



# ISKID

# MAGAZINE

HVAC&R JOURNAL OF TURKEY

ISKID AIR CONDITIONING & REFRIGERATION MANUFACTURERS' ASSOCIATION | PER SIX MONTHS - 2022 - VOLUME 24 | [f /iskidTR](#) [t /iskidTR](#) [i /iskidtr](#) [in /iskidtr](#) [y /iskidorgr](#)



## Türkiye

Turkish  
HVAC-R

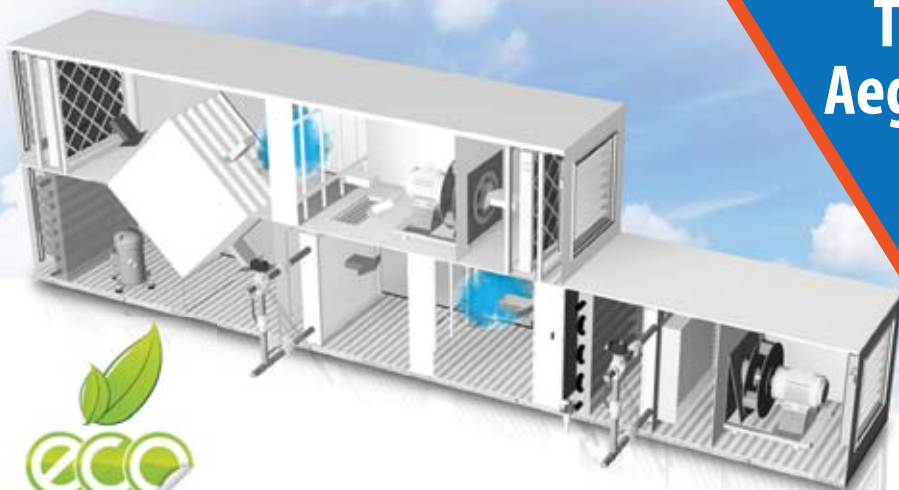


The 2022 Eurovent Summit  
will be held in Antalya  
on October 25–28



Eco-Design  
Requirements  
in Air Handling Unit  
Selection and Case Study

The Northern  
Aegean Dream:  
Assos and  
Bozcaada



REACTOR COOLING APPLICATIONS CONCRETE MARINE APPLICATIONS  
 CRANE CAB COOLERS P L A N T S TEST EQUIPMENT **D A T A**  
 ICE RINK COOLING APPLICATIONS PAINTING FACILITIES CENTERS  
 COMFORT APPLICATIONS INDUSTRIAL COOLING  
 MRI COOLING APPLICATIONS **APPLICATIONS**

**INJECTION MACHINES**

FOOD MACHINES SPOT WELDING MACHINES

LAZER MACHINES INDUCTION FURNACES

**EXTRUDER MACHINES** **DEFENSE INDUSTRY**

PACKING MACHINES  
 TEXTILE FILLING MACHINES  
 MACHINES



# AIR CONDITIONING AND REFRIGERATION APPLICATIONS



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ISH  
13 - 17 March 2023  
Hall: 8 Stand: C58



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ISKID Assesses 2021 Turkish HVAC&R Industry Data

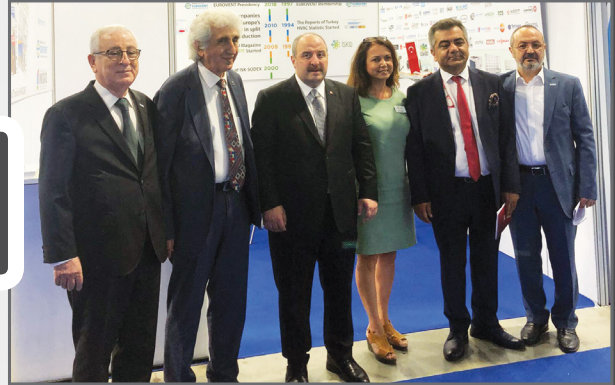
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**EUROVENT**  
**SUMMIT**  
**ANTALYA**  
25-28 OCT 2022  
#BuildingBridges

