

Modern industry solutions for the future

TOUGH TIMES NEED
STABLE SOLUTIONS



The Frizo logo, consisting of a stylized blue star-like icon made of four arrows pointing outwards, followed by the word "FRIZO" in a bold, blue, sans-serif font.



Refrigeration technologies

NH3

CO2

R290

Glycol

FRIZO

Your engineer for tough times

In the conditions of drastically rising energy prices, we motivate our clients to look at investments in a transformational context. The offer of FRIZO means innovations that enable joining the group of technological leaders, guaranteeing optimization of operating costs, and thus profitability and fair building of a competitive advantage in the era of fluctuations in the energy market. A holistic view of industrial plants in a transformational context is essential - it is a bustling organism where many components are ultimately important.

Modern design of cooling installations means looking for solutions that bring energy savings and thoughtful management of waste heat and accompanying media. It is also looking for new applications, such as cascade refrigeration, combining the best sides of several refrigerants - such as in the case of the ammonia and carbon dioxide cascade, or the use of ammonia heat pumps.



MISSION

Our mission
is to rebuild
Polish engineering thought



VISION

Our vision is to become a leader
in the refrigeration market
in Europe

#1

FRIZO IS THE FIRST POLISH PRODUCER OF
AMMONIA HEAT PUMPS

OUR OWN RESEARCH AND DEVELOPMENT CENTER

We are launching a Research and Development Center dedicated to innovative refrigeration technologies where we will be also working on our own high-temperature ammonia heat pumps solutions

MODERN INDUSTRIAL PLANT

We have two modern and fully automated production halls for black steel and stainless steel, along with a line for the construction of refrigeration units.

ENGINEERING, DESIGN

We are the largest refrigeration company in Poland, employing 140 people. Our team consists of over 50 engineers. Professionalism and excellence are rooted in Frizo's DNA

