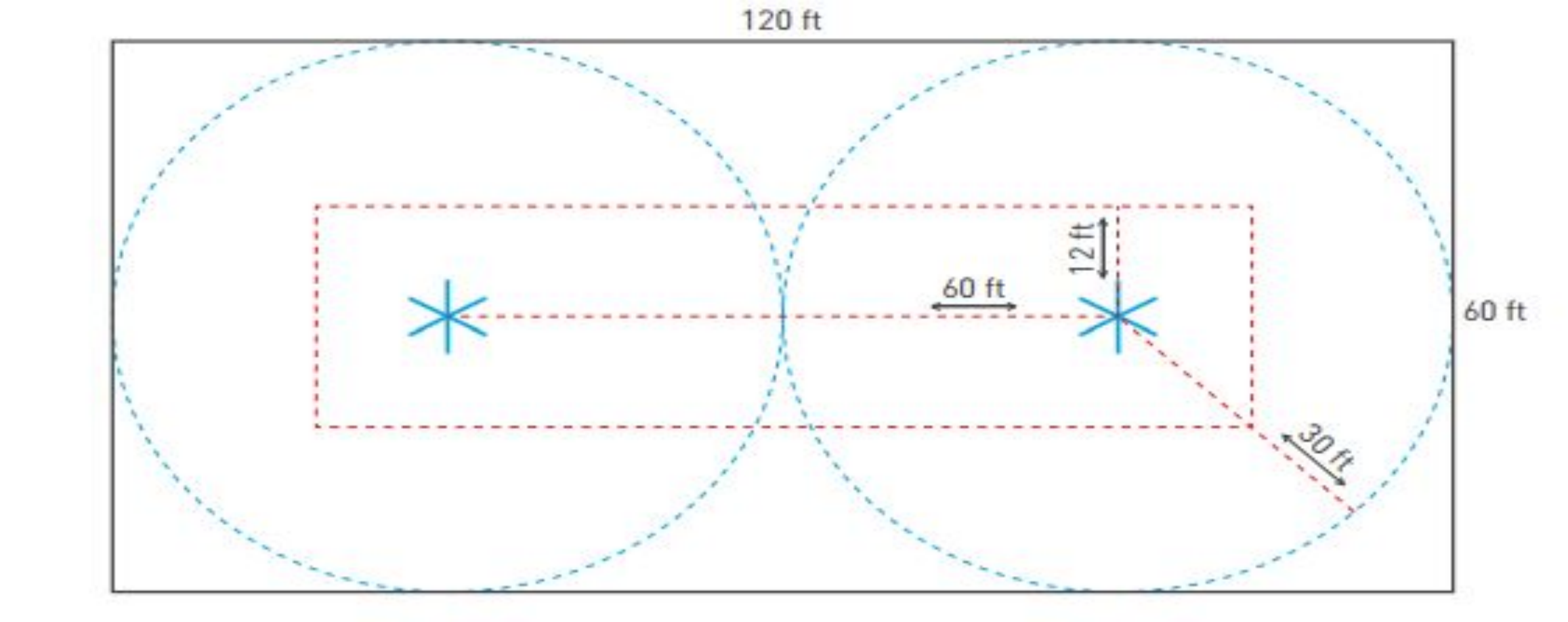
The number of fans needed in a particular space depends-

1. Building's total volume of air,
2. Shape,
3. Building material,
4. Occupied use,
5. Intended HVLS solution.

# FAN to Space chart

| HVLS Fan Diameter | Coverage Radius | Space between Fans | Minimum Space from Wall |
|---|---|---|---|
| 8 foot | 30 feet | 60 feet | 12 feet |
| 12 foot | 35 feet | 70 feet | 18 feet |
| 16 foot | 45 feet | 90 feet | 24 feet |
| 20 foot | 52.5 feet | 105 feet | 30 feet |
| 24 foot | 57.5 feet | 115 feet | 36 feet |

