

# Sustainable Technologies for Air Conditioning Workshop

## Technical basis and application of hydrocarbon chillers in Germany



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## Frigoteam in catchwords

- Founded in 1994 as a refrigeration technology wholesaler
- Since 2008 100% focused on natural refrigerants
- Today present on the German market as a consulting, engineering and sales company
  
- 2008 delivered the 1st natural refrigerant unit (ammonia chiller)
- 2011 delivered the 1st hydrocarbon Chiller
- Since 2008
  - 155 natural refrigerant units
  - 111 of them are hydrocarbon chillers
  
- Until today no massive leak and no accident

# agenda

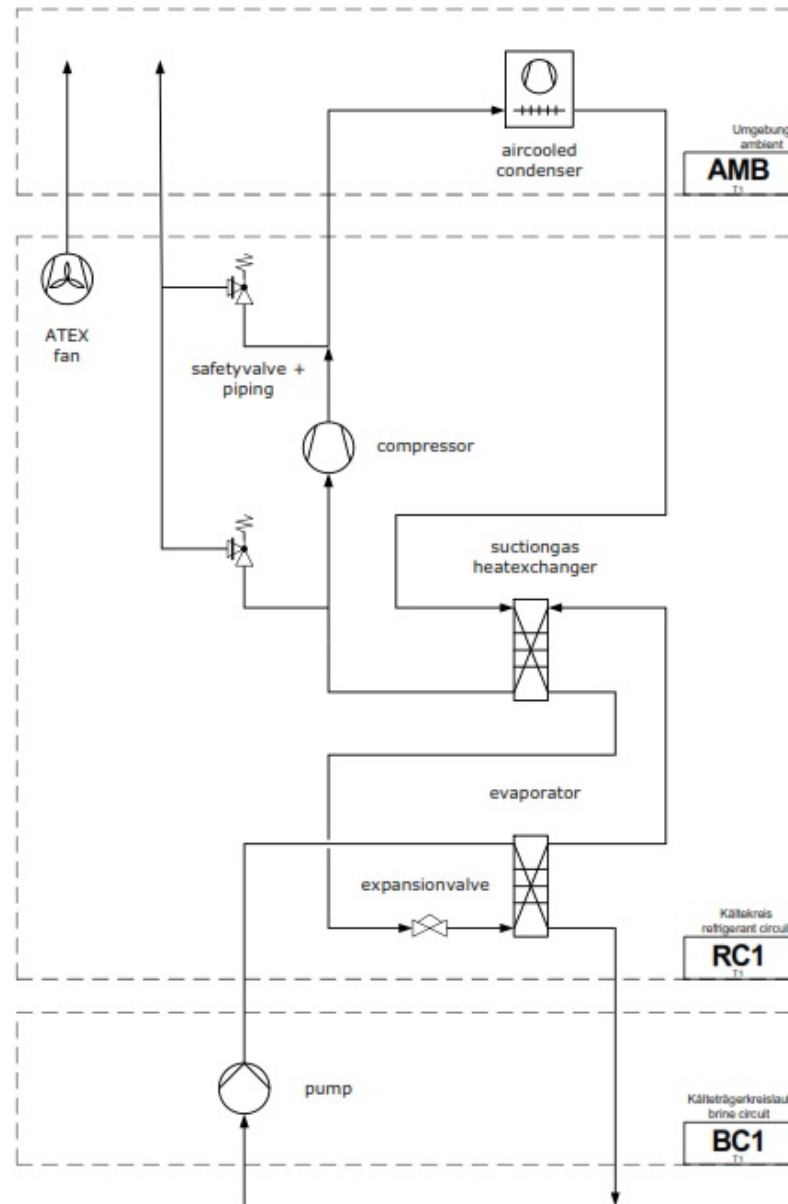
- Basis of HC Chillers and design of the refrigerant and brine circuit
- Overview of realized HC chiller projects in Germany

