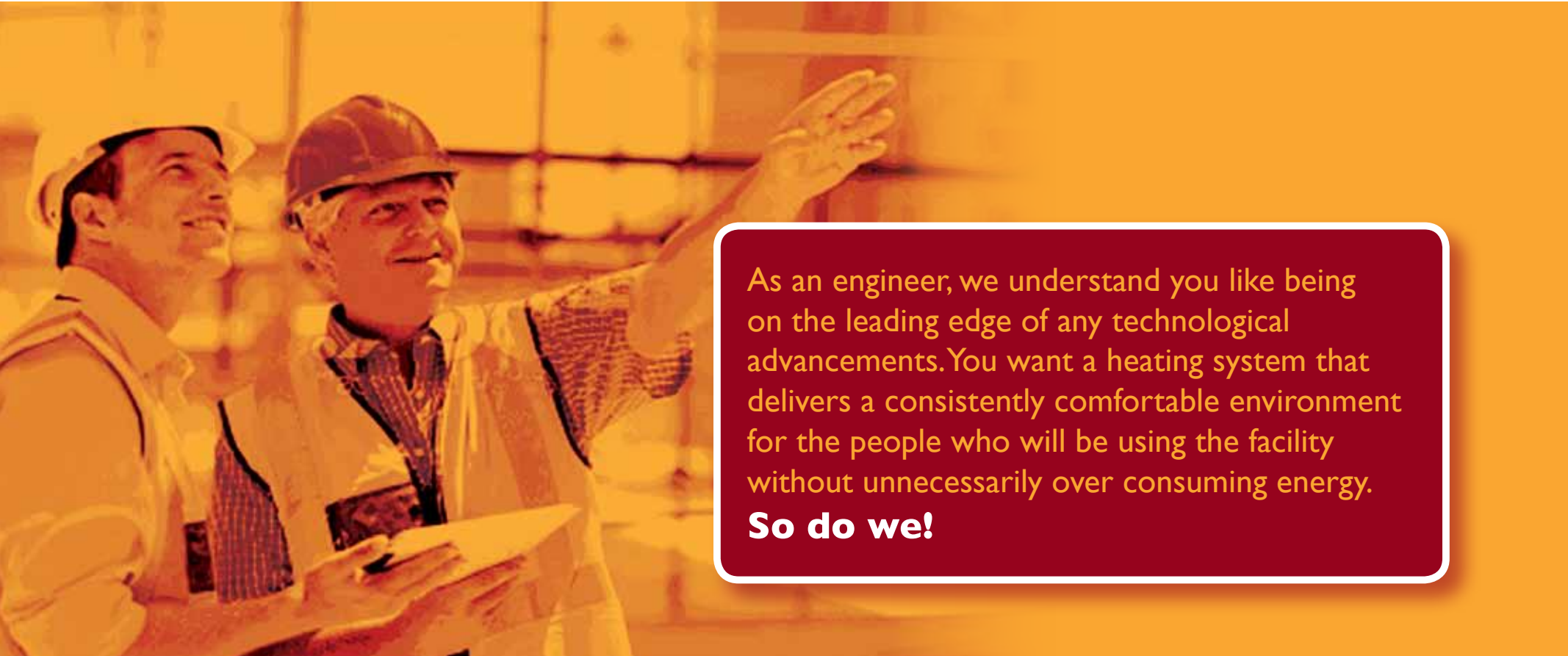


**Why direct fired HTHV  
is more energy efficient  
than unit heaters.**



**COMMITTED TO ENERGY EFFICIENCY>>**

# Conventional thinking may be costing you and your clients.

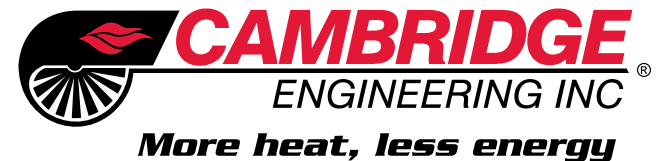


As an engineer, we understand you like being on the leading edge of any technological advancements. You want a heating system that delivers a consistently comfortable environment for the people who will be using the facility without unnecessarily over consuming energy.

**So do we!**



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But, it comes down to one fundamental question...

