

# Energy-Efficient Configuration (EE) vs. Alternate Technologies

www.kalehvac.com

Hemant D Kale, PE

Here is a comparison of EE configuration other previously introduced innovations as well as currently considered new innovations in the HVAC/R industry; particularly from the energy-efficiency consideration:

- **Rifle (grooved) Cross-Section Tubes** – These enhance heat transfer by about 5%, but also increase the resistance to fluid movement, increasing compressor or pump power. The net result is a wash, with a slight increase in the OEM cost.
- **Lanced Fins** – These fins have small pierced lancings in the fin surface that enhance heat transfer in laboratory setting. However, the lancings also increase the air resistance (more fan power) and make the coil prone to clogging, which gradually reduces heat transfer capacity once in use. The lanced fin-dies are expensive to make and maintain.
- **Slit Fins** – The fin material is slit to a ‘shredded’ form and wrapped around tube. These fins were tried and discarded in 80’s, because they deformed readily from hard rain, wind, hail storm and other, blocking the air passages to the extent of disabling the product. Once deformed, they could not be undone. Difficult to clean (unclog) due to their tinsel-like structure.
- **Variable Speed Fan** – These require expensive electronics and more sensors. Can be beneficial on large motors. They increase the initial OEM cost, putting the pay-back period few years down the road. Have not become common or mainstay.
- **Oval Tubes, Fins with Winglets** – Efforts are being made to research oval tubes (- <http://geothermal.inel.gov/publications/articles/sohalgrc90-01paper.pdf>). Oval tubes are non-standard and require whole new ground-up tooling.
- **Micro-channel Heat Exchanger Coils** – Extension of automotive radiator. The extremely narrow air passages and fluid passages (‘micro’) increase both air side and fluid side resistance. This is somewhat mitigated by reducing the number rows, which increases the face area. They are generally considerably more expensive than the fin-tube coils.
- **Small Diameter (5mm) Tubes** – Will increase heat transfer due to higher tube surface for same internal fluid volume, but will also increase fluid resistance (more compressor power). Result: a wash.
- **Scroll Compressor** – These claim 15% reduction in compressor power, but none in fan motor. The EE CONFIGURATION provides about 50% reduction in both compressor and fan power.
- **Solar Powered A/c** – Haven’t seen too many. Not qualified to comment.
- **Marginal Improvement** - Most importantly none of the above, or any other heat exchangers, even remotely claim reduction in compressor power, in any amount. Whereas, the EE CONFIGURATION is guaranteed to reduce the compressor power up to 50% from current level, concurrent with significant OEM cost savings.

Candid bottom-line view, while you can never say never, in all likeliness EE CONFIGURATION is as good as it gets for now and for some indefinite time to come.