

THERMOLEC ELECTRIC DUCT HEATERS

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Expert Service. Quality Products. Since 1960.

THERMOLEC ELECTRIC DUCT HEATERS

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THERMO-AIR AND THERMO-ZONE FRESH AIR HEATERS

Equipped with the most advanced **Electronic Modulating Controller and Air Flow Sensor** (*patent pending*)

- Just one electrical connection and the unit is ready to perform
- Adjustable duct sensor 0°C to 42°C included

Fresh Air Heater for 6" and 8" Ducts

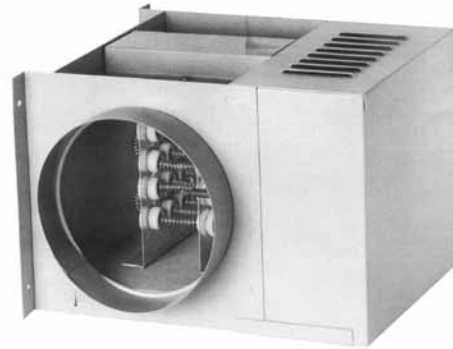
Today's airtight homes and offices beg for fresh air. When we trap the heat, excess humidity and indoor pollutants such as cleaning products, smoking and pets, will negatively affect the quality of the air we breathe, making our environment both uncomfortable and unhealthy.

Stale and humid air has to be replaced by fresh air. During winter, the incoming fresh air is at too low a temperature to be comfortable and requires preheating. It is more economical to preheat the incoming air at a specific **controlled** source than requiring the central system to continually compensate for heat loss.

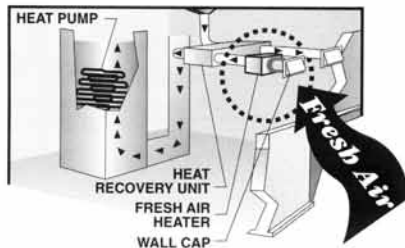
The **THERMO-AIR** heater is designed to complement your heating system by preheating this fresh air at the lowest cost, thus continuously providing **comfortable** ventilation throughout the house.

Equipped with the most advanced **modulating controller** and **air sensor**, the **THERMO-AIR** heater will operate with extremely low air flow (*see specifications*). The unit uses the minimum amount of energy required to meet your needs. The air flow sensor detects the amount of air flowing through the unit and modulates the heating capacity accordingly, maximizing savings.

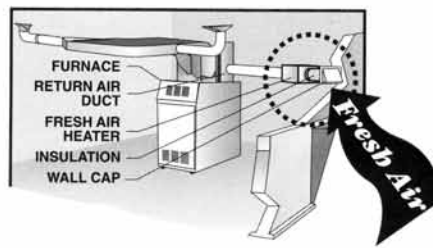
The **THERMO-AIR** heater is a quality product engineered to peak performance and long life.



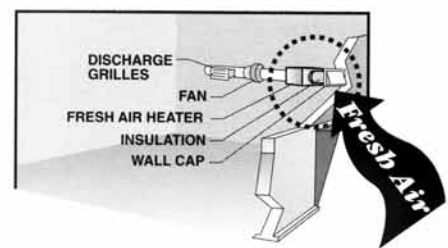
TYPICAL APPLICATIONS



Heat Recovery Ventilation and Heat Pump



Central Air Furnace



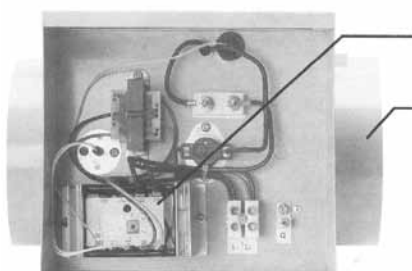
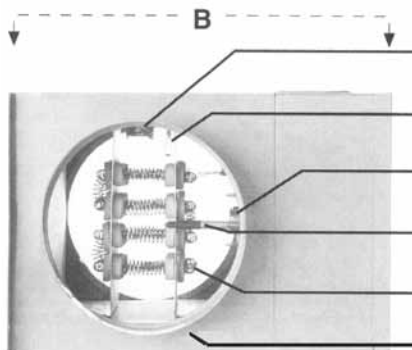
Hydronic or Baseboard Heating

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THERMO-AIR AND THERMO-ZONE FRESH AIR HEATERS (cont'd)

FEATURES AND SPECIFICATIONS



Automatic Reset Thermal Cut-out — Safety feature preventing overheating; will reset automatically after cool-off.

Air Flow Sensor — Modulates the heating capacity according to the quantity of air flowing through the heater.

Manual Reset Thermal Cut-out — Additional safety feature which prevents the frame from overheating.

Temperature Sensor — Controls the heater proportionally to maintain the pre-set air temperature in the duct.

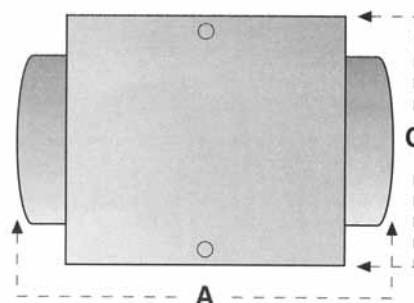
Open Coil Elements — Made of the highest grade nickel-chrome resistance wire, they will not age or oxidize, thus assuring longer heater life.

Enclosure — Corrosion resistant galvanized steel.

Built-in Electronic Temperature Controller and Sensor

— Proportionally modulates the heating load to match the exact capacity required, thus minimizing operating cost.

Round Collars — Simplifies the installation and considerably reduces field labour.



DIAMETER (")	A (")	B (")	C (")
6	12.50	11.50	8.50
8	12.50	13.75	10.25

MODEL	COLLAR SIZE (")	KW	VOLTAGE	AMPS	MIN CFM
TER-6-1120	6	1	120/1	8.3	10
TER-6-1240	6	1	240/1	4.2	10
TER-6-2120	6	2	120/1	16.7	20
TER-6-2240	6	2	240/1	8.3	20
TER-8-3240	8	3	240/1	12.5	30
TER-8-4240	8	4	240/1	16.7	40
TER-8-5240	8	5	240/1	20.8	40
TER-8-6240	8	6	240/1	25.0	40

Specifications are for standard units.