## How can a direct fired HTHV system be more energy efficient than unit heaters?

# THE ANSWER IS AS EASY AS:

**1** CONSUME LESS GAS

Direct fired has proven to show at least a 20% reduction in natural gas consumption compared to indirect when normalized for HDDs.

**2** IMPROVE VENTILATION RATE

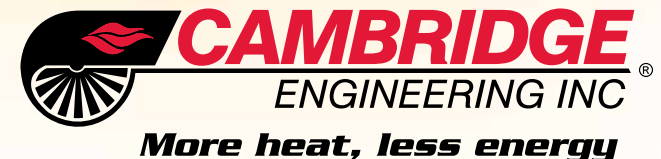
Continuous supply of 100% outside air eliminates need for an additional ventilation system. Direct fired HTHV also provides a higher discharge temperature and temperature rise which reduces the airflow required to deliver heat to the space.

**3** MINIMIZE TEMPERATURE STRATIFICATION

High velocity airflow minimizes temperature stratification negating the need to install large fans which, in turn, also reduces the consumption of electricity.



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# Direct fired HTHV delivers 92% efficiency vs. an 80% rating.

## Simply burn less gas.

High-efficiency gas heaters reduce natural gas consumption while maintaining heating performance by increasing the natural gas combustion efficiency, reducing off-cycle heating losses, and/or transferring the latent heat of flue gases to the building space.

By using strategies such as intermittent ignition devices, separated combustion, power venting, condensing heat exchangers, or direct-fired combustion, high-efficiency gas heaters offer increased steady-state thermal efficiency over conventional unit heaters.



D.O.E. TESTED



U.S. DEPARTMENT OF ENERGY

Langendorf Supply Co., a leading distributor and supplier of HVAC equipment throughout the Midwest, wanted to reduce the operating costs and improve occupant comfort in their warehouse area. In collaboration with the DOE the company identified upgrading their gas unit heaters to high efficiency units as a potential solution. Langendorf's warehouse included several aisles of shelving racks that extended to the approximately 24 ft. high ceilings, as well as six loading docks across 42,000 sq.ft.

[CLICK HERE FOR FULL D.O.E. REPORT](#)

D.O.E. TEST RESULTS

**20%**

LESS GAS (therms)

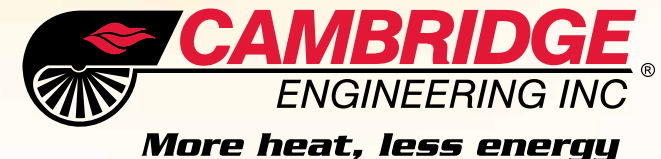


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	HDD (Base 60 F)	Utility Meter Values (Therms)	Modeled RTU Consumption (Therms)	Adjusted Utility Meter Values (Therms)	Consumption per HDD (Therms/HDD)
<b>Existing Heaters</b> (October & December)	965	2,338	311	2,027	2.10
<b>New Heaters</b> (November & February/March)	1,501	3,005	497	2,508	1.67
<b>(Department of Energy Results) % Net Savings ▶</b>					<b>20%</b>



