



# T & T Commercial Services, LLC

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June 8, 2022

City of Cartersville

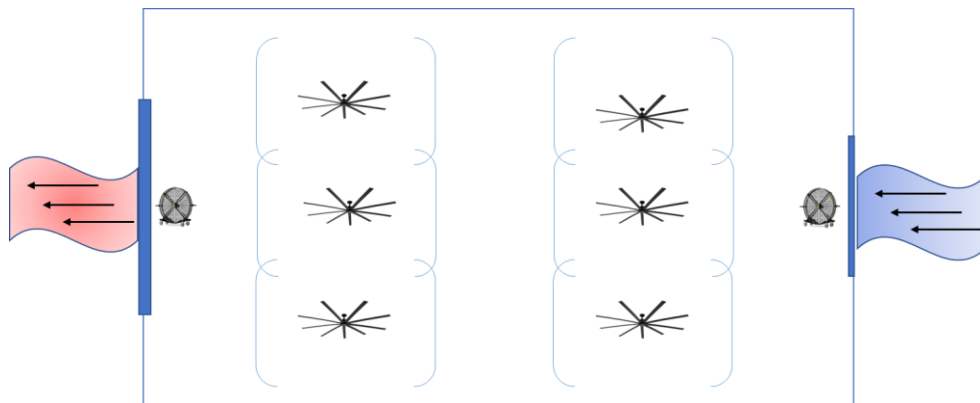
Freddy Morgan, Assistant City Manager

T&T Commercial Services performed the fan solution analysis and is providing a recommended use for the City Garage located at 500 S Tennessee St.

## Optimal Airflow by Season

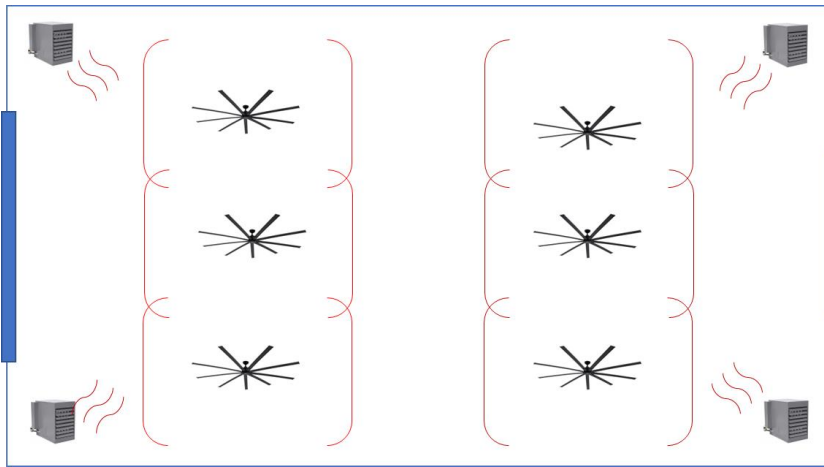
### Summer

- For optimal cooling, the garage should utilize as many 10' ceiling fans as possible for air movement within the entire building targeting fans with capacity to move air across the entire garage area.
- Industrial portable fans should also be used to provide inbound cool air and displace outbound warm.
- The garage breezeway door should be used for inbound air and the larger garage door for outbound air for maximum uninterrupted throughput. Also, the CFM (Cubic Feet per Minute) of the inbound and outbound fans should be similar for optimal air flow and air quality.



### Winter

- During the winter, the upgraded ceiling fans would be used with the heaters in place to effectively warm the garage. The ceiling fans improve destratification, mixing warm air from the ceiling down to the employees. There is no need to use the industrial portable fans during this season.

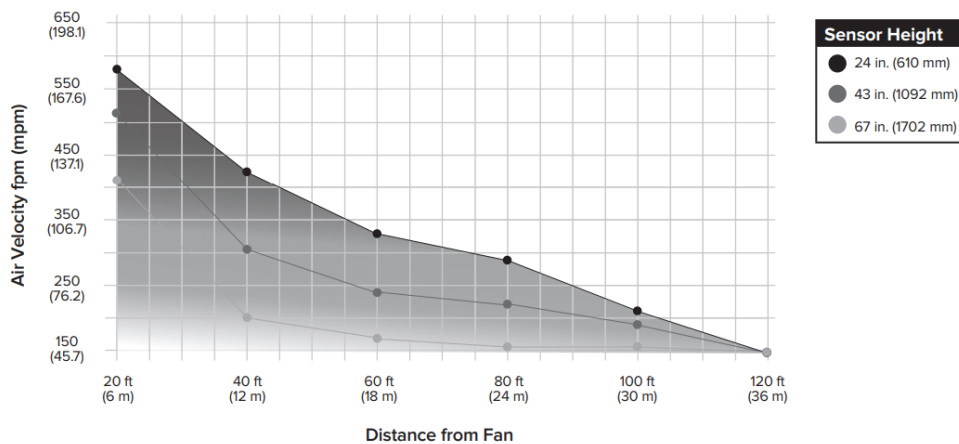


## Comparison of 8' and 6' Industrial Portable Fans

Based on manufacturing data, the airflow performance of an 8' fan and a 6' fan is very similar.

