



# Coil Company News

HVAC COILS • SPACE COOLERS • AIR HANDLING EQUIPMENT

Issue 17

## Computer Coil Selections

How They Really Happen!

We're going to get very "old fashioned" and very technical in this Newsletter. This one is for all you close engineers out there who actually want to know how coils are selected, and the factors that go into picking a coil. If all you are interested in doing is bringing up the newest coil selection program on your computer screen, and you don't really care about how the whole process works, then stop reading now. If you really are interested in how all this information is developed and the inter-relationship between this data, then this Newsletter is for you. Read on!

**Example:** Heat 7900 CFM from 50°F to 142°F using 190°F water, Lvg. at 170°

We're going to give you the actual "longhand" formulas and loads that people used to select this coil. By actually seeing the formulas you will get a much better idea of the selection process. You will also better understand how changing the input also changes the final selection. See if you can follow this! By the way, there used to be people who did this longhand on every job. Hard to believe, but true!

### Coil Company's Quick Ship Program

#### Standard Ship

Almost all coils ship in 4-5 weeks as standard. There are some exceptions, based on special materials, but 95% of all coils will ship in 4-5 weeks with no premium.

#### 10 Work Day Ship

Most coils can ship in 10 work days (2 weeks) for a premium of 20% based on the size of the job. We guarantee that the coil will ship on time or you don't pay the additional premium.

#### 5 Work Day Ship

For major coil emergencies, you can have your coil ship in 5 work days (1 week). The required premium for this shipment is 40%. We guarantee shipment or you don't pay the premium.

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#### Step #1 Calculate the Load

CFM X 1.08 X (lvg. air temp - ent. air temp) = BTU/HR  
7900 X 1.08 X (142 - 50) = **785,000 BTU/HR**

#### Step #2 Calculate G.P.M.

BTU/HR ÷ (500 X water temp. diff.) = G.P.M.  
785,000 ÷ (500 X 20) = 78.5 G.P.M.

#### Step #3 Calculate Face Area

CFM ÷ air velocity = Face area  
7900 CFM ÷ 500 F.P.M. = 15.8 sq. ft. required

#### Step #4 Pick a coil size (any size you like)

27" F.H. X 84" F.L. = 15.75 sq. ft. (18 tubes/row)

#### Step #5 Select a water velocity (charts available)

G.P.M. ÷ # tubes feed X factor (5/8" O.D.)  
78.5 ÷ (18 X 1.17) = 5.1 ft./second

#### Step #6 Select a "U" Factor

There used to be charts that showed each individual "U" factor based on ft./minute air velocity, ft./second water velocity, and fins/inch. This "U" factor is the actual heat transfer coefficient tied to a particular coil. You'll have to trust us on this one, but the "U" factor for 5.1 ft./second, 500 ft./minute and 8 fins/inch is 176.

#### Step #7 Figure the MTD (mean temperature difference)

Ent. Water - Lvg. Air (190 - 142) = 48  
Lvg. Water - Ent. Air (170 - 50) = 120  
MTD (counterflow) = 78.6 MTD

Relationship between the air temperatures and the water temperatures. Higher is better than lower.

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### Coil Company, LLC.

3223 Phoenixville Pike, Malvern, PA 19355

Toll-Free: 800.523.7590 • Phone: 610.251.0257 • Fax: 610.251.0805

Email: sales@coilcompany.com • Web: www.coilcompany.com

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### Step #8 Actual # Rows Required

$$\text{B.T.U./Hr.} \div (\text{MTD} \times \text{"U"} \text{ factor} \times \text{Face area}) = \text{Theoretical \# rows required}$$
$$785,000 \div (78.6 \times 176 \times 15.8) = 3.6 \text{ Rows}$$

Above is the actual formula required to calculate rows. Since it's impossible to build a coil exactly 3.6 rows, you must round up to 4 rows.

Believe it or not, when you plug all your numbers into a computer program, this is the set of calculations that takes place. Step #8 is exactly how coils are calculated. Everybody is always trying to build a coil with the fewest rows possible. Well, the way that you do that is to make the MTD larger, increase the "U" factor, or increase the face area. When you make any of those numbers larger, you decrease the number of rows. How can you make the "U" factor larger? Make the water go faster, make the air go faster, or increase fins/inch. How do you change the MTD? Make the water hotter, or the steam pressure higher. How do you change the face area? Make the coil bigger. There are other factors that increase "U". Coils operate at higher coefficients when wet rather than dry. "U" factors are different for 1/2" tube coils than 5/8". Really it comes down to making the MTD larger, the "U" factor larger, or increasing face area. If you do any of the above, you decrease the number of rows. These are all things that the computer does automatically for you when you change the data. Often times, we are all guilty of just mechanically changing the data and never knowing how the actual calculation process takes place.

Now you know! Knowledge is power, and the more knowledge that you have regarding how coils work, the better you will be at the selection process. Now you might say, "who cares?" I just use the computer anyway. That's true, but it's certainly better when you understand what the computer is actually doing.

***Please let us know if we can help you with any of your coil selections or problems — call Coil Company at 800-523-7590.***

## Stock

### Hot Water Booster Coils



*Hot Water Booster Coils sized from 6" x 12" to 30" x 60", shipped from stock in 1-3 days.*

### Replacement Hot Water Booster Coils, Shipped from Stock in 1 day to 3 days

It seems there's never a convenient time to install hot water duct coils. When it's time you know it, and you know you need to install them fast, with a quality coil specified for your application.

Coil Company consistently ships a broad range of hot water duct coils, and applying our combined experience of more than 75 years we'll make sure the coil suits the specifications of your application.

- 1 and 2 row coils in 33 different sizes from 6" X 12" to 30" X 60"
- Flanged or Slip & Drive

**For all your coil needs,  
technical information or questions, call our toll-free number**

**800-523-7590**



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