Scope of specialization

PRODUCER OF REFRIGERATION EQUIPMENT

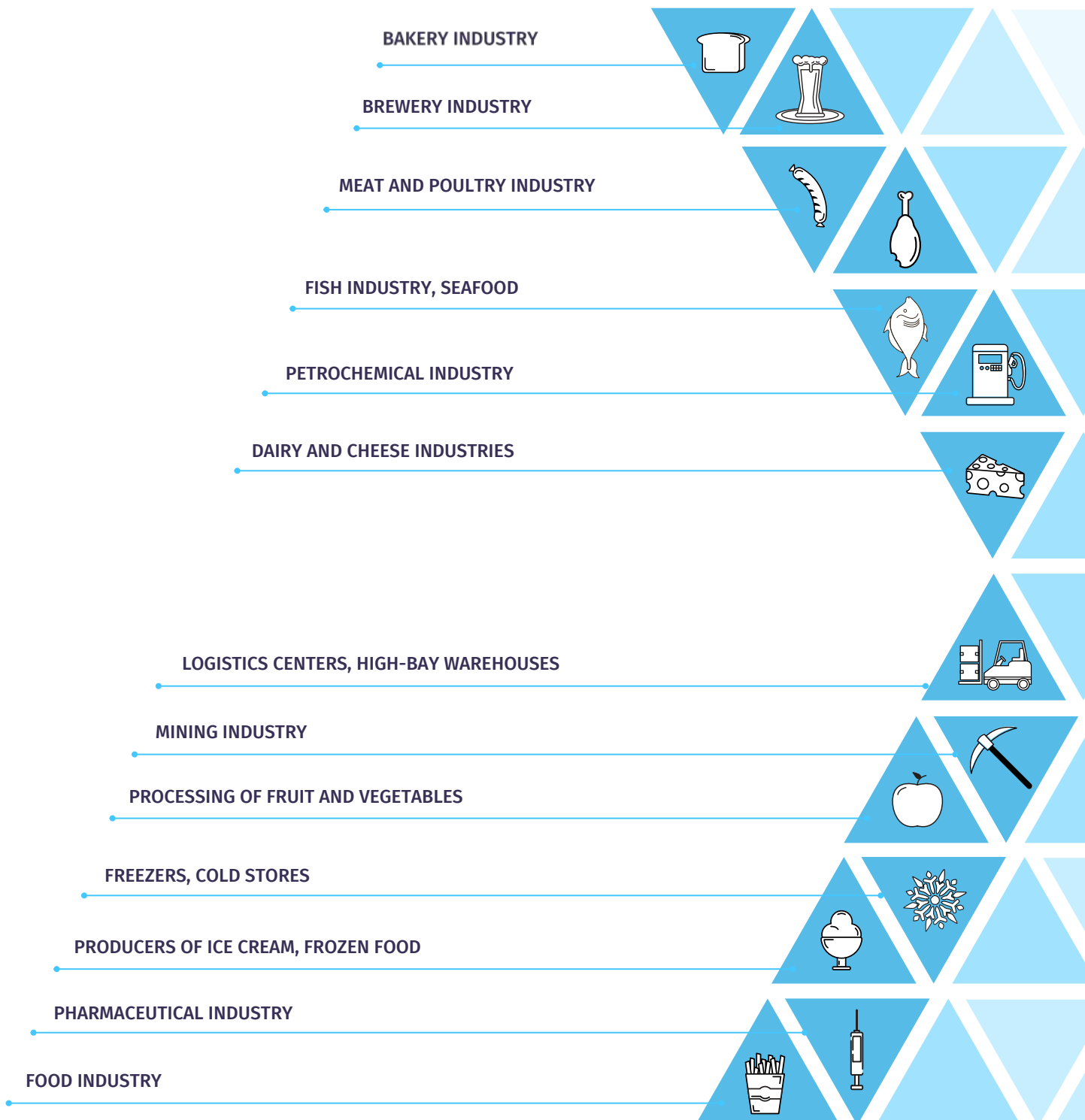
**COMPREHENSIVE DESIGN OF INDUSTRIAL
COOLING AND VENTILATION INSTALLATIONS**

**COMPREHENSIVE PERFORMANCE OF INDUSTRIAL
COOLING AND VENTILATION INSTALLATIONS**

**TECHNICAL CONSULTING
AND ENGINEERING CONSULTING**

DEDICATED 24/7 SERVICE

Get to know the industries for which we provide services



Industrial refrigeration is an area in which we operate comprehensively. Our qualified and experienced engineers are equipped with monitoring and data recording. Thanks to this, in accordance with applicable legal regulations,

Industrial refrigeration

In industrial refrigeration, we focus on reliability, offering solid systems that ensure the highest cooling parameters. By leveraging the power of advanced control systems, precise temperature monitoring and optimized energy management, we maximize efficiency and help reduce operating costs. Energy efficiency is a key element of our innovative refrigeration systems.



Climate control in the plant

Large manufacturing plants must create a clean and healthy environment for employees without compromising the quality of products or materials. Depending on your needs, we can support these activities with energy-saving and portable cooling or spot heating devices, up to stationary ventilation, cooling and dehumidification systems.



Efficient energy management systems

Energy consumption in large processing plants can account for up to 70% of fixed costs. Refrigeration processes can consume up to 85% of the energy used in a plant. For this reason, FRIZO focuses on an approach we call energy eco-modernization. When designing an installation for your plant, we will ensure the highest energy optimization.

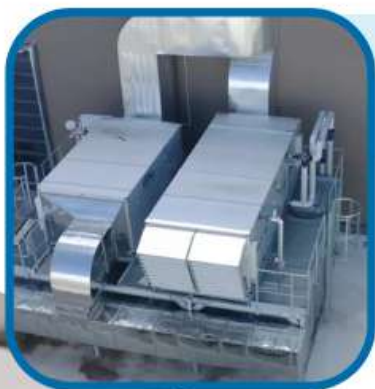


Freezing rooms, cold storage, distribution centers

Thanks to Frizo's solutions, frozen and chilled food will remain in the highest quality without any loss of taste or structure. Ultimately, the energy efficiency and ecology of our solutions in the form of, among others, the use of ammonia as a refrigerant - is our absolute priority.



Engineering and technical staff guarantees the design and implementation of computer-controlled systems, so the ammonia installations we design can be operated maintenance-free.



Industrial ventilation

Poor air quality not only affects the unfavorable changes in raw materials and products, but also affects the human body in production rooms, as well as the condition of the building. FRIZO offers comprehensive ventilation and air conditioning systems used in production halls of plants. It is necessary to maintain an appropriately low temperature and local ventilation, e.g. to eliminate unpleasant odors in production halls. Room air conditioning systems ensure appropriate air quality by eliminating pollutants and additionally ionize the air.



Heating installations and heat recovery

Industry uses large amounts of thermal energy to produce steam for disposal, sterilization and cleaning. That's why Frizo offers heating systems that are extremely reliable and energy-efficient. Skillful management of waste heat from the refrigeration installation is the key to achieving gigantic savings given the current ratio of gas prices to electricity prices.



Industrial dehumidification

Excess or lack of water in any air molecule can interfere with the preservation of perishable goods, whether in a cold room, freezer or production line. In other words, it is necessary to keep the amount of water in the air under control. Maintaining relative humidity at the ideal point for storing meat products is our priority.



Thermal insulation

To maintain low temperatures in production and technological processes, thermal insulation with appropriate parameters, made of polyurethane and synthetic rubber, is used. Temperature control and the prevention of thermal bridges are essential for products where an increase or decrease in temperature would negatively impact freshness, quality or safety.

Packaged air-cooled ammonia chillers based on screw compressors, with a 290–1,500 kW capacity range

Ammonia air-cooled chillers are based on plate-and-shell evaporators with integrated liquid separator, microchannel air-cooled condenser and screw compressors. Frequency converter and panel solutions are supplied as standard. Units are designed with a low ammonia charge basis. There are 6 different standard models in this range high- and low-temperature versions. Units are for outdoor installation so no need for the ammonia machine room.