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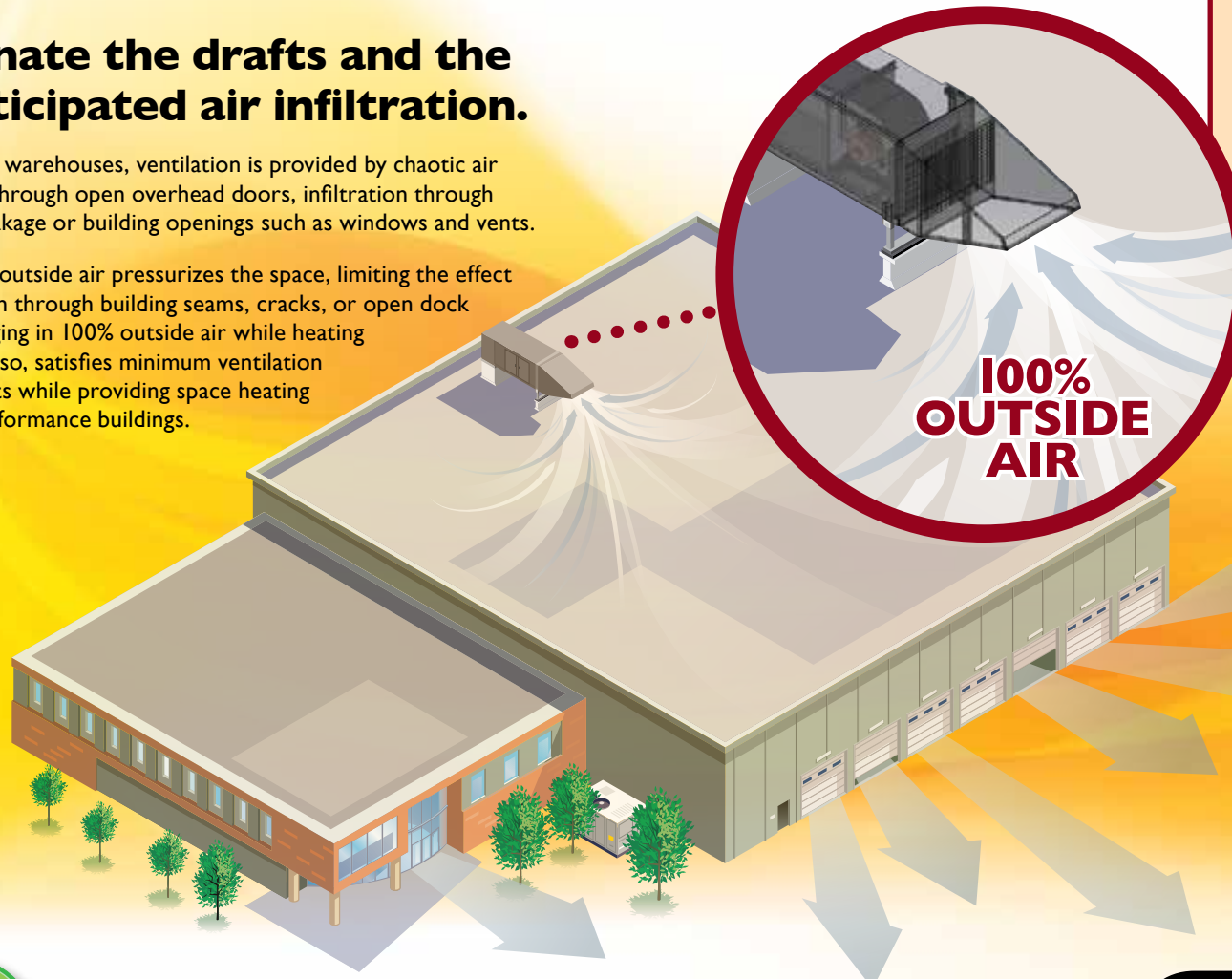


# Controlling the airflow creates more energy efficiency.

## Eliminate the drafts and the unanticipated air infiltration.

Typically for warehouses, ventilation is provided by chaotic air movement through open overhead doors, infiltration through envelope leakage or building openings such as windows and vents.

Using 100% outside air pressurizes the space, limiting the effect of infiltration through building seams, cracks, or open dock doors. Bringing in 100% outside air while heating the space, also, satisfies minimum ventilation requirements while providing space heating for high-performance buildings.




**HTHV VENTILATION RATE:**  
ASHRAE Standard 62.1 requires a continuous supply of ventilation air at the minimum rate of 0.06 cfm/ft<sup>2</sup> for warehouse applications during periods of occupancy. This is a prerequisite for all LEED projects and is also required by many local codes.

