



**CONTROLS
ESTIMATING
AND
DESIGN
GUIDELINE**

APPLICATION EXAMPLE #4

Electric Duct Heater

- “Subzone” of a constant volume rooftop unit
- Volume of air is 1300 CFM
- Serving an area demanding fairly precise temperature control

Electric Duct Heater

A 20 degree Delta T would allow the air into the zone to be heated to, say, 75 degrees during rooftop unit cooling (when the unit is producing 55 degree air). When the rooftop is not cooling, then the air into the zone could be raised to, say, 90 degrees (when the rooftop unit is strictly ventilating).

$$\text{Delta T} = 20$$

$$\text{CFM} = 1300$$

$$\text{BTU (required)} = 1,300 * 1.08 * 20 = 28,080 \text{ BTU}$$

$$\text{KW} = (28,080) / (3410) = 8.23$$

Select a 10 KW electric duct heater, and find the “actual BTU” and the “actual Delta T”

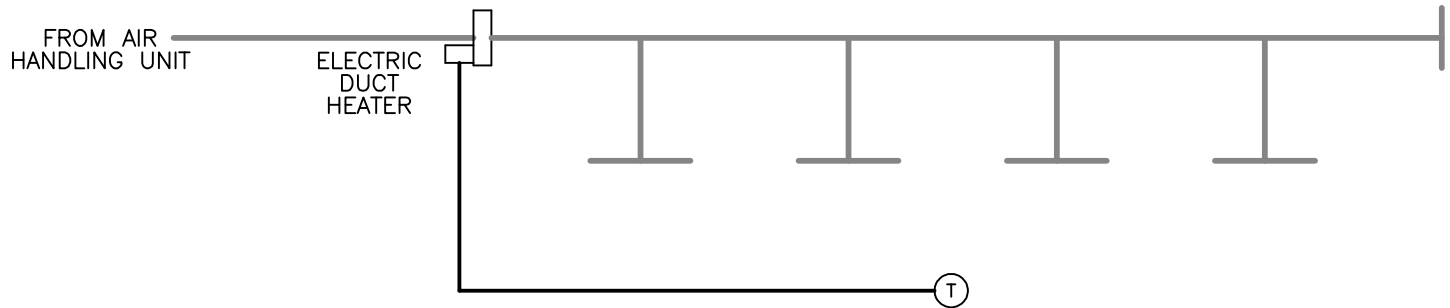
$$\text{BTU (actual)} = 3410 * 10 = 34,100$$

$$\text{Delta T (actual)} = (34,100) / (1.08 * 1300) = 24.3$$

Two-stage heater: appr. 12 degrees per stage

Three-stage heater: appr. 8 degrees per stage

ELECTRIC REHEAT COIL



DESCRIPTION

Electric duct heater served by an upstream air handling unit. The duct heater serves a single zone with a thermostat or temperature sensor in the zone.

COMPONENTS

	NOTES	LABOR (hours)	MATERIAL (cost)
Ⓣ THERMOSTAT (or)	1 2	2.0	65.00
Ⓣ TEMPERATURE SENSOR	1 3 4	2.0	-----
STARTUP AND COMMISSIONING: 3/4 hour	TOTALS:	2.0	-----
ENGINEERING TIME: 2 hours (per air handling unit)			

NOTES

- 1 Number of electric heating stages is dependent upon the design air temperature rise through the coil. As a rule, the delta T per stage should not exceed 10 degrees (for average temperature control). Using this rule, the minimum number of stages required is found by dividing the total delta T of the coil by 10. For more precise temperature control, lessen the delta T per stage, or use SCR control (furnished by manufacturer).
- 2 For electric reheat coils with two stages or less, a standard one or two stage thermostat will work.
- 3 For electric reheat coils with more than two stages, a step controller must be used. A temperature sensor is wired to the step controller, which is located in the controls compartment of the coil. The step controller and temperature sensor should be furnished by the manufacturer. If the multistage coil is ordered without a step controller, then a multistage control system must be purchased and installed separately (at a higher cost).
- 4 An alternative to the step controller is the SCR controller. SCR control, though more expensive, offers precise temperature control (for those applications that demand it). A temperature sensor is wired to the SCR controller, which is located in the controls compartment of the coil. The SCR controller and temperature sensor must be furnished by the manufacturer.