
EU
ATMO
sphere
solutions for europe
natural refrigerants
16-17 March, 2015 in Brussels

NATURAL REFRIGERANTS

HEAT PUMPS

LINE UP OF NATURAL FIVE : NH3 – CO2 – HC – WATER – AIR

HOT WATER PRODUCTION NH3 HEAT PUMP

DOC.2015-698 R1

MAYEKAWA MYCOM

LINE UP OF NATURAL FIVE

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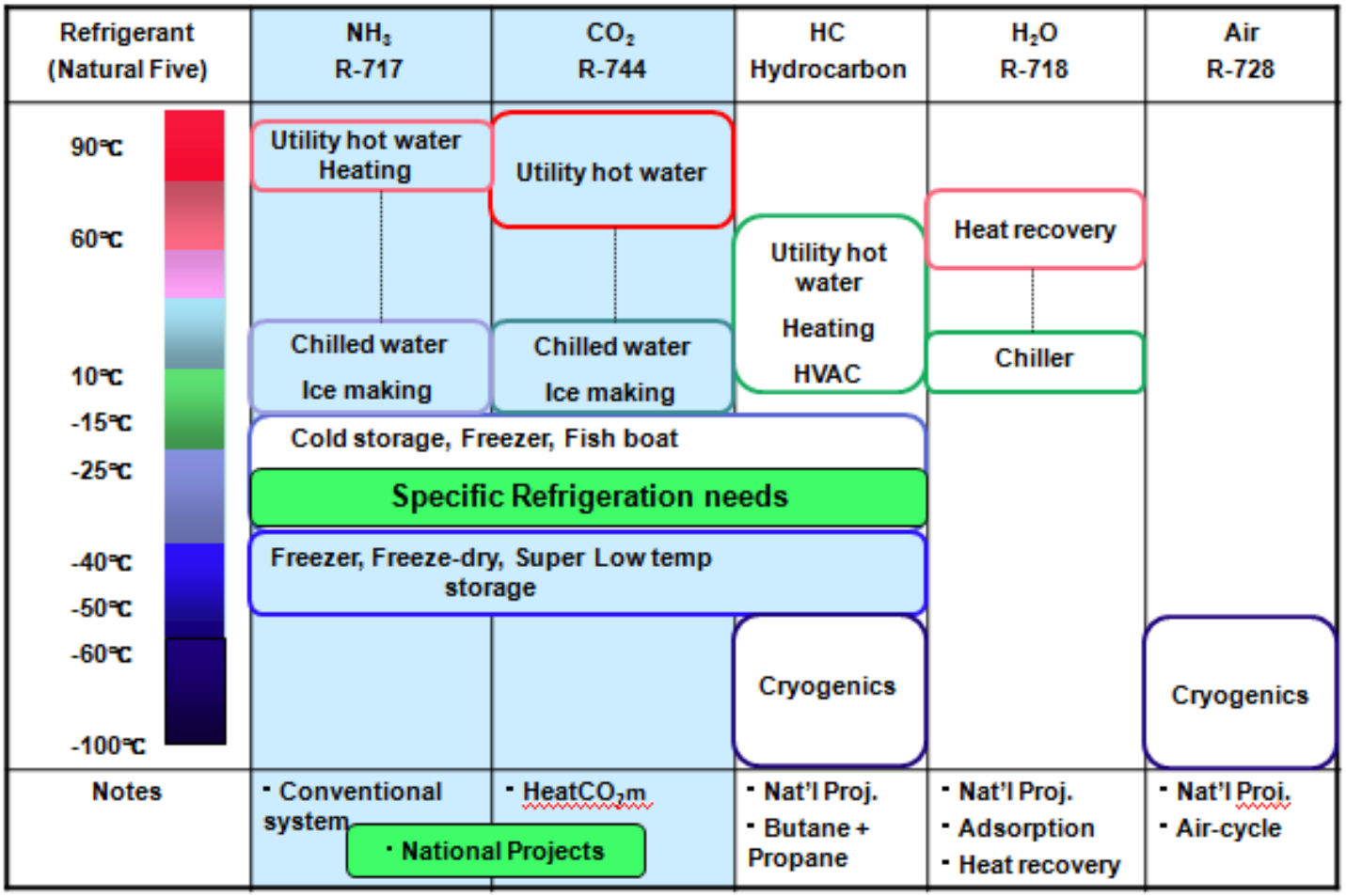
"Natural Five" Refrigerants and Product Solutions