## Technical basis of HC Chillers

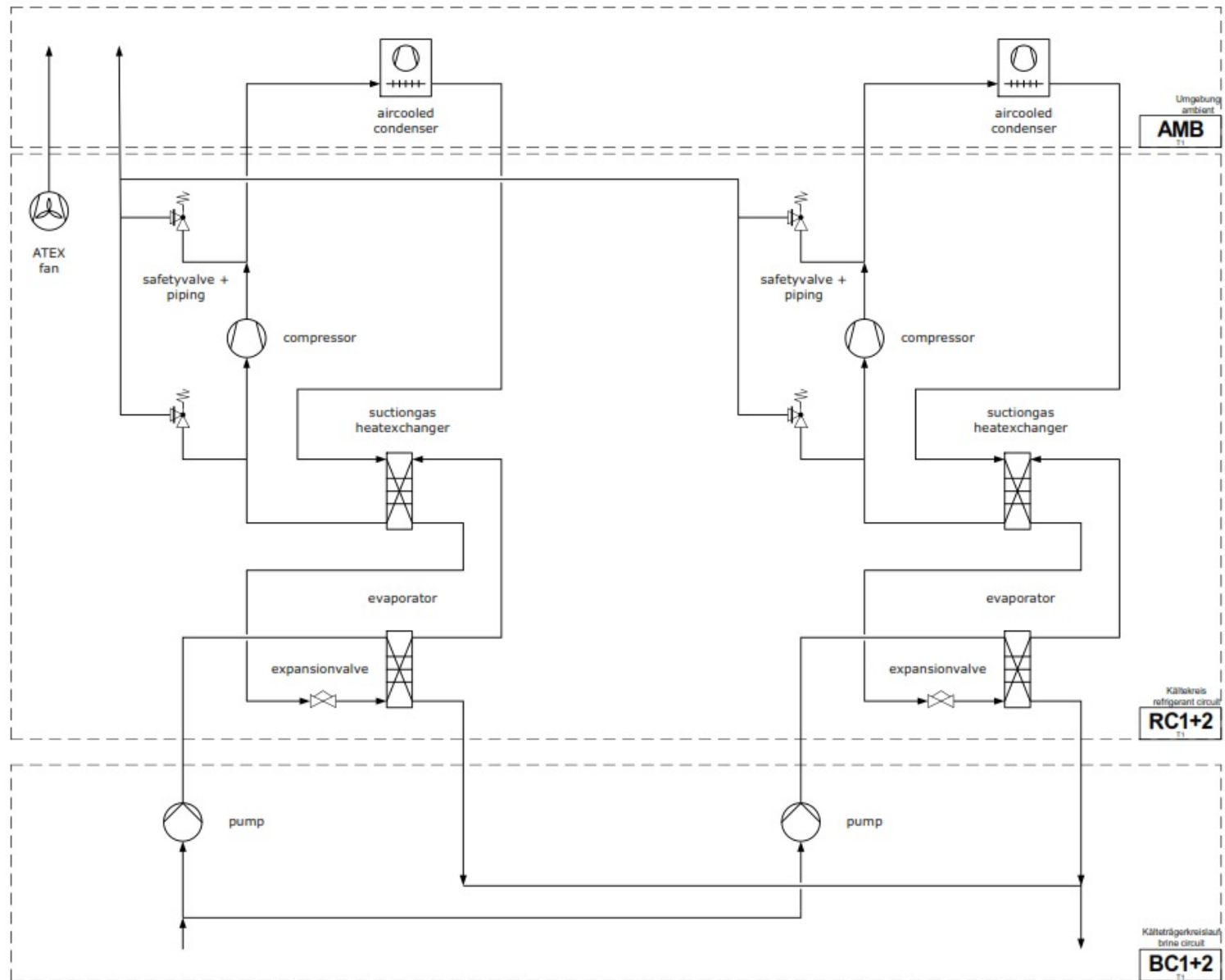
### safety concept overview

- Permanent technical leakproof refrigerant circuit design  
(no flexible or screwed connections allowed expect special HC approved versions)
- Closed housing for HC circuit with ATEX approved fan (pressure in housing lower than ambient)
- Permanent 2 stage gas detection in circuit housing  
stage 1 will turn on the fan and activate low level alarm  
stage 2 keeps running the fan, activates high level alarm and shuts down the unit
