

Electric Duct Heaters



Introduction

- What we will cover today
 - Greenheck's competitive advantages
 - Greenheck's value adders
 - Controls/physical features
 - Performance
 - Temp rise/min. velocity/pressure drop
 - Installation
 - Selection
 - Competitors
 - Summary

Greenheck's Duct Heater Advantages

- Quick lead times
 - Standard = 3 weeks
 - 3, 5, 10 day quick build programs
 - Next day (case by case)
- 99% on time shipping
- Competitive pricing
- Easy & fast selection process
 - CAPS



Duct Heater Models

IDHB

Voltages: **120/1 – 480/3**

Capacity: **0.5 – 39.9kW**

Dimensions: **8"x 8" – 36"x 36"**

Controls options: **Up to 3 stages**

IDHC

120/1 – 575/3

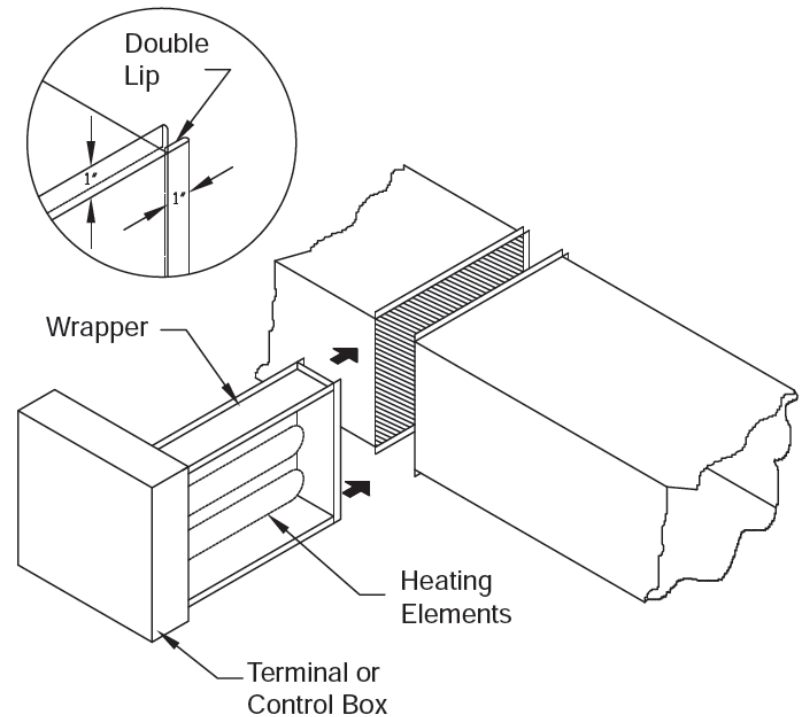
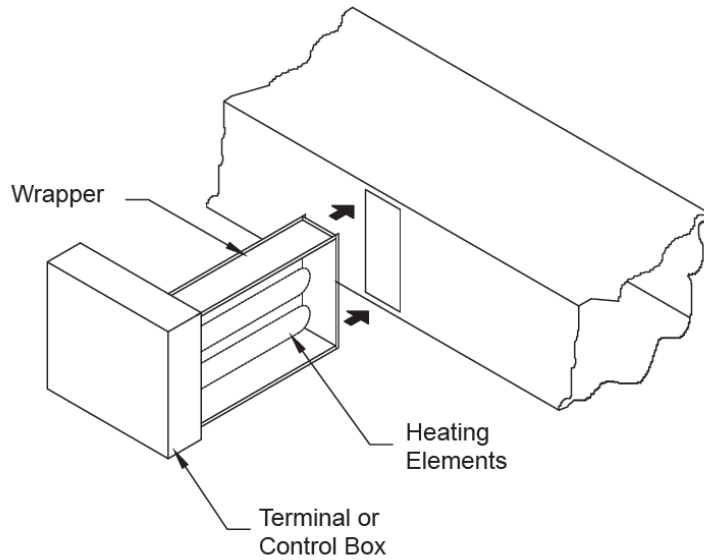
0.5 – 500kW

8"x 8" – 120"x 144"

- **Up to 4 stages**
- **Pure SCR control**
- **Vernier SCR (large kW)**
- **Duct thermostat**

