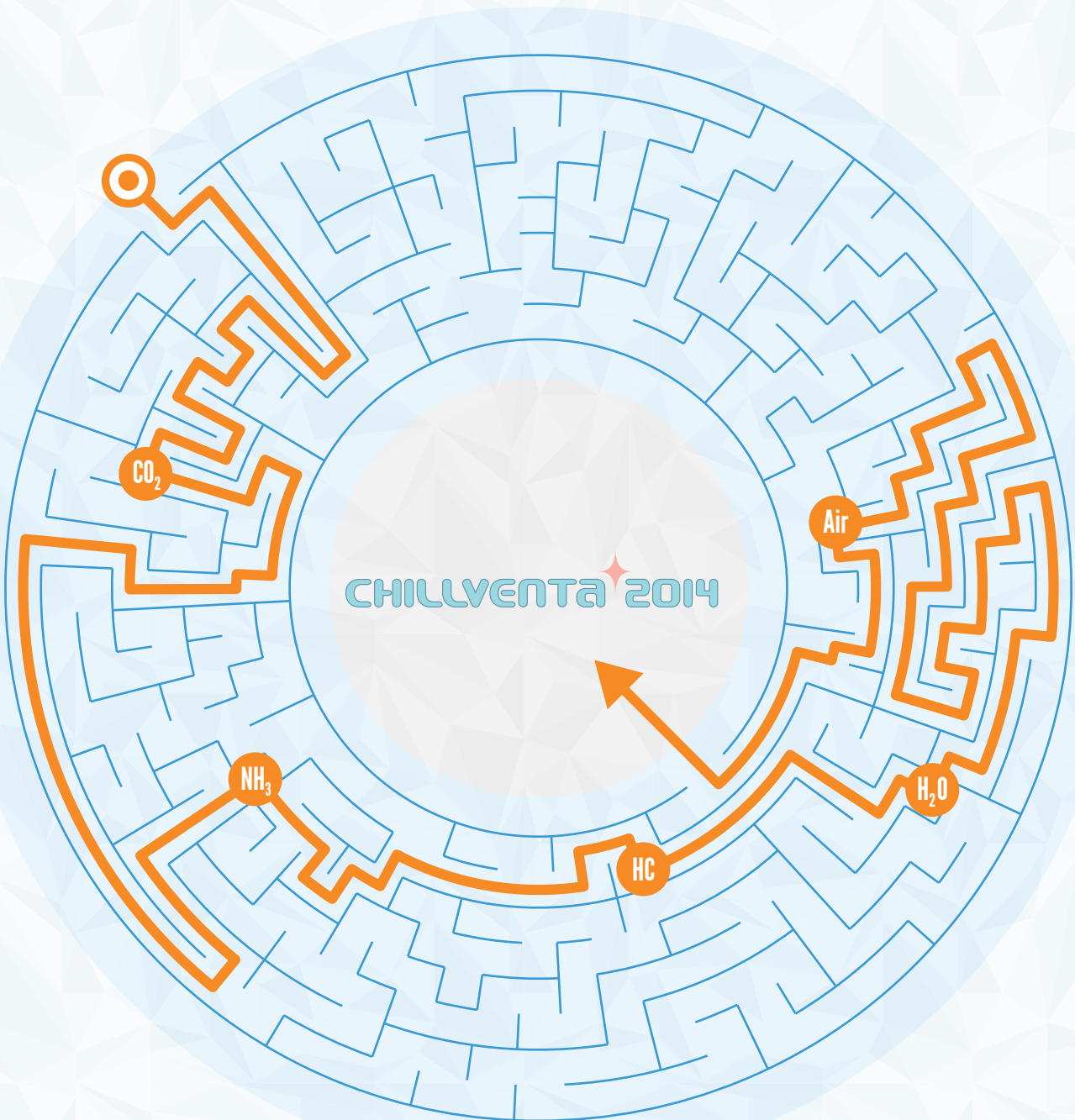




**guide**

shecco publications

## NATURAL REFRIGERANTS AT CHILLVENTA 2014



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NÜRNBERG 14.-16.10.2014  
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## WELCOME MESSAGE BY THE PUBLISHER



MARC CHASSEROT

Publisher / Managing Director

The concept of this first-ever GUIDE Chillventa is simple: connecting forward-thinking customers to the world's most advanced companies offering natural refrigerant technologies at Chillventa.

The idea stemmed from the fact that Chillventa offers one of the biggest collections of natural refrigerant technologies under one roof. Our company, shecco, as a leading publisher of worldwide news for CO<sub>2</sub>, ammonia, hydrocarbon and water-based solutions for HVAC&R, wanted to offer participants a simple tool to be able to identify these companies and their products in the many exhibition halls.

With the participation of our industry supporters, this GUIDE gives readers an overview of the 120+ companies displaying climate-friendly and energy efficient technologies and services, as well as where they are located, and, with the premium product directory, who to contact for more info. In addition, market trends and interviews provide readers with background and information on the current state of the industry.

The ultimate aim of our shecco publications such as this GUIDE Chillventa, is to advance the market for natural refrigerant technologies worldwide. For the next Chillventa, we hope to see even more companies offering innovative solutions!

## ABOUT THIS GUIDE



JANAINA TOPLEY LIRA

Editor

A new addition to shecco's popular GUIDE series, the GUIDE Chillventa 2014 provides a complete listing of everything related to the use of natural refrigerants at the Chillventa 2014 trade fair, which takes place from 14 to 16 October at its traditional Nürnberg venue. The show will gather over 1000 exhibitors, including over 120 companies providing products or services for carbon dioxide, ammonia, hydrocarbons and water as refrigerants, a testament to the leadership role that European companies are playing in driving the market uptake of climate and ozone friendly working fluids.

It is hoped that this GUIDE will maximise the value of trade fair participation for those people interested in or already working with natural refrigerants, by indicating all company booth locations and seminars relevant to CO<sub>2</sub>, NH<sub>3</sub>, R290, R600a and R718. In collaboration with its supporters, the GUIDE Chillventa also provides a showcase for a range of state-of-the-art natural refrigerant systems and components on display at the Nürnberg Messe.

This publication is divided into the following sections:

**ABOUT NATURAL REFRIGERANTS:** Reviews the chemical, physical, technical and environmental properties of carbon dioxide, ammonia, hydrocarbons, water and air, the most commonly used natural working fluids.

**NATURAL REFRIGERANT MARKET TRENDS:** Summarises European market trends for key natural refrigerant applications as well as the impact of European Union regulations and standards.

**EXCLUSIVE INTERVIEWS:** Provides insight into what's "hot" a Chillventa from some of the leading natural refrigerant industry providers.

**EVENTS PLANNER:** Outlines the presentations devoted to natural refrigerants, within the full technical conference programme held during and the day before Chillventa opens.

**HALL MAPS:** Shows the locations of all the natural refrigerant-relevant companies, providing participants with the information they need to create a tailored, self-guided tour through the exhibition space.



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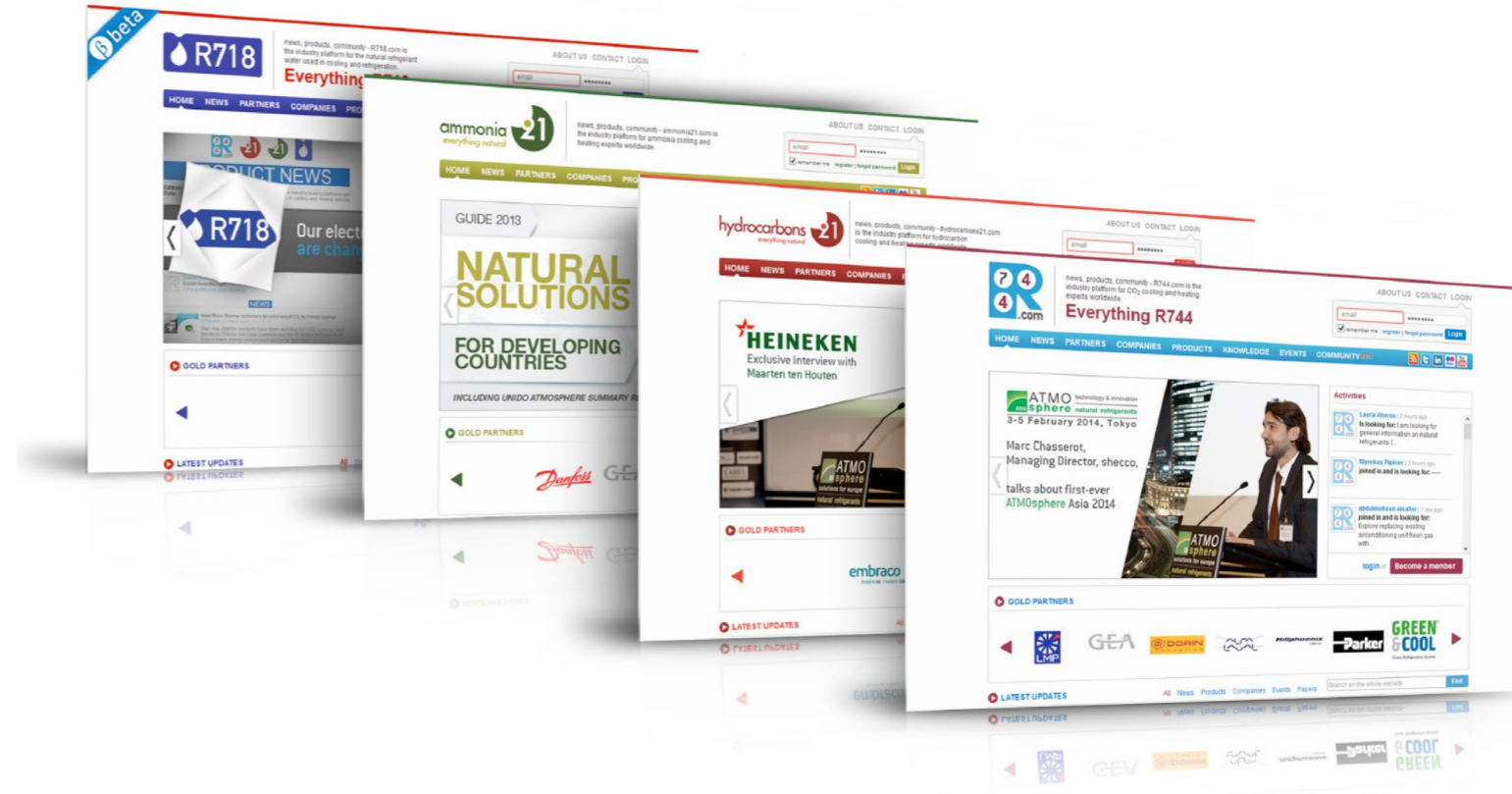
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# GUIDE CHILLVENTA 2014 SUPPORTERS

## NATURAL REFRIGERANTS AT CHILLVENTA

This project was supported by



### YOUR INDUSTRY NETWORK FOR NATURAL REFRIGERANTS

The world's only industry websites for the natural refrigerants carbon dioxide (CO<sub>2</sub>, R744), hydrocarbons (HCs, R600a, R290 etc.), ammonia (NH<sub>3</sub>, R717) and water (H<sub>2</sub>O, R718).



From the number one publisher of natural refrigerant information, our websites feature a unique mix of News, Products, Events and a Community, attracting 10,000+ regular readers, including CEOs, Technical Directors, Refrigeration Engineers, End Users, Marketing and Sales Managers, Policy Experts and more.

The ultimate aim of our B2B industry platforms is to advance the market for natural refrigerants worldwide.

### PARTNERSHIP PROGRAMME

To support companies in promoting their climate-friendly refrigeration, air conditioning and heating solutions to an international audience, we offer a 12-month partnership programme for each of the websites. Included in partnership: logo visibility, articles written about the company's products and services, email newsletter campaigns highlighting your company, designated product pages with sales links and more.

Over 100 Partners have joined our partnership programme to:

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If you would like to raise your company's visibility and showcase your innovative products and solutions to thousands of experts worldwide, contact us and join as a partner!

### CONTACT US

For benefits and pricing contacts us at:

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King of Cold



Refrigeration Excellence since 1962



ZANOTTI *is working for our future*

NATURAL REFRIGERANTS  
FOR NATURAL SOLUTIONS

NH<sub>3</sub>

R290

R744

R1270

ZANOTTI *is working for our future*



# NATURAL REFRIGERANTS FOR NATURAL SOLUTIONS

Zanotti Spa since 1962 designs and produces refrigerating units to cool, preserve and transport food stuff. Zanotti is a world leader and the company's success is based on the constant research conducted to technologically improve energy saving efficiency and to find customized solutions aimed at meeting customer demands.

Under the name of King of Cold, Zanotti offers products developed to cover the whole cold chain for food industry, with customisable solutions and latest technologies for "Green solutions". The diesel unit completes the cooling series with its split battery system or others, which were specifically designed for the short, medium and long distance food transportation.

Zanotti will be exhibiting new products at Chillventa using technologies that meet all of the new expectations of the market, that is to say, increased efficiency, new natural gases and Ecodesign features. Energy efficiency is the key equipment feature that all markets are looking for. As far as fluorinated gases are concerned, Zanotti has, as a matter of fact, been producing products, which use all natural gases. Zanotti has been manufacturing products for the last 4-5 years in accordance with Ecodesign protocols, which provide for the total recyclability of machines at the end of their lives and production protocols.

Zanotti is offering a range of monoblocks for wall or ceiling applications with refrigerants having very low environmental impacts (GWP = 3), such as Propane R290 or Propylene R1270 for the use with medium volume cells for fresh or frozen product preservation. The company has already been producing these blocks for some years. These monoblocks use hermetic compressors (only with R290) or semi-hermetic compressors (both R1270 as well as R290), air or water condensation, ATEX components, and remote type control/ command panel. The duties of the current range from 1000 to 4000 watts.

For the first time in the food refrigeration market, Zanotti is proposing the monobloc running with CO<sub>2</sub> (R744) for medium and large volume cells. This

gas has a GWP1 value so it is totally "green", with ODP= 0, thus solving the various problems caused by the polluting gases used in industrial refrigeration. It is a compact-type group and has all the features and advantages of the "plug and play" monobloc, i.e. quick installation and ready to use.

In the specific case, the plant system has been manufactured for use on low temperature cells, in the interior, the use of a semi-hermetic, dual-stage compressor with an intercooler, in a transcritical cycle is foreseen. The duty supplied by the group is 8500 Watts, provided to a -20 ° C cell and +30 ° C external environment.

When refrigeration units are needed to preserve foodstuffs where the traditional power grid is not present, one possible solution is to produce the needed electricity through solar energy.

For applications of this type, Zanotti offers a ready-to-use, monoblock refrigeration unit to preserve fresh products that runs on direct current and can be mounted on a small cell (7-8 m<sup>3</sup>). The unit is totally autonomous and controlled electronically.

This monoblock unit is capable of operating even in traditional electric mode (possibly powered by generators) as well as connected to photovoltaic panels and storage batteries.

The cooling capacity for a 0°C cell with a +30°C external environment is 1300 Watts.

It is a brand new product that is the result of totally environmentally sustainable research and technical innovation.

Zanotti also manufactures a multicompressors rack CO<sub>2</sub> (R744) refrigeration system equipped with 3 independent double-intake compressors and common exhaust. With semi-hermetic compressors for operating in a transcritical cycle for medium temperature applications for fresh product preservation, mounted on an open frame for machine rooms, completed with oil separator, liquid receiver, heat exchanger for flash gas, liquid sub-cooling and safety system to increase plant efficiency.

The main limit to use CO<sub>2</sub> is that it has a low critical temperature that limits its use to either cooler climates or requires the need for complex cascade circuits.

The transcritical cycle solves this problem, because it's a type of technology that permits the use of CO<sub>2</sub> in any area of the world, in both hot or cold climates.