For other sizes, voltages and capacities, please contact your local ECCO Supply Sales Branch.

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THERMO-AIR AND THERMO-ZONE FRESH AIR HEATERS (cont'd)

ELECTRIC FRESH AIR HEATERS

;F7? #	MODEL	COLLAR (")	KW	VOLT	AMPS
801250	TER-6-1120	6	1	120/1	8.3
801252	TER-6-1208	6	1	208/1	4.8
801254	TER-6-1240	6	1	240/1	4.2
801256	TER-6-2120	6	2	120/1	16.7
801258	TER-6-2208	6	2	208/1	9.6
801260	TER-6-2240	6	2	240/1	8.3
801262	TER-8-3208	8	3	208/1	14.4
801264	TER-8-3240	8	3	240/1	12.5
801266	TER-8-4208	8	4	208/1	19.2
801268	TER-8-4240	8	4	240/1	16.7
801270	TER-8-5208	8	5	208/1	24.0
801272	TER-8-5240	8	5	240/1	20.8
801274	TER-8-6240	8	6	240/1	25.0



TER

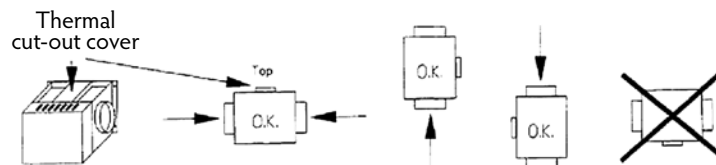
NOTE: 10" and 12" Collar Available — P.O.A. Contact your local ECCO Supply Sales Branch for more information.

INSTALLATION INSTRUCTIONS

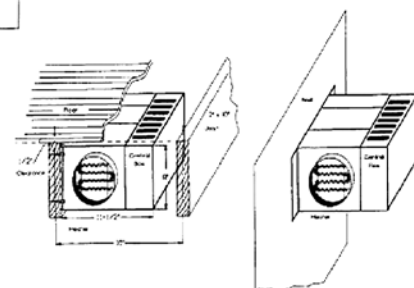
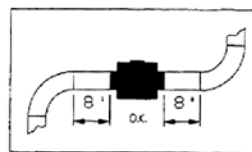
Mechanical Installation

Please read instructions carefully before installation.

- 1) The air direction may be either vertical or horizontal, but when the unit is installed horizontally, the cut-out cover must be on top.



- 2) Do not install elbows closer than 8" to the inlet or the outlet of the unit.
- 3) The electronic controller shuts down the heater when there is no air flow. The minimum amount of air required (in cubic feet per minute) to operate the unit is given in the last column of the table on next page (CFM).
- 4) Attach the unit to a suitable support. The 6" model is small enough to be located between standard 16" spaced floor joists. Always allow a minimum 1/2" clearance above the heater.



(cont'd on next page)

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THERMO-AIR AND THERMO-ZONE FRESH AIR HEATERS (cont'd)

INSTALLATION INSTRUCTIONS (cont'd)

Electrical Installation

Please conform to all local and national electrical codes for wiring. The heater should be supplied by a separate cable, of appropriate gauge, and with appropriate protection.

Please refer to the following table:

FRESH AIR AND ZONE HEATERS RECOMMENDED WIRE GAUGE AND PROTECTION								
THERMO-AIR MODEL	THERMO-ZONE MODEL	COLLAR DIA (")	KW	VOLTS	AMPS	WIRE GAUGE	FUSES	MIN AIR FLOW CFM
TER-6-1120	ZON-6-1120	6	1	120/1	8.3	14	15	10
TER-6-1208	ZON-6-1208	6	1	208/1	4.8	14	15	10
TER-6-1240	ZON-6-1240	6	1	240/1	4.2	14	15	10
TER-6-2120	ZON-6-2120	6	2	120/1	16.7	12	20	20
TER-6-2208	ZON-6-2208	6	2	208/1	9.6	14	15	20
TER-6-2240	ZON-6-2240	6	2	240/1	8.3	14	15	20
TER-8-3208	ZON-8-3208	8	3	208/1	14.4	12	20	30
TER-8-3240	ZON-8-3240	8	3	240/1	12.5	14	15	30
TER-8-4208	ZON-8-4208	8	4	208/1	19.2	10	30	40
TER-8-4240	ZON-8-4240	8	4	240/1	16.7	12	20	40
TER-8-5208	ZON-8-5208	8	5	208/1	24.0	10	30	50
TER-8-5240	ZON-8-5240	8	5	240/1	20.8	10	30	50
TER-8-6240	ZON-8-6240	8	6	240/1	25.0	10	30	60
To convert the air flow to litres/sec, multiply the value in CFM by 0.47								

Special Instructions for each type of unit:

Thermo-Air

When the unit is installed and connected, set the potentiometer on the controller to the desired temperature.

Please check the air direction carefully. The temperature sensor must be located on the air outlet side. When the unit is manufactured, this sensor is installed on the left side. It may have to be moved to the right if the air outlet is on the right. There are pre-punched holes on the right side to accommodate this change.

Thermo-Zone

When the unit is installed and connected, set the potentiometer on the controller to "R" (remote). Install the thermostat far from a heat source, on a wall where there is no air draft. Connect the two thermostat wires to the two "S S" marked terminals on the controller.

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FEATURES

Standard ●

Optional □

Mercury Contactors □

Used to power individual stages of heating. They allow a silent operation and are exceptionally reliable.

Disconnect Switch □

A built-in disconnect switch allows user to disconnect heaters individually in order to safely perform maintenance tasks.

Fuses □

Used to protect the total load or individual stages.

Transformer ●

Built-in control transformer supplies 24 volts to the control circuit.

Solid State Relay □

Electronic contactor used to silently and proportionally control the heater in response to a pulsed signal.

SCR Controller □

The SCR is a time proportioning type controller that modulates the heater and supplies the exact amount of power to match the heat demand. It is compatible with thermistor thermostat (RT or DT), 0-10 Vdc, 4-20 mA, 0-135 ohms input signals.

Automatic Reset Cut-Out ●

The automatic reset thermal cut-out is a fail-safe, fixed temperature, disc type safety device that opens the circuit when its set point is reached. It automatically resets and returns the heater to operating conditions.