Mounting Style

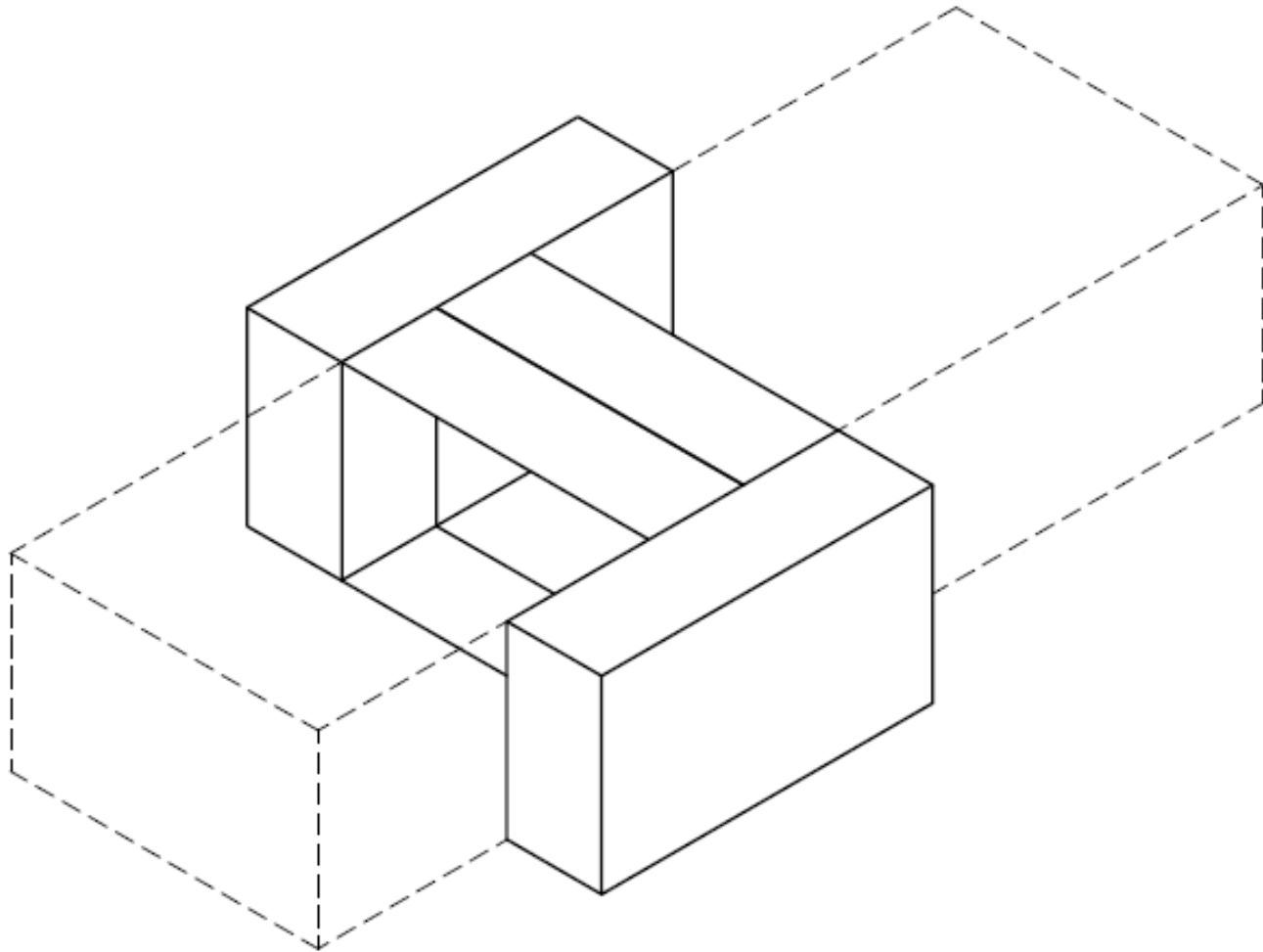
- Slip in
- Flanged



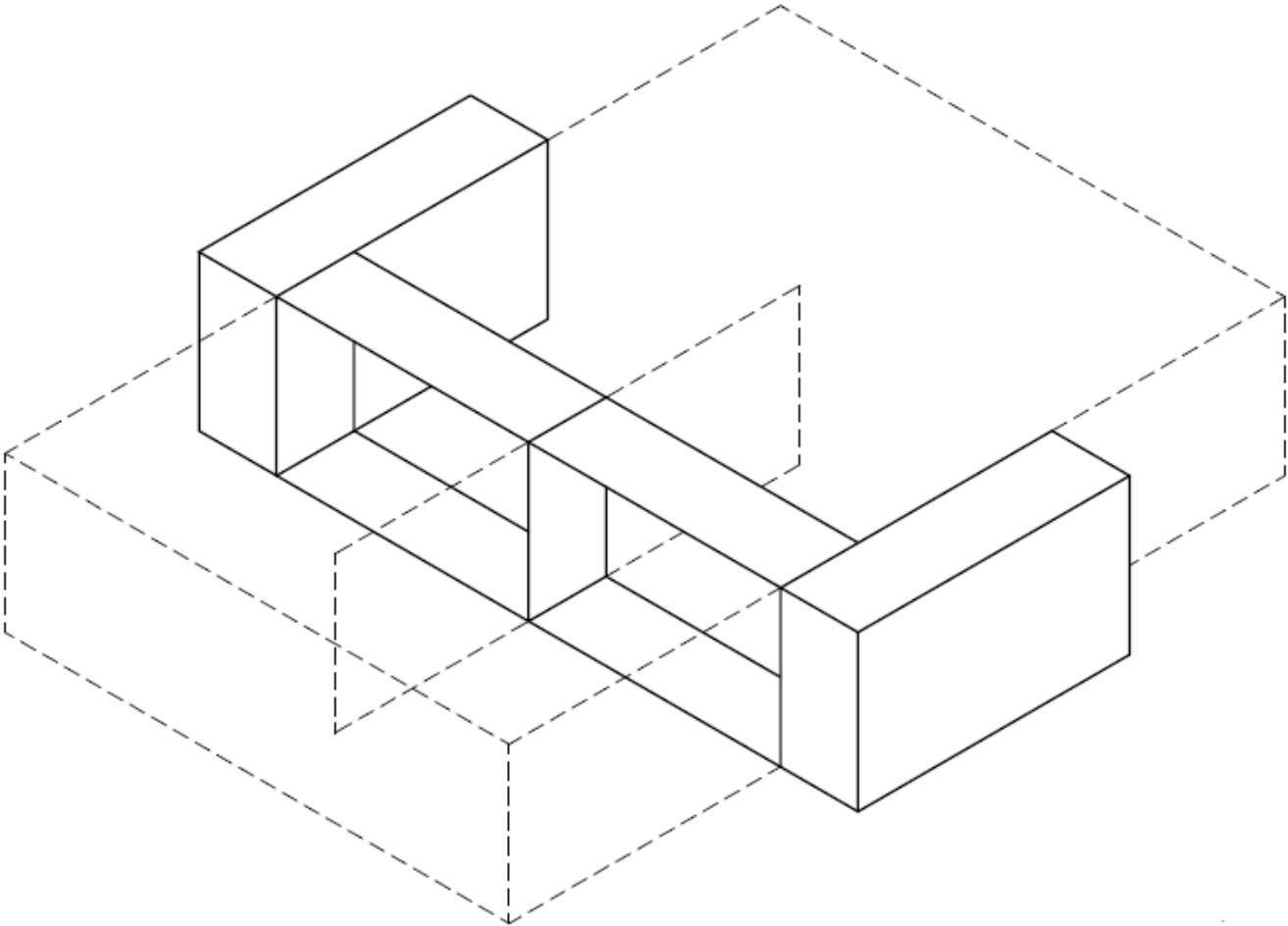
Selecting a Heater

- What you need to know when selecting a heater
 - Dimensions
 - Airflow direction
 - Voltage & phase of the power source
 - Note: heaters selected for one power type will not work with a different power type and cannot be modified in the field.
 - Kilowatt capacity
 - Mounting style
 - Accessories