ZANOTTI Spa has always been responsive to environmental impact and energy consumption of its products and industrial plants. The new generation of ZANOTTI "Green Industrial Plants" provides high performance utilizing screw compressors with speed control and variable internal volume ratio for high efficiency.

The ZANOTTI "BESTCOP" control system ensures the maximum efficiency of the compressors during the running period in all season. As a result the ZANOTTI "Green Industrial Plants" have always the maximum COP and an excellent ESEER values.

The respect for the environment is evidenced by the new refrigeration units running with Ammonia and CO<sub>2</sub>. This solution is, at the moment, the only one that satisfy the International rules regarding new refrigerants.

Ammonia (NH<sub>3</sub>) was historically one of the first refrigerant used in the construction of refrigeration plants and equipment, it has a very high latent heat of evaporation, it is a natural compound and it is widely known and used because of its high characteristics thermodynamic, the excellent ability to thermal transport heat, which allows to obtain the highest coefficients of performance (COP) and the low purchasing cost (also for the necessary type of oil)

ZANOTTI "Green solutions" is the answer to obtain optimal cooling solutions for all requirements with maximum sustainability, efficiency, energy costs and reliability ■



# ABOUT NATURAL REFRIGERANTS

**As a general differentiation, “natural refrigerants” are substances that exist naturally in the environment, while “non-natural refrigerants” or “synthetic refrigerants” are man-made chemicals, not naturally occurring in the environment. The precision of the term “natural refrigerants” is sometimes debated, given that, to be used as refrigerants, ammonia, carbon dioxide, and hydrocarbons also undergo an industrial purification and manufacturing process.**

However, today there is a well-established distinction between substances whose chemical properties and safety aspects have been studied in their entirety and those fluorinated gases which, given their chemical complexity and comparatively short period of usage, have confirmed and/or have unknown negative effects on ozone depletion, global warming and ecological safety, and therefore, are subject to continued debate.

The most commonly used natural refrigerants today are ammonia (NH<sub>3</sub>, R717), carbon dioxide (CO<sub>2</sub>, R744), and hydrocarbons (HCs), such as propane (R290), iso-butane (R600a), and propylene, also known as propene (R1270).

Mixtures of ammonia and dimethyl ether (R723) have been developed, as well as various hydrocarbon blends with optimised performance and safety properties (isobutane/propane; R441 etc.). Water and air are also used, to a lesser extent, for example in adsorption chillers and deep-freezing applications.

In addition to their wide availability, their non-toxicity, non-flammability and their unbeatable environmental credentials, water and air have shifted into the focus of R&D activities. Natural refrigerants no longer in use are sulphur dioxide (SO<sub>2</sub>) and methyl chloride (CH<sub>3</sub>Cl).

### CARBON DIOXIDE (ODP= 0; GWP= 1)

Carbon dioxide (chemical symbol CO<sub>2</sub>, refrigerant designation R744) is colourless, odourless and heavier than air. With a Global Warming Potential (GWP) = 1, CO<sub>2</sub> is the reference value for comparing a refrigerant’s direct impact on global warming.

Carbon dioxide carries an A1 safety classification (the same as most fluorocarbon refrigerants), indicating that it has low toxicity

and is non-flammable. CO<sub>2</sub> as a refrigerant is sourced as a by-product from a number of production methods. Although it is nontoxic, if enough carbon dioxide builds up in an enclosed space, it will begin to displace oxygen. Over a certain period of time, this can cause asphyxiation of those present. With a long atmospheric lifetime, CO<sub>2</sub> does not lead to any byproduct formation or decay products with serious environmental impact.

When used as a refrigerant, carbon dioxide typically operates at a higher pressure than fluorocarbons and other refrigerants. While this presents some design challenges, they can be overcome in systems designed specifically to use carbon dioxide. Carbon dioxide is compatible with some, but not all, commonly used refrigeration system lubricants. In particular, it is not suited for use with polyol ester (POE) and poly vinyl ether (PVE) lubricants and it only has limited applications with polyalkaline glycol (PAG) lubricants. It is generally regarded as a cheap and easily available refrigerant.

### AMMONIA (ODP= 0; GWP= 0)

Ammonia (chemical symbol NH<sub>3</sub>, refrigerant designation R717) is a colourless gas at atmospheric pressure. With zero ozone depletion and global warming potential, as well as a short atmospheric lifetime, it does not form any by-products or decomposition products with negative environmental impact. It is compatible with some, but not all, commonly used refrigeration system lubricants. In particular, it is not suited for use with polyol ester (POE) and poly vinyl ether (PVE) lubricants, and it only has limited applications with polyalkylene glycol (PAG) lubricants.

Despite its undisputed energy efficiency benefits, the use of ammonia is restricted in certain applications and geographic regions, due to its toxicity and flammability. As a result, R717

is effectively prohibited from use inside occupied spaces but can be used in unoccupied areas or outside.

However, many advances have been made in recent years to minimise risks for human health, particularly for ammonia installations in populated areas. These advances include using ammonia in conjunction with other refrigerants, such as in secondary systems, in order to reduce and isolate an ammonia charge, using advanced safety equipment, deploying containment casings, or using ammonia absorption systems.

It is important to note that ammonia has a strong odour, making leaks easy to detect. The additional safety equipment required will obviously increase costs; however, manufacturers claim that operational energy and maintenance savings potentially outweigh the higher initial outlay in the long run.

### HYDROCARBONS (ODP= 0; GWP< 4)

With zero ozone-depleting characteristics and an ultra-low global warming impact, the group of hydrocarbons (HCs) does not form any by-products or decomposition products in the atmosphere.

HC refrigerants can be applied either in systems designed specifically for their use, or as replacements in a system designed for a fluorocarbon refrigerant.

This makes them a cost-competitive solution, and optimal for developing countries. If a hydrocarbon refrigerant is to be used in a system designed for a different refrigerant, it should be noted that modifications are probably required to ensure compatibility. Lubricant compatibility and the issues associated with hydrocarbons’ flammability have to be addressed. However, the greatest potential for

hydrocarbon refrigerants lies in new systems.

Hydrocarbon refrigerants are flammable and, as a result, carry an A3 safety classification, which means they have a low toxicity but are in the higher range of flammability. HCs are often subject to stricter safety requirements concerning the quantities permitted in occupied spaces.

Hydrocarbon refrigerants are fully compatible with almost all lubricants commonly used in refrigeration and air conditioning systems. One major exception to this rule is lubricants containing silicone and silicate (additives which are commonly used as antifoaming agents).

### WATER (ODP= 0; GWP= 0)

Water (chemical symbol H<sub>2</sub>O, refrigerant designation R718) is one of the oldest refrigerants used for refrigeration applications. Also known as dihydrogen monoxide, water or water vapour is one of the Earth’s most abundant elements. Water has been extensively used as a process fluid (distillation, drying processes), as a heat transfer or energy storage medium (central heating, system cooling, ice storage systems) and as a working fluid in the Rankine power generation cycle. R718 is an environmentally safe refrigerant with zero ozone depletion potential and zero global warming potential. It is odourless, colourless, nontoxic, non-flammable, non-explosive, easily available, and it is the cheapest refrigerant.

In refrigeration applications, water requires state-of-the-art technology. Its use as a refrigerant has been mostly limited to compression chillers with steam injection compressors, absorption systems built around a binary fluid comprised of lithium bromide as the absorbent and adsorption systems using water as the refrigerant and the mineral zeolite as the adsorbent.

From an environmental and thermodynamic point of view, water is an ideal refrigerant for applications above 0°C. R718 has a higher latent heat of evaporation (2,270kJ/ kg) than other natural refrigerants. R718 absorbs significantly larger amounts of energy, in the form of heat, during a change of phase from liquid to gas, without a change in temperature. An obvious limitation is the high freezing rate at atmospheric pressure. Water leads to corrosion and oxidation of many metals. Water is more reactive than other refrigerants and choosing the right materials or the R718 system during the design phase requires special attention.

### AIR (ODP= 0; GWP= 0)

Air (refrigerant designation R729) is a refrigerant that is environmentally benign, cheap, totally safe and nontoxic. Environmental concerns about ozone depletion, global warming, and increasingly stringent legislation have renewed the interest in alternative refrigeration technology globally. However, the use of air cycle refrigeration systems is not new. It was

used on refrigerated cargo ships around the turn of the last century.

Air cycle refrigeration works on the reverse Brayton or Joule cycle. Air as a refrigerant does not undergo phase change (condensation/evaporation) at the temperature levels encountered in conventional refrigeration applications. The COP value of air is low because of its light weight, but air cycle cooling systems can provide relatively high temperature heat recovery without the efficiency set back experienced by vapour compression systems. Air cycle units, compared to vapour-compression units, can also produce a much higher temperature difference between the hot and cold sides. As a result, very cold air can be produced for near cryogenic processes. The performance of an air cycle unit does not deteriorate as much as that of a vapour-compression unit when operating away from its design point.

When operating in a refrigeration cycle, an air cycle unit can also produce heat at a useful temperature. Air has been used commercially for aircraft cooling for a long time. In spite of the low COP, air is used because of the specific operating conditions of aircraft (e.g., availability of compressed air and ram effect) and stringent specifications (e.g., low weight, small size, absolute safety, zero toxicity, etc.). Air has also been used as a refrigerant for residential and automobile air conditioning and cooling. In some refrigeration plants, air is used in the quick freezing of food products.

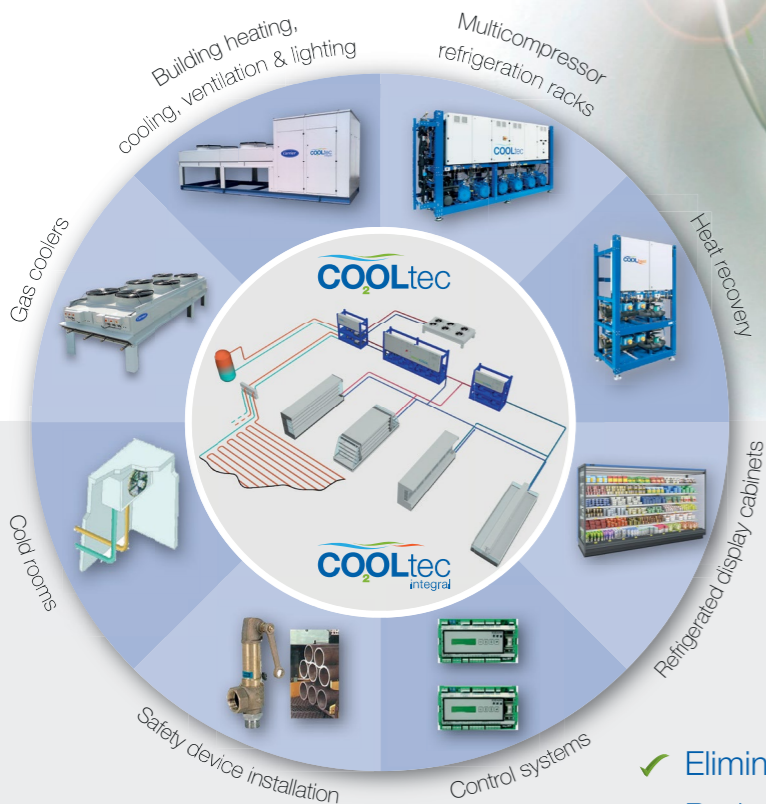
REFRIGERANTS	REFRIGERANTS NUMBER	CHEMICAL FORMULA	GWP (100 YEARS)	ODP	NORMAL BOILING POINTS (°C)	CRITICAL TEMPERATURE (°C)	CRITICAL PRESSURE (BAR)	SAFETY GROUP	MOLECULAR WEIGHT (G/MOL)
Ammonia	R717	NH <sub>3</sub>	0	0	-33.3	132.4	114.2	B2	17.03
Carbon dioxide	R744	CO <sub>2</sub>	1	0	-78	31.4	73.8	A1	44.0
Propane	R290	C <sub>3</sub> H <sub>8</sub>	3.3	0	-42.1	96.7	42.5	A3	44.1
Isobutane	R600a	C <sub>4</sub> H <sub>10</sub>	4	0	-11.8	134.7	36.48	A3	58.12
Propylene	R1270	C <sub>3</sub> H <sub>6</sub>	1.8	0	-48	91	46.1	A3	42.08
Water	R718	H <sub>2</sub> O	0	0	100	373.9	217.7	A1	18
Air	R729	-	0	0	-192.97	-	-	-	28.97



# NATURAL LEADERS IN SUSTAINABILITY

**At Carrier, we incorporate sustainability into all that we do. To us, it's only natural.**

From innovative solutions to green factories to services developed to increase efficiency, Carrier is a leader in sustainability. We pioneered the use of natural refrigerants in the food retail world, and continuously invest in research and development to improve our products and processes while protecting the natural environment.



Carrier's CO<sub>2</sub>OLtec<sup>®</sup> Integral system uses natural refrigerant CO<sub>2</sub> for refrigeration, heating and space cooling.

- ✓ Eliminates the need for traditional heating systems
- ✓ Reduces greenhouse gas emissions by up to 58%
- ✓ Delivers up to 35% energy savings

vs. R404A systems with gas boiler

## GUIDE CHILLVENTA 2014 - MARKET TRENDS

The European market for natural working fluids is buoyant, with over 400 European companies providing components, systems and services linked to the use of CO<sub>2</sub>, ammonia, hydrocarbons and water as refrigerants in the refrigeration, heating and air conditioning sectors.

### A preference for CO<sub>2</sub> confirmed by major European retailers: will R744's success continue into the heating and mobile air conditioning sectors?

Worldwide, the number of retailers using CO<sub>2</sub> refrigeration technology is constantly growing, with Europe leading this trend. Latest figures indicate a minimum of 2,885 stores use transcritical CO<sub>2</sub> refrigeration systems in Europe and that 1,639 stores use CO<sub>2</sub> / HFC cascade systems. Research by shecco, the leading publisher of natural refrigerant news worldwide, suggests that in just two years the number of CO<sub>2</sub> transcritical commercial refrigeration systems has increased by 117%. What is more, almost two-thirds of large supermarkets in Germany, France, Denmark, Norway and the UK confirm that they now use natural refrigerants in their stores<sup>1</sup>.

The recently adopted EU F-Gas Regulation, introducing EU-wide bans on HFCs in certain sectors is expected to further increase demand for natural refrigerant-based systems in Europe and beyond. Some of the major system manufacturers expect that Europe will see over 6,000 CO<sub>2</sub>-only stores annually by 2018, with more and more installed in Southern Europe, as solutions for warmer climates become increasingly available<sup>2</sup>.

For many large food retailers, who have an average technology investment cycle of 14 years, CO<sub>2</sub> systems are considered to have achieved parity with HFCs in terms of return on investment and life-cycle costs. For example, data from one CO<sub>2</sub> transcritical store in Norway indicates that the system reduces energy consumption by 30%, compared to similar supermarkets in the same chain that use HFC refrigeration systems. The gap between CO<sub>2</sub> and HFC systems' initial capital cost and investment is also narrowing and will be bridged as development gains pace.

In the light commercial refrigeration sector, The Coca-Cola Company has decided to phase out HFCs by adopting CO<sub>2</sub> technology and has already installed over 1 million units globally, a large number of these in Europe.

The growing trend towards CO<sub>2</sub> doesn't stop with commercial refrigeration. Following the success of CO<sub>2</sub> heat pump technology in Japan, where 600,000 units are sold on average each year, manufacturers in Europe are hoping to reach annual sales of tens-of-thousands by 2015.

For CO<sub>2</sub>, mobile air conditioning (MAC) is a final application area seeing significant development activity. Leading OEM (Original Equipment Manufacturers) Daimler has, since 2013, stood firmly behind its decision to develop CO<sub>2</sub> MAC systems<sup>3</sup>.