## İSKİD on International Arena

The 2022 Eurovent Summit will be held in Antalya on October 25–28





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Mr. Cüneyt MERT / Chairman of the TTMD Commissioning Committee

Mr. Emre ÖZMEN / member of the TTMD Commissioning Committee



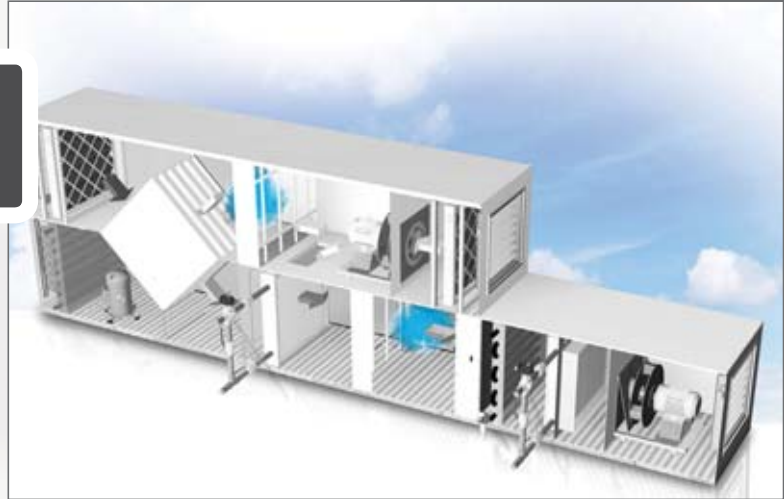
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Eco-Design Requirements in Air Handling  
Unit Selection and Case Study

Mr. Koray Gezer / ISKID Eurovent AHU Mirror Working Group Member

Mr. Serhan Taylan / ISKID Eurovent AHU Mirror Working Group Member



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**AYK SERDAR DİDONYAN**  
The Board Chairman of ISKID

## The 2022 Eurovent Summit will be held in Antalya on October 25–28

Dear ISKID fellow,

Whereas many people see the summer months as vacation, as we near the end of the first half of 2022, which began with hope and good wishes, the case for the Turkish

HVAC&R Industry is a bit different this year. Extensive preparations for the Eurovent Summit, which will be held in Antalya on October 25–28, 2022, continue without giving in to summer lethargy. Together with the European EUROVENT Association, ISKID will host this year's Eurovent Summit, the largest HVAC&R industry gathering in Europe, which takes place every two years.

The Eurovent Summit's main theme is "Building Bridges". It aims to establish bridges between Europe and its surrounding regions with more sustainable, community-friendly, environmentally sound industrial goods and systems for manufacturers, consultants, planners, installers, trade unions, and bureaucrats.

Current industry developments will be covered in sessions and panels for experts working in the areas of "Heating, Ventilating and Air Conditioning (HVAC)", "Process Cooling" and "Cold Chain Technologies for Food" throughout the four-day summit's more than 50 meetings. HVAC&R experts from other countries will have the chance to learn about Türkiye's cultural diversity. At the same time, meetings on the Turkish HVAC&R Industry will take place during the day, and activities will be conducted at Antalya's historical sites in the evening. We thus extend an invitation to all our business associates and experts in the industry to join and follow this fantastic gathering of the European HVA&R Industry.

The global problems that inflict significant material harm, including loss of lives due to climate change, continue in 2022.

Due to many factors like high population pressure, a lack of improvement in environment friendly production and consumption practices and other factors, climate change issues are affecting our countries more and more each year.

Water and agricultural fields, which are essential to the survival of human existence, are particularly under stress. One of Türkiye's most important issues on the industry's

agenda is the carbon border adjustment mechanism, which will be implemented within the scope of the European Green Deal and is one of the main steps in the struggle against climate change. Within this framework, Türkiye must take immediate action to promote R&D projects that align with its carbon neutrality goal, invest in clean energy in the HVAC&R industry and other industries, employ eco-friendly fluids in the refrigeration field, and turn it into zero-carbon industrial processes.

