

ARP Food Industry, Portugal

In a Portuguese food company colibri will install a twostage ammonia-water-absorption refrigeration system. The 1st refrigeration stage provides the customer with liquid ammonia and has a capacity of 900 kW at a temperature of -34°C.

The evaporator of the 2nd refrigeration stage cools down a brine of propyleneglycol/water from 0°C down to -5°C.

The driving medium is steam of 6 bar g.

By the use of hybrid coolers for as well NH3 condensation and rejection of absorption heat huge fresh water savings will be achieved.

Model:	ARP
Refrigeration capacity LP:	900 kW at -34°C
Refrigeration capacity HP:	1.550 kW brine cooling
Brine inlet:	0°C
Brine outlet:	-5°C
Driving energy:	Steam
Steam pressure:	6 bar g
Condenser cooling:	hybrid evaporative
	condenser
Absorber cooling:	hybrid evaporative cooler
Design:	assembled in steel
	frames and mounted on
	site
Start up:	September 2009



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ABN-AmRo 42.75.21.866 IBAN: NI 10 ABN A 0427521866 BIC: ABNANI 2A



ARP Ice rink, Sweden

Colibri got the order to deliver an ammonia absorption system for a Swedish town. The refrigeration of this system is used to cool the brine for a skating rink.

The absorption system will be running with hot water of 100°C and evaporating at about -15°C. These conditions can be realized due to the cooling water temperature level.

Model:	ARP
Refrigeration capacity:	150 kW
Brine:	CaCl2-Water
Brine inlet:	-9°C
Brine outlet:	-12°C
Driving energy:	250 kW, Hot water
Hot water temperatures:	98°C/88°C
Electrical consumption:	8 kW excl. cooling towers
Condenser cooling:	cooling water
	15°C/20°C
Absorber cooling:	cooling water
	15°C/20°C
Design:	length, width, height:
	7 m x 3,5 m x 4 m
	assembled in factory
Start up:	September 2009



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ARP Food Industry, Spain

In a spanish company an absorption refrigeration plant will be installed. The plant will be driven with steam from a cogeneration plant.

The evaporator is designed as cascade heat exchanger and will condense the ammonia of the already existing compression cooling cycle. Both ammonia refrigerant cycles remain separated.

Model:	ARP
Refrigeration capacity:	800 kW
Evaporation temperature:	-12°C
Driving energy:	Saturated steam
Steam pressure:	6 bar g
Electrical consumption:	1-2 % of refrigeration
	capacity excl. evaporative
	coolers
Condenser cooling:	evaporative condenser,
	design w.b.t. 20°C
Absorber cooling:	evaporative cooler,
	design w.b.t. 20°C
Design:	length, width, height:
	3,5m x 3m x 7m
	without evaporative
	coolers
	assembled in factory
Start up:	2010



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ARP Coffee industry 1st extension, Russia

For a Russian coffee factory the 1st extension was planned and installed. Output of freeze dried coffee was doubled. Therefore it was necessary to double the refrigeration capacity.

A second solution circle, similar to the first one, was integrated into the existing system. Nearly the complete installation could be done without a stop of the existing system.

Colibri did engineering, supervision of manufacturing and commissioning of the 1nd extension of this two stage ammonia absorption refrigeration system.

Model:	ARP
Refrigeration capacity:	3.200 kW
Evaporation temperature:	-58°C, -52°C
Driving energy:	Steam of 17 barg
Electrical consumption:	52 kW excl. cooling
	towers
Condenser cooling:	evaporative condensers
Absorber cooling:	shell & tube design,
	cooling water from
	cooling tower
Design:	18 m x12 m x 15 m
	assembled on site
Start up:	Winter 2008



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ARP Supermarket, United Kingdom

In an english supermarket an absorption refrigeration plant will be installed. The plant will be driven with hot water temperatures of 120°C supply and 115°C return.

The evaporator is designed as cascade heat exchanger and will condense the ammonia of the already existing compression cooling cycle. Both ammonia refrigerant cycles remain separated.

Model:	ARP
Refrigeration capacity:	500 kW
Evaporation temperature:	-13°C
Driving energy:	960 kW, Hot water
Hot water temperatures:	120°C/115°C
Electrical consumption:	11 kW excl. cooling
	towers
Condenser cooling:	shell & tube design,
	cooling water
	24°C/30°C
Absorber cooling:	cooling water
	24°C/30°C
Design:	length, width, height:
	7 m x 3,5 m x 3,8 m
	assembled in factory
Start up:	Spring 2008



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ARP Chemical Industry, Egypt

A large german plant construction company placed the order to colibri for the delivery of the engineering package of a two-stage ammonia absorption refrigeration plant.

The plant is driven with process gas coming out of the production facilities which now can be used for the generation of the required refrigeration capacity.

The plant will be installed in Egypt and will provide the required refrigeration for a polypropylene-factory.

Model:	ARP
Refrigeration capacity:	10.000 kW
Evaporation 1. stage:	1.300 kW at -11°C
Evaporation 2. stage:	8.700 kW at +8°C
Driving energy:	Process gas
Process gas capacity:	< 19.000 kW
Process gas supply:	approx. 150°C
Process gas return:	approx. 140°C
Condenser cooling:	shell & tube design,
	cooling water from
	cooling tower
Absorber cooling:	shell & tube design,
	cooling water from
	cooling tower
Cooling water supply:	32°C
Cooling water return:	42°C
Cooling water capacity:	< 31.000 kW
Cooling water flow:	< 2.650 m ³ /h
Design:	assembled on site
Start up:	2010

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ARP Food Processing, Spain

Colibri is manufacturing an absorption refrigeration plant for a Spanish animal food processing company.