Tubular Incoloy Element ●

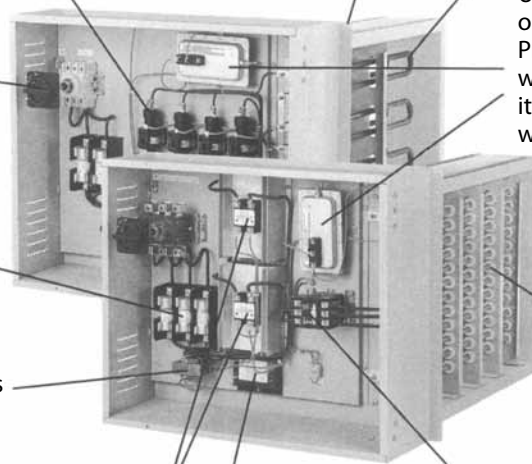
Airflow Switch ●

Used to prevent a heater from operating if there is no airflow. Provided with a pitot tube which, when installed into the duct, makes it sensitive to velocity pressure as well as to static pressure.

Highest Grade Open Coil ●

Magnetic Contactors ●

Used to power individual stages of heating or as back-up for safety switches.



All Thermolec Heaters are CSA and NRTL/C approved.

The "NRTL/C" indicator adjacent to the CSA Mark signifies that the product has been evaluated to the applicable ANSI/UL and CSA Standards, for use in the US and Canada. NRTL, i.e. Nationally Recognized Testing Laboratory, is a designation granted by the US Occupational Safety and Health Administration (OSHA) to laboratories which have been recognized to perform certification to US Standards.

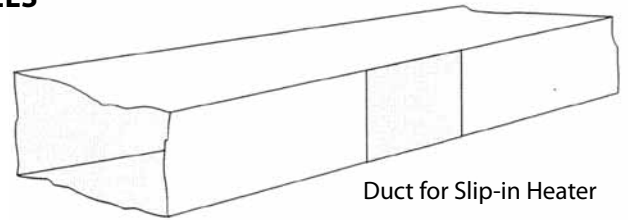
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THERMOLEC ELECTRIC DUCT HEATERS (cont'd)

SLIP-IN AND FLANGED TYPE DUCT HEATER MODELS

- SC Slip-In Open Coil (Fig. 1)
- ST Slip-in Tubular
- FC Flanged Open Coil
- FT Flanged Tubular (Fig. 2)
- RFC Round Collar Open Coil (Fig. 3)
- RFT Round Collar with Tubular Elements



Duct for Slip-in Heater

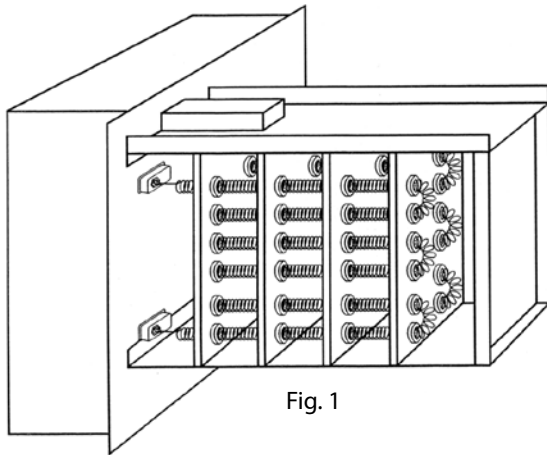
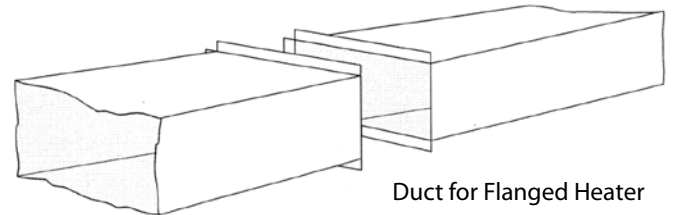


Fig. 1



Duct for Flanged Heater

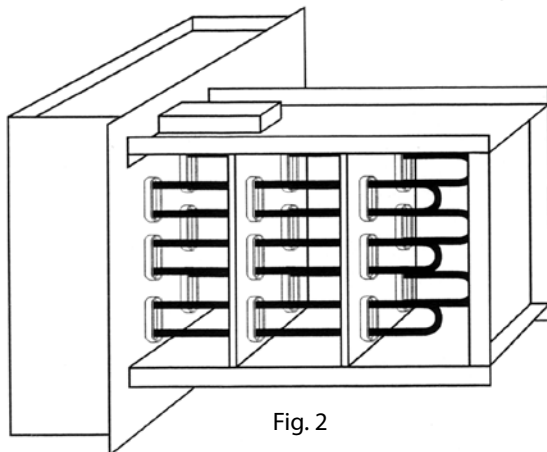


Fig. 2

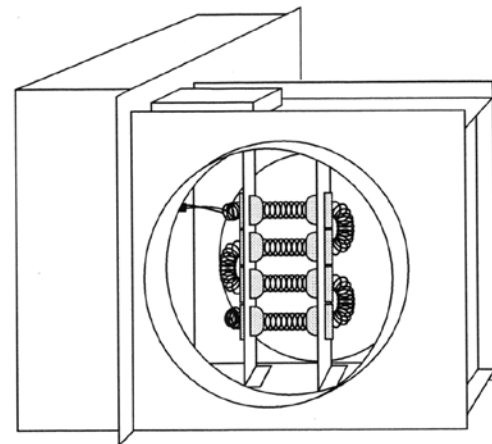


Fig. 3

NOTE: All Thermolec heaters are CSA and NRTL/C approved.

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THERMOLEC ELECTRIC DUCT HEATERS (cont'd)

HOW TO SELECT AND SPECIFY

Heater Capacity

Given CFM (volume of air in cubic feet per minute) and $\Delta^{\circ}\text{T}$ (temperature rise in $^{\circ}\text{F}$), the KW capacity can be determined from the formulas:

$$\text{KW}^{**} = \frac{\text{cfm} \times \text{Temperature Rise, } ^{\circ}\text{F}^{*}}{\text{CMF}}$$

$$\text{Temperature Rise, } ^{\circ}\text{F} = \frac{\text{KW} \times 3000}{\text{CMF}}$$

NOTE: The above formulas are for standard air. Consult your local ECCO Supply Sales Branch for non-standard air conditions.