Many Turkish companies have begun to generate their power to reduce both carbon emissions and rising power prices.

Many European countries have also adopted natural energy sources instead of fossil fuel in new construction projects.

We believe that further concrete actions will be taken considering these encouraging developments in the coming period.

Our World, where life continues at full speed despite its socio-economic fluctuations, has begun to experience the tension that started in 2022 between Russia and Ukraine, which affected the Eurasian geography and the entire world. The conflict eventually grew into a war.

Unfortunately, many people lost both their lives and their living spaces.

We hope that the conflict will end before the year is over through the implementation of humanist policies that promote peace as quickly as possible.

Like many other industries, the HVAC&R industry —our area of expertise— has been impacted and continues to be impacted by the pandemic, climate change and conflicts.

From this vantage point, we believe that growing inter-sectoral solidarity, communication and exchanging experiences will be important in minimizing losses and solving issues by building a solidarity economy. As a worldwide movement for a just and sustainable economy and the building of life, the solidarity economy will therefore play a significant role in overcoming our economic challenges.

I wish you a healthy and joyful summer season and hope to meet you in person at the Eurovent Summit in Antalya on October 25-28.



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# AIR CONDITIONING AND REFRIGERATION MANUFACTURER'S ASSOCIATION İSKİD



The air conditioning and refrigeration industry, which has emerged in the 1950s in Türkiye, developed very quickly. İSKİD was established in 1992 with the contributions of prominent companies in the sector, to conduct work towards achieving sustainable and regulated HVAC&R Industry development in compliance with the world.

Over 100 member companies are gathering under İSKİD's roof to conduct activities for the development of the industry and to produce with high-quality standards.

## **The objective of İSKİD:**

To ensure cooperation between the members that are manufacturers and/or importers of climatization, refrigeration and air conditioning devices in Türkiye and work on finding solutions for their problems,

To protect the rights of air conditioning consumers and companies on a national and international level;

To conduct activities that will ensure companies to protect the environment while providing solutions for the country's HVAC&R needs and contribute to the country economy by supporting energy efficient product solutions.

## **Mission:**

To realize strategic plans for the development of the Air Conditioning Industry and the actions that will carry out these strategies in cooperation with the sector and the other stakeholders.

## **Vision:**

To raise the Air Conditioning Industry to a reputable and leading position both in our country and abroad through its work increasing public life quality, to be sensitive to the environment, innovative, reliable and competitive.

## **Goals:**

- To develop the sector's research-development infrastructure and university-industry cooperation,
- To encourage the training of a qualified workforce for the sector,
- To encourage the use of renewable energy resources, high-end products, innovative technologies and applications,
- To increase activity in the national and international media,
- To track and update regulations and standards, create specifications when needed, perform market monitoring more effective and prevent unfair competition to maintain a more trustworthy sector image,
- To promote and support industry-Government relations,
- To introduce high-quality Turkish product image to the international market and increase our reputation,
- To increase cooperation with international organizations.





# The World Was Not Flat **WE WANTED TO WITNESS IN SITU**

Starting from the expression, “not the one who lives longer but a traveler knows a lot” we explored it by exporting to 55 countries in 4 continents.  
The world wasn't really flat at all.



# For 30 years, İSKİD "Adds Value" to the Industry



Since its foundation in 1992, İSKİD has been working on behalf of the industry to advance the Turkish Air Conditioning, Refrigeration, and Air Conditioning industry on the global market. This year, İSKİD will celebrate its 30th Anniversary with events centered around the idea of "Adding Value."

İSKİD was founded in 1992 with the support of leading industry representatives and prominent air conditioning and refrigeration companies. İSKİD now continues to represent 90% of the industry with its 112 members. Having completed the institutionalization process with the help of its member companies, İSKİD carries the industry's deeply ingrained traditions and values from the past to the future with a vibrant and cutting-edge vision.