Improper Installation With Two Heaters

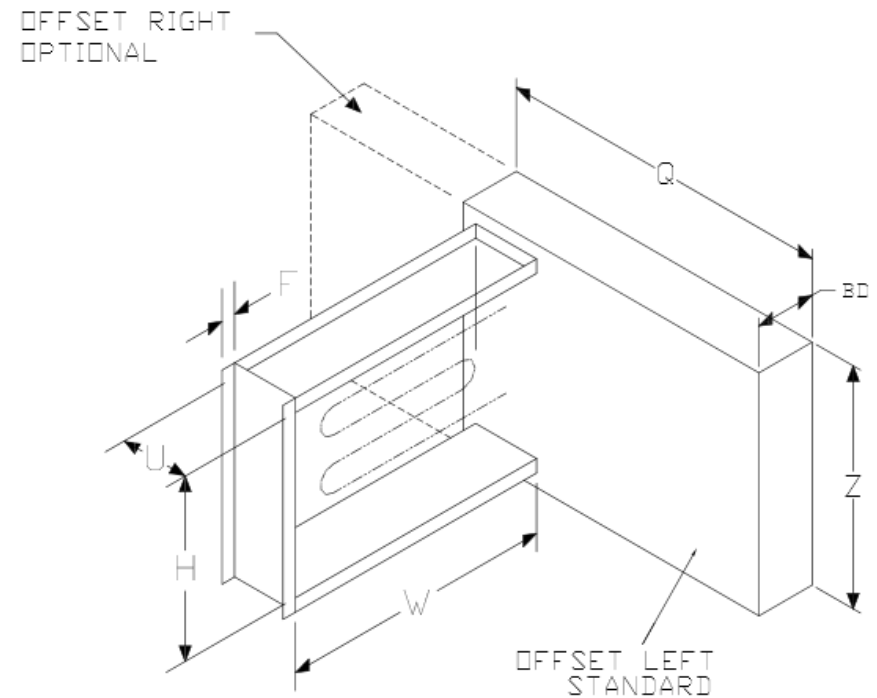


Proper Installation With Two Heaters



Selection

- Airflow direction
 - Horizontal
 - Vertical up
 - Vertical Down -Future
- Control box offset
 - Left
 - Right



Selection

DUCT HEATERS - Mark 1

Model Best Available

Model	Sizes / Quantities	Accessories	Drawings	SDRs / Notes	
Airflow Direction	<input type="text" value="Horizontal"/>	Element Wire	<input type="text" value="Standard"/>	Recess (in.)	<input type="text" value="None"/>
Control Box Offset	<input type="text" value="Left"/>	Heater Control	<input type="text" value="Stage"/>	Flush Mount	<input type="text" value="No"/>
Control Voltage	<input type="text" value="24 VAC"/>	Heater Type	<input type="text" value="Slip In"/>	Stainless Hardware	<input type="text" value="No"/>
Deration (kW)	<input type="text" value="None"/>	Heater Volt./Phase	<input type="text" value="230/3"/>	Power Fusing	<input type="text" value="No Preference"/>

- Control voltage – 24 VAC or 120 VAC.
- Deration – derated coils aid in longer element life
- Element wire – standard or 80/20
- Heater control – Stage, SCR or Vernier SCR
- Heater type – slip in or flanged
- Heater volt/phase – main power source

Selection

DUCT HEATERS - Mark 1

Model Best Available

Model | Sizes / Quantities | Accessories | Drawings | SDRs / Notes

Airflow Direction	<input type="text" value="Horizontal"/>	Element Wire	<input type="text" value="Standard"/>	Recess (in.)	<input type="text" value="None"/>
Control Box Offset	<input type="text" value="Left"/>	Heater Control	<input type="text" value="Stage"/>	Flush Mount	<input type="text" value="No"/>
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Deration (kW)	<input type="text" value="None"/>	Heater Volt./Phase	<input type="text" value="230/3"/>	Power Fusing	<input type="text" value="No Preference"/>

- Recess – insulated duct application
- Flush mount
- Stainless Hardware
- Power fusing
 - Less than 48 amps
 - Over 48 amps

Selection

DUCT HEATERS - Mark 1

Model Best Available

Model Sizes / Quantities Accessories Drawings SDRs / Notes

Airflow Switch	<input type="text" value="Non-Adjustable"/>	Thermostat	<input type="text" value="None"/>	Pilot Light	<input type="text" value="None"/>
Control Transformer	<input type="text" value="Unfused"/>	Fan Interlock	<input type="text" value="No"/>	Time Delay Relay	<input type="text" value="None"/>
Contactor	<input type="text" value="Magnetic"/>	Vapor Barrier	<input type="text" value="No"/>		
Disconnect Switch	<input type="text" value="No"/>	Dust Tight Box	<input type="text" value="No"/>		