*Maximum air temperature rise for which the heater is designed.

**This formula is for quick calculation and contains a loss allowance of 5%.

Air Flow Requirements and Minimum Velocity

When there is a choice in heater face dimensions the specification writer has several good reasons for favouring the smaller rather than the larger heater face area: the smaller sized, higher velocity electric coil will perform better, weigh less and cost less per KW than an otherwise identical larger coil.

The main selection criteria are KW per square foot of face area (or duct size) and Design Velocity.

KW PER SQUARE FOOT RANGE	COMMENTS	FACE VELOCITY IN FEET PER MINUTE (FPM)	COMMENTS
Less than 5	High cost per KW	Less than 400	Requires derating of watts density on elements. Specify proportional control.
5 to 12	Medium cost per KW	400 to 2000	Most economical range
12 to 20	Low cost per KW	Over 2000	Specify special coil supports
Over 20	Medium cost per KW		

Unlike hot water or steam coils, electric coils will generate 100% of the heating capacity (i.e. the heat output is constant as long as the heater is energized) regardless of the air flow. A drop in air flow through an electric coil below the minimum required FPM (feet per minute) will increase both the coil temperature and the exhausted air, which may result in high limit cut-outs tripping.

Another frequent cause of unnecessary cut-out tripping is the uneven distribution of air flow over the coil surface, resulting in "hot spots". In order to achieve trouble-free performance, provide adequate air flow as per "air flow requirement" chart (on page 391) and ensure even air flow distribution by following sound industry practice in design and installation of ductwork and equipment.

The Thermolec CSA NRTL/C listing is limited to 22.5 KW per square foot of duct area for open coil heaters and 13 KW per square foot of duct area for tubular element heaters.

Air Flow Requirements for ON-OFF Control

The minimum air flow required through a duct heater depends on the KW per square foot of face area for the highest capacity ON-OFF stage. In general 400 FPM is adequate in most applications.

Air Flow Requirement for full SCR Control

An SCR controlled heater may be considered as having an "infinite" number of control stages, and consequently the air flow requirements of the chart (on page 391) for minimum air flow does not apply. As a general rule, heaters equipped with FULL SCR will require an air velocity of at least 300 FPM. For lower design velocities please consult your local ECCO Sales Branch.

Exclusive Feature

The special Thermo-V unit for VAV applications allows the heater to perform down to 50 FPM.

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THERMOLEC ELECTRIC DUCT HEATERS (cont'd)

HOW TO SELECT AND SPECIFY (cont'd)

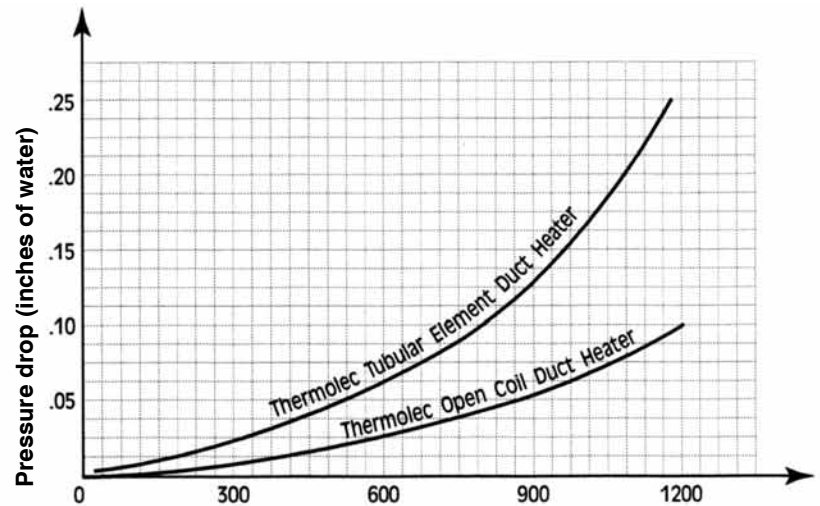
Open Coil vs Tubular Elements

Thermolec manufactures both open coil and tubular duct heaters.

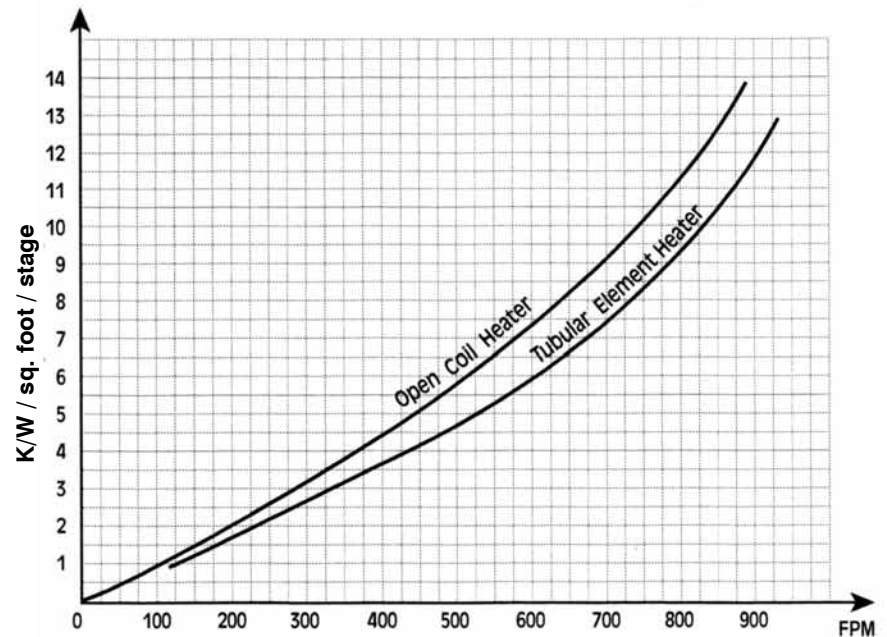
It is widely acknowledged that tubular elements find practical application under certain circumstances (service conditions include possible contact by personnel, presence of dust or particles in the air flows or atmospheric conditions).

