CHILLVENTA

International Exhibition
Refrigeration | AC & Ventilation | Heat Pumps

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AND THE WINNER IS …

- **Chillventa AWARD presented in four categories**
- **First-class projects**
- **Special jury prize**

The Chillventa AWARD celebrated at first in 2016, with NürnbergMesse and Bauverlag making the presentations to the lucky winners for the first time. The Chillventa AWARD was given in four categories: large-scale refrigeration, commercial refrigeration, air-conditioning systems and heat pumps.

The jury considered a range of aspects when assessing submissions: true to Chillventa's motto of "Connecting Experts", planning and cooperation on a partnership basis by the parties involved in the project came first, followed by "implementation of the planning instruction", "functionality", "depth of innovation" and "cost-effectiveness and operation". The winners in each category had to score points in each of these areas.
The jury met in September and agreed that outstanding planning but just 8/15 for technology would have as little chance of winning as a technically refined project that lacked any obvious sign of special cooperation based on partnership. The submissions that ultimately won the awards clearly involved outstanding refrigeration designs and projects, both with and without the use of natural refrigerants.

The jury has now announced the winners:

In the large-scale refrigeration category:
Project: Ammonia cooling plant for Paulaner Brewery
Construction of new brewery buildings for Paulaner Brauerei GmbH & Co. KG in Munich-Langwied involved designing and producing a central cooling plant. This comprised an ammonia cooling system with screw compressors, evaporators with gravity circulation, evaporative condensers (10.8 MW), high-pressure accumulators, economisers, separators and various consumer pumps. The plant supplies 6.3 MW of power for an alcohol-water system for tank storage and utility cooling (temperature -8°C) and 2 MW for

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a brewing water system with a storage unit to cool the brewing water (temperature 0°C). This provides cooling for the tank storage unit, the storage tanks and several production processes, as well as air-conditioning for the production halls and data centre.

A provisional design by Heineken Supply Chain (the designer) was revised and improved by Johnson Controls Service GmbH, which was responsible for the implementation and commissioning stages, which led Paulaner, as the customer, and Heineken to revise the entire footprint of the plant. This plan will now serve as a blueprint for further brewery construction projects.

The customer, designer, the companies involved in implementation and the testing organisations all worked very closely together to ensure the project could be completed on time and within the specified budget, with constant monitoring of the schedule and implementation process. The plant design pays particular attention to ensuring that on-site employees can operate it without difficulty (e.g. recording operating hours for all drives to optimise maintenance work, an error app from Johnson Controls for on-site troubleshooting and fault rectification, comprehensive on-screen displays and data recording), since the operators were involved at all times alongside the project management and were able to actively contribute to shaping the project.

The winner in the air-conditioning systems category:
Project: Cooling and air-conditioning plant for Rupp + Hubrach
Rupp + Hubrach, one of Germany's leading manufacturers of lenses for spectacles, needs process cooling water for a range of manufacturing processes and air-conditioning. The cold-water system is fed by a new plant from hekra Kälte- und Klimatechnik GmbH, which was installed as a replacement for an obsolete system. This is now one of three cooling machines in use there. Rupp + Hubrach aims to anchor the concept of environmental protection at its Bamberg location in more than just its core process, the manufacture of spectacle lenses: it is also careful to use environmentally friendly technology in its support processes, such as the supply of cooling water to its manufacturing plant. Long-term performance and cost-effectiveness calculations and a thorough investigation of potential components for the new plant resulted in a cooling machine with a rated output of 270 kW and fitted with a highly efficient turbo coolant compressor that needs no oil. One technical challenge involved fully integrating the new plant technology into the existing technical building control services and the existing cold water network (i.e. the plant hydraulics).

In addition to a requirement by the operator to use environmentally friendly technology, prioritising improved energy efficiency and cost savings was an essential condition for the parent company. It was therefore vital to record the load situation precisely. As part of the work for a Master's thesis, the system was investigated over a period of several weeks to determine load performance in the context of fluctuating manufacturing capacity, and the results were evaluated in detail. Rupp + Hubrach as the customer, Hekra as plant manufacturer, and all the affected business areas worked very closely together to elaborate the plant design. Other companies like Siemens (which supplied the technical building control services) and departments within the company (Facility Management) were also closely involved, since the conversion had to take place in a tight timeframe and in a limited physical space in the utility room, all without interrupting operations.

The winner in the heat pumps category:
Project: Sustainable building services strategy for dm-markt branches
Retail chain dm-drogerie markt developed a standardised building services strategy for all its branches between 2008 and 2012. It has since been implemented in 950 outlets. The technology that was adopted uses a three-wire system with heat recovery to permit simultaneous heating and cooling with no energy losses, as far as possible. The direct evaporation system (air/heat pump) needs 33% less electricity than separate systems for heating and cooling. Only green electricity is used to drive the heat pump. A large number of room and other sensors records the number of people in the shop at any time and constantly records the heat situation, including smartly adjusting the door air-curtain using a specially developed automatic control system. An online energy management system at the 'Gläserne' branch automatically analyses and displays all data. All business areas (heating, air-conditioning, ventilation, light) communicate with each other, with particular emphasis on end-to-end control over the building services – almost functioning as a "fully automatic branch"; this also serves to improve operator comfort for dm-markt employees and prevent operator errors. A filter system with a self-cleaning function reduces energy consumption and minimises servicing work.