The plant will be driven by steam produced in a cogeneration plant. It will deliver refrigeration to deepfreeze equipment and will operate in parallel with four existing compressors. The evaporator of the absorption system is designed as cascade heat exchanger and will condense the refrigerant of the compression system. Both refrigerant cycles remain separated.

The plant will be delivered completely assembled.

Model:	ARP
Refrigeration capacity:	220 kW
Evaporation temperature:	-43°C
Driving energy:	Steam of 8 barg
Electrical consumption:	35 kW incl. cooling
	towers
Condenser cooling:	evaporative condenser
Absorber cooling:	evaporative absorber
Design:	length, width, height 2,5
	m x 3 m x 7 m
Start up:	April 2008



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ARP Coffee industry, Russia

For a Russian coffee factory Colibri by got the order to deliver the complete works for engineering, supervision of manufacturing and commissioning of a two stage ammonia absorption refrigeration system for the production of freeze-dried coffee.

With this two stage absorption refrigeration plant the company starts its production of freeze-dried coffee besides their already existing packaging lines.

The first stage refrigeration capacity will power air coolers for the freezing of the coffee extract. The second stage is connected to the vapor traps of the freeze drier.

ARP
1.600 kW
-58°C, -52°C
Steam of 17 barg
52 kW excl. cooling
towers
evaporative condensers
shell & tube design,
cooling water from
cooling tower
18 m x12 m x 15 m
assembled on site
Winter 2007



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ARP Coffee Industry, India

For an indian coffee factory Colibri by got the order to deliver an ammonia absorption refrigeration plant. The double-stage installation now covers the low temperature loads for as well deep freezing of coffee extract as also freeze drying of the coffee.

All components were purchased within Europe and were transported to India. Construction of buildings, erection of the (absorption-) system, cabling, testing, commissioning have been done onsite.

Model	ARP
Refrigeration capacity:	740 kW
Evaporation temperature:	-55°C, -48°C
Driving energy:	Steam of 17 barg
Electrical consumption:	30 kW excl. cooling
	towers
Condenser cooling:	evaporative condense
Absorber cooling:	shell & tube design,
	cooling water from
	cooling tower
Design:	10 m x 8 m x 15 m
	assembled on site
Start up:	January 2007



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ARP Fruit Industry, Germany

In a German fruit industry company a CHP plant driven by bio gas was installed. With the heat of the engines an ammonia absorption refrigeration plant is driven. This absorption system provides a cold storage house with the necessary cooling energy.

On site there is ground water available. So the absorption system has been equipped with plate heat condenser and plate heat absorption cooler which are run by this ground water.

The control system is designed for non attended automatic control.

Model	ARP
Refrigeration capacity:	280 kW
Brine in temperature:	-6°C
Brine out temperature:	-8°C
Driving energy:	Pressurized water
Hot water in:	110°C
Hot water out:	90°C
Electrical consumption:	15 kW
Condenser cooling:	Plate heat exchanger
	cooled by ground water
Absorber cooling:	Plate heat exchanger
	cooled by ground water
Design:	3,5 m 3,5 m x 8 m
	prefabricated module
Start up:	Dezember 2006





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ARP Ice rink, Sweden

On the Swedish island Gotland, a district heating system powered by waste heat from a cement factory has been installed. By means of an ammonia absorption refrigeration plant this heat is used to produce cold for a skating rink.

Due to altering temperatures in the district heating net the absorption system had to be designed to run with 115°C/105°C as well as with 90°C/80°C for the temperature of the hot driving water.

ARP

Model:
Refrigeration capacity:
Brine in temperature:
Brine out temperature:
Driving energy:
Summer hot water:
Winter hot water:
Electrical consumption:

Condenser cooling:

Absorber cooling:

Design:

Start up:

250 kW -7,5°C -10°C Pressurized water 115°C/105°C 90°C/80°C 15 kW (evaporative coolers not included) evaporative coolers s,5 m 3,5 m x 8 m prefabricated module November 2006



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In a German coffee factory Colibri by got the order to deliver the complete works for engineering, supervision of manufacturing and commissioning of a two stage ammonia absorption refrigeration system.

With this two stage plant, the existing freeze drying capacity was more than doubled. Colibri has also designed the complete ammonia supply system for the freeze dryers.

Due to the evaporators being located beneath the separators, pumping systems for back transport of liquid ammonia were installed.

Model:	ARP
Refrigeration capacity:	1.600 kW
Evaporation temperature:	-58°C, -52°C
Driving energy:	Steam of 17 barg
Electrical consumption:	52 kW excl. cooling
	towers
Condenser cooling:	evaporative condenser
Absorber cooling:	shell & tube design,
	cooling water from
	cooling tower
Design:	18 m x12 m x 15 m
	assembled on site
Start up:	July 2004



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ARP-C65 Petro-Chemical Industry, The Netherlands

This plant delivered by Stork Thermeq/Colibri was installed in a petrochemical factory in The Netherlands. The plant has three absorption levels (a three stage plant) and five different evaporators in which a hydrocarbon mixture is cooled down to -55°C. All absorbers and the condenser are water cooled.

The plant was assembled on site. It was a turn key project including engineering and manufacturing.

Model:	ARP-C65
Refrigeration capacity:	6.500 kW
Evaporation temperature:	-60°C, -48°C, -12°C
Driving energy:	Steam of \approx 15 barg
Electrical consumption:	52 kW
Condenser type:	shell & tube
Absorber cooling:	shell & tube design,
	cooling water from
	cooling tower
Design:	18 m x 16 m x 18 m
	(I $x w x h$) assembled on
	site
Start up:	February 2003

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