### Hydrocarbon freezers and fridges: the future-proof solution for FMCG and supermarket chains

Alongside CO<sub>2</sub>, hydrocarbon refrigeration systems represent another growth market for natural refrigerants. Outside the domestic refrigeration market, where hydrocarbons have become the standard refrigerant, more and more companies are investing in low temperature freezers using R290. Perhaps the biggest player in this market, Unilever has already purchased over 1 million hydrocarbon units and plans to purchase 1.3 million by 2015. Supermarket chains are also investing in this technology, with German retailers such as Lidl and Aldi Süd having purchased over 40,000 freezer cabinets using hydrocarbons in 2013<sup>1</sup>.

Whilst The Coca-Cola Company has chosen CO<sub>2</sub> as its preferred option for its cooler fleet, companies like Heineken and Red Bull have purchased over half a million hydrocarbon fridges and coolers between them.

For heat pump applications, R290 remains a niche application, but is considered a good technology for the residential renovation market, as a substitute for gas or oil boilers.

### Ammonia, the stalwart of the industrial refrigeration sector

In Europe, about 95% of large industrial applications use ammonia, a situation expected to continue over the next decade, although reduced charge NH<sub>3</sub> / CO<sub>2</sub> solutions will become increasingly competitive. Other key technological trends, besides minimising refrigerant charge through cascade systems or innovative heat exchangers, include increased efficiency by means of frequency control, advanced valve control systems or multi-stage systems, as well as heat recuperation and improved safety features.

Applications that rely on ammonia refrigeration include food processing plants such as dairies, bakeries, slaughterhouses, ice cream and chocolate manufacturers, breweries and fishing vessels. Whilst such NH<sub>3</sub> refrigeration systems are commonplace, ammonia is also thought to have a significant market potential in industrial heat pump applications using waste heat to provide space heating or process heat in large scale applications such as waste treatment, the automotive sector, chemical industry or metal processing. District heating using ammonia is also gaining popularity. For example, several hundred ammonia heat pumps have been installed in Norway since the early 1990s.

As with CO<sub>2</sub> and hydrocarbons, changes in legislation represent a significant opportunity for ammonia growth in the refrigeration market. In this respect, the ban on R22 that will enter into force in 2015 in Europe, will require cold stores, warehouses, ice rinks and food and beverage processing facilities to switch to ozone and climate friendly alternatives, such as ammonia.

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## Enhancing **energy efficiency** and enabling the industry to achieve **refrigerant goals**

Affordability, safety and environmental concerns are the cornerstones of **sustainability**

Danfoss encourages the further development and use of low-GWP refrigerants to help slow – and ultimately reverse – the process of global warming. Our goal is to ensure continued global well-being and economic development along with the future viability of our industry.

Meet Danfoss experts at Chillventa 2014. They are ready to offer advice and guidance on the refrigerants and technologies of both today and tomorrow.

Visit us at Chillventa 2014 booth 102, hall 4.

For more information, please visit [www.refrigerants.danfoss.com](http://www.refrigerants.danfoss.com)

ENGINEERING  
TOMORROW

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## EXCLUSIVE INTERVIEWS

### INDUSTRY LEADER INSIGHTS INTO THE LATEST NATURAL REFRIGERANT TECHNOLOGIES

Ahead of Chillventa 2014, shecco publications interviewed Alessandro Greggio of Carel, Group Head of Marketing – Retail & Refrigeration; Giovanni Dorin, Marketing Manager at Dorin; Pedro Ollala of Huayi Compressor Barcelona, Vice General Manager Sales & Purchasing; Eric Delforge of Mayekawa Europe, Corporate Business & Policy Officer and Nicola Pignatelli, Sales Director, SCM FRIGO. In the following section of this GUIDE, these industry-leading companies reveal their product showing at Chillventa 2014 and how they think the natural refrigerant market has evolved in the last 6 years, since the first Chillventa in 2008. Increasing product energy efficiency demands, together with retailers asking for natural refrigeration solutions for small convenience stores and warm climates, have created a dynamic market for natural refrigerant technologies, spurring rapid product innovation.





**Nicola Pignatelli**  
Sales Director  
SCM Frigo S.p.A.

**What natural refrigerant products have you chosen to showcase at Chillventa and why?**

Due to the company vision to be "a leader in the production of refrigeration systems with natural refrigerants", SCM FRIGO will present at Chillventa 2014 its latest generation of CO<sub>2</sub> boosters for supermarket applications, our Emerald line. We think that CO<sub>2</sub> boosters are the most efficient systems today in this sector, capable to perform well in various climate scenarios, according to the latest technology.

**What are the key product features and how do they help end users save energy and money and/or change the market?**

With experience of more than 1000 CO<sub>2</sub> units installed, SCM FRIGO has arrived to develop the latest generation of CO<sub>2</sub> boosters, focusing especially on the end user's needs: easy management, easy maintenance, easy to install. Also, there is the possibility to install it outside with our sound-proof container box. Energy saving is guaranteed by inverters by leading compressors and heat recovery availability.

**How do you think the natural refrigerant product offering at Chillventa has evolved over the last few last years?**

At the beginning of this journey, almost 10 years ago, there were very few components available and only prototypes for parts such as valves and exchangers. Moreover, not all the players really believed in CO<sub>2</sub>'s growth potential. It was a "development phase". At Chillventa 2012, 90% of the producers were CO<sub>2</sub> or natural fluids-oriented and most of the news was related to either CO<sub>2</sub>, NH<sub>3</sub> or propane etc. So the components market became ready and system producers started the "optimisation phase".

**What other components for CO<sub>2</sub> / hydrocarbons / ammonia / water / air does SCM FRIGO manufacture?**

SCM FRIGO also produces Water Chillers with CO<sub>2</sub> as the refrigerant in our Amethyst line. They are compact chillers for outdoor installation (with an integrated condenser).

**For which region in Europe do you see the biggest growth/interest for NatRef products?**

The future will be green all around Europe. We are improving our export of natural refrigerant products to all European countries, a forecast of +40% next year, from Spain to the Baltics, and Norway to Italy. Today, it is possible to find the right/efficient/reliable CO<sub>2</sub> system for any geographical area in Europe.

**What influence has the new F-Gas Regulation on your business?**

The F-Gas regulation influence can be positive for our business because it is increasing the interest of installers and end users for natural refrigerants, even in countries where natural refrigerant products have not been considered as an alternative so far.



**Eric Delforge**  
Corporate Business and Policy Officer  
MAYEKAWA EUROPE

**What natural refrigerant products have you chosen to showcase at Chillventa and why?**

Aside from solutions for our core business of industrial refrigeration applications we also display our capability in industrial heating solutions. Mayekawa will even occupy a prominent space at the European Heat Pump Association booth to showcase industrial heating applications. The reason for this choice is obvious: as a leading industrial solutions provider for combined cooling and heat pump applications using natural refrigerants we want to underline our capabilities and the fact that we are ready to fulfill the fast growing need for industrial heating solutions.

**What are the key product features and how do they help end users save energy and money and/or change the market?**

There are many, but I can highlight one that both saves money and will change the market. It is the introduction of semi-hermetic compressor/motor blocks. This combination enables efficient part load operation and best in class permanent magnet motors. Furthermore, this physical integration eliminates what was formerly a potential problem: shaft seal refrigerant leakage. This is a game changer, especially for ammonia applications.

**How do you think the natural refrigerant product offering at Chillventa has evolved over the last few last years?**

It has been Mayekawa's mission to promote natural refrigerants in industrial applications for decades. Because of their proven energy efficiency, this hasn't been too hard. The challenge though is to multiply this logic to smaller applications such as commercial and eventually domestic markets. This is exactly what is happening now. More and more manufacturers are discovering the multitude of natural refrigerant offerings, with astounding energy efficiencies and combined with unmatched environmental advantages.

**What influence has the new F-Gas Regulation on your business?**

Since its introduction it triggered a lot of demand for information from new customers and novel applications. Mayekawa is benefiting from having been at the forefront of defending natural refrigerants. For instance the majority of old R22 installations that will be replaced by natural refrigerant based technology (NRBT) from now on will be a real challenge to keep up with, but we are prepared.

Many entrepreneurs being faced with the question of which refrigeration technology to choose will realise that taking into account that the new F-Gas Regulation, they are facing a real HFC phase down scenario. As a result they need to choose long term, sustainable and energy efficient solutions, and this will ultimately mean choosing natural refrigerants.

## CAREL Retail Sistema Range, integration and ease of use for natural refrigerants.



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Tel. (+39) 049.9716611 - Fax (+39) 049.9716600 - e-mail: carel@carel.com

carel.com



**Alessandro Greggio**  
Group Head of Marketing – Retail & Refrigeration  
CAREL INDUSTRIES S.p.A.

### What natural refrigerant products have you chosen to showcase at Chillventa and why?

CAREL will showcase a complete portfolio of solutions for natural refrigerants, including the pR300T, the flagship of our pRack range of CO<sub>2</sub> rack controllers. This is further complimented with the 140-bar high pressure range of valves for both gas coolers and system flash gas bypass management.

The comprehensive EEV range of valves on show is suitable not only for CO<sub>2</sub> applications but also for ammonia and hydrocarbons.

CAREL continues to drive developments for wider acceptance of natural solutions in warmer climates, with parallel compression and ChillBooster for adiabatic cooling.

Moreover, we are investing in enabling the use of CO<sub>2</sub> even in smaller capacity applications, and making vertical solutions available for compact racks and condensing units (pR100T, E2V-C).

Today, Carel offers a one-stop solution for the rack system, including dual compressor suction, on-board dual valve driver capabilities with built in Ultracap technology to ensure the high pressure valves close in the event of system power failures. All of these built-in features and functions benefit customers significantly in terms of CAPEX in electrical switchboards, as no additional controllers, wiring, solenoids or battery backup solutions are needed.

Last but not least, CAREL Heos and Hecu groundbreaking refrigeration system that will be on show will soon embrace natural refrigerants and are already providing an amazing 80% reduction in supermarkets' refrigerant charge (Heos) together with ultimate energy efficiency and food temperature stability.

### What are the key product features and how do they help end users save energy and money and/or change the market?

The industry has been continuously investing in reducing and eliminating the gaps that can undermine or delay the introduction of CO<sub>2</sub> as a refrigerant in commercial refrigeration.

At CAREL, we have achieved good results by largely simplifying system installation and operation both at a field level and in terms of remote monitoring: touch graphic user interfaces for rack control, full integration and high-grade remote dashboards are all available and unique to CAREL.

### For which region in Europe do you see the biggest growth/interest in natural refrigerant products?

As we know, CO<sub>2</sub> is already well established in northern Europe, and we can say that the technology is already suitable, however not yet widely used in central Europe.

The next technical and commercial challenges and interest will be in more southern latitudes, where parallel compression and ejectors will play a key role.

Europe is also an example and source of solutions for other regions, such as the Americas and Asia.



**Giovanni Dorin**  
Marketing Manager  
Dorin

**What natural refrigerant products have you chosen to showcase at Chillventa and why?**

Dorin has decided to focus on natural refrigeration for this edition of Chillventa and will be showcasing transcritical and subcritical compressors for CO<sub>2</sub>, a full range of compressors from 0.4 to 80 Hp for HC (ATEX), and new single stage and double stage open type compressors for NH<sub>3</sub> ranging over 80 Hp.

**Where is the product available?**

Products are regularly available through our distribution network globally and for OEMs directly from our manufacturing facility.

**How do you think your natural refrigerant product offering has evolved over the last few last years?**

Speaking about CO<sub>2</sub>, I should say that compressors now have better performance, are more compact and lightweight and are more reliable due to the decades of experience Dorin has with this technology.

**What influence has the new F-Gas Regulation on your business?**

With regards to new F-Gas Regulation, I would say that it is pushing and challenging companies to develop new solutions.

# THE POWER OF BRAINS

A machine is only as good as the engineer who built it



**CD400 SERIES – CD5000M MODEL**

Compressor CD5000M from CD400 series, for now is the largest model Dorin is producing for CO<sub>2</sub> applications. It is a 4 piston model, characterised by a displacement of 30,23 m<sup>3</sup>/h and a nominal motor power of 50 hp.

**SERIES CD**

THE WORLD'S LARGEST CO<sub>2</sub> TRANSCRITICAL COMPRESSOR RANGE.  
LEADING CO<sub>2</sub> COMPRESSION TECHNOLOGY FOR YOUR  
ENVIRONMENTALLY CONSCIOUS SOLUTIONS

**DORIN is glad to welcome you at its  
Stand 309, Hall 5 in Chillventa 2014**



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**DORIN**<sup>®</sup>  
INNOVATION

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**cubigel**<sup>®</sup>  
compressors

# THE STRENGTH OF BELONGING TO A GROUP



Huayi Compressor Barcelona, S.L is the new subsidiary in Spain of Huayi Compressor Co. Ltd , the world leading group in compressor manufacturing for household and commercial applications. Cubigel Compressors<sup>®</sup> is the brand for the light commercial refrigeration offering:

- › The most complete range of compressors and condensing units
- › Environmental and sustainable refrigeration for commercial appliances
- › European manufacturing
- › Innovation and quality

**cubigel**<sup>®</sup>  
compressors  
by  
HUAYI  
COMPRESSOR  
BARCELONA



**Pedro Ollala**

Vice General Manager Sales & Purchasing  
Huayi Compressor Barcelona S.L.

### What natural refrigerant products have you chosen to showcase at Chillventa and why?

The main product that we are presenting at Chillventa 2014 is our new U range, which has with 3 models, the NUT55CA, NUT60CA and NUT70CA, for R290 LBP applications, mainly ice cream freezers. These 3 models cover cooling capacities between 227 and 288 kcal/h with a COP of 1,80. These compressors are at this moment the most efficient in the market for this type of application. We will extend this range to other displacements and natural refrigerants like R600a. At the same time we will also present a new Variable Speed Compressor, the NLT60FSN, that works with R290 and is suitable for coolers. This particular model has a COP over 3,00 that makes it the most efficient in the market.

### What are the key product features and how do they help end users save energy and money and/or change the market?

The main market trend is to reduce the energy consumption and to use natural refrigerants, and hydrocarbons offer the best option. We have been working to improve the efficiency of our compressor by designing and manufacturing more and more efficient products. This allows the end users to reduce the cost of energy in their business and also to reduce CO<sub>2</sub> emissions to the atmosphere.

### How do you think the natural refrigerant product offering at Chillventa has evolved over the last few last years?

The first thing that has evolved in a dramatic way over the last years is the demand for compressors working with natural refrigerants; this increase has been accompanied by a reduction in energy consumption. If we look at Cubigel Compressors<sup>®</sup> in particular, we have increased our range of compressors working with natural refrigerants with the aim of covering all types of applications and markets but the main change is the efficiency level. The new U range offers an efficiency that is 65% higher with respect to the first propane compressors designed about 10 years ago.

### For which region in Europe do you see the biggest growth/interest for natural refrigerant products?

Initially the use of natural refrigerants was more common in the north of Europe, mainly Scandinavian countries and Germany, but now the countries in the south of Europe are also moving towards this option. Based on this, I would say that across Europe as a whole the use of natural refrigerants, R290 and R600a, for light commercial applications is growing.

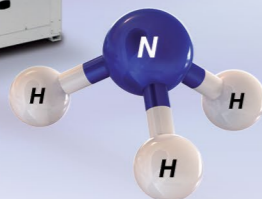
# SCM

FRIGO  
refrigerating systems

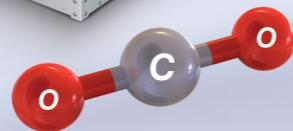
It's now time for...



**Ammonia Chiller**  
Capacity: **85 - 365 kW**



**Transcritical  
Booster System**  
Capacity: **20 - 300 kW**



## EVENTS PLANNER

**Monday 13 October | Tuesday 14 October | Wednesday 15 October**

The following Events Planner highlights presentations and events taking place during Chillventa, which will focus on or include discussions about natural refrigerants CO<sub>2</sub>, ammonia, hydrocarbons and water. With this calendar, participants are best able to plan their attendance and easily see "at a glance" where and when these presentations and events will take place.

