ASHRAE
Advancing HVAC&R to serve humanity and promote a sustainable world

Refrigerant Update

2010 and Beyond

Stephen Niles
Refrigeration/Commercial Sales Manager

Gustave A. Larson Company
WHOLESALE HVAC AND REFRIGERATION

Agenda

- Recap
- Current Situation
- Considering the Future

Governing Documents and Regulations

- ANSI/ASHRAE 34-2001
- EPA SNAP Listing
- Montreal Protocol
- Section 605 of the Clean Air Act Jan. 21, 2003
- Montreal Protocol Meeting 19- September 2007
- EPA Rule Changes December 2008- Awaiting the Final Rule

Recap

(Problem/Solution Cycle)

- Increasing need for refrigeration in expanding use in Food, Medical, Manufacturing(Process), and Comfort HVAC applications

Specification Criteria

- Boiling Point between -50 and 0 C, to absorb heat at 0 and reject at 40
- Non-Flammable
- Non-Toxic
- Non-Corrosive
- Economical
- Capacity
- Serviceability

Recap

(Problem/Solution Cycle)

- Increasing need for refrigeration in expanding use in Food, Medical, Manufacturing(Process), and Comfort HVAC applications
  - CFC Solution

Recap

- 1974 Rowland and Molina- Middle Stratosphere CFC's breakdown by UV radiation releasing Chlorine atoms. Proposed that chlorine was breaking down Ozone.
- Highly disputed. Congress funded research.
- 1976 US National Academy of Sciences confirms the credibility of the ozone depletion hypothesis.
- 1985 British Antarctica Survey- Ozone hole discovered over Antarctica
- Vienna Convention
  - 1989 Montreal Protocol- substitutes must be found and ozone depleting substances must be phased out

Recap

- United States Clean Air Act Amendments of 1990 contain provisions for implementing the Montreal Protocol and establishes explicit authority for the U.S. Environmental Protection Agency to regulate ozone depleting chemicals.
- Industry slow to adopt and adapt to changes.
- CFC production banned. HCFC set for phase out.

Current Situation

- CFC's- no production. Service use only through reclamation.
- HCFC's- Developed Countries (Article 2): Accelerated* Phase Out Schedule
  - 2004 35% reduction from baseline
  - 2010* 75% reduction from baseline
  - 2015 90% reduction from baseline
  - 2020* Stop production with 0.5% of baseline for service only until 2030
  - 2030 No production or importing of HCFC's

*September 2007 Rules Change

Current Situation

- Proposed rule changes under review
  - 2010 Allocation Rule
    - Reductions per existing Montreal Protocol
    - Production and import for servicing equipment produced prior to January 1, 2010
    - Change to include consumption and production allowances for HCFC- 123, -124, -225ca, and -225cb currently not part of the allocation rule.

Current Situation

- 2010 Pre-Charge Appliances Rule
  - Ban the sale or distribution of pre-charged systems and components manufactured on or after January 1, 2010.
  - Includes HCFC-22, HCFC-142b, and any blend containing these components.
  - Includes imported products.
  - Allowance made for servicing.
  - Some confusion with regard to field installed systems.
  - Special provision for systems charged with reclaimed refrigerant.
  - Publication of Final Rule still pending.

  See http://epa.gov/ozone/title6/phaseout/rulesoverview.html

Current Situation

- HCFC phase out estimated to create 2010 imbalance between supply and demand (DUPONT estimates 27.5 million pound shortfall)
- Alternatives- HFC's
  - HVAC
    - R410A
    - R407C
    - R423A
    - R134a
  - Refrigeration
    - R404A
    - R507
    - R134a

Current Situation

- Concerns about availability and fit
- Alternative Blends
  - Refer to SNAP Listing
  - Safety ratings
  - Base use for retrofit on fit, cost, availability, system operating characteristics, and complexity of the retrofit
  - No silver bullet
  - R438A, R407A,
- HFC's not the final answer- GWP

Considering the Future

- Global Warming
- European Influence
- Government Intervention- EPA regulations, Carbon Taxes
- Technological Developments
- Special interests influence on Global Companies
- Proliferation of Refrigerant Cocktails
- Pushing the limits on safety- toxicity/flammability

Considering the Future

- European call for phase out of R134a
- Development of CO_2 systems and components
- HFO1234yf (hydrofluoroolefin 2,3,3,3,-tetrafluoroprop-1-ene)
- Equipment and system design
  - Self contained
  - Modular
  - Secondary Loop
  - Close coupled
  - Systems environments will change
  - Smart systems- self monitoring, automation
  - Safety monitoring
  - Radical Component changes

Questions