FIELD CASE

HOT WATER PRODUCTION
NH3 HEAT PUMP

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Reason for building a Heat Pump in Bakery Plant in Belgium

1. Extension of the production capacity
2. Reduction of energy consumption & energy costs
3. Contribution to the Sustainability program

Ammonia heat pump

Hot water needs at 65°C

1. Heat recovery from the NH3 refrigeration system : hot gasses
   Water is preheated from 5°C to 25°C
   by a condensation temperature of 25°C

2. In order to get water at a temperature of 65°C in an energy efficient way, we used an ammonia heat pump (ODP & GWP = 0)
   with condensing temperature of 67°C (29,5 barg)

Ammonia heat pump

HEAT PUMP :
using NH3 refrigeration system condensor heat as heat source

1. Positive impact on condensor load

2. Recovery of residual heat for hot water production
   -> Sanitary hot water : 65°C
   -> process : dough proofer

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Ammonia heat pump

DEMANDS

1. WATER TEMPERATURE 65°C
   heat demand : 300 KW (hot water 1000 m3/day)

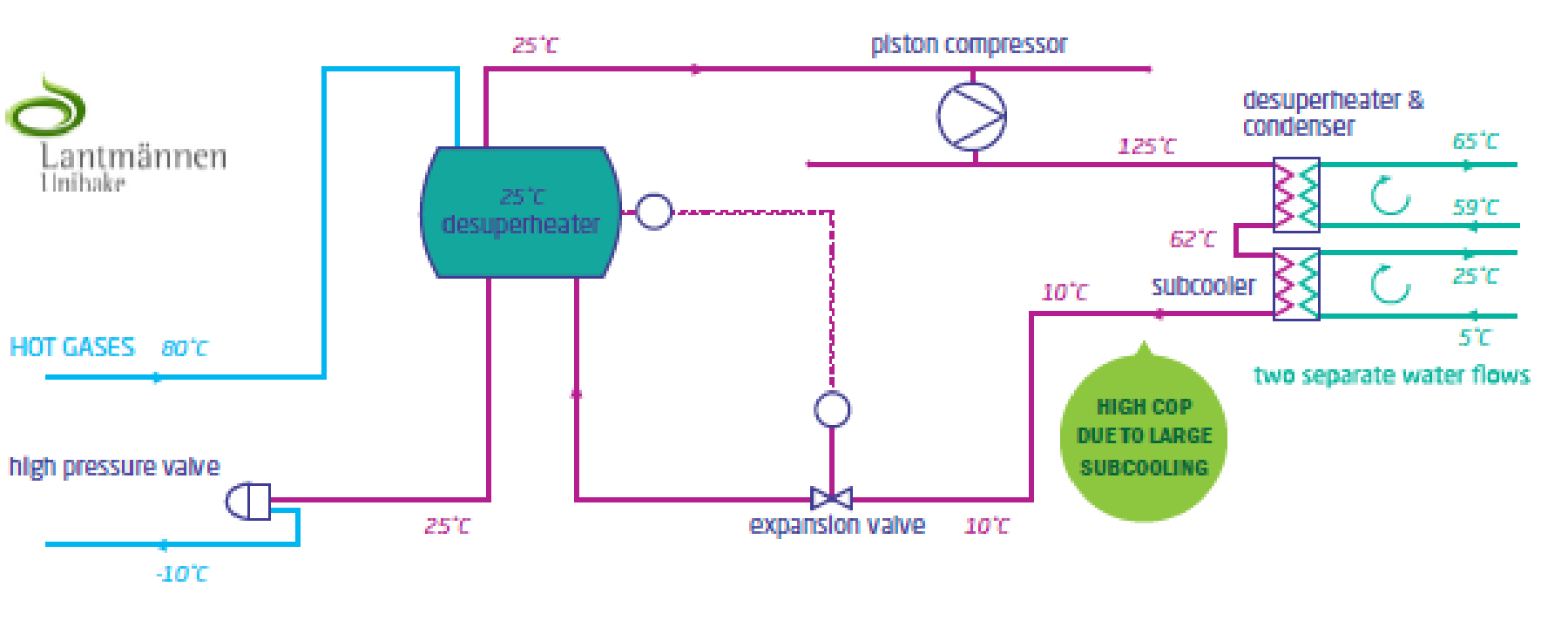
2. WATER TEMPERATURE 25°C
   heat demand : 65 KW (process water 70 m3/day)