- Airflow Switch
- Control Transformer
- Contactor
- Disconnect Switch
 - required
- Thermostat
 - Room stat or duct stat

Selection

DUCT HEATERS - Mark 1

Model Best Available

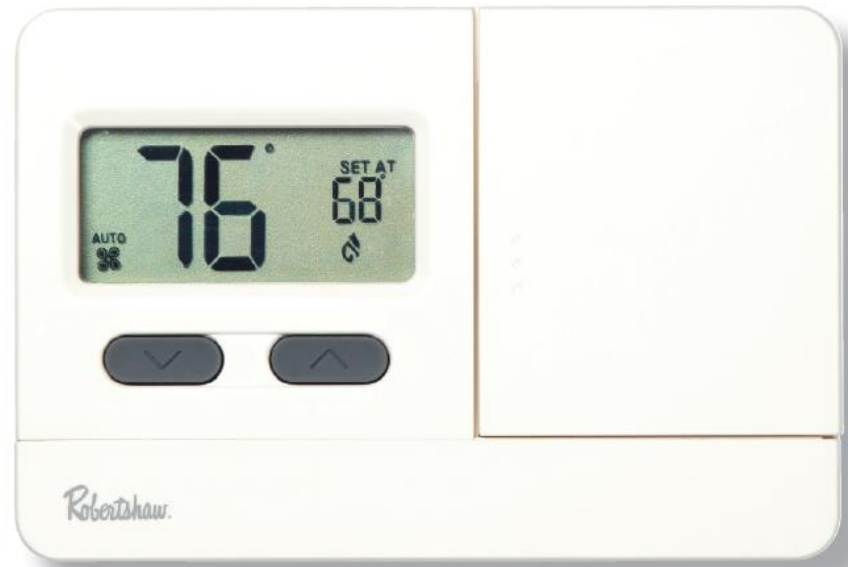
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Contactors	<input type="text" value="Magnetic"/>	Vapor Barrier	<input type="text" value="No"/>		
Disconnect Switch	<input type="text" value="No"/>	Dust Tight Box	<input type="text" value="No"/>		

- Fan Interlock – Like an end switch on a damper ensure airflow before the heater is turned on
- Vapor Barrier – Keeps condensation away from controls
- Dust Tight Box – Silicone caulk applied to all joints
- Pilot Light – Indicates heater conditions example, heater is energized
- Time Delay Relay – Provide time delay of 30 to 60 seconds

Heater Control

- Stage Control
 - Up to 4 stages



Heater Control

- SCR Control – linear proportional capacity control
- Vernier SCR – provides Vernier heat control
 - Required on units with an amperage greater than 135 amps



All heaters have a built in automatic sensor that trips at 140 degrees and resets at 110 degrees, the back up manual sensor trips at 160 degrees

Controls

- Most used accessories are the airflow switch, disconnect switch and control transformer
- Thermostat – Room stat or Duct stat
 - Thermostats ship loose
 - Duct stats are only available with SCR control
 - Typically used in dehumidification reheat and outdoor air applications
 - Should be mounted at least 4 feet downstream of heater
 - Room stats are available with every control type



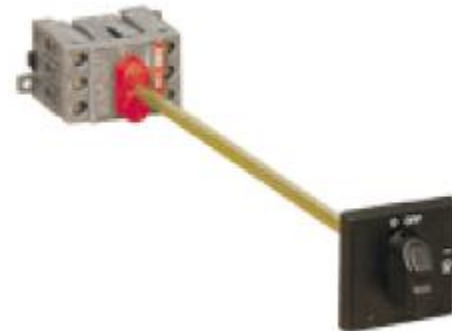
Controls

- Airflow switch
 - Ensures a pressure difference between the interior and exterior of the duct prior to allowing the heater to operate
 - Adjustable – 0.05”- 12.0” WC set point range
 - Non-adjustable – 0.05” WC fixed set point