Topics included in the below planner are: an overview of market and technology trends in the EU, North America, Japan and China, presented by Nina Masson of shecco; the state of natural refrigerants in various world regions, presented by various associations and academia; and the latest technology trends by leading manufacturers such as Bitzer, Carel, Danfoss, Emerson, Shrieve and more.

TIME*	MONDAY 13 OCTOBER CHILLVENTA CONGRESSING	TUESDAY 14 OCTOBER	WEDNESDAY 15 OCTOBER
09:30 — 09:40			<b>Title:</b> Introduction: Natural Refrigerants Throughout the World – Country Situation, Applications and Experiences <b>Presenter:</b> Monika Witt, TH. WITT Kältemaschinenfabrik GmbH <b>Location:</b> Forum in Hall 1 Stand 1-536 <b>Language:</b> English
09:40 — 10:10			<b>Title:</b> Specific political guidelines, requirements, experiences and tendencies using natural refrigerants in Kazakhstan <b>Presenter:</b> Yuri Dubodelov, SAKADA Engineering <b>Location:</b> Forum in Hall 1 Stand 1-536 <b>Language:</b> English
10:00 — 10:20		<b>Title:</b> CO <sub>2</sub> as a refrigerant – start right away! <b>Presenter:</b> Oliver Javerschek, BITZER Kältemaschinenbau GmbH <b>Location:</b> Forum in Hall 4A Stand 4A-508 <b>Language:</b> English	<b>Title:</b> What drives Ammonia in the Middle East <b>Presenter:</b> Hans Raaymakers, ADEAREST LLC <b>Location:</b> Forum in Hall 1 Stand 1-536 <b>Language:</b> English
10:20 — 10:40	<b>Title:</b> Erfahrungen mit dem Kältemittel R-290 in Seriengeräten <b>Presenter:</b> Dipl.-Ing. Reinhold Resch, AHT Cooling Systems GmbH <b>Location:</b> Room Istanbul, NCC Ost <b>Language:</b> German	<b>Title:</b> Low Global Warming Potential (GWP) refrigerants and associated next generation lubrication technology <b>Presenter:</b> Dr. Christopher Seeton, Director of Global Application Technology of the Shrieve Speciality Products Division <b>Location:</b> Forum in Hall 1 Stand 1-536 <b>Language:</b> English <b>Title:</b> A low capacity centrifugal chiller using water as the refrigerant <b>Presenter:</b> Dr.-Ing. Jürgen Süß, Chief Technical Officer / Efficient Energy GmbH (Feldkirchen) <b>Location:</b> Forum in Hall 4A Stand 4A-508 <b>Language:</b> English	
10:40 — 11:00		<b>Title:</b> Die neuesten CO <sub>2</sub> Trends für Kälteanlagen <b>Presenter:</b> Sirko Kirsten, Carel Deutschland GmbH <b>Location:</b> Forum in Hall 4A Stand 4A-508 <b>Language:</b> German <b>Title:</b> Optimizing heat recovery from industrial processes with heat pumps <b>Presenter:</b> Kenneth Hoffmann, Heating Application Manager, GEA Refrigeration Technologies GmbH <b>Location:</b> Forum in Hall 7 Stand 7-330 <b>Language:</b> English	<b>Title:</b> Ammonia and Natural Refrigerants in Turkey <b>Presenter:</b> Hüseyin M. Yüksel, Air Conditioning & refrigeration Manufactures' Association - ISKID <b>Location:</b> Forum in Hall 1 Stand 1-536 <b>Language:</b> English
10:40 — 12:00			<b>Title:</b> Compressor design between resilience, sustainability and cost effectiveness in CO <sub>2</sub> Systems <b>Presenter:</b> Sylvain Lamy, Director Refrigeration & Industrial Marketing, Emerson Climate Technologies <b>Location:</b> Forum in Hall 4A Stand 4A-508 <b>Language:</b> English
11:00 — 11:20			<b>Title:</b> The use of Ammonia and Natural Refrigerants in the USA <b>Presenter:</b> Dave Rule, International Institute of Ammonia Refrigeration (IIAR) <b>Location:</b> Forum in Hall 1 Stand 1-536 <b>Language:</b> English

TIME*	MONDAY 13 OCTOBER CHILLVENTA CONGRESSING	TUESDAY 14 OCTOBER	WEDNESDAY 15 OCTOBER
11:35 — 12:00	<b>Title:</b> R744 als Gemischkomponente für Kältemittel mit niedrigem GWP <b>Presenter:</b> Tobias Göpfert, Technische Universität Dresden <b>Location:</b> Room Istanbul, NCC Ost <b>Language:</b> German		
12:00 — 16:00			<b>Title:</b> 5 <sup>th</sup> International GIZ Proklima Expert's Day: Green Cooling – Sustainable refrigeration and air-conditioning <b>Presenter:</b> GIZ Proklima, together with the German Federal Environment Agency (UBA), supported by the Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety (BMUB) <b>Location:</b> ARVENA MESSE Hotel <b>Language:</b> English
13:40 — 14:00	<b>Title:</b> Gas Absorption Heat Pump, Ammonia-Water, Air-Source, Demonstration, Performance Prediction <b>Speaker:</b> Dr.-Ing. Constanze Bongs <b>Location:</b> Hall Shanghai, NCC Ost <b>Language:</b> English		<b>Title:</b> Natürliche Kältemittel, Blended Learning, E-Learning, Know-How-Transfer <b>Presenters:</b> Dipl.-Ing. Karsten Beermann Geschäftsführer / Direktor, IKKE and Marco Buoni, AREA and Refrigeration European <b>Location:</b> Forum in Hall 1 Stand 1-536 <b>Language:</b> German
14:20 — 14:40		<b>Title:</b> High-performance alkylbenzene lubricant technology; data report of long-term ammonia (R717) screw compressor trials <b>Speaker:</b> Manuel Munoz Alonso, Shrieve Products International Limited <b>Location:</b> Forum in Hall 4A Stand 4A-508 <b>Language:</b> English	<b>Title:</b> System Architectures and Compressor Solutions in Light of F-Gas Regulation <b>Presenter:</b> Venugopal Kandi, Product Manager Refrigeration Marketing, Emerson Climate <b>Location:</b> Forum in Hall 1 Stand 1-536 <b>Language:</b> English
14:40 — 15:00		<b>Title:</b> Natural refrigerants in food retail: An overview of market, technology and policy trends in EU, N. America, Japan, China <b>Speaker:</b> Nina Masson, Deputy Managing Director / Shecco sprl <b>Location:</b> Forum in Hall 1 Stand 1-536 <b>Language:</b> English <b>Title:</b> Trends in safety and control systems for Industrial Refrigeration systems <b>Speaker:</b> Niels P. Vestergaard, Director of Market Support for Danfoss Industrial Refrigeration <b>Location:</b> Forum in Hall 4A Stand 4A-508 <b>Language:</b> English	
15:20 — 15:40		<b>Title:</b> Semiverschweißte Hochdruckapparate für CO <sub>2</sub> und Ammoniak bis 64 barg <b>Speaker:</b> Ralf Süßmann, thermowave GmbH <b>Location:</b> Forum in Hall 4A Stand 4A-508 <b>Language:</b> German	
15:40 — 16:00			<b>Title:</b> Lösungen für Supermarktanwendungen mit R744 oder Kohlenwasserstoffen <b>Presenter:</b> Stefan Wesch, Danfoss <b>Location:</b> Forum in Hall 1 Stand 1-536 <b>Language:</b> German

\* Timing may slightly vary, please consult official technical programme on [www.chillventa.de/en/kongress/](http://www.chillventa.de/en/kongress/)



## PREMIUM PRODUCT DIRECTORY

The following Premium Product Directory is a selection of the latest natural refrigerant-based technologies on display at Chillventa, offered by the industry supporters of this GUIDE. In this directory, participants will find, arranged by hall, both components and systems for household, commercial and industrial applications.

## LEADING CO<sub>2</sub> TECHNOLOGY FOR REFRIGERATION AND HEAT PUMPS

- ENERGY SAVING AND ENVIRONMENTALLY FRIENDLY

*Advansor is an internationally leading manufacturer of sustainable refrigeration, for supermarkets, industrial refrigeration, power plants, food processing industry, chemical industry and air conditioning of office spaces, with CO<sub>2</sub> as the only refrigerant.*

- . 100% environmentally friendly
- . Non-toxic, inflammable
- . Single refrigerant applied
- . No global warming impact
- . No zone classification
- . No ozone depletion
- . Compact design
- . Low noise
- . Easy service
- . Easy installation
- . Low energy consumptions
- . Low cost of installation
- . Low cost of maintenance
- . Future proof solution

Launching  
new design!  
The compSUPER  
SIGMAS ValuePack



- . All-in-one unit – integrated cooling, freezing, air conditioning and heating
- . Compact, easy-to-install and service friendly design
- . Energy efficient performance in hot climate
- . Electrical savings: Southern Europe 6-7% (11% including heat recovery)
- . Low investment cost

MT capacity: 25-55 kW

LT capacity: 3-12 kW

AC capacity: 10-20 kW



**ADVANSOR**™  
by Hill PHOENIX

## HALL 2



Galileo TP — [www.galileotp.com](http://www.galileotp.com)

### Kion C11 (World Premiere)



Galileo TP has been manufacturing a comprehensive line of hydrocarbon equipment since 1994, including HC charging systems, complete safety management systems, ex-proof ultrasonic welders, leak detection systems, evacuation systems and more. A global market leader in the vacuum, leak detection, and refrigerant-charging domains (covering all HC & CO<sub>2</sub> needs), Galileo TP's 20 years of experience with HC installations around the world (over 600) has earned the trust of manufacturers worldwide. Galileo TP's unique, proven systems, have been widely accepted by local AHJ (Authorities Having Jurisdiction) and insurance company safety compliance underwriters, for their high reliability and documented compatibility with local norms.

Hall 2 / 2-404 — talk to Piero Poggiali

## HALL 4



Evapco Europe BVBA — [www.evapco.eu](http://www.evapco.eu)

### ATC-DC Wet/Dry Condenser



EVAPCO's new hybrid condenser, the ATC-DC, faces the challenge of significantly reducing water and energy consumption. By connecting two heat exchangers in series, this new condenser combines the advantages of an air cooled unit with an evaporative cooled unit. The hybrid condenser can operate in dry mode at lower ambient outlet temperatures and in evaporative mode during the warm season. The condensing of the hot gas begins in the ARID fin Pak™ heat exchanger of the dry cooler section and is then completed in the CROSSCOOL™ Ellipti-fin® heat exchanger of the standard condenser which provides a more efficient heat transfer by increasing the internal surface area of the coil tubes. The new ATC-DC condenser, your water and energy saver!

Hall 4 / 4-518 — talk to Michael Rabenstein or Luk Van Driessche



MAJA-Maschinenfabrik Hermann Schill GmbH & Co. KG  
— [www.maja.de](http://www.maja.de)

### Flake Ice Machines RVH CO<sub>2</sub> for R744 operation

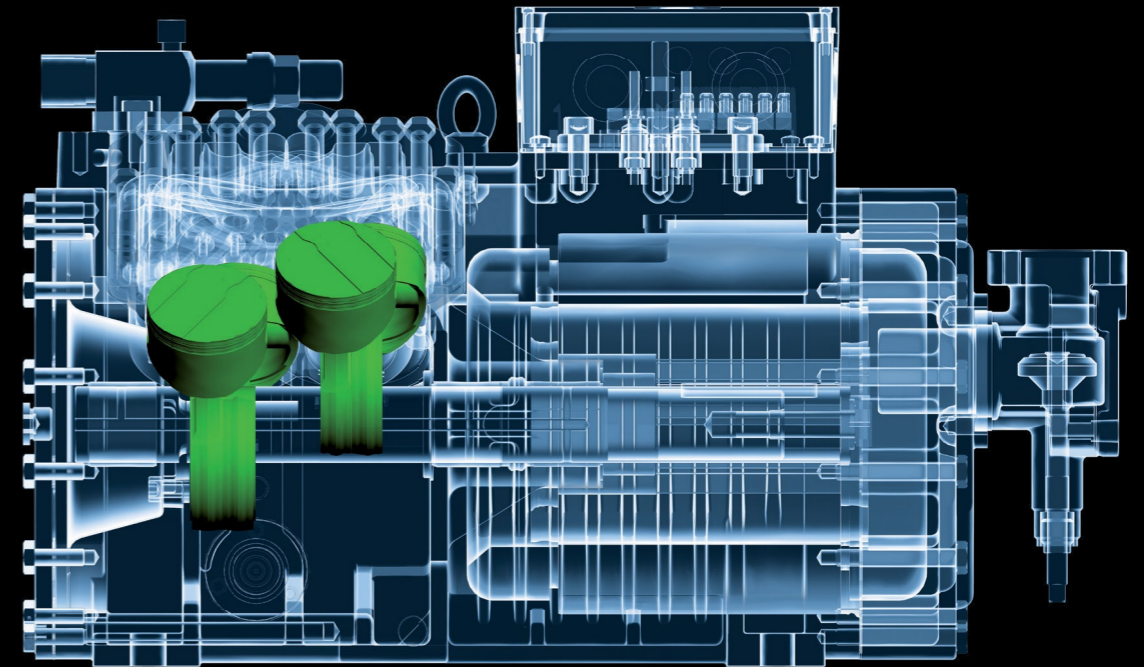


Ice output 500 – 3.800 kg / 24 h

For R744 operation with a multicompressor refrigeration unit or a separately installed condensing unit. The RVH CO<sub>2</sub> can be integrated into refrigeration projects targeting sustainability and environmental safety. Like all MAJA Flake Ice Machines, this type is labelled "HY-GEN protected", allowing for quick and easy cleaning, either by hand or automatically by the self-cleaning system MAJA-SCS (option). HY-GEN Flake Ice Machines are made for the production of flake ice under excellent sanitary conditions. The core piece of the HY-GEN sanitation principle is the evaporator tank in plastic material, which can easily be removed for cleaning.

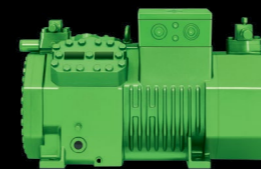
Hall 4 / 4-402 — talk to Andreas Walter

Chillventa 2014  
Hall 4, Booth 310 & 408



OCTAGON CO<sub>2</sub>

CO<sub>2</sub> AS A REFRIGERANT?  
ABSOLUTELY!



