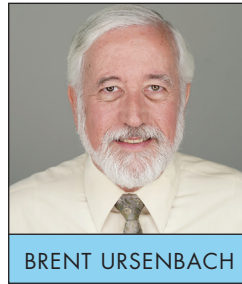


MECHANICAL CODE DISCUSSION

ACCA Manual D – Friction Rate Worksheet – Coils



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THE TITLE OF THIS DISCUSSION is a repeat from thirteen years ago, in my third Pipeline Code discussion, where I reviewed the overall application of the friction rate worksheet. This discussion will focus on the first device typically listed in the worksheet – *Direct Expansion Refrigerant Coil*. I would be naive to suggest every new construction or retrofit residential installation includes a complete design in accordance with ACCA Manuals J, D, and S. I will suggest every installation absolutely should include at a minimum, an analysis of the device pressure losses. Failure to ensure there is available



static pressure for a duct system will result in system which will never operate as intended.

Assuming we are basing our design on a blower at 0.70 IWC (inches water column), selecting a coil with a 0.30 or higher loss will result in a system which never produces full capacity. Following the coil, we must account for the filter, registers, grills, and any other devices, hoping we have something left for the duct system. Too often, the wrong coil is selected, followed with a restrictive 1" filter, and finally with a poor duct system. Fan horsepower cannot fix that.

Let's consider the wet pressure drop across several coils from a major manufacturer, where our target airflow is 1200 CFM.

14" wide 3-ton coil @ 1200 CFM: 0.335 iwc

17" wide 3-ton coil @ 1200 CFM: 0.231 iwc

21" wide 3-ton coil @ 1200 CFM: 0.160 iwc

17" wide 3.5-ton coil @ 1200 CFM: 0.204 iwc

21" wide 3.5-ton coil @ 1200 CFM: 0.165 iwc

17" wide 4.0-ton coil @ 1200 CFM: 0.185 iwc

21" wide 4-ton coil @ 1200 CFM: 0.150 iwc

Obviously, selecting an oversized coil with the correct TXV lowers the pressure drop across the device, improves

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Friction Rate Worksheet

Step 1) Manufacturer's Blower Data
 External static pressure (ESP) = IWC CFM =

Step 2) Device Pressure Losses

Direct expansion refrigerant coil	<input type="text"/>
Electric resistance heating coil	<input type="text"/>
Hot water coil	<input type="text"/>
Heat exchanger	<input type="text"/>
Low efficiency filter	<input type="text"/>
High or mid-efficiency filter	<input type="text"/>
Electronic filter	<input type="text"/>
Humidifier	<input type="text"/>
Supply outlet	<input type="text"/>
Return grille	<input type="text"/>
Balancing damper	<input type="text"/>
Other device	<input type="text"/>
Total device losses (DPL)	<input type="text"/>

Step 3) Available Static Pressure
 ASP = ESP - DPL = (-) = IWC

Step 4) Total Effective Length (TEL)
 Supply-side TEL + Return-side TEL = (+) = FEET

Step 5) Friction Rate Design Value (FR) $\frac{ASP \times 100}{TEL}$
 FR value from friction rate chart =

airflow, increases efficiency, and improves customer comfort.

Please be cautious in selecting third party manufacturer's coils, especially when you notice the coil is shorter than the OEM coils. You must verify the coil pressure drop. My opinion/recommendation is you only select split system components which you can certify system performance through manufacturer's expanded data or through AHRI.

Lastly, many of you know my opinion regarding the installation of a 5-ton residential split system, if not, here it is: **Don't install 5-ton systems, at our altitude and in our dry climate with very little latent load, you simply cannot get enough air through the devices, filters, and duct systems to attain full capacity.** Look up your

furnace and air handler blower data, then compare it to this coil data:

21" wide 5-ton coil @ 2000 CFM: 0.488 iwc

24" wide 5-ton coil @ 2000CFM: 0.342 iwc

The pressure drop across these coils is simply too high, especially with the less than desired furnace/air handler airflow. A key issue here is the manufacturer's design equipment based on most of the country where there is humidity and latent loads. Lower airflows provide increased latent capacity. Not our problem here where we are high and dry.

Please continue your comments and questions. These discussions are based on comments I receive from you.

Thank you — Brent ■

45 Lessons Life Taught Me, in Celebration of Growing Older – Part 2

BY REGINA BRETT WITH THE CLEVELAND PLAIN DEALER

22. Over prepare, then go with the flow.

23. Be eccentric now. Don't wait for old age to wear purple.

24. The most important organ is the brain.

25. No one is in charge of your happiness but you.

26. Frame every so-called disaster with these words: "in five years, will this matter?"

27. Always choose life.

28. Forgive.

29. What other people think of you is none of your business.



30. Time heals almost everything. Give time time.

31. However good or bad a situation is, it will change.

32. Don't take yourself so seriously. No one else does.

33. Believe in miracles.

34. God loves you because of who God is, not because of anything you did or didn't do.

35. Don't audit life. Show up and make the most of it now.

36. Growing old beats the alternative of dying young.

37. Your children get only one childhood.



38. All that truly matters in the end is that you loved.

39. Get outside every day. Miracles are waiting everywhere.

40. If we all threw our problems in a pile and saw everyone else's, we'd grab ours back.

41. Envy is a waste of time. Accept what you already have, not what you need.

42. The best is yet to come...

43. No matter how you feel, get up, dress up and show up.

44. Yield.

45. Life isn't tied with a bow, but it's still a gift! ■