OPTIONS

- Variable-speed drive (VSD)
- Soft-starter or Y/D starter
- Control panel mounted separately
- Economiser option
- Integrated cascade heat exchanger for subcritical CO₂ low-temperature application



Scan the QR code and watch the video from Chillventa Fair, where we presented SKADI chiller to the world for the first time

TECHNICAL DATA - PACKAGED AIR-COOLED AMMONIA CHILLERS

FEATURES	BENEFITS
Factory assembled package unit based on the most efficient compressors	Package design ensures low unit and installation cost
Compact design with small ammonia charge and minimised footprint	No need for an expensive machinery room
Combined flooded evaporators with integrated liquid separator	Small refrigerant charge with the competitive cooling effect
Natural refrigerant Ammonia R717	Can be provided with an additional integrated cascade heat exchanger for subcritical CO2 (R744) low-temperature application
High COP and part load performance (compressors on VSDs)	Efficient microchannel air cooled condenser

ALL DATA AND NOMINAL CAPACITIES KW AT 3550 RPM.
OUR UNITS ARE WITHIN THE SCOPE OF ECO-DESIGN, IMPLEMENTED ACCORDING TO REGULATION NO 2015/1095

Model	Compressor type	Number of compressors	Nominal capacities* in kW (Evaporation temperature)			COP			Unit dimensions in mm*		
			-11,0oC	-8,0oC	3,0oC	-11,0oC	-8,0oC	3,0oC	L	W	H
SKADI A 1S-0.5-3.7	Screw	1	295,4	334,5	510,8	2,78	2,99	3,73	5280	2300	3000
SKADI A 1S-0.7-4.4	Screw	1	368,4	418	642,2	2,92	3,23	4,43	5396	2500	3000
SKADI A 1S-0.8-4.5	Screw	1	441,8	501,3	769,9	2,95	3,26	4,47	6528	2500	3159
SKADI A 2S-1.0-3.7	Screw	2	590,8	669	1021,6	2,78	2,99	3,73	6827	2680	3159
SKADI A 2S-1.3-4.4	Screw	2	736,8	836	1284,4	2,92	3,23	4,44	7850	2680	3283
SKADI A 2S-1.5-4.5	Screw	2	883,6	1002,6	1539,8	2,95	3,26	4,47	7959	2680	3283

* NOMINAL CAPACITIES CALCULATED AT +45OC CONDENSING TEMPERATURE

Packaged water-cooled ammonia chillers based on screw compressors, with a 315–3,200 kW capacity range

Packed ammonia water-cooled chillers are based on plate-and-shell heat exchangers (evaporator with integrated liquid separator and combined condenser with integrated oil cooler) and the screw compressors. Frequency converter and panel solutions are supplied as standard. Units are designed with a low ammonia charge basis. There are 9 different standard models in this range high- and low-temperature versions. Units are for outdoor or indoor installation (outdoor option with external housing).



Options:

- Variable-speed drive (VSD)
- Soft-starter or Y/D starter
- Control panel mounted separately
- Economiser option
- Integrated cascade heat exchanger for subcritical CO2 low-temperature application

TECHNICAL DATA - PACKAGED WATER-COOLED AMMONIA CHILLERS

FEATURES	BENEFITS
Factory assembled package unit based on the most efficient compressors	Package design ensures low unit and installation cost
Compact design with small ammonia charge and minimised footprint	No need for an expensive machinery room in outdoor installation option.
Combined flooded evaporators with integrated liquid separator and combined water cooled condenser with integrated oil cooler.	Small refrigerant charge with the competitive cooling effect
Natural refrigerant Ammonia R717	Can be provided with an additional integrated cascade heat exchanger for subcritical CO ₂ (R744) low-temperature application
High COP and part load performance (compressors on VSDs)	Efficient combiner condenser with integrated oil cooler and/or desuperheater and sub-cooler

Model	Compressor type	Number of compressors	Nominal capacities* in kW (Evaporation temperature)			COP			Unit dimensions in mm*		
			-11,0oC	-8,0oC	3,0oC	-11,0oC	-8,0oC	3,0oC	L	W	H
SKADI W-1S-0.5-4.4	Screw	1	316,5	357,3	541,4	3,38	3,61	4,36	3200	2300	2500
SKADI W-1S-0.7-5.5	Screw	1	397,7	449,5	683,5	3,78	4,15	5,52	3200	2300	2500
SKADI W-1S-0.8-5.6	Screw	1	476,8	538,9	819,4	3,82	4,18	5,57	3200	2300	2600
SKADI W-1S-1.1-4.5	Screw	1	626	706,5	1070	3,46	3,69	4,46	3600	2500	2600
SKADI W-1S-1.4-5.6	Screw	1	791,7	894,6	1359	3,86	4,23	5,63	3600	2500	2800
SKADI W-2S-1.6-5.6	Screw	2	953,6	1077,8	1638,8	3,82	4,18	5,57	3800	2680	2800
SKADI W-2S-2.1-4.5	Screw	2	1252	1413	2140	3,46	3,69	4,46	3900	2680	2800
SKADI W-2S-2.7-6.3	Screw	2	1583,4	1789,2	2718	3,86	4,23	6,34	4000	2680	2800
SKADI W-2S-3.2-4.7	Screw	2	1900,6	2144	3244,8	3,65	3,89	4,70	4300	2680	2800

ALL DATA AND NOMINAL CAPACITIES KW AT 3550 RPM.

