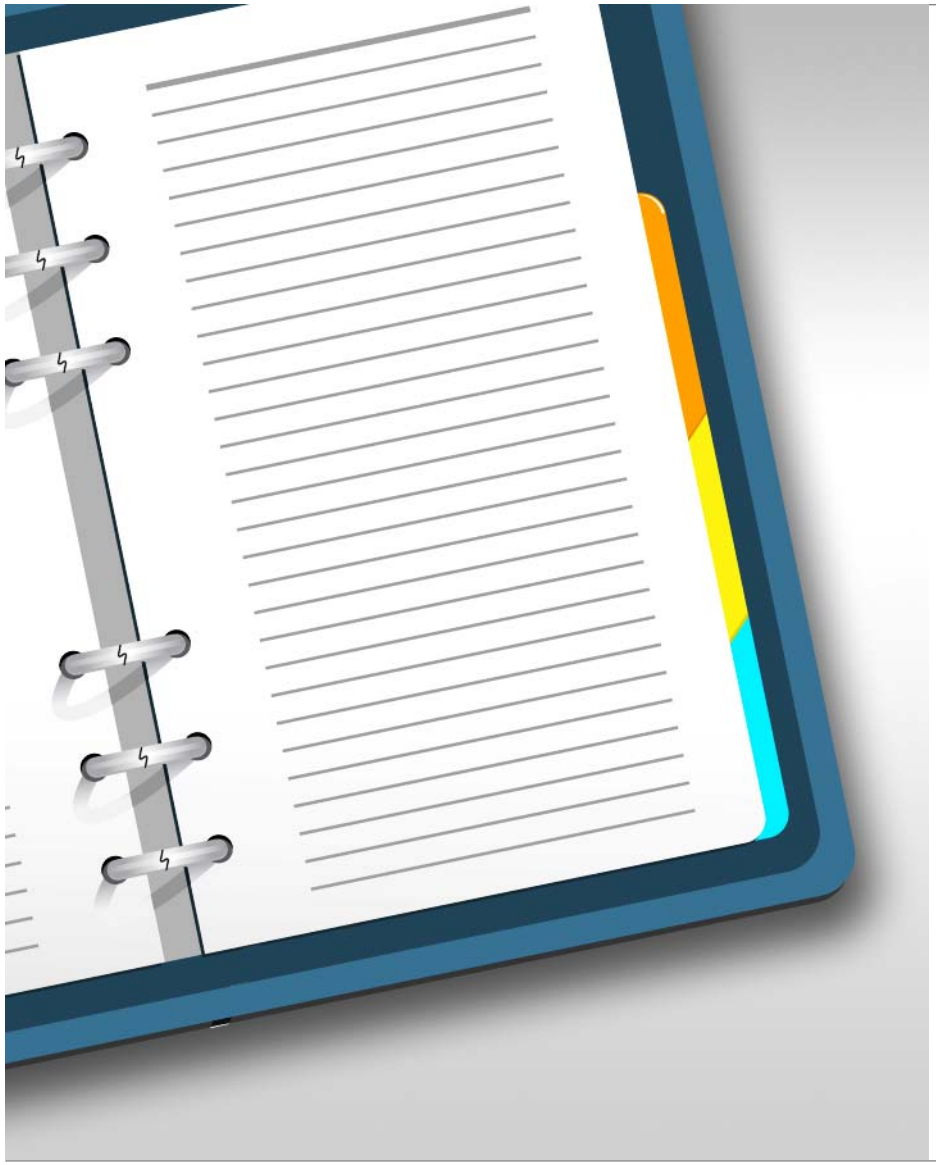
MAKING MODERN LIVING POSSIBLE

Hydrocarbons in the USA

www.danfoss.com



Background:

- Hydrocarbons have been used as refrigerant in household and light commercial for approx. 20 years.
  - Europe as front runner
  - USA did not follow, mainly due to the US law-suit culture
- Within a few months, the US will allow specific hydrocarbons for household and food retail cabinets
- Agenda:
  - Legislation
  - Scope and requirements
  - Outlook/market reactions

EPA SNAP initiative:

- Environmental Protection Agency (**EPA**) is the US ministry of environment
- Under its Significant New Alternative Policy (**SNAP**) program is proposes

  "Rule 17 - Listing of Four Hydrocarbon Substitutes for Household Refrigerators and Freezers and Retail Food Refrigeration"

http://www.epa.gov/ozone/snap/regulations.html

- Official proposal published in May 2010, but is result of year long push headed by Unilever
- Expected to go into force within a few months

Legal Framing:

- Hydrocarbons where never illegal in US on federal level
- SNAP rule works as a protective legal barrier
  - Legal system in the USA is very aggressive.
  - EPA is an official body stating that the risk is acceptable
  - Insurance companies may not be want to insure companies beyond the officially accepted risk

Scope and Requirements:

- Household freezers and refrigerators (UL250) up to 57g of
  - R600a, HCR-188C or HCR-188C1
- Food Retail standalone units (UL471) up to 150g of
  - R290
- Use conditions:
  - Only new equipment (no retrofits)
  - Pipes, hoses and service connections marked with red paint
  - Appropriate DANGER and CAUSION markings on the system
  - Service connections must be different that of non-flammables

http://www.gpo.gov/fdsys/pkg/FR-2010-05-10/pdf/2010-10959.pdf

- US economy is 20-25% of world economy: THIS COULD BE LARGE
- Pressure from end-users:
  - …McDonald's, Pepsi, Coca-Cola…
- Acceptance of hydrocarbons sparks many R&D projects.
  - Mainly R290 is seen by Danfoss
- Also a few R&D projects with larger charges.
  - …if small systems are ok, why not large systems with safety measures?

http://www.hydrocarbons21.com/content/articles/115920110707.php

- Future of HCR-188C and HCR-188C1 is uncertain
  - proprietary blends from a small manufacture.

Danfoss Policy Statement

Danfoss encourages the further development and use of low-GWP refrigerants to help slow – and ultimately reverse – the process of global warming while helping to ensure continued global wellbeing and economic development along with the future viability of our industry:

- We will enable our customers to achieve these refrigerant goals while continuing to enhance the energy-efficiency of refrigeration and air conditioning equipment.
- Danfoss will proactively develop products for low-GWP refrigerants, both natural and synthetic, to fulfil customers' needs for practical and safe solutions without compromising energy-efficiency
- Danfoss will lead and be recognised in the development of natural refrigerant solutions.
- Danfoss supports the establishment of a global regimen (such as the Montreal Protocol) to phase down emissions of high-GWP refrigerants … to provide for long-term production of very small quantities of HFCs for critical needs.