Controls

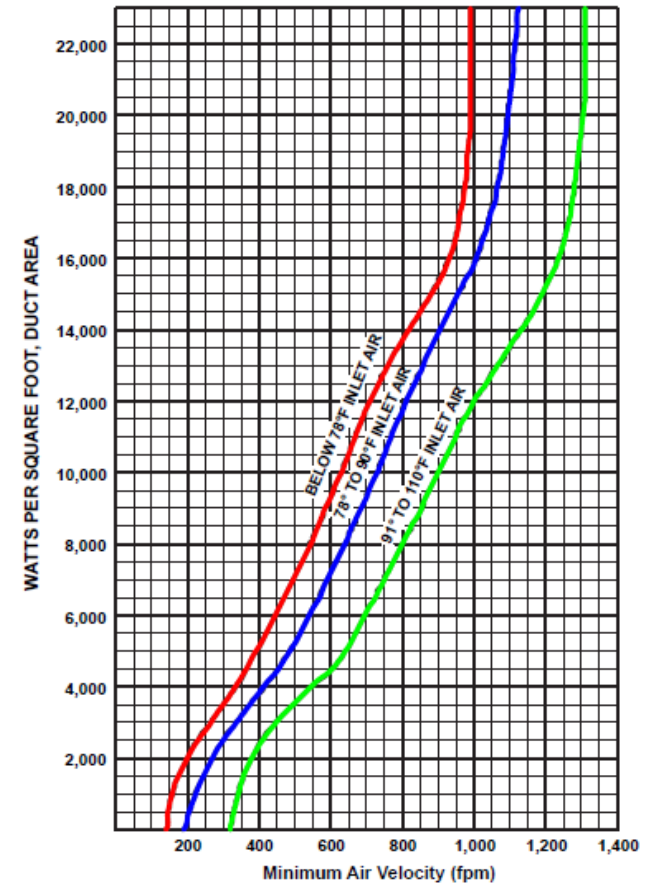
- Control Transformer
 - Fused – transformer is protected from damage in the event of an electrical short
 - Unfused – could be damaged/destroyed from an electrical short
- Disconnect switch
 - Door interlocking type



Minimum Airflow

- All heaters require a minimum airflow velocity to ensure longevity of heating elements
- Equivalent face velocity is primary concern
- Minimum airflow requirements are dependent on the dimensions and capacity of the heater
- Watt Density = Watts per square foot
 - Total watts divided by the square footage of the heater.

Minimum Air Velocities



Temperature Rise

- Temperature rise = Delta T = ΔT
- LAT (leaving air temperature) minus EAT (entering air temperature) = TEMP RISE

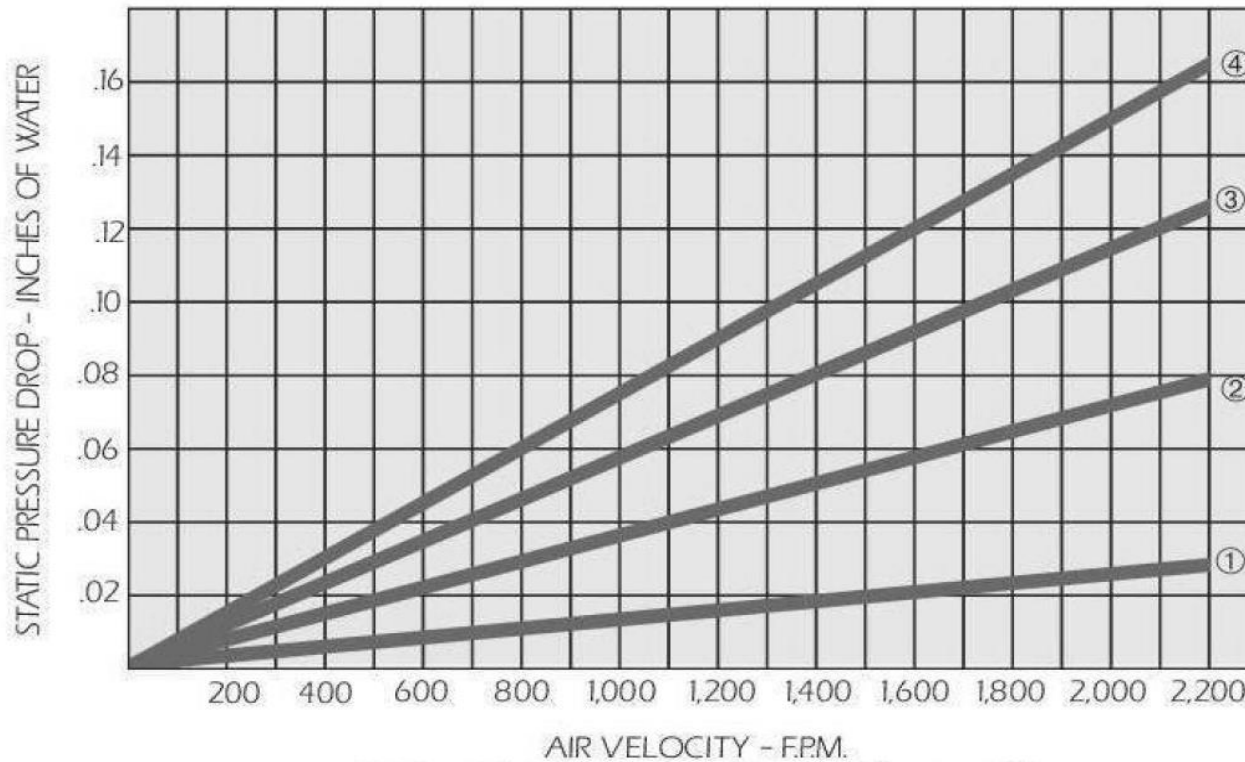
$$kW = \frac{CFM \times 1.08 \times \Delta T}{3414}$$