OUR UNITS ARE WITHIN THE SCOPE OF ECO-DESIGN, IMPLEMENTED ACCORDING TO REGULATION NO 2015/1095

* NOMINAL CAPACITIES CALCULATED AT +45oC CONDENSING TEMPERATURE



Chillers with R290 refrigerant and integrated free cooling module

Refrigeration units operating on the basis of the environmentally friendly R290 refrigerant, also known as propane, are modern cooling devices designed for process cooling installations. They offer exceptional efficiency, precise multi-stage performance control and very quiet operation. This product line includes versions tailored to a variety of investor needs, along with a wide selection of optional upgrades. The devices use plate exchangers with one or two independent cooling circuits and one water circuit. The evaporators are insulated. For safety, a differential pressure switch is installed that turns off the compressors in the event of lack of water circulation.

OPTIONS:

- Inverter speed control of fans
- Vibration isolators
- Superheat heat recovery
- Side cover panels
- EC fans
- Soft start



TECHNICAL DATA - CHILLERS WITH R290 REFRIGERANT

FEATURES	BENEFITS
High efficiency thanks to inverter-controlled piston compressors	Hydraulic module for heat recovery
Natural propane refrigerant (R290) with low GWP=3	Silent version
High efficiency EC axial fans (standard)	Capacity regulation of all compressors
Compact size	Quality of workmanship - components from leading manufacturers
PLC driver	High efficiency
Propane is not corrosive	Economical refrigerant

OUR DEVICES FALL WITHIN THE SCOPE OF ECO-DESIGN IMPLEMENTED IN ACCORDANCE WITH REGULATION NO. 2015/109

5 PROPANE NOT SUBJECT TO FLUORINATED GREENHOUSE GAS REGULATIONS. WE WILL BE HAPPY TO ADVISE YOU ON HOW TO APPLY FOR FUNDING FOR REFRIGERATION UNITS POWERED BY NATURAL REFRIGERANTS

Model	Compressor type	Cooling capacity in kW*	Total power consumption	Total current consumption**	EER	SEPR***	Refrigerant
FRIZO-propane-60	semi-hermetic piston type	60,6	18,6	32,8	3,26	6,51	R290
FRIZO-propane-80	semi-hermetic piston type	84,4	27	60,6	3,13	5,43	R290
FRIZO-propane-100	semi-hermetic piston type	103	33,5	64,8	3,07	5,4	R290
FRIZO-propane-130	semi-hermetic piston type	133,3	42	74,6	3,17	5,74	R290
FRIZO-propane-150	semi-hermetic piston type	146,7	46,2	80,7	3,18	5,8	R290
FRIZO-propane-180	semi-hermetic piston type	175,7	57,2	100	3,07	6,12	R290

* ETHYLENE GLYCOL 30% 12/7°C, AMBIENT TEMPERATURE 35°C

** COMPRESSORS + FANS

***SEPR VALUE DETERMINED FOR WATER, 12/7°C

FRIZO | OUR INDUSTRIAL PLANT IN MISZEWKO NEARBY GDAŃSK

5000 m²

production area dedicated for
FRIZO solutions development

FRIZO Industrial Plant
Miszewko nearby Gdańsk

The background image shows a large industrial facility with high ceilings and yellow overhead cranes. In the foreground, there are several large, complex assemblies of pipes and valves, some mounted on metal frames. A worker in a blue shirt is visible in the lower right, working on one of the assemblies. The floor is concrete, and there are various tools and materials scattered around the work areas.

Our original solutions in the form of heat pumps and ammonia chillers are created at the FRIZO production plant in Miszewko. We have two modern and fully automated production halls for black steel and stainless steel, along with a line for the construction of refrigeration units.



Scan the QR code
and take a virtual
tour of the plant

One of the key factors that distinguishes us is our own production of valve stations. By producing them in-house, we significantly shorten the assembly time and provide high-quality, prefabricated components. Our skilled team of technicians and engineers meticulously designs and manufactures valve networks in accordance with our customers' specifications and project requirements. Prefabrication of valve stations in our production plant eliminates the need for time-consuming on-site assembly, but also minimizes the risk of errors or complications during the assembly process.

Transcritical CO2 condensing units for low temperature applications with a capacity range of 30kW - 500kW

Solid frame construction, painted with epoxy powders. The principle of operation of the standard version is based on a gravity-flooded evaporator, which allows for better temperature control and lower energy consumption. Use of a natural refrigerant such as CO2 (R744) with zero OPD, GWP = 1. Reversible version, with dedicated logic to optimize COP based on the required water temperature. Highly efficient coalescing oil separator with an inspection flange enabling periodic filter replacement.