HELPS EXCEED  
ASHRAE  
**62.1**  
REQUIREMENTS



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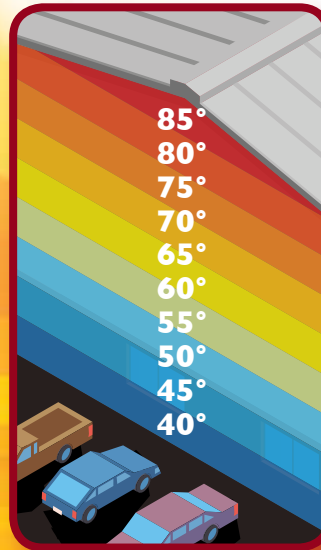
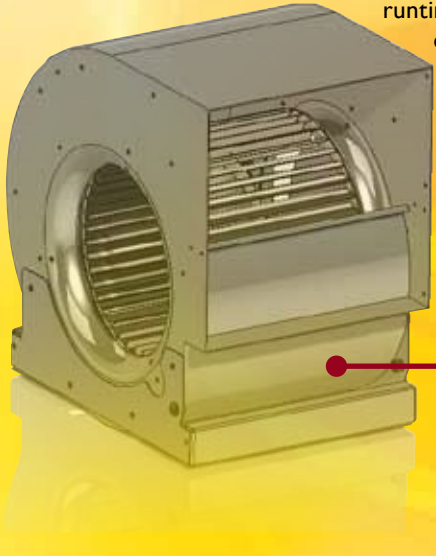
 **CAMBRIDGE**  
ENGINEERING INC.  
*More heat, less energy*

# Destratification is the key.

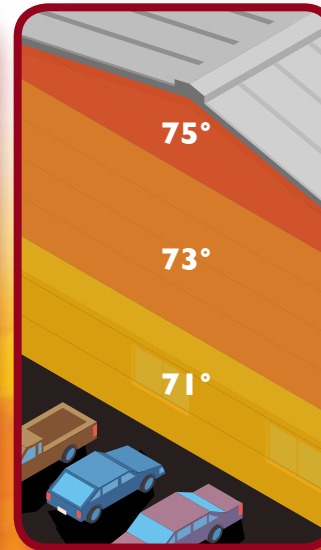
Warehouses typically have high open ceilings where significant differences in air temperature can occur between floor level and the ceiling due to lack of adequate air movement.

## High levels of stratification waste energy.

Because heated air naturally rises to the ceiling, conventional technologies create a temperature gradient in high-bay buildings. When this occurs, the occupied areas near the floor take longer to reach their designated temperatures, increasing equipment runtime and energy consumption. High-pressure blower fans found in HTHV direct-fired technologies more readily circulate the heated air to the floor, reducing the temperature gradient between floor and ceiling.



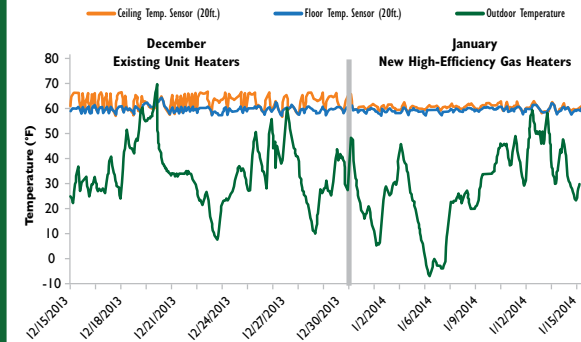
**UNIT HEATER STRATIFICATION**



**DIRECT FIRED HTHV STRATIFICATION**

D.O.E. TESTED

### Example of Thermal Stratification Central Temperature Sensors – High and Low



U.S. DEPARTMENT OF  
**ENERGY**

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**High Velocity Blower = Destratification = Less Energy Consumption**



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ENGINEERING INC®  
*More heat, less energy*

# Delivering energy efficient and sustainable solutions.

Cambridge Engineering has been manufacturing commercial and industrial heating equipment for over 50 years now. Our commitment to energy efficiency and innovation are the guiding principles for everything that we manufacture. With over 400 energy impact building studies conducted by the U.S. Department of Energy and other independent energy auditors, our direct fired HTHV solution continues to exceed efficiency performance industry standards...**something of which we are very proud.**

ASHRAE  
**62.1**

ANSI  
**Z83.4**

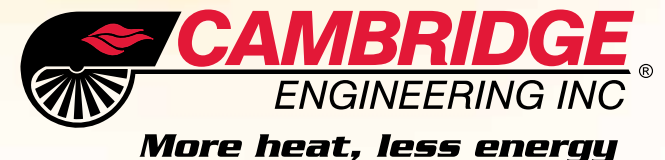
**IAQ**  
LEADER

**CSA**  
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**USGBC**



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