3. COOLING DEMAND : 3 MW

-> NH3 pump circulation refrigeration system (NH3 at -10°C)

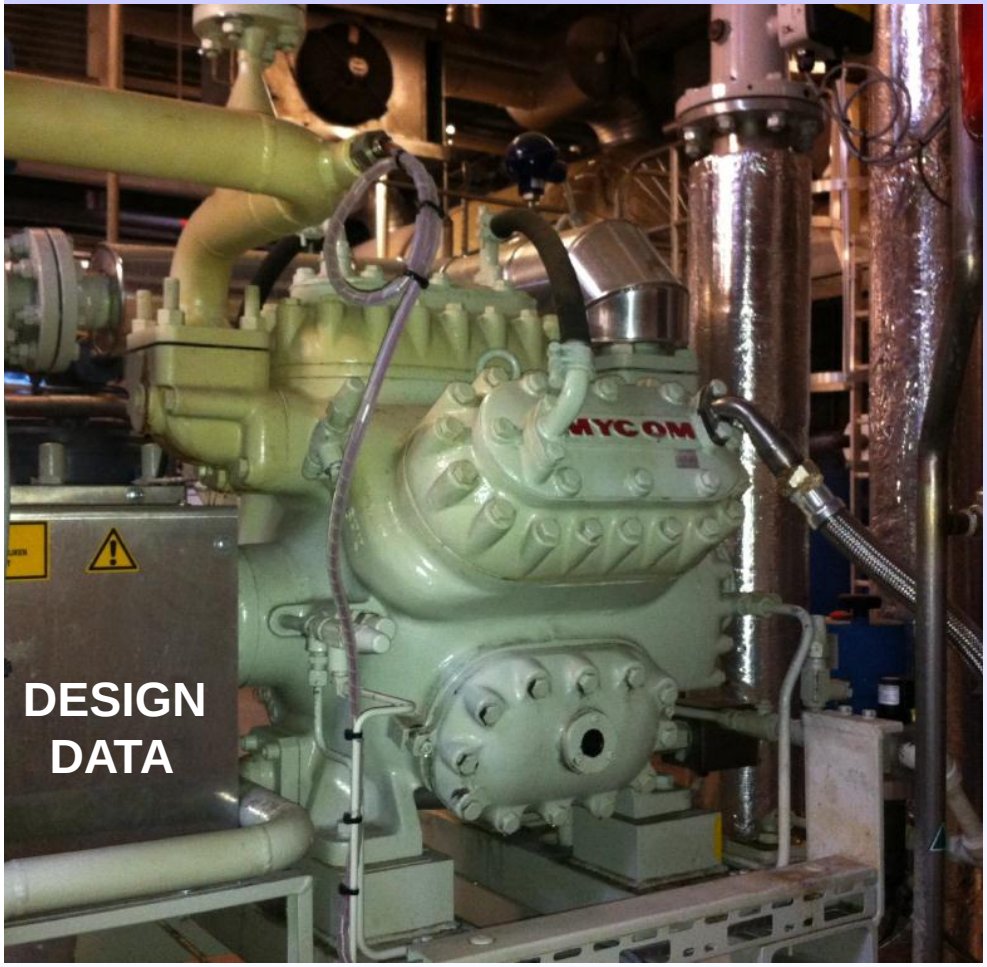
-> Cold and freezing rooms (t° : xx & xx °C)