OPTIONS:

- Heat recovery (single- or double-wall exchanger)
- Pump module for heat recovery
- Evaporator module
- Factory tanks up to 800 liters capacity
- Emergency cooling unit



TECHNICAL DATA - TRANSCRITICAL CO₂ CONDENSING UNITS

FEATURES	BENEFITS
Transcritical and/or subcritical design	A safe factor for the environment - CO ₂ is already in the atmosphere, it is non-toxic and non-flammable
High pressure safety controls	Significantly higher volumetric cooling capacities
Heat recovery module options	Leaks will not damage the products
No engine room	High performance even in large systems

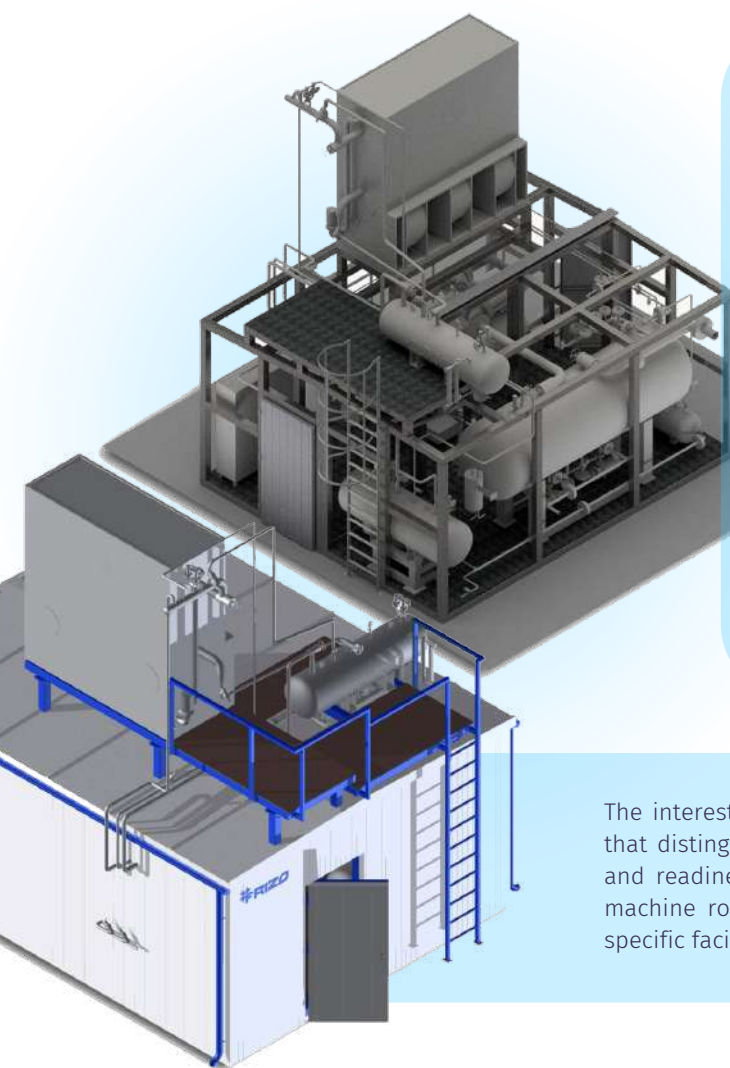
OUR DEVICES FALL WITHIN THE SCOPE OF ECO-DESIGN IMPLEMENTED IN ACCORDANCE WITH REGULATION NO. 2015/1095

Model	Cooling capacity at Te=-32°C	Cooling capacity at Te=-43°C
FRIZ-KS050	50	30
FRIZ-KS100	100	60
FRIZ-KS160	160	95
FRIZ-KS250	250	145
FRIZ-KS300	300	195
FRIZ-KS400	400	260
FRIZ-KS500	500	330

* NOMINAL CAPACITY CALCULATED AT A CONDENSING TEMPERATURE OF +45°C

Ammonia container machine rooms with cooling capacity in the range 121kW - 1000kW

Ammonia container machine rooms are technologically advanced refrigeration systems designed to produce cold for the needs of broadly understood industrial facilities. Container engine rooms are used wherever it is necessary to quickly implement an investment related to the preparation of a cooling source, its replacement or modernization. They enable obtaining full power immediately after installation, integrating them into the existing refrigeration installation of the facility, as a supplement to the cooling capacity or, most often, installing an independent refrigeration system based on the container itself. They do not require the construction of foundations permanently connected to the ground, shortening the assembly and full commissioning time to a minimum.



The interest in container monoblocks results from their special features that distinguish them from traditional engine rooms. These are mobility and readiness for quick connection in the indicated place. Each of our machine rooms, as well as its equipment, is designed each time for a specific facility, in accordance with the arrangements with the investor.

PROPOSALS FOR THE USE OF AMMONIA REFRIGERATION MACHINE ROOMS

Fig a. - a new complete cooling system for a new or existing facility

Fig. b. - supporting system - for one or several selected cold consumers, e.g. high-bay freezer, freezing or cooling tunnel, plate freezers, etc.