The compressor is the heart of every refrigeration system. This heart now beats for the environment – with CO<sub>2</sub>. At these high pressure levels you need a product you can rely on. As the market leader in CO<sub>2</sub> reciprocating compressors, BITZER offers quality and peace of mind – plus a broad product portfolio and services to match. When you turn to BITZER, a strong heart ensures a better life. Learn more about our products at [www.bitzer.de](http://www.bitzer.de)

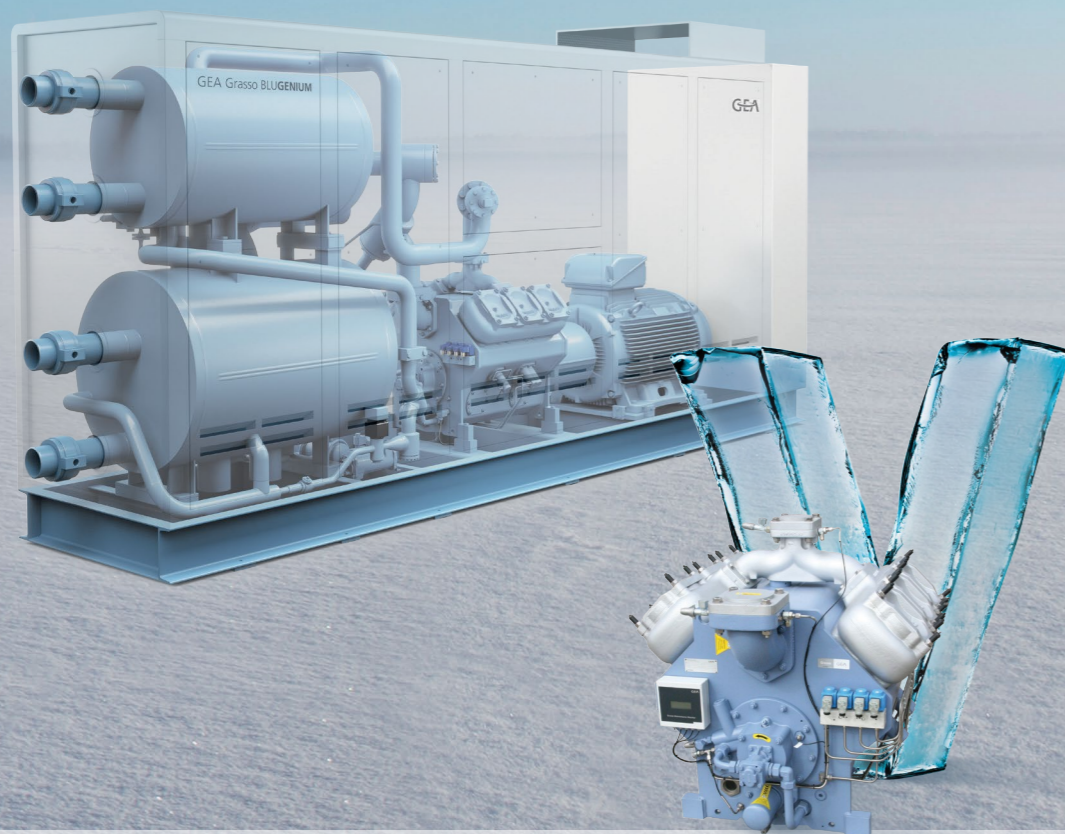


THE HEART OF FRESHNESS





High efficiency in industrial refrigeration and air conditioning with **natural refrigerant** chillers and compressors



CHILLVENTA 2014

October 14 – 16, 2014, Nuremberg  
Visit us at stand 4-316 in hall 4

With its **GEA Grasso BluGenium series**, GEA Refrigeration Technologies introduces a new line of **water-cooled ammonia chillers** based on the proven piston compressors from the **GEA Grasso V series**. Designed for long service lives and low life-cycle costs these new chillers have an impressively high ESEER value of more than nine ensuring industry leading energy efficiencies in full and part load operation.

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MAJA-Maschinenfabrik Hermann Schill GmbH & Co. KG  
— www.maja.de



**Flake Ice Machines RVH NH<sub>3</sub> for direct R717 operation**

Ice output 7.000 – 14.000 kg / 24 h

The direct operation with R717 guarantees the best efficiency, especially if big ice quantities are required. R717 is appreciated for its environmentally-friendly characteristics. Like all MAJA Flake Ice Machines, this type is labelled "HY-GEN protected", allowing quick and easy cleaning, either by hand or automatically by the self-cleaning system MAJA-SCS (option). HY-GEN Flake Ice Machines are made for the production of flake ice under excellent sanitary conditions. The core piece of the HY-GEN sanitation principle is the evaporator tank in plastic material, which can easily be removed for cleaning.

Hall 4 / 4-402 — talk to Andreas Walter



ENGINEERING YOUR SUCCESS.

Parker Hannifin — www.parker.com/race



**Sporlan CO<sub>2</sub> flow control products**

A broad range of new design transcritical CO<sub>2</sub> flow controls, including gas cooler and flash gas bypass stepper motor valves specifically engineered to supply booster, chiller, heat pump OEMs and end-users with outstanding energy saving capabilities and system life-long reliable components. The perfect complement to the Parker-Sporlan subcritical CO<sub>2</sub> product portfolio, reaffirming the brand's strong commitment to provide premium quality and overperforming technology, also when the focus is environmentally friendly solutions.

Hall 4 / 4-114 — talk to Andrea Virzi or Gordon Coates

HALL 4A



Efficient Energy — www.efficient-energy.de



**eChiller using water (R718) as the refrigerant (World Premiere)**

The eChiller is the first industrial, mass-producible chiller worldwide that uses WATER (R718) as the refrigerant. Therefore, it is not in conflict with any upcoming HFC regulation. The eChiller is an environmentally benign long-term solution for any cooling application. Plus: the innovative eChiller will cut your power consumption by 50%. The thermodynamic process with water has been implemented extremely efficiently through patented innovations. The first introduced model has a refrigeration capacity of 45 kW; units with 20 kW and 90 kW will follow soon.

Hall 4A / 4A-109 — talk to any representative



Enex — [www.enex.it](http://www.enex.it)

### Ejector Refrigeration Booster (World Premiere)



A refrigeration unit for supermarkets and cold rooms with a plug & play design, simple and reliable. Ejector liquid overfeeding improves efficiency compared to state-of-the-art products. It uses CO<sub>2</sub> (R744), a "zero" environmental impact refrigerant. The unit can operate efficiently even with high outdoor air temperature. Available in Chilling (MT) and Booster (MT/LT) versions. Several options available, among which parallel compressor, ejector recovering expansion, heat recovery and AC water chiller.

Hall 4A / 4A-212 — talk to Irene Semenzato



SAGINOMIYA — [www.saginomiya-global.com](http://www.saginomiya-global.com)

### CO<sub>2</sub> line-up of automatic controls (European Premiere)



SAGINOMIYA is a leading manufacturer of automatic controls used in refrigeration and air-conditioning. The company has a wide line-up of components that use CO<sub>2</sub> refrigerant, a promising non-fluorinated alternative. The main CO<sub>2</sub> applications include water heaters (Eco-Cute), vending machines, showcases and refrigeration units. SAGINOMIYA's CO<sub>2</sub> line-up of automatic controls consists of:

- » CCB pressure switches, MWP = 150 bar
- » HSK pressure sensors, MWP = 150 bar
- » HPV solenoid valves, orifice 1.0 mm, 1.2 mm, 4.0 mm (new), 7.8 mm
- » UKV-J, JKV electronic expansion valves from 3 to 20 kW

Hall 4A / 4A-205 — talk to any representative



Secop — [www.secop.com](http://www.secop.com)

### DELTA and XV Compressors



Compressor Compactness

Whether you choose the cost efficient fix speed DELTA or the intelligent variable speed driven XV, you are guaranteed unmatched flexibility and efficiency. DELTA and XV compressors are also the ideal choice for energy-efficient wine coolers and minibars. The ultra-compact size of the DELTA compressor reduces shipping and storage costs. Furthermore, the DELTA compressor's all in one concept comes with accessories already preassembled, leading to significant improvement in reliability and noticeable reduction in complexity. Intelligently combining an extremely small size with extremely high performance, the Secop XV compressor is a pioneering technology designed to meet the global demand for innovation, efficiency and sustainability.

Hall 4A / 4A- 411 — talk to any representative



Secop — [www.secop.com](http://www.secop.com)

### DLE-CN and NLE-CN Compressors

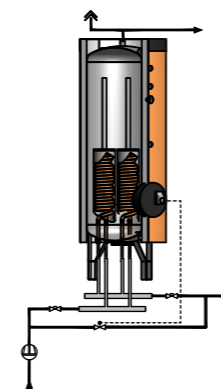


New Energy-Optimised Propane Compressors

The new DLE and NLE compressors are tailored for commercial use and are capable of substituting products made for high GWP (Global Warming Potential) refrigerants like R404A and R134a. With optional run capacitors, the efficiency can be further increased if needed. With these compressors, designed for LBP/MBP applications like bottle coolers, commercial freezers, food retail and ice-cream cabinets, etc. Secop is able to meet the increasing market demand for high efficiency and natural refrigerant products, with a very low GWP (3.3 GWP). These compressors mark an energy-efficiency leap for Secop's propane compressors - but there is more to come ...

Hall 4A / 4A-411 — talk to any representative

## HALL 5



DK-Kälteanlagen GmbH — [www.dk-kaelteanlagen.de](http://www.dk-kaelteanlagen.de)

### DK- HEAT RECOVERY FOR CO<sub>2</sub> REFRIGERATING PLANTS



As a company eager to innovate, DK already presented at Chillventa 2008 a Heat Recovery solution for CO<sub>2</sub> refrigeration plants in the transcritical range. The heat exchangers were strengthened in that they were approved for pressures of up to 130 bar at +150°C. Since 2008, DK delivered 200 Heat Recovery Systems for transcritical cooling systems which are running successfully. Over the last months, more and more DK products were prepared for high pressure, which will be shown at Chillventa.

Hall 5 / 5-115 — talk to Michael Kappenberg



DSI — [www.dsi-as.com](http://www.dsi-as.com)

### DSI Plate Freezers using Natural Refrigerants



Fast freezing maintains the freshness and the natural product quality. DSI Plate Freezers that use CO<sub>2</sub> provide a high freezing rate and experience shows that CO<sub>2</sub> freezers reduce the freezing times with 25–40%. DSI CO<sub>2</sub> freezers have obvious environmental advantages. Compared to traditional refrigerants, CO<sub>2</sub> in a closed system does not represent a burden on the environment. DSI have more than 500 CO<sub>2</sub> freezers in operation. All DSI Freezers can of course also operate on ammonia. The quality of the complete range of DSI vertical and horizontal plate freezers is incontestable.

Hall 5 / 5-104 — talk to Mads Sigsgaard

PLATE FREEZING  
... Worldwide!



ESK Schultze GmbH & Co. KG — [www.esk-schultze.de](http://www.esk-schultze.de) **ESK Schultze**

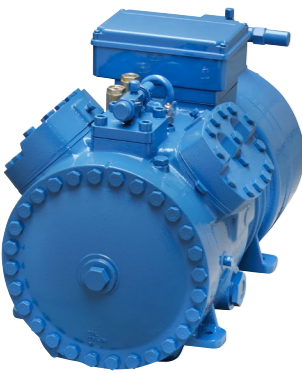
### Oil Separator

ESK Oil Separators for CO<sub>2</sub> have been available for many years. Today, ESK offers 3 lines of oil separators for different pressure limits:

- » OS...-CD up to 53 bar
- » BOS2...-CDM up to 60 bar
- » BOS3-CDH... up to 130 bar

At this year's Chillventa, ESK Schultze will present its redesigned transcritical series BOS3-CDH for an up to 1000 kW refrigeration capacity.

**Hall 5/ 5-219**  
talk to **Salim Afalou, Daniel Danne or Thomas Kubitzka**



Frascold — [www.fracold.it](http://www.fracold.it) **fracold**

### Fracold TK and SK2

A full range of R744 compressors

Fracold offers a complete line of compressors for all subcritical and transcritical CO<sub>2</sub> applications: cascade systems, booster systems, heat pumps etc. The subcritical SK2 range, 13 models from 1,6m<sup>3</sup>/h to 34m<sup>3</sup>/h, can be supplied with a standstill pressure up to 60 bar. Capacity regulation can be achieved with an inverter or by installing the innovative RSH head that permits a 50%-100% regulation on 2-cylinder compressors. The transcritical TK range, displacements from 4m<sup>3</sup>/h to 26m<sup>3</sup>/h, includes 11 models optimised for refrigeration applications and 8 models for heat pumps. All compressors can operate with VFD. Frascold products for natural refrigerants also include "ATEX zone 2" AXH compressors for hydrocarbons and open screw compressors for ammonia.

**Hall 5 / 5-313** — talk to **Vincenzo Isgrò**



Rivacold — [www.rivacold.com](http://www.rivacold.com) **RIVACOLD**

### R744 transcritical split system TH\_X

The TH\_X, among other solutions presented by RIVACOLD at Chillventa, is the new complete Green system for commercial refrigeration that represents Rivacold's answer for low temperature application using a natural refrigerant. Designed for outdoor installation, the Rivacold TH-X consists of a condensing unit, an evaporator and a control panel. The condensing unit and evaporator are fitted with EC fan motors that, besides saving energy, reduce the overall noise level of the system. Suitable for low temperature cold rooms (from -15°C to -25°C), its refrigerating output is 11.4 kW at a -20°C cold room temperature, corresponding to a cold room volume of about 300m<sup>3</sup>.

**Hall 5 / 5-231; 5-233** — talk to any representative



[www.esk-schultze.de](http://www.esk-schultze.de)



**CHILLVENTA 2014**  
Visit us in Nuremberg **Hall 5 / 5-219**



**BLUE** goes **GREEN**

Components engineered for CO<sub>2</sub>  
Innovative – Efficient – and highly Reliable

**ESK PRODUCTS**

QUALITY PRODUCTS FOR COOLING, AIR CONDITIONING AND HEAT PUMP SYSTEMS

MADE IN GERMANY

# HALL 6



**Klimal by Frigomec S.p.A. — [www.frigomec.com](http://www.frigomec.com)** **KLIMAL** by

## Vertical Receiver RCO+WT

High pressure CO<sub>2</sub> receiver with internal coil (standstill cooling, flash gas superheating etc.)

Hall 6 / 6-328 — talk to Ruggero Pampanin

Now with 3-digits LED display



**HB products A/S — [www.hbproducts.dk/en](http://www.hbproducts.dk/en)**

## Sensors for NH<sub>3</sub> & CO<sub>2</sub>



The HBLT-Wire, which was introduced to the market in November 2013, now has a 3-digit display installed as standard. The HBLT-Wire is used for level measurement in liquid separators etc. and is characterised by the following product advantages:

- » Flexible measurement area, 300-4000 mm, which can be adjusted on location or can be delivered shortened to the desired measurement area
- » Very small built-in height <200 mm
- » No deadzone, either at the top or bottom
- » Requires no calibration
- » Analogue output 4..20 mA and programmable alarm output (PNP)
- » 3-digit display

Hall 6 / 6-334 — talk to Mark Kristensen

**Sensata Technologies — [www.sensata.com](http://www.sensata.com)** **Sensata Technologies**

## Pressure Sensors for natural refrigerants

Features and benefits:

- » Pressure sensors and switches for CO<sub>2</sub>, ammonia, propane and others
- » ATEX standard pressure switches
- » Hermetic sensors for withstanding harsh conditions
- » Fully stainless steel offerings available
- » Enhanced accuracy with high reliability over a very wide range of pressures
- » Exceptional shake and vibration tolerance
- » Pressure+Temperature sensor available in one package
- » Precise super heat measurement

Applications: Beverage coolers, supermarkets/light commercial cooling systems, commercial & industrial cooling systems, air conditioning, heat pumps

Hall 6 / 6-428 — talk to Ateeth Rayapeddi



shecco — [www.publication.shecco.com](http://www.publication.shecco.com)

## GUIDE+



shecco's new publication "GUIDE+: HFC taxes & fiscal incentives for natural refrigerants in Europe" provides a comprehensive overview of existing and proposed fiscal measures in key European countries, aimed at reducing the use and emissions of HFCs in HVAC&R sectors while encouraging the switch to climate-friendly technologies. The measures reviewed in this publication vary from environmental taxes on HFCs, in line with the polluter pays principle, to grants and enhanced tax relief schemes for investments in climate friendly technologies at the national as well as the regional level.

For just €300\* (discounted from original price €500), gain a competitive edge and find out all that you need to know on the policy support and tax schemes available for your business.

Hall 6 / 6-230 — talk to Janet Thompson



16-17 March 2015 in Brussels

shecco — [www.atmo.org](http://www.atmo.org)

## ATMOsphere Europe 2015



ATMOsphere Europe, the annual meeting place for key industry stakeholders to discuss the latest natural refrigerant technologies, market trends and regulatory issues in Europe is back for its 6th edition! With the new EU F-Gas Regulation scheduled to come into effect two months before the conference kicks off, ATMOsphere Europe 2015 "Natural Refrigerants - Solutions for Europe" will provide updates on the legislation and its implementation. The conference will also be covering a mix of applications from commercial and light commercial, industrial and transport refrigeration to heat pumps and air-conditioning.

For Chillventa participants only: Extension of the ATMOsphere Early Bird Special (€500). Come and register at our booth!