- Example: determine KW needed to raise the temperature of 2500CFM by 18F

$$KW = \frac{CFM \times 1.08 \times \Delta T}{3414} = \frac{2500 \times 1.08 \times 18}{3414} = 14.25kW$$

Pressure Drop

PRESSURE DROP THROUGH HEATER



1, 2, 3 and 4 - the number of rows of heater coils
When the number of rows of heater coils is unknown, assume 4

Greenheck Value Adders

- All duct heaters are listed to UL standard 1996
- All duct heaters will be supplied with their own wiring diagram which will be located in the control box
- 18 ga control cabinet with piano hinged swing-out cover
- Bi-directional airflow
- The standard casing material is G90 galvanized
- All heaters carry a zero clearance rating. If you have a heater in a duct in an attic or under a floor the wood framing can be right against the ductwork where the heater is located with no danger of catching fire
- In general, the maximum temperature rise you will see with Greenheck duct heaters will be 70 degrees. The absolute maximum will be 120 degrees, which is rare.

Competitors

- Greenheck duct heaters are comparable to the duct heaters supplied by the following manufacturers:
 - Indeeco
 - Brasch
 - Dell Heatrix
 - Markel
 - Neptronics
 - Thermolec
 - Warren

Common Questions

- Q: Can the heater be operated at a voltage other than what is shown on the nameplate label?
 - A: No, the heater is designed to operate at the listed voltage.
- Q: Can the heaters be modified in the field?
 - A: In general no. Heaters should not be modified in the field as this can violate the UL label and cause an unsafe condition.
- Q: Customer is having trouble getting the heater to turn on in the field, what could be the most likely problem?
 - A: Usually the problem is the heater isn't seeing airflow or not seeing enough airflow. They should check how much airflow is going through the heater and relate that with the minimum requirements found on the submittal.
- Q: Are there any options for round duct heaters or round transitions on duct heaters?
 - A: There are no round duct heaters or heaters with round transitions available and we don't recommending adding transitions in the field as this could create hot spots.

Summary

- Full standard product offering
- Heaters are bi-directional with airflow in either direction when mounted vertically with horizontal airflow
- Install heaters a minimum of (4) feet from heat pumps, air conditioners, air handlers, air filters and humidifiers
- The IDHC and IDHB are the only models
- Heaters are used for space heating, secondary heating, reheat or primary heating applications
- Like dampers, heaters require little to no maintenance.
- Never operate a heater without airflow

Thank you for your time.

Questions?



The mission of Greenheck is to be the market leader in the development, manufacture and worldwide sales of quality air moving, control and conditioning equipment with a total commitment to customer service.