The project began with a comprehensives analysis of the initial situation. This involved examining 200 dm-markt outlets across Germany to determine their energy requirements, energy consumption and CO_2 emissions. The strategy was developed on that basis.

The project involved cooperation between dm, GERTEC Planungsgesellschaft, ID Ingenieurbüro (the consultant engineers) and a large group of companies involved in the actual execution of the project. Great store was placed by long-term cooperation with the same installation and maintenance companies, continuous training for the partner entities and manufacturers regarding the dm building services strategy, and maintaining a working group involving all the parties to the project to ensure quality.

The winner for commercial refrigeration:
Project: R134a/R744 cascade for walk-in refrigerators and freezers at Cytec Solvay in Östringen

A new freezer with an upstream coolroom was implemented for Cytec Solvay in Östringen. The coolroom is cooled to +4°C and the freezer to 23°C, respectively, using two R134a/R744 (CO_2) cascades installed in two technology containers on the roof of the building. Each cascade works as an independent system, providing 100% redundancy. Even though it meant higher investment costs, a system using natural coolants was adopted. The technical features include a well thought-out oil management system, heating for condensation water basins and pipes, a gas warning system in the technology containers, container cooling with duct-free inverter evaporators, integration of the cascades in a process control system with measurement data trend recording, archiving of error messages and a cascade display via a touch panel. Besides using PLCs, the plants were also fitted with a monitoring system that ensures even greater plant availability, efficient operation and optimised maintenance. Structural parameters meant that the rooms could be cooled only gradually, by 3 K per day (i.e. 14 days were needed to reach the target value in the freezer). This was controlled using the Rütgers monitoring system.

The technical requirements were worked out in detail by the designer (Rütgers) and made available to all project participants. This included a detailed schedule for assembly and commissioning; installation planning for the containers and condensers; a meticulous calculation of the long pipeline paths, which had to be concealed as much as possible while remaining readily accessible; planning for the electrical facilities and material deliveries, and safety management on the building site (there were stringent safety requirements on-site). The system was jointly commissioned by engineers from Rütgers and Christof Fischer. Once Rütgers produced the design, Fischer configured the multicompressor refrigeration systems. The cascades were directly fitted into the containers supplied to Fischer, in consultation with both Rütgers and Fischer.

Winner of the jury's special prize:
Project: New buildings for TWK (Test- und Weiterbildungszentrum Wärmepumpen and Kältetechnik GmbH) in Stutensee, near Karlsruhe
The new buildings for TWK GmbH were awarded a special jury prize, since this plant occupies a special position among testing and professional development centres, which cannot be readily compared with private-enterprise projects. The construction project for TWK included an innovative energy concept to use waste heat from test benches to provide the building with energy-efficient heating and cooling that would cut down on greenhouse gases. The innovative aspect of the heating and cooling system lies in combining thermoactive building systems (TABS) for building temperature control with a 93 m^3 water-based latent heat storage unit coupled with a heat pump system. The system will be used as a laboratory unit as part of TWK's range of professional development services.
A substantial part of the waste heat from the test benches in the testing centre that is generated during the cooling period (i.e. summer) and the cooling load in the building is directed to the latent heat storage unit, and is made available to control the building temperature during the heating period (winter) using heat pumps. The energy transfer system for heating and cooling the building is designed for the TABS set to low temperature, to enable the heat pumps to operate with maximum economic efficiency. This innovative energy strategy was designed by engineer Fritz Nüssle and implemented with assistance from the three companies Uponor, Speeter and Herrmann Haustechnik.

One of the challenges for the principal involved combining individual requirements in terms of building use and energy efficiency with the demands of economic efficiency while remaining within budget. It became evident that, while industrial construction using preassembled elements causes some limitations in architectural freedom, it does produce substantial savings in terms of investment. Even so, there are still restrictions in this area, particularly if the principal is aiming to produce a combined heating and cooling system, something that is still unusual in commercial buildings. After weighing up all the advantages and disadvantages, the principal opted to award the building services aspects separately to local design companies and specialists.

The design was gradually developed in close cooperation and following multiple discussions with all the companies involved in the project, and the actual construction was completed quickly. Vital contributors to the implementation of the building services project were the designer Fritz Nüssle, the employees at the Hermann company for planning the

implementation and the actual assembly, and Yannik Fries from Karlsruhe University, who wrote his Master's thesis on the system. This innovative energy project was made possible by donations from many companies (heat pumps and cooling systems, for instance) and state sponsorship.
The Ministry of the Environment of the state of Baden-Württemberg provided sponsorship for the project as a flagship project for energy efficiency and innovative energy strategies.

Chillventa Award 2016: the jury

- Christoph Brauneis, Editor-in-chief of KKA and tab
- Prof. Michael Deichsel,
  Georg Simon Ohm University of Applied Sciences, Nuremberg
- Rolf Harig, Harig GmbH
- Dr. Rainer Jakobs,
  Informationszentrum Wärmepumpen and Kältetechnik (Information Centre on Heat Pumps and Refrigeration), IZW
- Prof. Ulrich Pfeiffenberger,
  Giessen-Friedberg University of Applied Sciences, Fachverband Gebäude-Klima (Association for Buildings and Indoor Air Quality)
- Bertold Brackemeier, Public Relations Manager, NürnbergMesse

For further information about Chillventa, the Chillventa AWARD and the industry, see the new Chillventa Newsroom at **chillventa.de/news**

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All press materials, including further information, photos and film, are available at: **www.chillventa.de/presse**