But, where heating filtered air is the sole function, the open coil heater is superior for many reasons:

- Longer life
- More kilowatts per square foot
- Less stratification by equal distribution of the elements
- Lower wire surface temperature
- Less maintenance
- Greater serviceability
- Better heat distribution across heater face
- Less pressure drop
- Lighter weight
- Low shipping costs
- Less sensitivity to moisture
- More flexibility of size and capacity
- Cost effective
- Smaller size
- Large electrical clearance



Pressure Drop for Tubes



Minimum Air Velocity for Tubes

– E.&O.E. – All Prices F.O.B. Our Warehouse – Subject to Change Without Notice – All Taxes Extra – May not be Available at All Branches –

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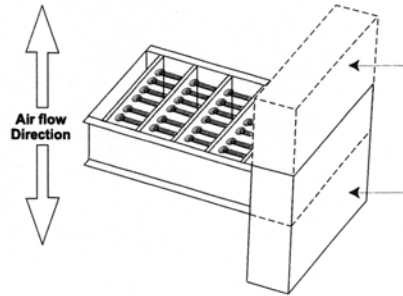
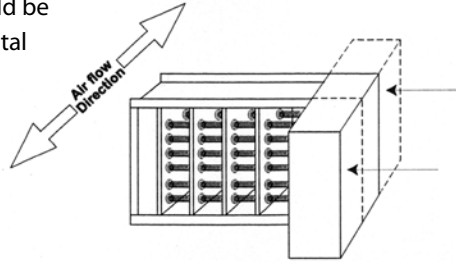
THERMOLEC ELECTRIC DUCT HEATERS (cont'd)

HOW TO SELECT AND SPECIFY (cont'd)

Universal Mounting of Thermolec Heaters

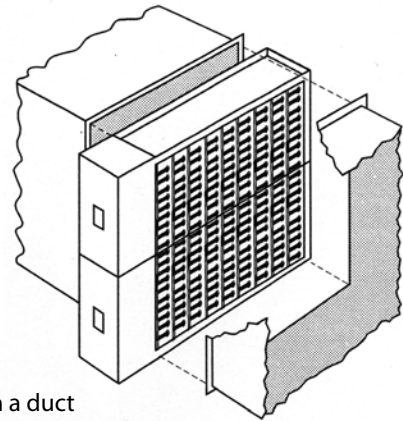
Unique Feature

By design, all Thermolec heaters are made non-sensitive to air flow direction. The built-in high limit thermal cut-outs are located in such a way that the air flow could be in any direction without impairing safety and the same heater could be installed in a horizontal or vertical duct.



Multiple Heaters in a Duct

Normally, electric heaters are not designed to be used in series in a heating installation. For very large heaters, manufacturing, shipping, field handling, and installation can be simplified by using two or more units specially designed for parallel installation. Each section has its own cut-outs and terminal blocks are provided to interconnect the controls in the field.

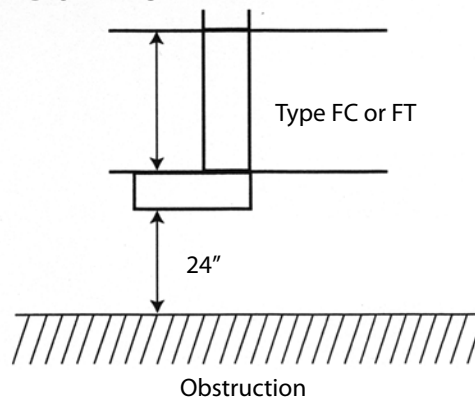
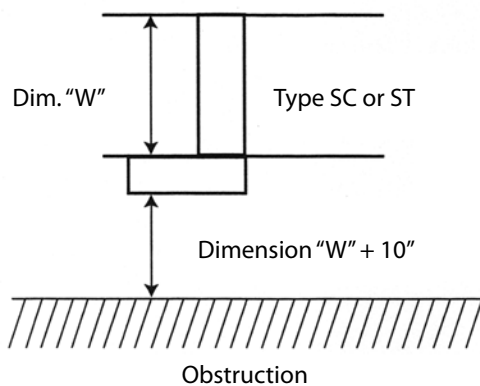


Two stacked sections in a duct

Clearance

Thermolec heaters are CSA and NRTL/C approved for zero clearance to combustible material. This means that there is no distance restrictions between the section of the duct housing, the heater, and combustible material. However, space should be provided to install and service the duct heater. Please see the minimum recommended installation clearances figures below.