Hall 6 / 6-230 — talk to Janet Thompson



Tecumseh Europe — [www.tecumseh.com](http://www.tecumseh.com)

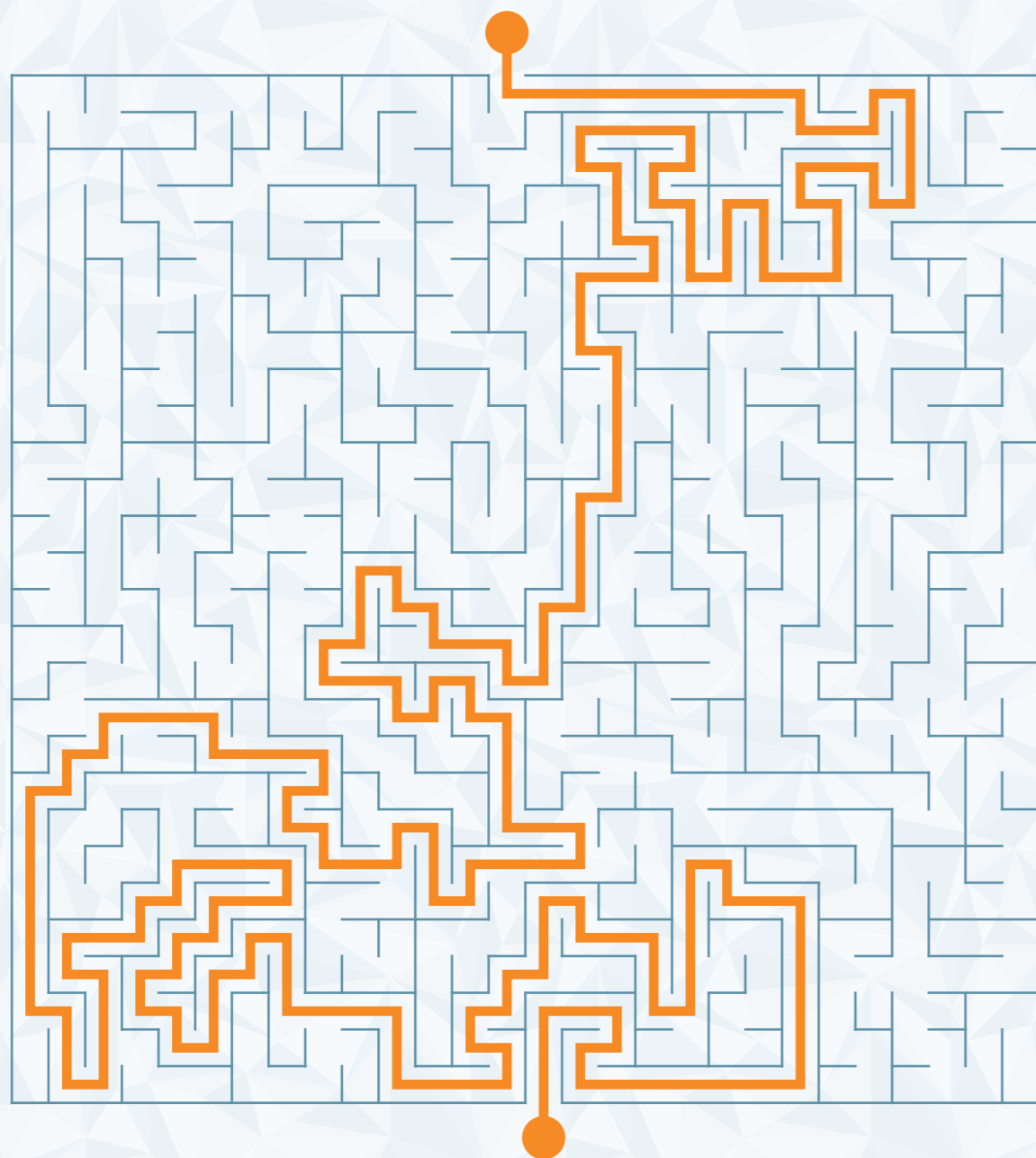
## AJ<sup>2</sup>



"AJ<sup>2</sup>, built for today, ready for tomorrow."

Throughout its history, Tecumseh Products Company has been a leader in providing customers with efficient and reliable products for commercial refrigeration. AJ is the commercial refrigeration standard recognised worldwide for its reliability and acoustic performance. Tecumseh keeps on optimising its ranges globally and has developed the AJ<sup>2</sup> range. Tecumseh launched the new AJ<sup>2</sup> platform, built for today as an answer to market expectations in terms of interchangeability, compactness and silence; and ready for tomorrow, as this platform is able to meet the upcoming environmental challenges by using an HC refrigerant (R290). The AJ<sup>2</sup> delivers best-in-class efficiency, a wide range and a smaller size envelope, as well as Tecumseh's industry standard for reliability.

Hall 6 / 6-130 — talk to Emilie Bretonniere



## FIND YOUR WAY AROUND CHILLVENTA

Out of the 1000 Chillventa 2014 exhibitors, over 120 companies provide products and services related to natural refrigerants, highlighted in the floor plans that follow. Designed as a tool to best-prepare for the show, these maps provide a unique reference of climate friendly solutions in HVAC&R at the event.

Whether they work with CO<sub>2</sub>, ammonia, hydrocarbons, water or air, the companies listed offer a range of solutions including: systems, components, refrigerants, engineering services, and training.

## COMPANY DIRECTORY\*

### Hall 1

- » Hall 1 / 1-110 Scotsman Ice
- » Hall 1 / 1-122 TWK
- » Hall 1 / 1-216 Frigoteam
- » Hall 1 / 1-219 Skopje University
- » Hall 1 / 1-224 Ziegra
- » Hall 1 / 1-310 Eurammon
- » Hall 1 / 1-532 Fujian Snowman
- » Hall 1 / 1-536 Forum Hall 1
- » Hall 1 / 1-539 DEKA
- » Hall 1 / 1-543 Higel

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- » Hall 2 / 2-307 Wigam
- » Hall 2 / 2-313 Inficon
- » Hall 2 / 2-315 Agramkow
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- » Hall 2 / 2-415 Panimpex
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- » Hall 2 / 2-507 Reftek
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- » Hall 4 / 4-412 Igloo
- » Hall 4 / 4-416 Tecnofreddo
- » Hall 4 / 4-420 BVA Lubricants
- » Hall 4 / 4-501 Ries
- » Hall 4 / 4-508 Cofely Refrigeration

- » Hall 4 / 4-514, 4-612 LU-VE
- » Hall 4 / 4-518 Evapco
- » Hall 4 / 4-518 Flex coil
- » Hall 4 / 4-606 Shrieve
- » Hall 4 / 4-622 SAPRE
- » Hall 4 / 4-624 US Reco

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- » Hall 4A / 4A-106 Temprite
- » Hall 4A / 4A-108 Mayekawa Europe
- » Hall 4A / 4A-114 COOL PPH
- » Hall 4A / 4A-116, 4A-214, 4A-320 Cabero
- » Hall 4A / 4A-117 Refteco
- » Hall 4A / 4A-205 Saginomiya
- » Hall 4A / 4A-212 Enex
- » Hall 4A / 4A-212 Secon
- » Hall 4A / 4A-306 Zudek
- » Hall 4A / 4A-321 HKT
- » Hall 4A / 4A-322 Alfa Laval
- » Hall 4A / 4A-404 Onda
- » Hall 4A / 4A-406 Refra
- » Hall 4A / 4A-408 Settala Gas
- » Hall 4A / 4A-411 Secop
- » Hall 4A / 4A-417 Teco
- » Hall 4A / 4A-508 Forum Hall 4A

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- » Hall 5 / 5-105 Huayi Compressor Barcelona
- » Hall 5 / 5-115 DK-Kälteanlagen
- » Hall 5 / 5-117 Howden Compressors
- » Hall 5 / 5-119 Kirloskar
- » Hall 5 / 5-131 Vahterus Oy
- » Hall 5 / 5-137 Schick
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- » Hall 5 / 5-227, 5-228 Robert Schiessl
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- » Hall 5 / 5-402 WITT
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- » Hall 5 / 5-407 HPH
- » Hall 5 / 5-409 Stefani
- » Hall 5 / 5-411 Dena Line

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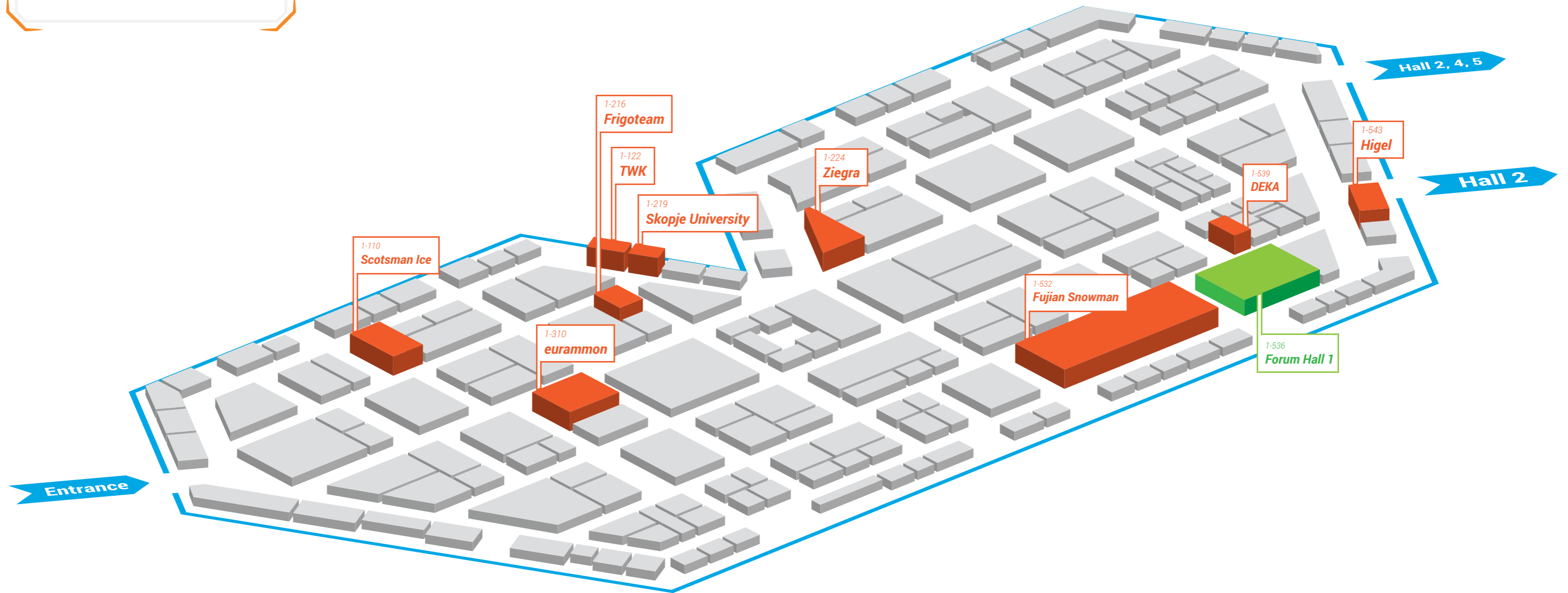
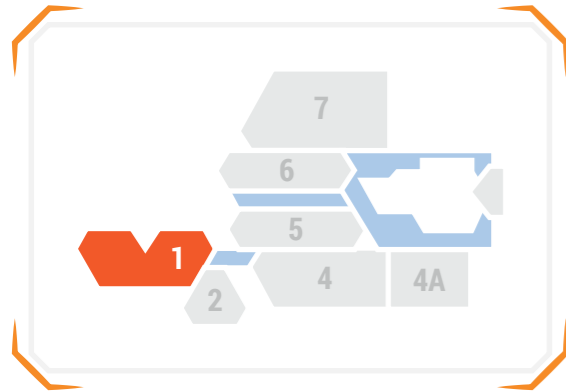
- » Hall 6 / 6-103 MSR
- » Hall 6 / 6-104 Carel
- » Hall 6 / 6-106 SRS Frigadon
- » Hall 6 / 6-108 Elreha
- » Hall 6 / 6-110 Frigopol
- » Hall 6 / 6-118 Beutler
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- » Hall 6 / 6-121 Zila
- » Hall 6 / 6-130 Tecumseh
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- » Hall 6 / 6-208 Wieland-Werke
- » Hall 6 / 6-222 Grundfos
- » Hall 6 / 6-223 Bacharach
- » Hall 6 / 6-223 Murco
- » Hall 6 / 6-230 shecco
- » Hall 6 / 6-234 RDM
- » Hall 6 / 6-301 OCS Cold
- » Hall 6 / 6-316 Hermetic-Pumpen
- » Hall 6 / 6-319 Mueller Industries
- » Hall 6 / 6-328 Frigomec
- » Hall 6 / 6-332 Eliwell Controls
- » Hall 6 / 6-334 HB Products
- » Hall 6 / 6-342 Castel
- » Hall 6 / 6-404 SAMON
- » Hall 6 / 6-420 Geopal
- » Hall 6 / 6-428 Sensata Technologies

### Hall 7

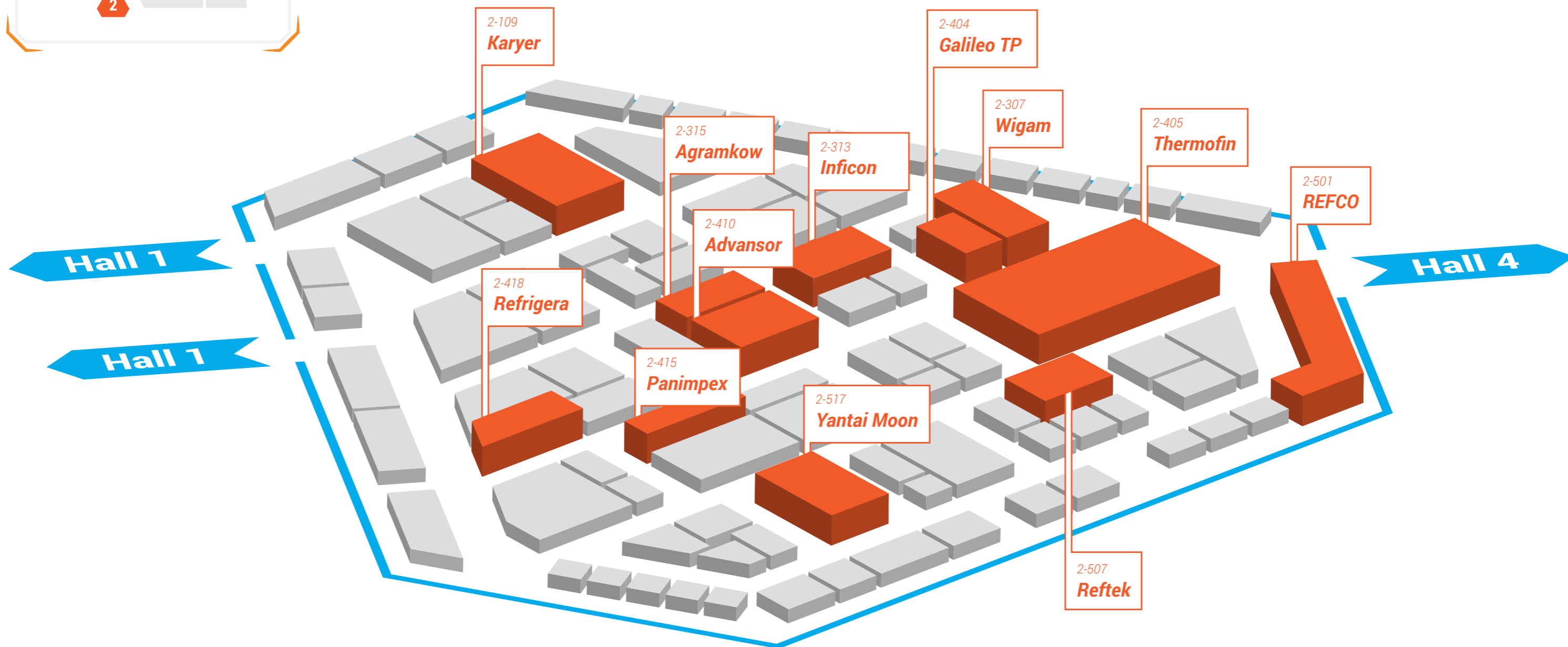
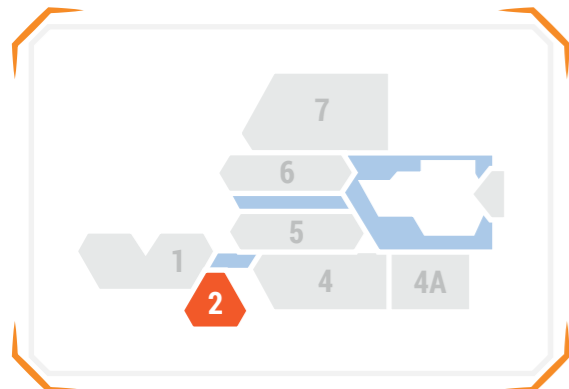
- » Hall 7 / 7-233 thermea. Energiesysteme
- » Hall 7 / 7-236 Clima Net
- » Hall 7 / 7-312 Munters
- » Hall 7 / 7-318 Hitema
- » Hall 7 / 7-324 MHI
- » Hall 7 / 7-330 Forum Hall 7
- » Hall 7 / 7-337 Kaori
- » Hall 7 / 7-414 Panasonic
- » Hall 7 / 7-628 SorTech

