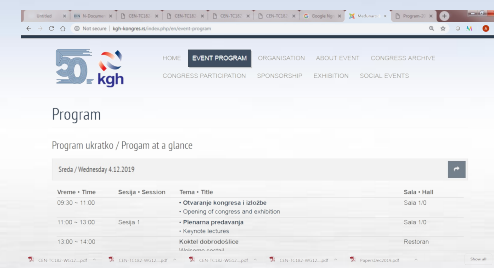


Using Ammonia Safely

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In business to secure a better future



What's on the menu

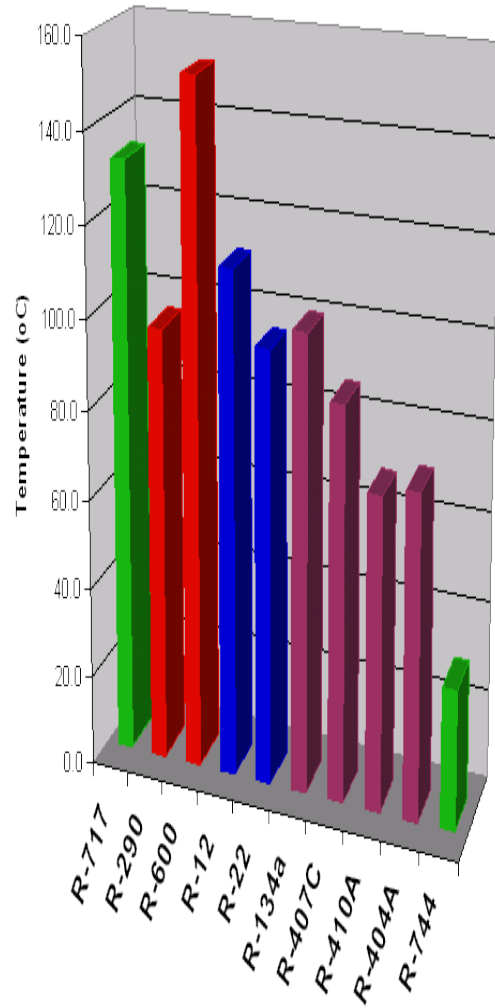
- **Ammonia as a refrigerant**
- **Hazards**
- **Accident histories**
 - **Real incidents**
 - **Myths**
 - **Misinformation**
- **Risk Reduction**
- **New design concepts**

- **Conclusions**

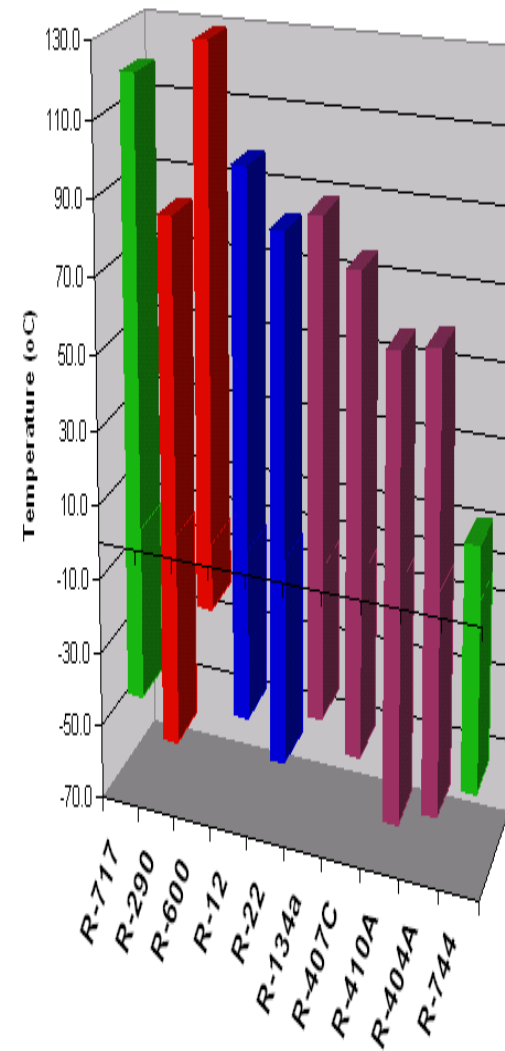


Why is ammonia worth it?