PRINCIPLE SCHEME



EQUIPMENT

MODEL		**N6HK**
QTY		**1**
SITE LOCATION		
COUNTRY		BELGIUM
TOWN		MOUSCRON
REFRIGERANT		NH3
TE	°C	25
TC	°C	67
PS	barg	9
PD	barg	29,5
RPM	rpm	1150
QC	kW	375
BKW	kW	55
COP-H		**6,8**
OPERATING HOURS		21/01/2015
HP	hrs	7186



UNIT LAYOUT

DOC.2015-698 R1

Installation date :
February 2013

Operating hours per year
±7000 hrs

Calculation detail :
POWER DRIVE
Efficiency =
97~98%

DRIVE MOTOR
WEG 315S/M 75kW
cosφ = 0,87/0,75
efficiency =
93,7/93,2
(100%/50% load)

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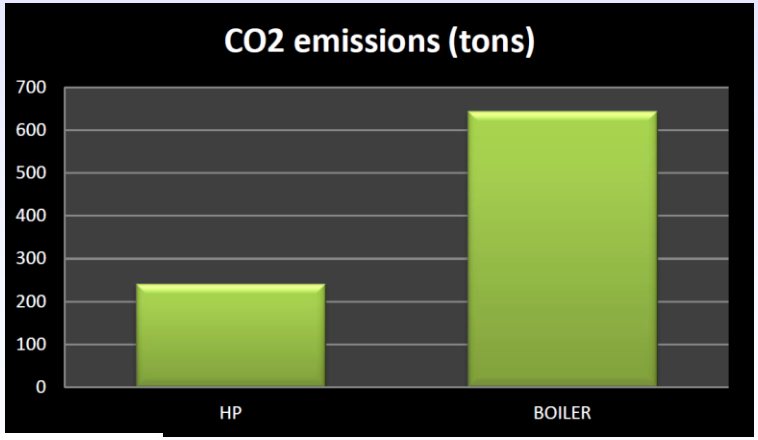
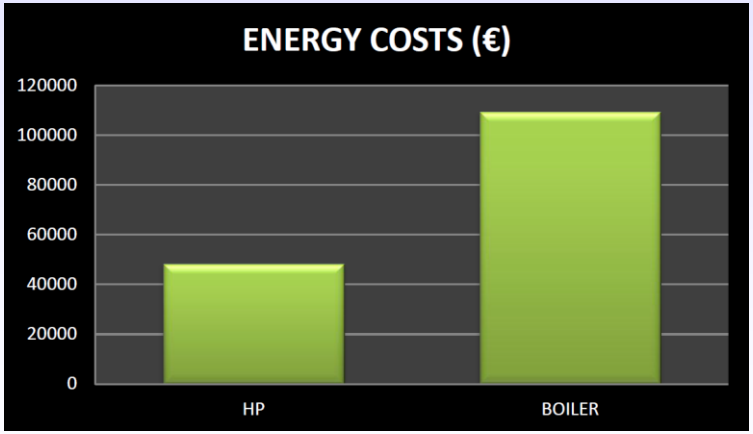
OPERATION SAVINGS

	HEAT PUMP	BOILER
Performance (COP)	6,8	0,9
Hot water	375 kW	375 kW
Energy consumption primary (8760 hrs/yr)	483 MWh	365000 m3 natural gas
Energy prices	€ 100/MWh	€ 0,30 /m3
Energy costs	€ 48.300,-	€ 109.500,-
CO2 emissions	242 tons	645 tons





CONCLUSION :

ANNUAL SAVINGS :

OPERATION 61.200 €
CO2 EMISSION 403 tons
CONDENSOR-WATER + treatment)
NATURAL WASTE HEAT
CONDENSOR

INVESTMENT : €150.000
RETURN OF INVESTMENT < 3 YRS

FUNDINGS ?