MINIMUM RECOMMENDED DISTANCE FOR SAFETY AND SERVICE



Installation Clearances

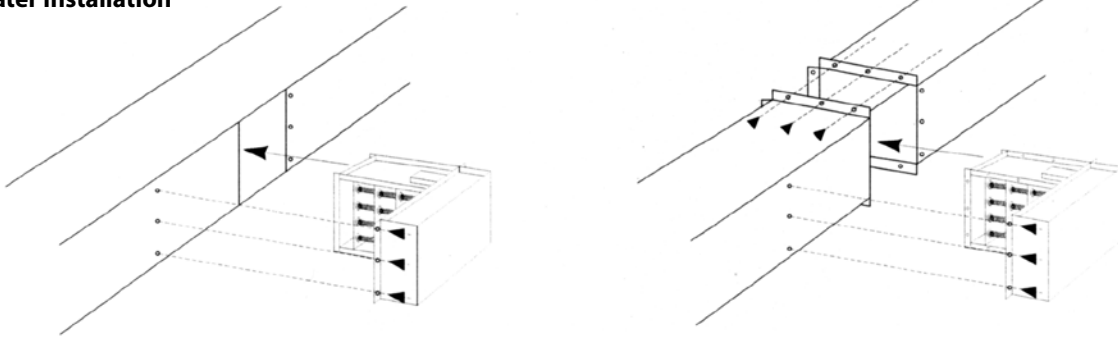
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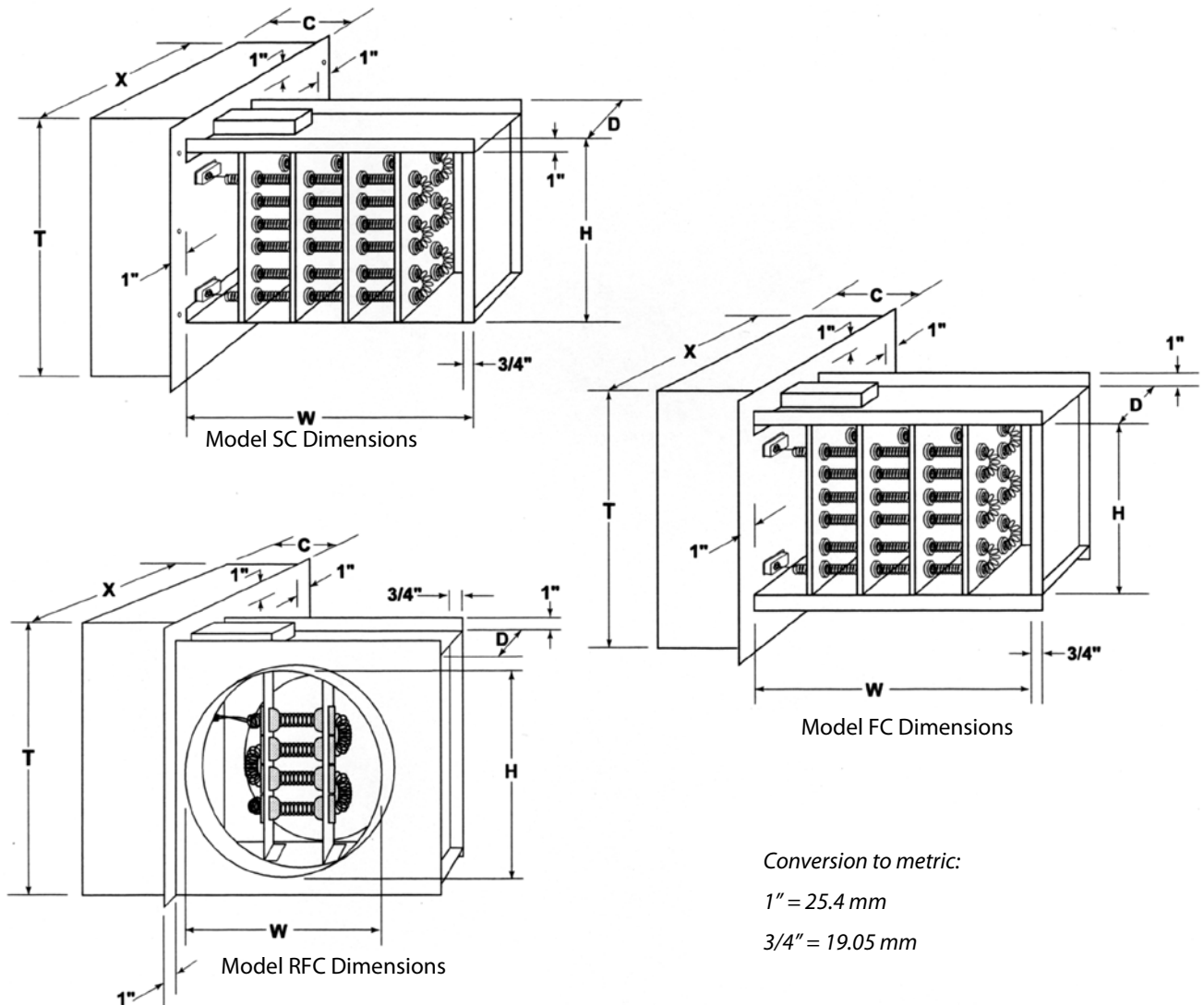
THERMOLEC ELECTRIC DUCT HEATERS (cont'd)

HOW TO SELECT AND SPECIFY (cont'd)

Heater Installation



Details of the Thermolec Mechanical Construction



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THERMOLEC ELECTRIC DUCT HEATERS (cont'd)

POWER AND VOLTAGE REQUIREMENTS

Nominal and Standard Supply Voltages

While a utility's voltage may be referred to by means of a nominal figure, actual applied voltage may vary over a fairly wide range depending on factors like the system's power distribution lines, and many others. For instance, a nominal voltage of 575V / 3PH / 60Hz may variously be called 550V, 575V or 600V depending more on what the specification writer is accustomed to calling it than on the actual voltage supplied to the heater. Designing a heater for 550V when in fact 600V is supplied to it will result in almost 10% more current and 20% more KW capacity since current is proportional to the voltage and KW is proportional to the square of the voltage. Conversely, application of a lower voltage results in a corresponding under-performance of the heater. It is therefore of the utmost importance to ensure that the correct voltage is specified.

For safety reasons, Thermolec standard supply voltages have been chosen to be the highest for each voltage range, as shown in the table below. Heaters designed for lower voltages in each range are available and will be supplied when a customer expressly specifies a lower supply voltage.

Standard Voltages

COMMON	110							318					440		550	
	Nominal	115				230		332					460		575	
	Voltages	120	280		220	240		277	347		380		416		480	
THERMOLEC																
Standard	120	208	208	220	240	240	277	347	380	380	416	416	480	480	600	600
Voltages	1 ph	1 ph	3 ph	1 ph	1 ph	3 ph	1 ph	1 ph	1 ph	3 ph	1 ph	3 ph	1 ph	3 ph	1 ph	3 ph

Selection Code

The selection code describes the duct heater completely, including all features and options.

For example:

Features

- 6 KW capacity
- 2 stages
- 208/1/60 voltage
- Dimensions: 30" x 8" (W x H)

Options

- Flanged frame
- Pressure differential switch
- Toggle-type disconnect switch
- Protective screens on both sides
- Vertical Air flow

sc	-	6	-	30	x	8	-	208	/	1	-	2	-	F	T	9	3	V
<input type="text"/>	-	<input type="text"/>	-	<input type="text"/>	x	<input type="text"/>	-	<input type="text"/>	/	<input type="text"/>	-	<input type="text"/>	-	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
WEIGHT XPRESS DUCT HEATER		CAPACITY (KW)		WIDTH (inches)		HEIGHT (inches)		VOLTAGE		NUMBER OF PHASES		NUMBER OF STAGES		FLANGED FLAME	TOGGLE-TYPE DISC. SWITCH	PRESSURE SWITCH	PROTECTIVE SCREENS (2)	VERTICAL AIR FLOW

Standard Built-In Controls

All duct heaters shall be complete with the following built-in controls:

- High limit cut-outs, magnetic contactors as required, control transformer and air flow sensor as standard components.