Fig. c. - supplementing the missing cooling capacity for the existing installation

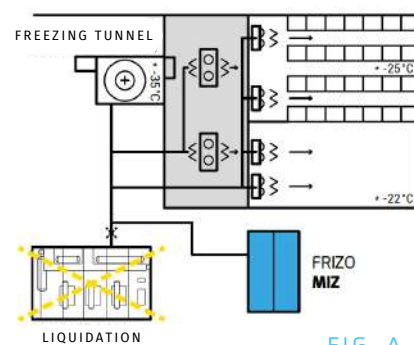


FIG. A

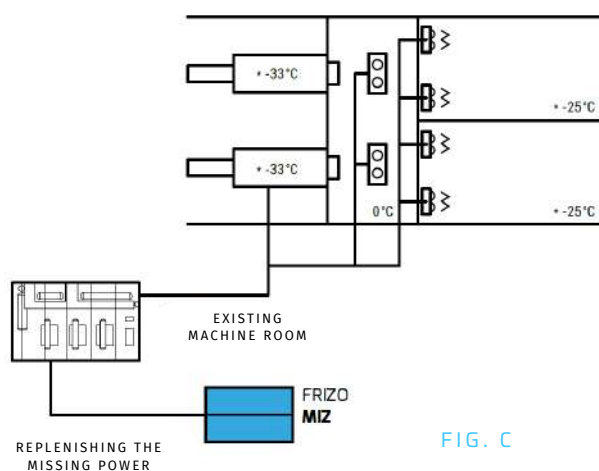


FIG. C

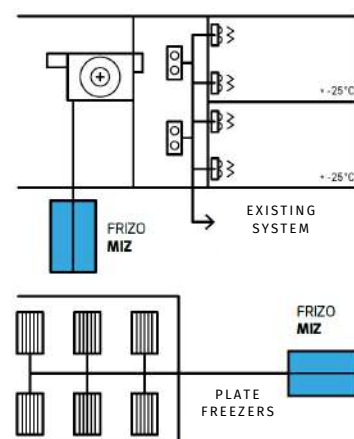


FIG. B

WE OFFER THREE TYPES OF OUR PRODUCTS, DIFFERING IN EFFICIENCY. BELOW WE PRESENT THEIR SELECTED CHARACTERISTICS:

Group	Model	Cooling capacity Q_0	Evaporation temp. of the refrigerant t_0	Evaporation temp. of the refrigerant t_k	Installed electrical power of monoblock refrigeration equipment	Annual savings compared to an equivalent freon installation*
Group I	MIZ-1	121 [kW]	-35°C	+35°C	78 [kW]	77,6 k Euro/year
	MIZ-2	156,6 [kW]	-35°C	+35°C	96 [kW]	95,8 k Euro/year
	MIZ-3	202 [kW]	-35°C	+35°C	122 [kW]	121,3 k Euro/year
Group II	MIZ-4	286,8 [kW]	-35°C	+35°C	172 [kW]	171 k Euro/year
	MIZ-5	375,5 [kW]	-35°C	+35°C	215 [kW]	214 k Euro/year
	MIZ-6	489 [kW]	-35°C	+35°C	289 [kW]	287,5 k Euro/year
Group III	MIZ-7	2x286,8 (573,6) [kW]	-35°C	+35°C	333 [kW]	331,2 k Euro/year
	MIZ-8	2x375,5 (751) [kW]	-35°C	+35°C	435,5 [kW]	433,2 k Euro/year
	MIZ-9	2x489,3 (978,6) [kW]	-35°C	+35°C	545 [kW]	542 k Euro/year

* for the calculations, an equivalent standard freon installation was assumed, annual installation operating time 6100 hours, average cost [kWh] of electricity along with a distribution fee of PLN 1/kWh

Additionally, it is possible to select the parameters of the above-mentioned products to adapt them to the customer's requirements, including retrofitting with additional modules such as heat recovery, ammonia heat pump, trigeneration system

Packaged ammonia heat pumps based on screw compressors, with a 315–3,200 kW capacity range

Packed ammonia water-cooled chillers are based on plate-and-shell heat exchangers (evaporator with integrated liquid separator and combined condenser with integrated oil cooler) and the screw compressors. Frequency converter and panel solutions are supplied as standard. Units are designed with a low ammonia charge basis. These units are designed to provide a cost-effective way to tackle needs for cooling and heating at the same time. There are 8 different standard models in this range with two condensing temperature ranges +65°C and +78°C. Units are for outdoor or indoor installation (outdoor option with external housing).

FEATURES	BENEFITS
Factory assembled package unit	Package design ensures low unit and installation cost
Compact design with small ammonia charge and minimised footprint	Easy to move even in combined space
Combined flooded evaporators with integrated liquid separator and combined water cooled condenser with integrated oil cooler.	Small refrigerant charge with the competitive cooling effect
Natural refrigerant Ammonia R717	Can be provided with ammonia/ammonia evaporator
High COP and part load performance (compressors on VSDs)	Efficient combiner condenser with integrated oil cooler and/or desuperheater and sub-cooler



OPTIONS:

- Variable-speed drive (VSD)
- Soft-starter or Y/D starter
- Control panel mounted separately
- Economiser option

