

GREENHOUSE - Q AND A TIPS AND ADVICE

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Ask the Experts

Question: We are considering a hot water boiler plant (5,000,000 BTU's) for our greenhouse operation. Our consultant and contractor are providing a system based on a 20 deg. F delta T. What does this mean ?

The term that your consultant / contractor is referring to is the method that he used to establish and select the equipment heating outputs, pipe and pump sizing. In your particular case he is basing his selection on a 20 deg. temperature drop between supply water and return water temperatures. Generally the established norm is 200 deg F supply water (EWT) and 180 deg. F return water (LWT). This is very common expression in the heating profession.

However, if you were interested in installing a more cost effective system, we would suggest that the system be sized based on a 40 deg. delta T. This would mean that the heating equipment would be selected for say 200 def. F (EWT) and 160 deg. F (LWT). Your consultant / contractor may question this

approach at first, since their heating equipment will go up a bit, but the true area of savings will be in the supply and installation of the piping distribution system. As an example a 5,000,000 BTU boiler system sized on 20 deg. delta T will require 500 gal per min. flow, which requires 6" piping. Whereas, the same 5,000,000 BTU system on a 40 deg. delta T will require 250 gal per min. flow, which requires 4" piping. The piping size reduction affects the entire heating distribution, so the piping savings can be significant. Also from an operational cost, you will realize significant power savings on the 40 deg. delta T approach since heating pumps will be smaller in size. And, from a system response factor you will find that the 40 deg. delta T system will act and respond far quicker because of the reduced mass of the water in the system. If you remember basic high school

facts, a BTU of heat equals the heat required to raise one lb of water one deg F. So the more water in the system, the longer it take to heat up.

Consider this:

6" schedule 40 pipe will hold 12.15 lbs of water per foot.

4" schedule 40 pipe will hold 5.51 lbs of water per foot.

3" schedule 40 pipe will hold 3.20 lbs of water per foot.

2" schedule 40 pipe will hold 1.452 lbs of water per foot.

Now consider the lengths of the various pipe sizes you have in your greenhouse. It gets scary when you work out the differences between high mass/low mass and 20 deg./40 deg. delta T. In a greenhouse, the structure is low mass, the heat loss when conditions happen, happens rapidly, your heating system needs to trend this rapid heat loss as efficiently and quickly as possible, that's were a lower mass higher delta T heating systems work much more favorably.

Hmm ... less installation costs, less operating costs and greater heating recovery and trending efficiency ... I know which way I would go.

If you find that you consultant/contractor is reluctant to discuss this with you, keep us in mind, our office actively designs hot water systems. Simply contact our office.

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*Consultants, Suppliers and Installer to the
Commercial Greenhouse Industry*