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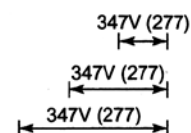
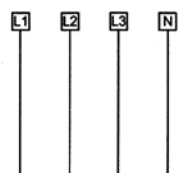
THERMOLEC ELECTRIC DUCT HEATERS (cont'd)

POWER AND VOLTAGE REQUIREMENTS (cont'd)

347 (277) V. Single Phase Power Supply

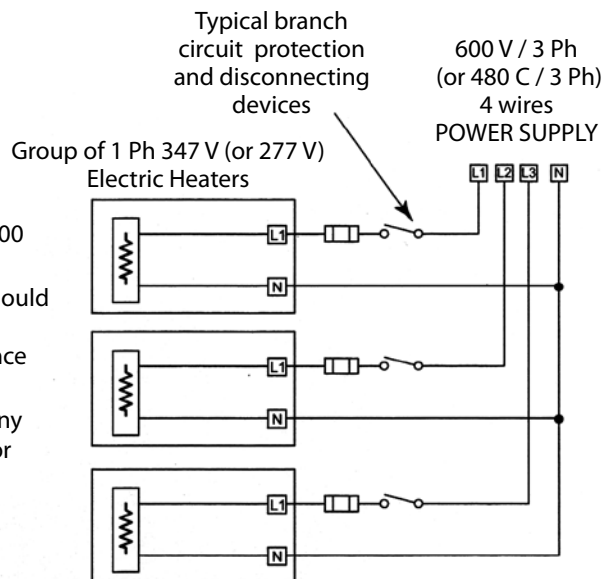
When capacities are below 7 KW at 277 V and 8 KW at 347 V Thermolec recommends the use of the following arrangements to obtain the most economical cost for heaters and electrical distribution.

600 V / 3 Ph
or (480 C / 3 Ph)
4 wires
POWER SUPPLY



347 / 600V
4 wire
power supply
(also 277 / 480)

These voltages are generally derived from a 600 (480) volts – 3 phase – 4 wire power supply.
A group of 347 (277) volt – 1 phase heaters should be distributed as equally as practical over the three phases in order to keep current imbalance to a minimum.
Neutral conductor should not be broken by any switching or protective device, be it internal or external to the heater.



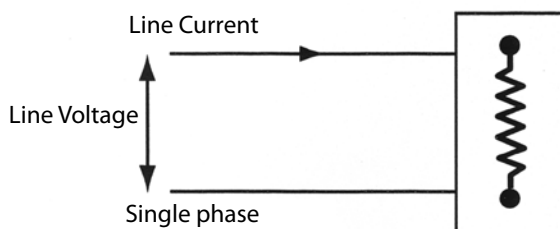
Equal distribution of heaters

Line Current

The table below shows line current per one KW capacity at various voltages. The following formulas apply:

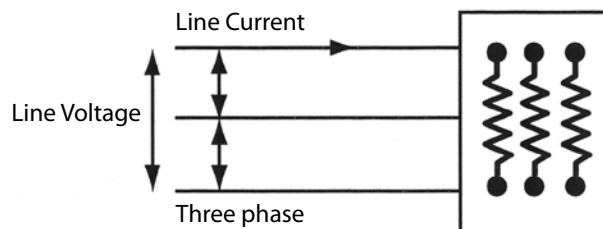
SINGLE PHASE

$$\text{Line Current in Amperes} = \frac{\text{Watts}}{\text{Line Voltage}}$$



THREE PHASE (Star or Delta loads)

$$\text{Line Current in Amperes} = \frac{\text{Watts}}{1.73 \times \text{Line Voltage}}$$



THERMOLEC Standard Voltages	120 1 ph	208 1 ph	208 3 ph	220 1 ph	240 1 ph	240 3 ph	277 1 ph	347 1 ph	380 1 ph	380 3 ph	416 1 ph	416 3 ph	480 1 ph	480 3 ph	600 1 ph	600 3 ph
MULTIPLIER Amp/KW	8.33	4.81	2.78	4.55	4.17	2.41	3.61	2.88	2.63	1.52	2.40	1.39	2.08	1.20	1.67	0.96

Multipliers to calculate Line Currents

(Line current in amperes = Multiplier × KW capacity)

Example: The line current for 40 KW / 600V / 3 phases heater is: 40 × 0.96 = 38.4 amperes.

THERMOLEC ELECTRIC DUCT HEATERS

www.thermolec.com

THERMO X AIR MINI FRESH AIR MAKE-UP

- Provides up to 90 CFM of tempered fresh air
- Three position push button room controller with pilot lights
- Modulated heat
- Washable filter
- Compact size



Patented

Today's airtight homes and offices beg for fresh air. When we trap the heat, excess humidity and indoor pollutants such as cleaning products, smoking and pets, will negatively affect the quality of the air we breathe, making our environment both uncomfortable and unhealthy.

In new construction the ventilation code requires the installation of a system to provide adequate fresh air. During winter, the incoming fresh air is at too low a temperature to be comfortable and requires preheating. It is more economical to preheat the incoming air at a specific, controlled source than requiring the central system to continually compensate for heat loss.

When the fresh air required is 90 CFM or less the new **THERMO X AIR** mini fresh air make-up offers the optimum solution at the lowest total cost.

The **THERMO X AIR** mini fresh air make-up is designed to complement your heating system by pre-heating this fresh air at the lowest cost, thus continuously providing comfortable ventilation throughout the house.

Equipped with the most advanced modulating controller and air sensor, the **THERMO X AIR** mini fresh air make-up uses the minimum amount of energy required to meet your needs. The air flow sensor detects the amount of air flowing through the unit and modulates the heating capacity accordingly, maximizing savings.

The **THERMO X AIR** system is a quality product engineered for peak performance and long life.

