

Fachprogramm

**Technical
Programme**





Ammonia and Natural Refrigerants in Turkey

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*Turkey***

Nuremberg (Germany), 15th October 2014

- **Turkish AC&R Association**
- **Since 1993**
- **97 Member Companies**

Some Activities:

- Statistics
- Supporting ISK-SODEX
- EU integration; Foreign Relations
- ACV&R Journal of Turkey
- Legislation
- R&D
- other



ISKID

AIR CONDITIONING
& REFRIGERATION
MANUFACTURERS'
ASSOCIATION

Current Legal Situation in Turkey

- CFC: Industry successfully phased out in **1990's**. As of 01.01.2008, all importation of CFCs is forbidden.
- HCFC: From **01.01.2009** on, the import of HCFCs is subject to decreasing quota. In addition, since **01.01.2010**, the import of products which contain HCFC is prohibited.
From **01.01.2015** on, import of HCFC is only allowed for a fraction amount, for service purposes only.
- Draft revision of ODS regulation and **draft F-gas regulation** were published in August 2014, opinions from the stakeholders were collected in September.

Usage Areas of Ammonia in Turkey

Ammonia refrigeration systems in Turkey are widely used for decades

- At -40/-25/0/+10 °C temperatures and glycol refrigeration systems
- In bigger industrial plants like
 - cold and frozen storages
 - food processing plants like French fries, diced/cubed/sliced fruits and vegetables, poultry, meat and fishery plants, dairy plants, ice cream plants
 - brewery and beverage etc.

at a similar level like in EU and USA.

Usage Areas of Ammonia in Turkey

- Latest: Governmental company «Meat and Milk Board» is establishing up to 5 big storages in different places of the country. CO₂-Ammonia cascade, multiple units per storage.
- Plants with F-Gases lately reached higher capacities than before.

Production in Turkey

- Design and installation of plants
- Evaporators
- Valves
- Tanks etc.
- Condensers

- Compressors and automatic controls are imported
- Condensers, mainly import



An example

Ice Cream production facility in Central Anatolia, 2013



An example

Ice Cream production facility in Konya, 2013

- 300.000 sqm-46 football fields
- LEED certified
- Refrigeration unit completed in less than 1 year
- 11.590 kW capacity, 4 different temperatures: +2, -10, -35, -45 °C
- Cold and freezer rooms for raw material storage, mixture, production, packaging; freezing tunnels
- 6 high stage compressors, 4 low stage compressors, 4 evaporative condensers, 9 pressure tanks, 4 heat exchangers, 19 ammonia evaporators, 3 freezing tunnels, controls etc.

Ammonia Refrigeration Market Volume

- Ammonia refrigeration equipment: 10 Million Euro
- Contracting market: 40 Million EUROS

** Estimations only, not official ISKID data!*

Other Natural Refrigerants in Turkey

- CO₂ is new and limited in Turkey. Due to high temperatures (climate) and hence high pressures, cascade system is being preferred. Industrial: Istanbul, Denizli, Yozgat, Konya. Biggest Project Kirklareli 3300 kW -40 °C
- Governmental investment for up to 5 big storages. CO₂-Ammonia cascade, multiple units per storage.
- Investment cost for CO₂ systems is still a disadvantage for the investors.
- In supermarkets, 3 supermarket refrigeration units installed with CO₂, 1 Trans-critical, 2 cascade system. These kind of applications use mostly R404A.

Other Natural Refrigerants in Turkey

- Commercial applications, display cabinets and bottle coolers are switching to HC's in last 2 years, especially R600a and R290.
- Major domestic refrigerator manufacturer has switched from R134a to R600a (HFC>HC).
- Manufacturing of components for HC's started as well.
- For the split type air conditioners, R410A is being mostly used in Turkey. Natural refrigerants newly introduced.

CO₂ in the World (Source Atmosphere 2014)



Future

- With increasing capacities, cascade applications will become more common. Trans-critical has still some disadvantages.
- In smaller equipment, usage of natural refrigerants will develop.
- It would be useful to teach more about CO₂ at the universities.

Conclusion

- Natural refrigerant NH_3 is well accepted in the Turkish market, used traditionally. No accidents.
90% NH_3 vs 10% fluorinated (<2000 m²)
- CO_2 is new for the market. Especially multinational corporates started retrofitting existing high GWP and GDP applications and chillers.
- Bottle coolers and some display cabinets use CO_2 .
- HC's in small refrigeration equipment.
- Turkey follows the EU legislation and this is an advantage for natural refrigerants.

Thank you!

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