TECHNICAL DATA - PACKED AMMONIA HEAT PUMPS

Model	Compressor type	Number of compressors	Nominal capacities* in kW (te:+23°C/tc:+65°C)		COP	Unit dimensions in mm		
			Evaporator	Condenser		L	W	H
HEATIUM 1S-0.3-4.6	Screw	1	293,2	307,0	4,61	3200	3100	2300
HEATIUM 1S-0.6-4.8	Screw	1	598,3	633,6	4,83	3600	3200	2300
HEATIUM 1S-1.0-5.1	Screw	1	902	974,6	5,06	3800	3200	2300
HEATIUM 1S-1.8-5.1	Screw	1	1625,6	1817,3	5,10	4150	3200	2300
HEATIUM 2S-1.2-4.8	Screw	2	1196,6	1267,2	4,83	4400	3400	2300
HEATIUM 2S-1.9-5.1	Screw	2	1804	1949,2	5,06	4800	3400	2300
HEATIUM 2S-3.6-5.1	Screw	2	3251,2	3634,6	5,10	5200	3400	2300

Model	Compressor type	Number of compressors	Nominal capacities* in kW (te:+23°C/tc:+78°C)		COP	Unit dimensions in mm		
			Evaporator	Condenser		L	W	H
HEATIUM 1S-0.2-3.2	Screw	1	243,7	244,2	3,19	3200	3100	2300
HEATIUM 1S-0.5-3.3	Screw	1	496,5	510,7	3,32	3600	3200	2300
HEATIUM 1S-0.8-3.5	Screw	1	746,6	798,5	3,46	3800	3200	2300
HEATIUM 1S-1.5-3.5	Screw	1	1344,8	1528,7	3,49	4200	3200	2300
HEATIUM 2S-1.0-3.3	Screw	2	993	1021,4	3,32	4600	3400	2300
HEATIUM 2S-1.6-3.5	Screw	2	1493,2	1597,0	3,46	5000	3400	2300
HEATIUM 2S-3.1-3.5	Screw	2	2689,6	3057,4	3,49	5400	3400	2300

* NOMINAL CAPACITIES CALCULATED AT +35°C CONDENSING TEMPERATURE

* DIMENSIONS CAN VARY DEPENDING ON THE SELECTED OPTION

Types of glycol valve stations, diameters DN25 ÷ DN50 – version 1

Construction of valve stations:

- ball valves with electric drives from Belimo
- balancing valves from Oventrop / Danfoss / IMI
- stainless steel service ball valves- screwed connections
- stainless steel pipelines, grade 1.4301 (304)
- Hilti / Korff / Walraven cooling pipe clamps
- structures for valve stations made of galvanized steel
- drip trays under valve stations made of stainless steel, grade 1.4301 (304)
- each drip tray with a drain valve - ball, stainless
- ends of pipelines secured with plastic caps
- valve stations (up to 5 pcs.) mounted on a special structure prepared for transport
- valve drives, temperature and pressure sensors are dismantled for transport, assembly on site by the installation contractor
- the wiring of the valve stations is the responsibility of the installation contractor

Cold propylene glycol valve stations – version 1.1

Assumptions:

- working medium: 35% propylene glycol
- density, specific heat and dynamic viscosity of the working medium were assumed for calculations at a temperature of -10 oC
- stainless steel pipelines with a roughness of 0.05 mm
- maximum unit resistance of the working medium: 50 kPa / 100 mb (500 Pa / 1 meter)
- maximum flow speed of the working medium: 2 m/s
- the choice of the appropriate size (diameter) of the valve station, tailored to the customer's needs, is the responsibility of the designer of a given installation

	Cooling capacity [kW]			
Type	Nominal pipe diameter	for $\Delta T = 3\text{ K}$ (e.g. -8/-5 oC)	for $\Delta T = 4\text{ K}$ (e.g. -8/-4 oC)	for $\Delta T = 5\text{ K}$ (e.g. -8/-3 oC)
	DN25	1 ÷ 5	1 ÷ 7	1 ÷ 9
	DN35	6 ÷ 11	8 ÷ 15	10 ÷ 19
	DN40	12 ÷ 17	16 ÷ 23	20 ÷ 29
	DN50	18 ÷ 33	24 ÷ 44	30 ÷ 55

Example of valve station selection:

Cooler with a cooling capacity of 20 kW, powered by cold 35% propylene glycol with $\Delta T = 4\text{ K}$, with defrosting of the cooler block with warm 35% propylene glycol with $\Delta T = 10\text{ K}$.