- Safety valves connected to a centralized exhaust pipe which is located in a non risk area
- To realise bigger capacities build multi refrigerant circuit units instead of compressor racks
- Positioning of the chiller only in non public areas (minimum: a fence to devide)
- Refrigerant charge limitation (outdoor max. 25 kg, indoor max. 5 kg)
- Special requirements regarding indoor or basement installed units
- Only appropriately trained staff is allowed to perform commissioning and service

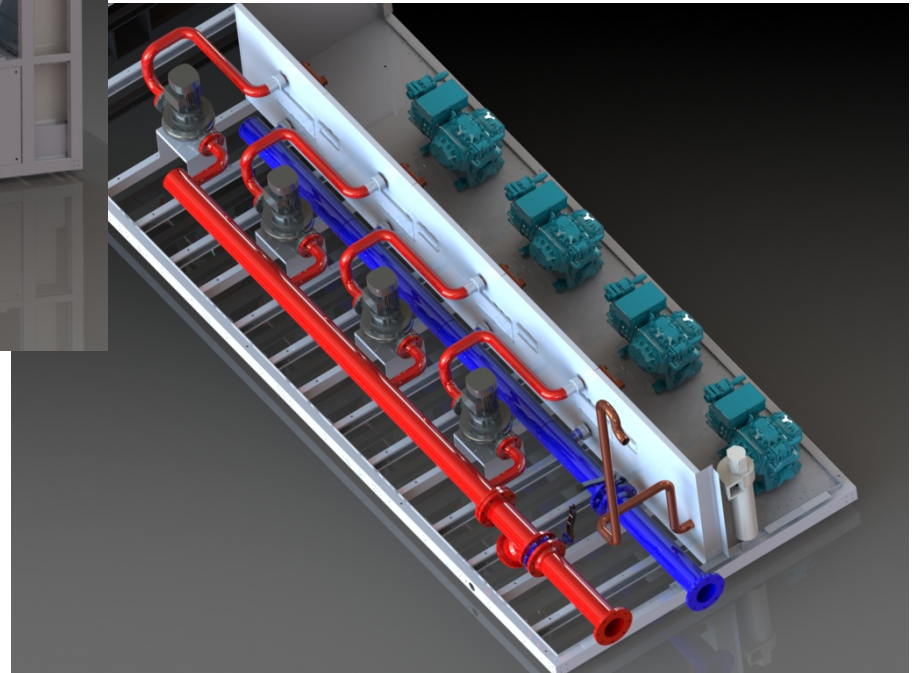
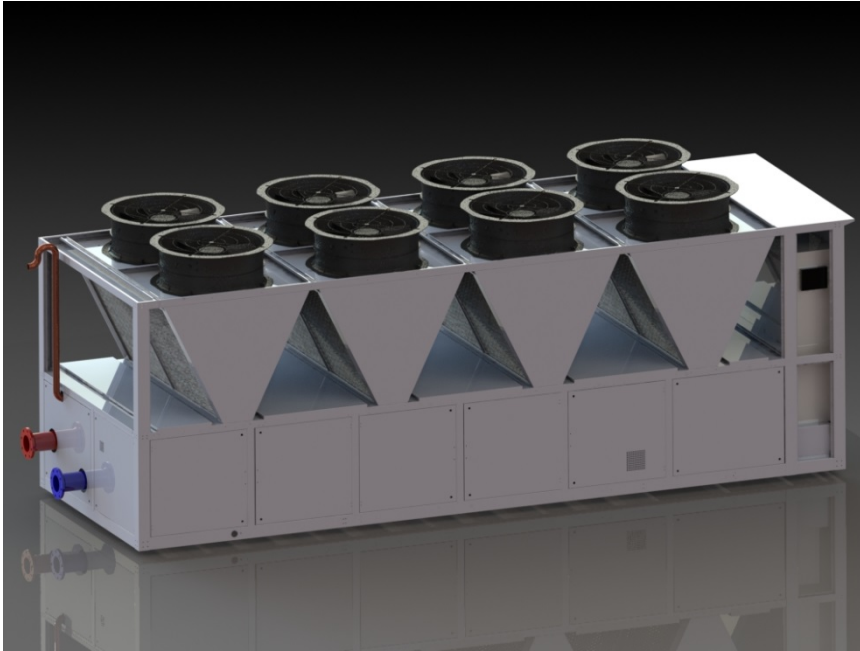
## Common refrigerant circuit of a HC Chiller