HIGHER EFFICIENCY THAN COMPARABLE TECHNOLOGIES

LONG LIFE TIME (>25 YEARS)

MAINTENANCE LOW-COST

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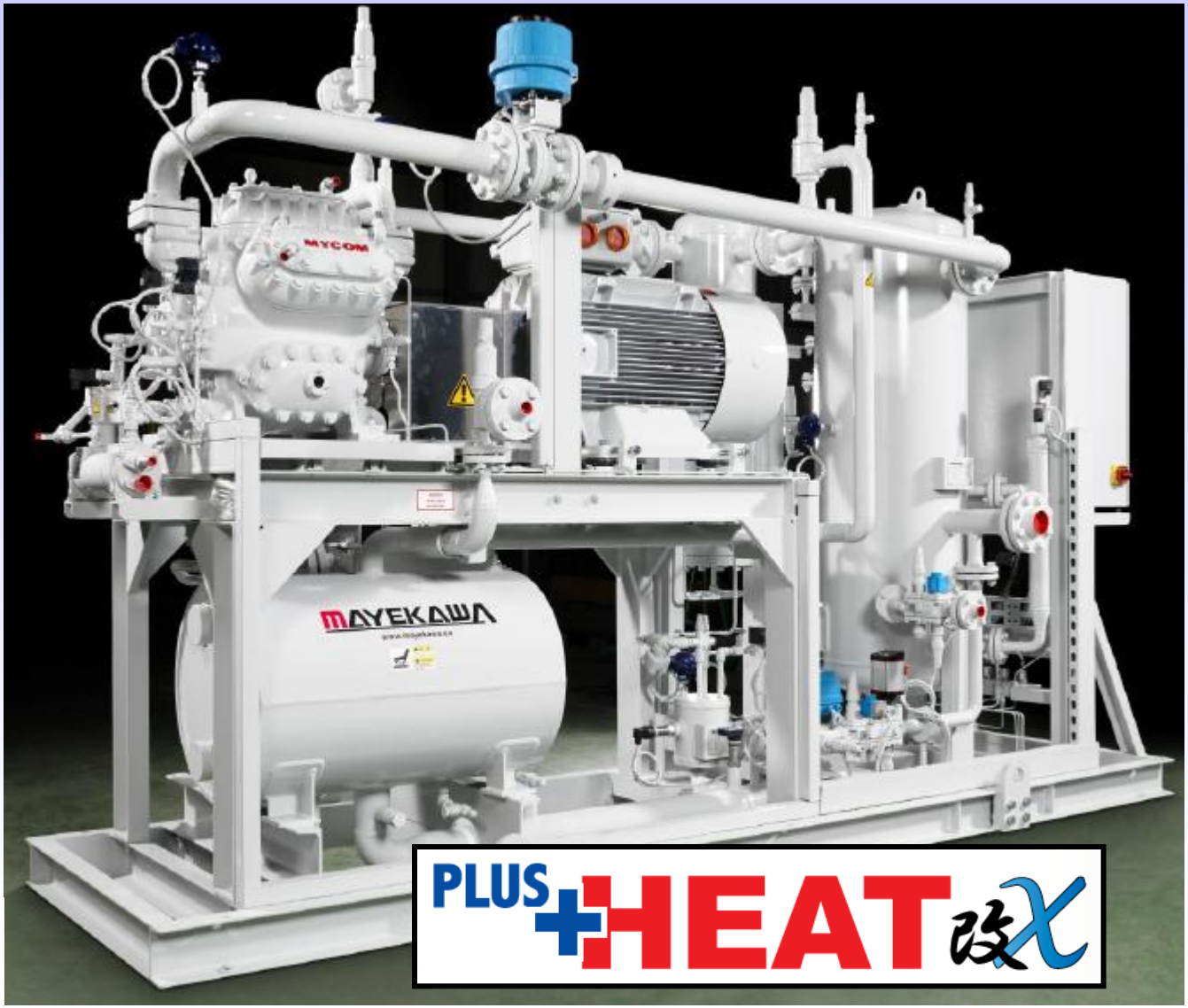
MAYEKAWA NEW STANDARD HIGH STAGE HEAT PUMP

MAYEKAWA MYCOM



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HOT WATER PRODUCTION AMMONIA HEAT PUMP

THANKS FOR YOUR ATTENTION !

special thanks to :

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EN02/2013