The above selection of the hot glycol valve station was made with the following assumptions:

- required heating capacity to defrost the air cooler block is 55% of its cooling capacity ($Q_{g \text{ block defrosting}} = 55\% \cdot Q_o$)
- required heating capacity to defrost the air cooler tray is 10% of its cooling capacity ($Q_{g \text{ of tray defrost}} = 10\% \cdot Q_o$)

Hot propylene glycol valve stations – version 1.2

Assumptions:

- working medium: 35% propylene glycol
- density, specific heat and dynamic viscosity of the working medium were assumed for calculations at a temperature of +20 oC
- stainless steel pipelines with a roughness of 0.05 mm
- maximum unit resistance of the working medium: 50 kPa / 100 mb (500 Pa / 1 meter)
- maximum flow speed of the working medium: 2 m/s
- the choice of the appropriate size (diameter) of the valve station, tailored to the customer's needs, is the responsibility of the designer of a given installation

	Heating capacity [kW]			
Type	Nominal pipe diameter	for $\Delta T = 10\text{ K}$ (e.g. +30/+20 oC)	for $\Delta T = 15\text{ K}$ (e.g. +35/+20 oC)	for $\Delta T = 20\text{ K}$ (e.g. +40/+20 oC)
	DN25	1 ÷ 24	1 ÷ 36	1 ÷ 49
	DN32	25 ÷ 49	37 ÷ 73	50 ÷ 98
	DN40	50 ÷ 72	74 ÷ 108	99 ÷ 144
	DN50	73 ÷ 137	109 ÷ 206	145 ÷ 275

The background of the entire image is a blurred industrial assembly line. In the foreground, a robotic arm is visible, holding a complex brass or copper component. The component has several ports and a red ring. In the background, other similar components are being assembled on a conveyor belt. The overall scene is a factory setting with various mechanical parts and machinery.

30%

The stay of the assembly team
at the customer's plant is reduced
by 30% compared
to the traditional process

80%

Our innovative approach achieves
an astonishing 80% reduction in
assembly time compared to
traditional 100% on-site processes

Selection of our projects

FROZEN FOOD PROCESSING PLANTS "IGLOTEX" SKÓRCZ



Scan the QR code
and learn the
history of this
special project



WAREHOUSE AND DISTRIBUTION CENTER "ANIMEX FOOD" TYROWO NEAR OSTRÓDA



Scan the QR code and find out
how the energy-efficient
ammonia refrigeration
installation in this plant works

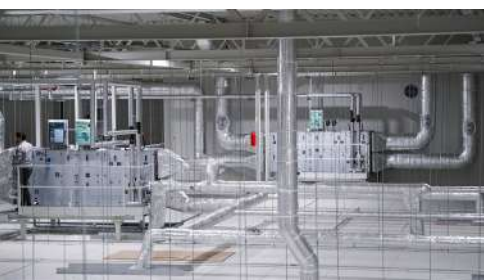




**ANIMAL FOOD PRODUCTION PLANT
"PET REPUBLIC" IN KOLUSZKI**



Scan the QR code
and learn about
the history of this
ecological plant



**FROZEN FOOD PRODUCTION PLANT AND COLD STORAGE FACILITY
"EUROGRZYB" MIĘDZYRZEC PODLASKI**



Scan the QR code and find
out how the refrigeration
installation in this plant
works



Research & Development

Appropriate technology of heat pumps or refrigeration units is important for eliminating CO2 emissions and primary energy consumption, as well as maximizing the use of renewable energy in industrial processes. Expanding industrial applications is also important to further enhance these effects. In particular, it is necessary to develop and disseminate energy-efficient and economical solutions for broadly understood industrial applications. The biggest current problem area is the lack of experimental and demonstration spaces, and the FRIZO Research and Development Center will meet this need.

FRIZO has undertaken the construction of its Original Research and Development Center, a unique space for technology development as well as for sharing knowledge and training engineers. Our goal is, among others: pioneering the development of high-temperature heat pump technologies that can meet the specific needs of industries requiring elevated output temperatures. By focusing on high-temperature heat pumps, we strive to address the unique challenges faced by industries that require process heat at temperatures beyond the capabilities of conventional heat pumps. Through extensive research, rigorous testing and collaboration with industry experts, we strive to revolutionize the field of refrigeration and heating. The establishment of the Research and Development Center underscores our commitment to remaining at the forefront of technological advancements and providing our valued customers with exceptional solutions tailored to their specific requirements.



*The FRIZO
Research & Development
Center is more than a
building - it is a symbol
of our determination
to shape a more effective
future for the industry!*

Join the group of technological leaders

Refrigeration installations are the largest consumer of electricity in the industry. However, the advantage of refrigeration systems is stability and predictability in terms of energy consumption due to the need to maintain temperature regimes. Therefore, the profitability of the final product in industry depends primarily on the energy efficiency of refrigeration installations.



Artificial intelligence solutions

With your FRIZO installation, we can provide our dedicated learning software to operate your installation in the most efficient way possible, tailored to your individual needs. Artificial intelligence offers innovative solutions such as real-time monitoring of energy consumption, maintenance aspects and diagnostics of humidity conditions, temperatures, etc. Companies are investing in automation and Internet of Things (IoT) technologies to primarily increase operational efficiency, reduce costs and ensure compliance with regulatory standards. This trend is already visible, among others, in the cold chain market, which is also benefiting from technological advances such as LoT, which allows for real-time monitoring of temperature and humidity levels during transportation and storage. Additionally, this technology helps ensure product safety and quality, reducing the risk of spoilage and waste. The speed with which artificial intelligence solutions are popularized is becoming a necessity in order to join the group of technological leaders in the industry.



Questions? Contact us.



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