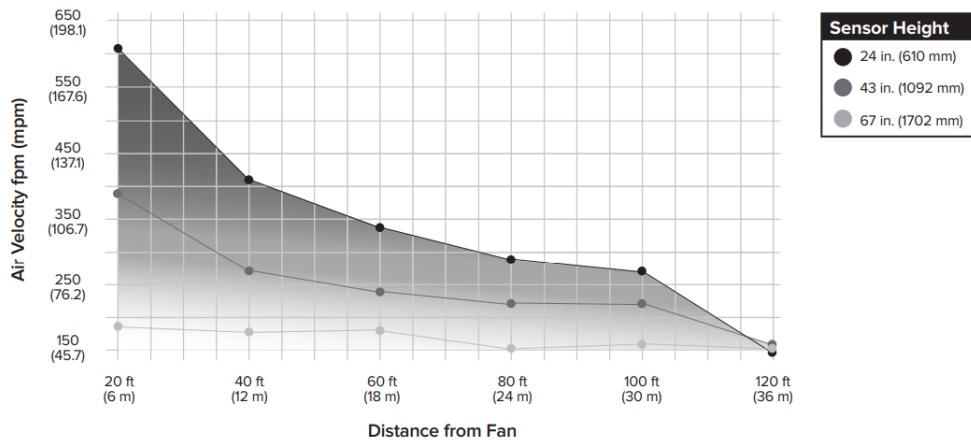
*Airflow Velocity* measures the speed of the air at varying heights and distances from the fan. Comparing the two fan sizes shown in Figures 1 and 2, the 6' fan has slightly higher initial airflow velocity but over the distances the airflow velocity of both fans measure very closely all the way the final distance of 120 ft.

The three lines show air velocity from the center of the fan at three sensors of varying height.



**Figure 1 - 8' Fan Air Velocity**

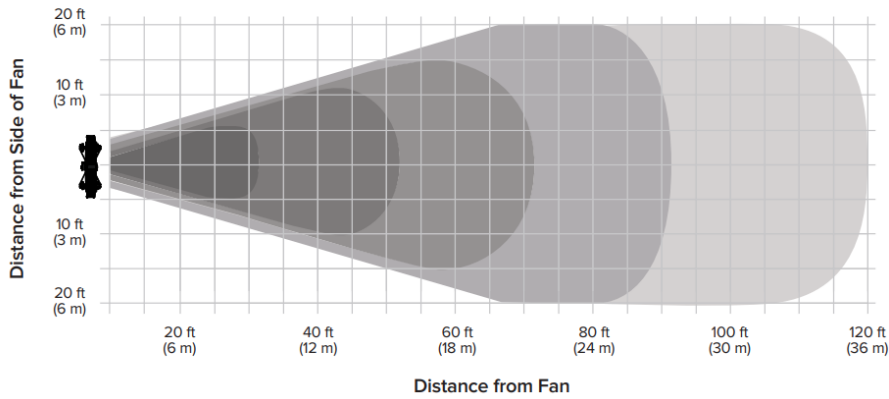
The three lines show air velocity from the center of the fan at three sensors of varying height.



**Figure 2 - 6' Fan Air Velocity**

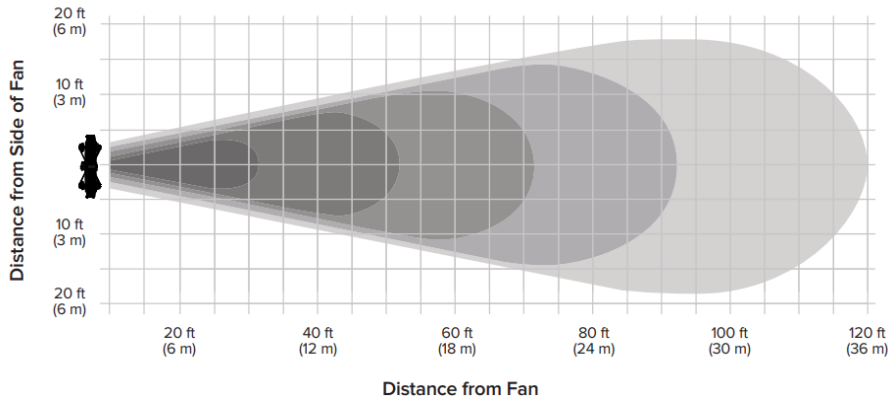
*Airflow Distance* measures the distance that air from the fan reaches both in length and width. Comparing Figures 3 and 4, airflow from both fans again reach the distance of 120 ft. However, due to the larger size and blade design, the 8' fan offers a broader width of air distribution surpassing 20 ft.

Shaded areas represent cooling up to 120 feet (36.6 meters). That's one-third the length of a football field! Darker shading indicates faster air velocity.



**Figure 3 - 8' Fan Airflow Distance**

Shaded areas represent cooling up to 120 feet (36.6 meters). That's one-third the length of a football field! Darker shading indicates faster air velocity.



**Figure 4 - 6' Fan Airflow Distance**

### *CFM (Cubic Feet / Minute)*

CFM is a measurement of airflow volume determined by the amount of cubic feet of air passing by a stationary point in one minute. Comparing the CFM between the 8' and 6.5' fan, the CFM measurements are the same at 3,700 CFM.

To summarize, the two sizes of fans perform very closely to each other with airflow. The airflow width of the 8' fan is greater than the 6' fan but the distance of length is the same. The cost of the 8' fan does come at a premium over the 6' fan but in reality does not offer the significant levels of increased performance.

## Recommendation

The recommended configuration for fans in the City Garage is for the City of Cartersville to use as many 10' ceiling fans as possible in conjunction with dedicated inbound/outbound industrial portable fans. With the performance of the 6' fans, and the lack of increased performance of the 8' compared with its significantly higher price, 6' fans should be used for both the inbound/outbound fans.

Please let us know if any additional information is needed. We look forward to working with the City of Cartersville.

Regards,

**Ricky Allen**

*Project Manager*

**T&T Commercial Services, LLC**

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