# FAN to Space diagram



# FAN to Space diagram

1. Diagram (in above Slide) shows the proper spacing for two 8-foot HVLS fans.

2. The fans are 60 feet apart.

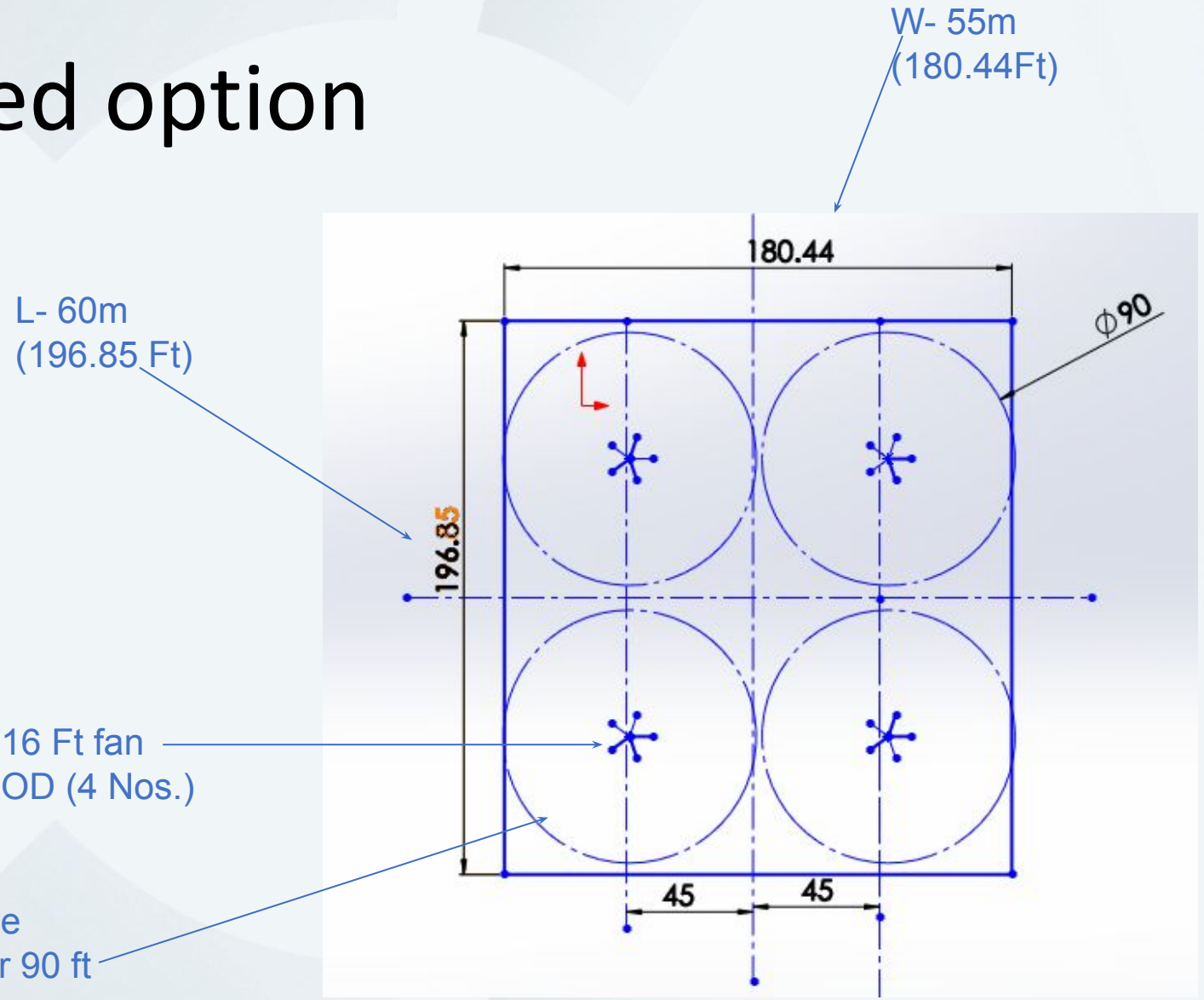
3. The smaller rectangle shows the minimum space required for an 8-foot HVLS fan (12 feet from the wall)

3. The large rectangle shows the maximum coverage radius.

# Example 1st Shed option

Shed Size-
L- 196.85 Ft
W- 180.44Ft
H- 21.32 ft

Minutes Per Air Change- 6
( Fabrication/ engine room)



# Shed 1 - CFM

CFM- 126213

## CFM CALCULATOR

| | |
|---|---|
| 196.85 | Length of Area (feet) |
| 180.44 | Width of Area (feet) |
| 21.32 | Height of Area (feet) |
| 6 | Frequency of Desired Air Change (minutes) |
| CALCULATE | L x W x H / Minutes |
| 126213 | CFM Required For Desired Results |

# References-

-http://www.esmagazine.com/ext/resources/ES/White_Papers/Files/PDF/introduction-to-specifiying-hvls-fans-02021632.pdf

-https://www.industrialfansdirect.com/pages/cfm-calculator