\*This information was compiled using the Chillventa website, but we do not warrant that this list is complete

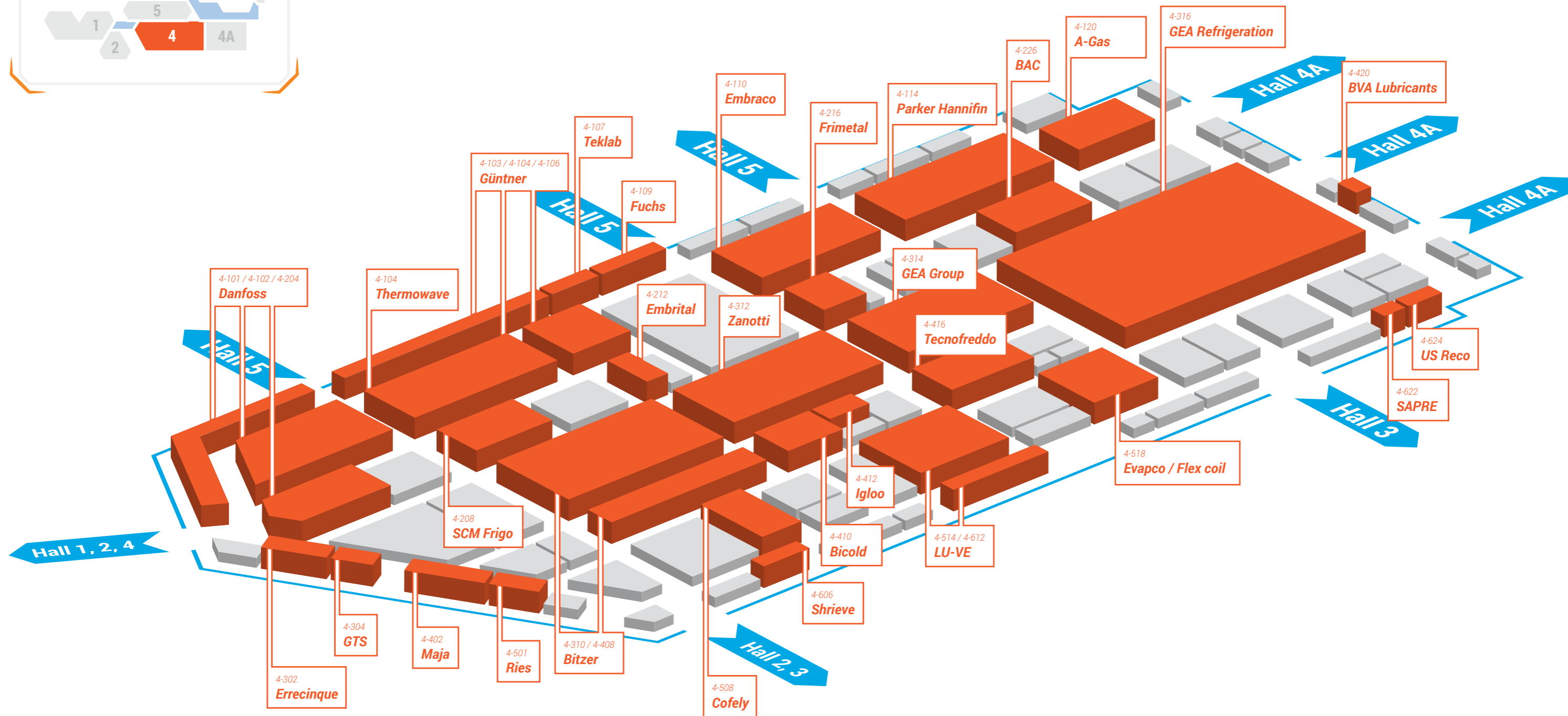
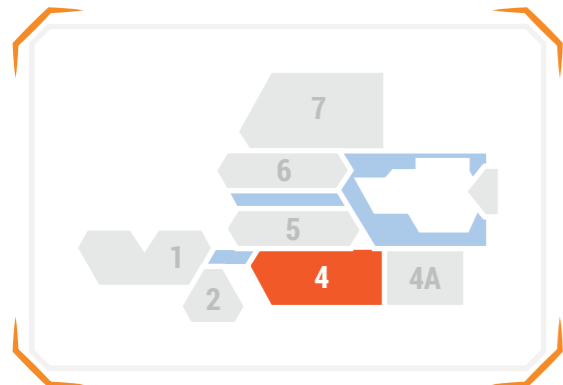
# HALL 1



# HALL 2

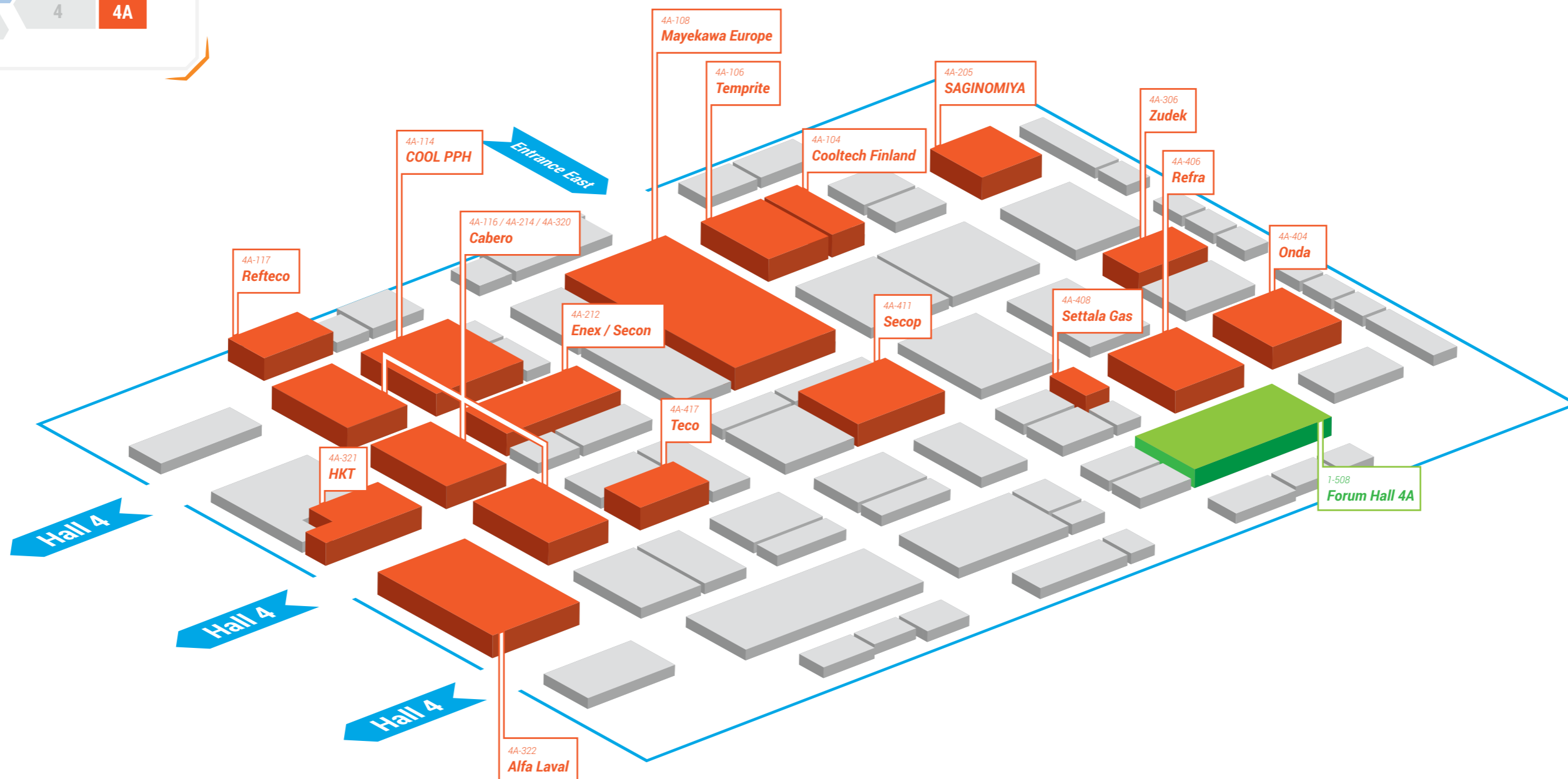
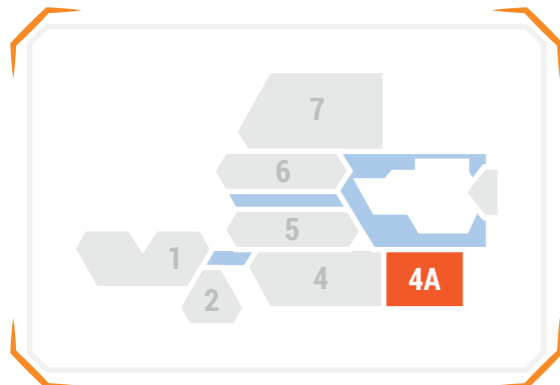


# HALL 4

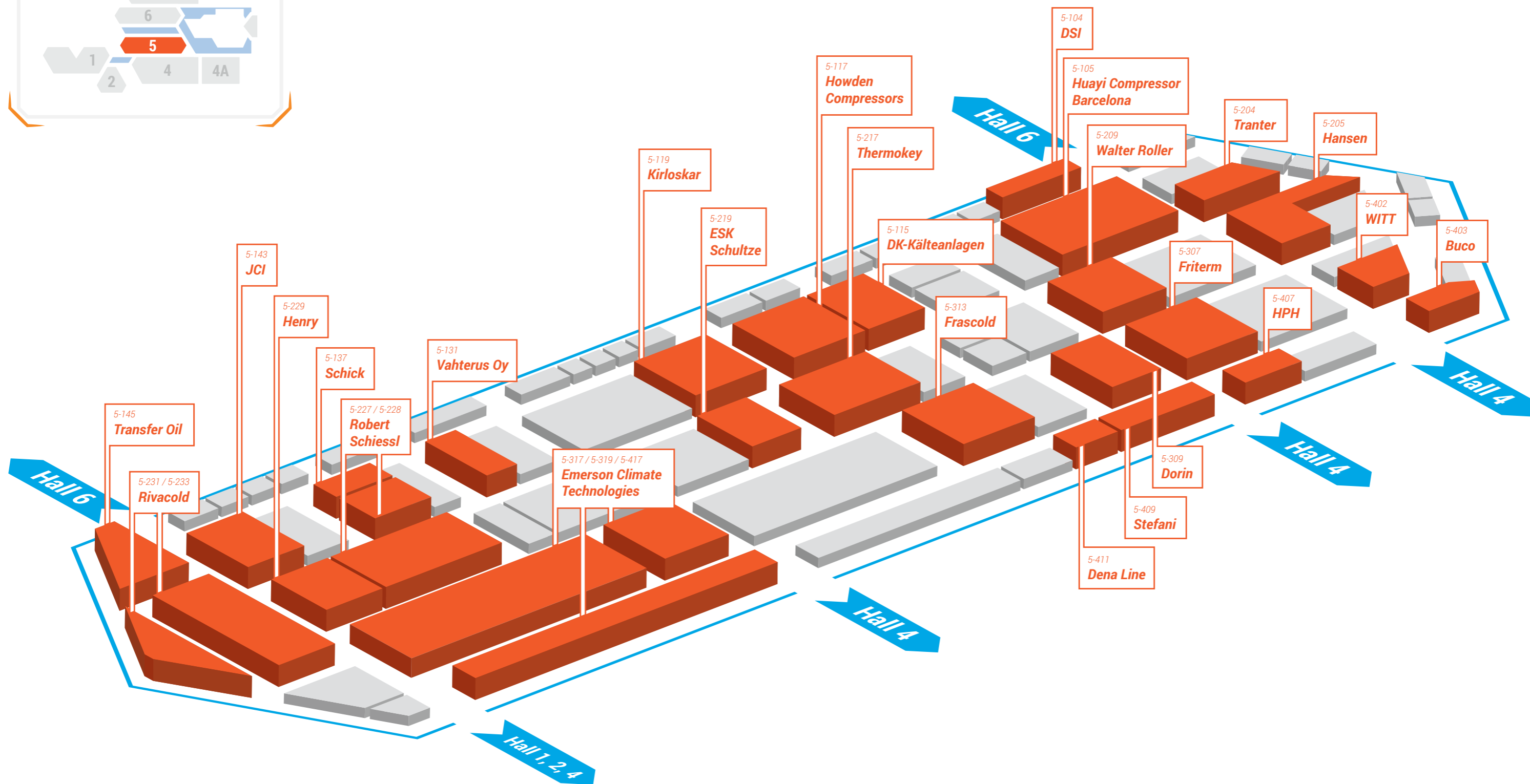
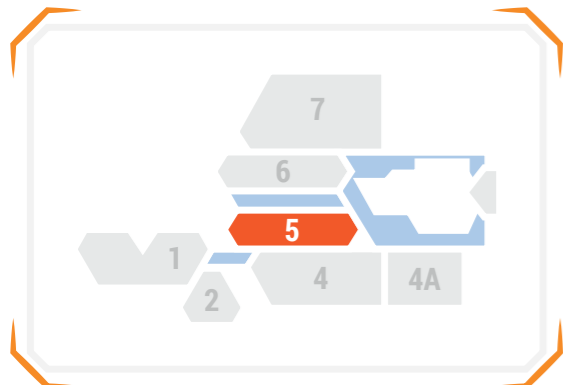




