

### CHAPTER 3: SCREENING OF DESIGN OPTIONS

The Process Rule requires that the Department screen design options before beginning the Engineering Analysis. To be considered as the basis for the rulemaking, design options must satisfy four *screening criteria*:

- Must be technically feasible
- Must be practical to mass manufacture, install, and service
- Must not substantially reduce consumer utility
- Must not raise significant safety concerns

We assume that design options available in products currently offered to the mass market meet those screening criteria. The most widespread of these *efficiency-related enhancements* are:

- Increased coil face area and depth
- Multiple speed fan motor or blower motor
- Variable (or multiple) speed or capacity compressor or dual compressor
- Thermostatic or electronic expansion valve
- Improved air flow and fan design
- Increased efficiency compressor (scroll, advanced reciprocating)

Several recent and ongoing developments may soon change the cost impact of some of these enhancements and make them more attractive to manufacturers. Each of these *emerging technologies* also meets the screening criteria:

- Advanced variable speed motor control (e.g. DC controllers and AC inverters)
- Advanced modulating compressors (e.g. Bristol TS<sup>®</sup>, Copeland Modulated Scroll<sup>®</sup>)
- Microchannel heat exchangers

We considered the impacts of these emerging technologies separately from our ARI validation effort.

Finally, the industry currently faces a federally mandated phase out of refrigerant HCFC-22 by 2010. Although researchers continue to investigate several alternative refrigerants, only two seem likely to achieve significant penetration: 410A and 407C. For new products, 410A is favored. Its higher operating pressure and thermodynamic properties enable some reductions in component size that partially offset higher lubricant and refrigerant costs. 407C operates at similar pressures as HCFC-22 but at a lower efficiency. Both refrigerants pass the screening criteria. Again, we did not consider either of these within our ARI validation effort since ARI considered equipment limited to HCFC-22.