Critical Temperatures



Operating Temperature Range



Why is ammonia worth it?

Is ammonia dangerous?

Yes, it is flammable and toxic?

So are ammonia plants safe?

Absolutely, if designed and operated correctly

- Ammonia accidents are very rare
- Fatalities mainly affect technicians working on the system
- Injuries are very rare and not well documented
- Press reports are often misleading
- There are probably as many serious incidents with HFCs and HFOs, but not as dramatic so poorly reported
- The bad publicity is probably the worst aspect of an incident like this



VORES FOKUS TRÆPILLER TAGER KULS PLADS I ENERGI-FORSYNINGEN AFFALD OG GENBRUG VANDMILJØ UNDER PRES METRO CITY FLERE >

Fisketorvet efter ammoniakudslip: Snifferalarm var ikke nok til at evakuere



Fisketorvet mente ikke, at der var grund til at evakuere gæsterne. Men så kom politiet og gjorde det alligevel. (Illustration: Wikimedia Commons / Susanne Nilsson)

Fem personer måtte tilses af en læge efter et ammoniakudslip i shoppingcentret Fisketorvet i København lørdag. Centret afviser, at det skulle have evakueret de handlende.

Af [Andreas Lindqvist](#) [Følg AndreasLindqvist](#) 12. nov 2019 kl. 09.08 [2](#)

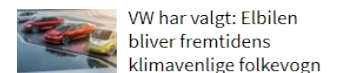


Job fra **JOBFINDER**

- Medarbejder med interesse for energieffektivisering
- Arbejdsmiljøkoordinator med fokus på projekteringsfasen
- Leder af enheden Bygning og Drift
- Projekteringspecialist og/eller erfaren projektleder søges
- Udviklingsorienteret GIS-specialist
- Bæredygtighedsspecialist

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Mest læste Mest debatteret



Elvsekskaber frarter

- Ignition is unheard of in Europe provided the safety standards are followed and appropriate ventilation is operational
- This is because of the flammability characteristics of ammonia; it is not just wishful thinking
- Toxicity incidents are occasionally experienced but almost exclusively affecting technicians working on the plant who experience a sudden and unexpected change of conditions
- Suitable procedures, training and protective equipment protect against even the unexpected incidents
- Panic reaction in people unfamiliar with ammonia is a legitimate concern

- The public could be surprised and overcome by ammonia
- 300ppm is “immediately dangerous to life and health”
- Ammonia should not be used because there have been multiple fatality accidents in China and India
- Ammonia fires cause cool stores to burn down
- An accident in China, started by an ammonia fire, caused 120 deaths in a poultry factory

NOT TRUE

- Don't use pumped circulation – reduce the ammonia content
- Don't use high pressure receivers – reduce further
- Don't use long liquid lines – reduce even further
- Avoid liquid-cooling of compressor oil
- Avoid non-permanent joints (flanges, threads, drain valves)
- Don't use hot gas defrost (but don't use electric defrost either)
- Minimise the need for manual maintenance activity eg oil draining

Installations



Installations



Defrosting made easy



- Enables heat pump operation
- Quick and efficient defrost
- Easy to control – discharge pressure
- Easy to maintain
- Zero risk of hydraulic shock
- Valve mounted in machinery room
- No moving parts at the evaporators
- Visual indication of correct operation
(frost pattern)
- Can also be instrumented for remote monitoring if required

Conclusions

- The advantages of ammonia as a refrigerant are real and valuable
- The measures required to make ammonia systems safe are not difficult
- ...and not expensive
- The alternatives promoted as “safer” are just as dangerous if done badly
- Direct ammonia refrigeration offers the lowest cost of operation of any cooling alternative for industrial refrigeration
- And can be safely applied in many other applications