## Refrigerant circuits of a HC multi circuit Chiller



Outdoor installed HC Chiller, 450 kW cooling capacity, +6 °C LWT, 4 circuits engineering



Outdoor installed HC Chiller, 450 kW, + 6 °C LWT, 4 circuits 4x 8 kg R290  
air conditioning - pharmaceutical plant





Outdoor installed HC Chiller, 190 kW, +7 °C LWT 2 circuits 2x 5 kg R290  
air conditioning – consumer electronics store



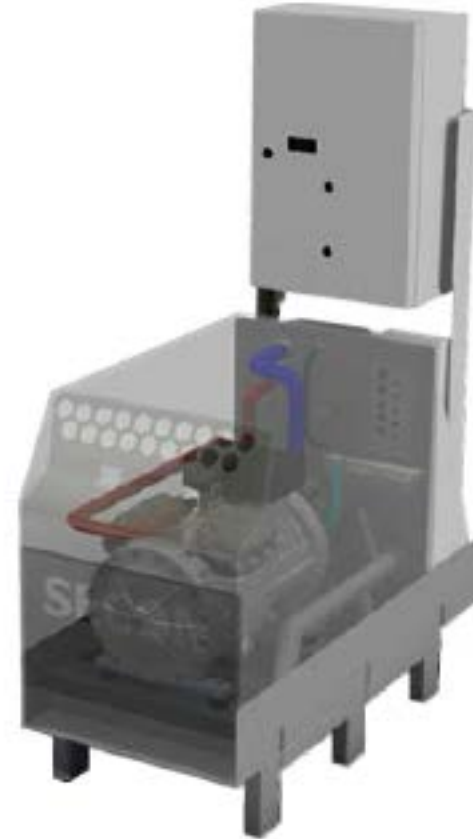
Outdoor installed HC Chiller, 190 kW, +7 °C LWT, 2 circuits 2x 5 kg R290  
air conditioning – consumer electronics store



Indoor installed HC Chiller, 85 kW,  $-8\text{ }^{\circ}\text{C}$  LWT, 2 circuits 2x 2.5 kg R290  
fruit storage



FXP compact modular chiller - several models available  
AC capacity 15-45kW, refrigerant charge 0.5-2.5kg



Ondoor installed HC Chiller, 40 kW, -8 °C LWT, 2 circuits 2x 1.5 kg R290  
fruit + vegetable storage



# 2nd prize german refrigeration award 2016



Bundesministerium  
für Umwelt, Naturschutz,  
Bau und Reaktorsicherheit



## Deutscher Kältepreis 2016

5. Wettbewerb der Kälte- und Klimatechnik



## Frigoteam Handels GmbH



Kaltsoleanlage



**BURKHARD DUNST**  
Geschäftsführer  
Frigoteam Handels GmbH

Effiziente Kältetechniken  
als Beitrag für eine  
klimafreundliche Zukunft



EMISSIONSMINDERUNG: 20 %

*„Die Verleihung des Deutschen Kältepreises für unser PCM-Latentspeichersystem ist eine große Ehre für uns. Das Preisgeld verwenden wir, um unser System noch weiter zu verbessern und für Öffentlichkeitsarbeit zu diesem Thema.“*

Thank you for your attention!

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