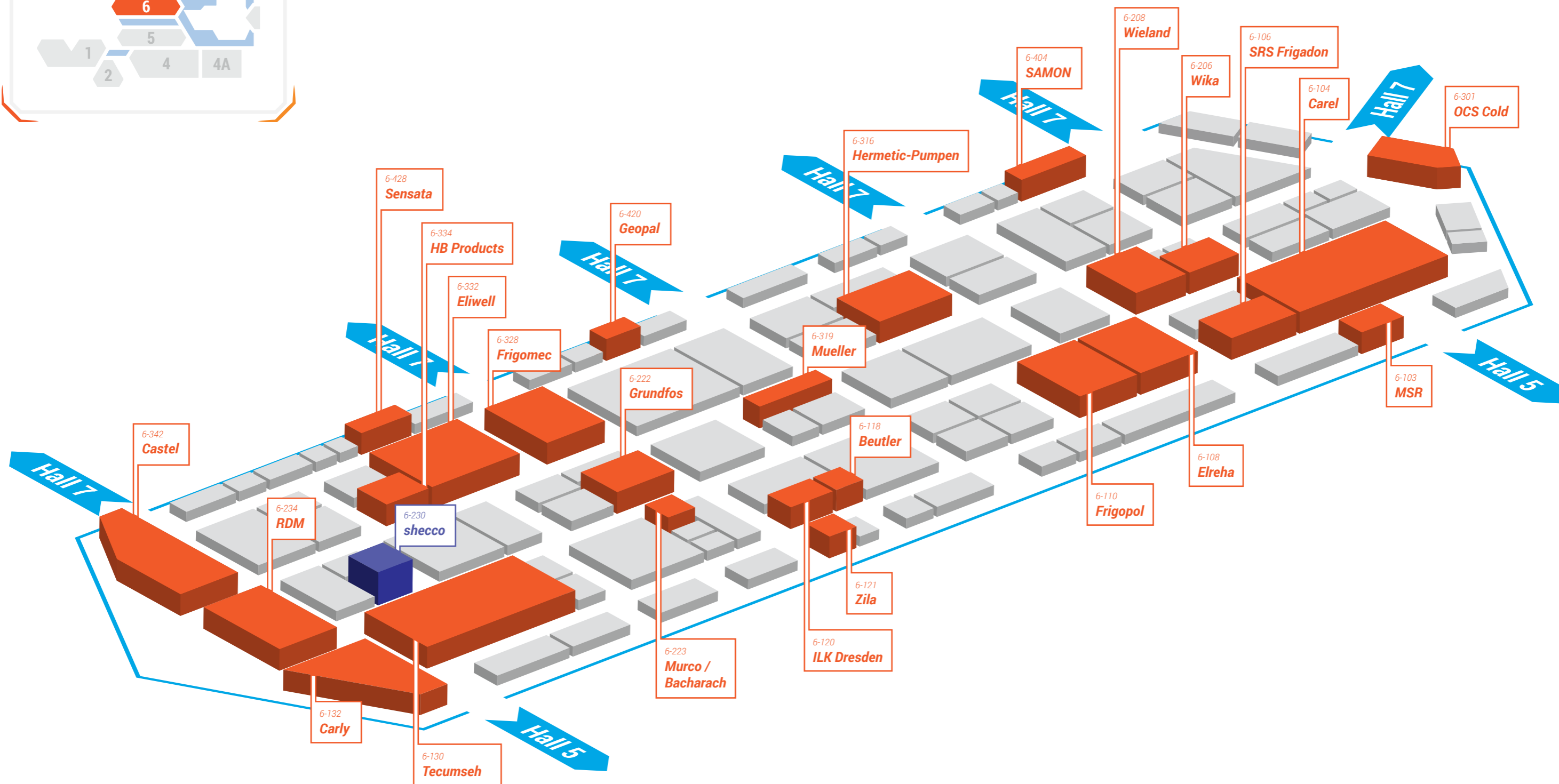
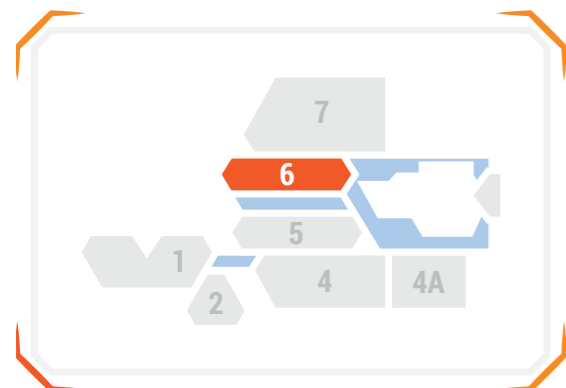
# HALL 4A



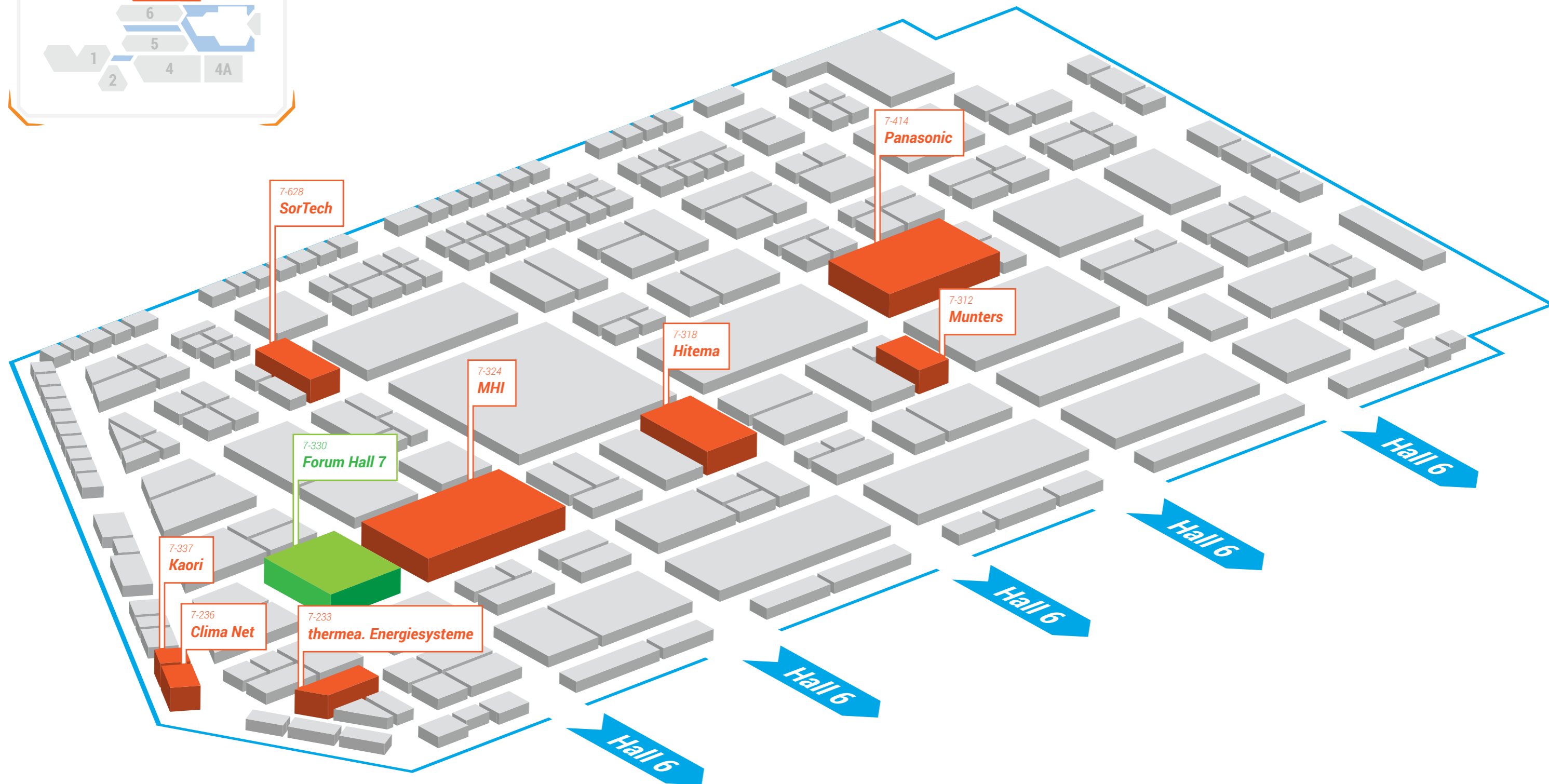
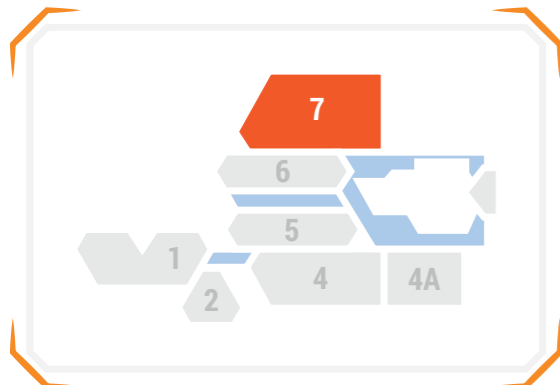
# HALL 5



# HALL 6



# HALL 7





## Natural Refrigerants Faster to Market

shecco is a market development specialist helping companies worldwide to bring their climate friendly solutions faster to market.

Within the HVAC&R (heating, ventilation, air conditioning and refrigeration) industry we specialise in the natural refrigerants CO<sub>2</sub>, hydrocarbons, ammonia, air and water.

shecco offers a variety of services in three areas:

- 1) media & publications, including online industry platforms and a catalogue of dedicated research reports;
- 2) business development, including market research, consultancy and public affairs services, as well as special international projects; and
- 3) events, including international conferences and national workshops.

### PROMOTING YOUR SOLUTIONS

Through media and publications, including the world's leading online industry platforms for the the natural refrigerants CO<sub>2</sub>, hydrocarbons, ammonia and water (add logos), and our catalogue of dedicated research reports, the GUIDEs.

### MEETING THE EXPERTS

Through our international ATMOSphere events, created to bring policy-makers, end users and industry together to find ways to "bring natural refrigerants faster to market?"

### DEVELOPING YOUR BUSINESS

Through our tailor-made market research and public affairs services including, issue tracking, SWOT, market forecasts, and consultancy

### AMONGST OUR 100+ PARTNERS

Advansor, GEA, Carrier, SANDEN, Parker, Mayekawa, Danfoss, Hillphoenix, Johnson Controls, Linde Group, Alfa Laval, Emerson, Dorin, Embraco, Bitzer, Grundfos, SWEP, Star, Temprite, Hansen, Green & Cool, Systems LMP, Carnot, CIMCO, AHT, Mistubishi Heavy Industries, secop, BAC, Tecumseh

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**MARC CHASSEROT**

Publisher / Managing Director  
shecco

Marc holds degrees (incl. two Masters) in Economics, Politics, and Marketing. He has studied at the London School of Economics, INSEAD Singapore, Sciences Po Paris, and the College of Europe. He has specialised in natural refrigerants since 2003. He is an active member of ASHRAE. He founded the leading industry platforms R744.com, hydrocarbons21.com, ammonia21.com and R718.com. Since 2007 Marc is co-founder and Managing Director of shecco, an independent market development company specialised in bringing natural refrigerants 'faster to market'.



**JANAINA TOPLEY LIRA**

Editor  
shecco

A multi-lingual communications manager, Janaina holds a Masters Degree in Environmental Technology from Imperial College London and has a broad understanding of the environment arena, with specialist knowledge of climate change related issues. Prior to joining shecco she worked in research, policy analysis, and events organisation in the NGO sector. Now managing shecco's media and publications department, Janaina develops and delivers marketing and communications campaigns to promote climate friendly HVAC&R technologies.



**FRANZISKA MENTEN**

Author / Managing Director  
beatPlus GmbH

As a new part of the shecco group, beatPlus GmbH is a Berlin-based creative agency for branding & design, digital solutions and events for green and sustainable projects. Before co-founding beatPlus, Franziska worked as Events and Marketing Manager at shecco. She has over five years of professional experience in the field of climate-friendly technologies with a concentration in natural refrigerants. Franziska holds a Master's degree in Business and Economics from Humboldt University in Berlin and a degree in Management from Bordeaux Business School.



**MEHDI BOUHJAR**

Head of Design  
shecco

As far as he can remember, Mehdi has always loved drawing, building, design, and crafting things. As soon as he got the opportunity, he chose to pursue a career as a graphic designer. Identifying and understanding the user's needs, then finding the right visual solution is fascinating to him. Over the past 7 years Mehdi has had the opportunity to sharpen his skills in various businesses in Europe, Canada and Australia. These experiences have allowed him to really understand and apply the creative process. He is applying this knowledge every day.

## CONTACT US

Get in touch with us to learn how we can help you in gathering business intelligence, getting your climate technology faster to market and spread the message among decision makers.

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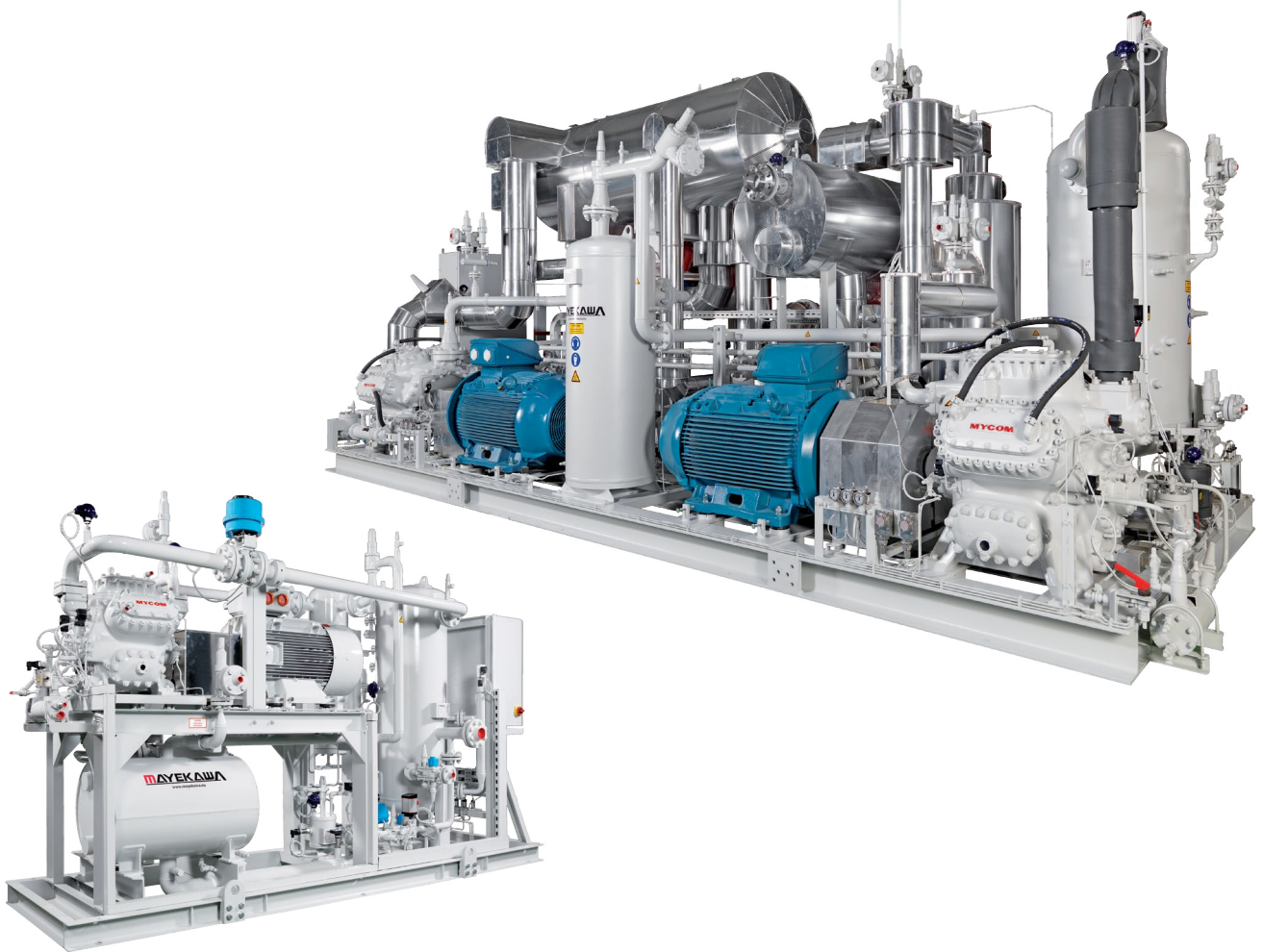


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