Part #	MODEL	COLLAR SIZE (")	KW	VOLTAGE	AMPS	CFM
801290	FER-1.5-120	6	1.5	120/1	12.5	45
801291	FER-1.5-240	6	1.5	120/240/1	6.25	45
801292	FER-2-240	6	2	120/240/1	8.3	60
801293	FER-3-240	6	3	120/240/1	12.5	90

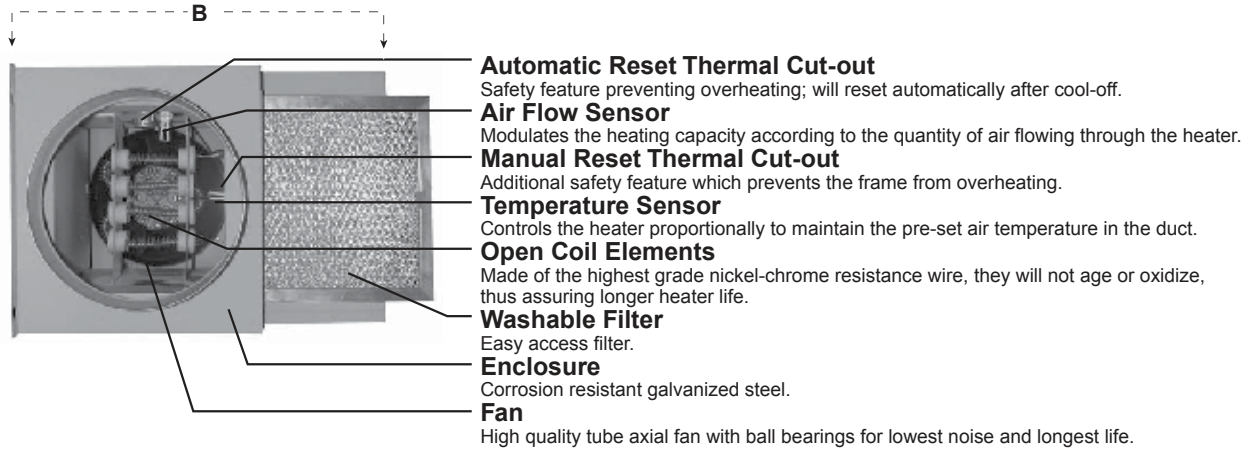
Other capacities and voltages available.

THERMOLEC ELECTRIC DUCT HEATERS

www.thermolec.com

THERMO X AIR MINI FRESH AIR MAKE-UP (cont'd)

Features and Specifications

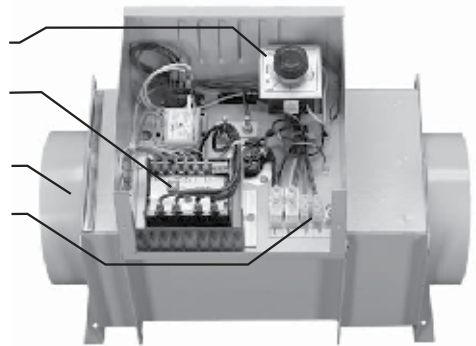


Fan Speed Control
To adjust the air volume.

Built-in Electronic Temperature Controller and Sensor
Proportionally modulates the heating load to match the exact capacity required, thus minimizing operating cost.

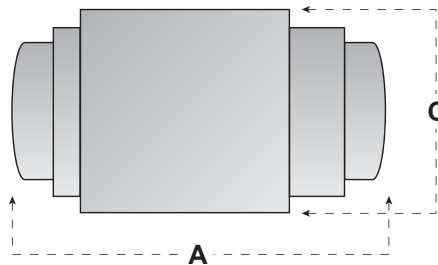
Round Collars
Simplifies the installation and considerably reduces field labor.

Connection for Exhaust Fan Supplied
120VAC up to 3 amps. max. output to drive simultaneously an exhaust fan when required.

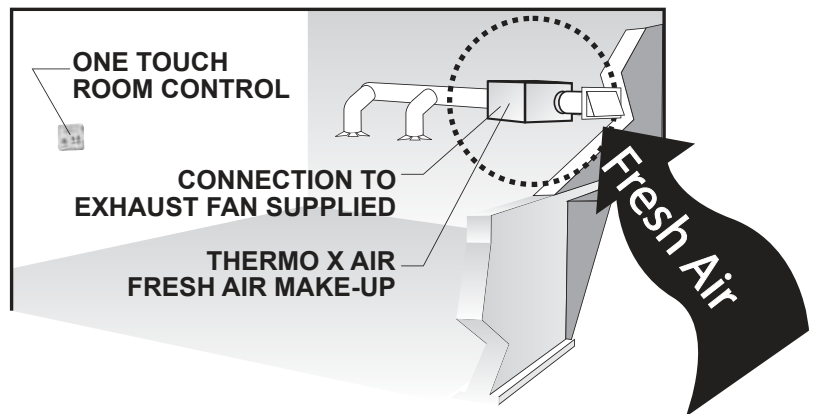


One Touch Room Control

Allows for full or intermittent ventilation.
Pilot lights indicate the selected mode.



DIA	A	B	C
6"	16.00"	11.50"	8.00"



Typical Application

THERMOLEC ELECTRIC DUCT HEATERS

www.thermolec.com

THERMO X AIR MINI FRESH AIR MAKE-UP (cont'd)

Custom Duct Heater Quote Form

SPEC TAG	QUANTITY	DUCT DIMENSIONS W x H ("")		KW	VOLTAGE	PHASE	STAGED OR MODULATING (SCR)	AIRFLOW	OPTIONS
Example-1	1	14	8	10	277	1	Staged	Vertical	1, 3, 4, 8, 11

QUOTE PROCESS NOTES: Wholesale quote requests can be faxed or emailed to your local ECCO Supply branch. Quotes will be returned within 2 business days. Submittal drawings will be created and forwarded to you for approval. These drawings need to be signed off and returned before an order can be processed.

Standard Components Included in All Heaters

- Slip-in Mounting
- Open Coil Elements
- Auto and Manual High Limit Cutouts
- Magnetic Contactors
- Airflow Switch
- Transformer

Optional Equipment

1. Built-in Disconnect Switch
2. Room Thermostat (RT)
3. Duct Thermostat (DT)
4. Flanged Mounting
5. Dual Fuel Control
6. Grade A Elements
7. Pilot Lights
8. Remote Adjustable Duct Sensor (RADS)
9. Remote Adjustable Room Sensor (RARS)
10. Nema 4 Control Box
11. Remote Control Box
12. Insulated Terminal Box
13. Dust Tight Control Box
14. Recess Terminal Box
15. Protective Screens (both sides)
16. Tubular Elements (expect 3-week lead time)
17. Full Break Contactors