### **New Logo Designed for the 30th Anniversary**

İSKİD has designed a 30th-anniversary logo in honor of the association's 30th Anniversary, which will be used throughout the year in all printed and digital materials, and at events with the theme "Adding Value." For the video to be shared on social media with the participation of İSKİD member company representatives, a vibrant video content was created with brief replies given to İSKİD members on the theme of "İSKİD Through the Eyes of Our Members".

İSKİD aims to highlight environmental, natural, and health-related issues in its 30th Anniversary celebrations. İSKİD and

TEMA collaborated to plant a memorial forest in this regard. A marathon for "awareness for the importance of indoor air quality" is planned in the autumn. The goal is to raise awareness by involving all İSKİD members, their families, and industry representatives.

Ayk Serdar Didonyan, the Board Chairman, made a press statement as part of the İSKİD 30th Anniversary, emphasizing the value of the association: "The association generally seeks to bring together companies that are technically competitors and bring them together on a common platform. In the most straightforward and brief terms, the association means serving society and industry with no reciprocation. Being an organized industry is becoming increasingly crucial, providing us power on the social and economic fronts. This is essential to consider the state of the world and our country. We can observe that organized industries can solve their problems better and have the ability to impose sanctions in all scenarios.

Adopting, owning, and being a member of associations signifies that one, rather than being a bystander, has decided to actively participate in the change of society and industry in which they live and work. This is extremely important and valuable. On the 30th Anniversary of our association, I want to express my gratitude to all of our presidents, boards of directors, and members for their devoted service rendered to our industry and our association.



# CLEAN AIR ENGINEERING

Emsa Engineering is ready to be your solution partner with high quality, affordable and completely domestic production **electrostatic filter** systems.



## ISKID Assesses 2021 Turkish HVAC&R Industry Data



ISKID discussed 2021 data on the heating, ventilation, air conditioning, and refrigeration (HVAC&R) industry in a webinar held on April 26, 2022.

The webinar entitled 'ISKID assesses 2021 data of the Turkish HVAC&R industry' was attended by Ayk Serdar Didonyan, chairperson, Seda Olcan, chairperson of the Statistics Commission, and Volkan Arslan, board member and member of the Statistics Commission of İSKİD. The topics were: İSKİD activities, the Turkish market and export data and the industrial outlook, İSKİD's statistics collection process and digital data collection, data collection period, data collection – product groups, access to statistics, data by product group, and trends and forecasts. A question and answer (Q&A) session was also a part of the webinar.

Ayk Serdar Didonyan welcomed the participants and made the opening remarks. Emphasizing the export and growth potential of the industry in his presentation, he stated that industrial exports in 2021 reached US\$ 6.2 billion, and the target for 2022 will be US\$ 7.0 billion. Mr. Didonyan stated, "The Turkish HVAC&R industry is expected to achieve a total of US\$ 60 billion with an export value of US\$ 25 billion and a domestic market size of US\$ 35 billion in the next decade."

"With its ability to easily embrace and implement the latest technology, produce according to energy efficiency

standards, and offer environmentally friendly products complying with the European Union (EU) regulations, our country acts as a production base for the air conditioning industry, 90% of which is represented by İSKİD," said Ayk Serdar Didonyan, after having explained the export data at the industry level. In her presentation, Seda Olcan explained how İSKİD statistics are collected and published. Stating that statistics data were collected from 92 İSKİD members in a total of 27 product categories, Seda Olcan reminded participants that non-İSKİD members could also provide data for their statistics in related categories. She then mentioned that companies sharing their data for İSKİD's statistics activities will be offered reports on the relevant product groups, whereas they have to purchase statistics reports for other categories. On the other hand, companies choosing not to share their data obtain these statistics reports by purchasing them. Stating that İSKİD statistics have been continuously improved since 1994, their first publication, and highlighting that the last three years' data have been digitally collected, resulting in faster and more accurate report publication, Seda Olcan indicated that one of the most sensitive issues in statistics is data confidentiality. She underlined that İSKİD took the necessary precautions to implement the highest level of privacy while building the digital environment.

She said that all statistics data were digitally collected in four-month, eight-month, and 12-month periods.

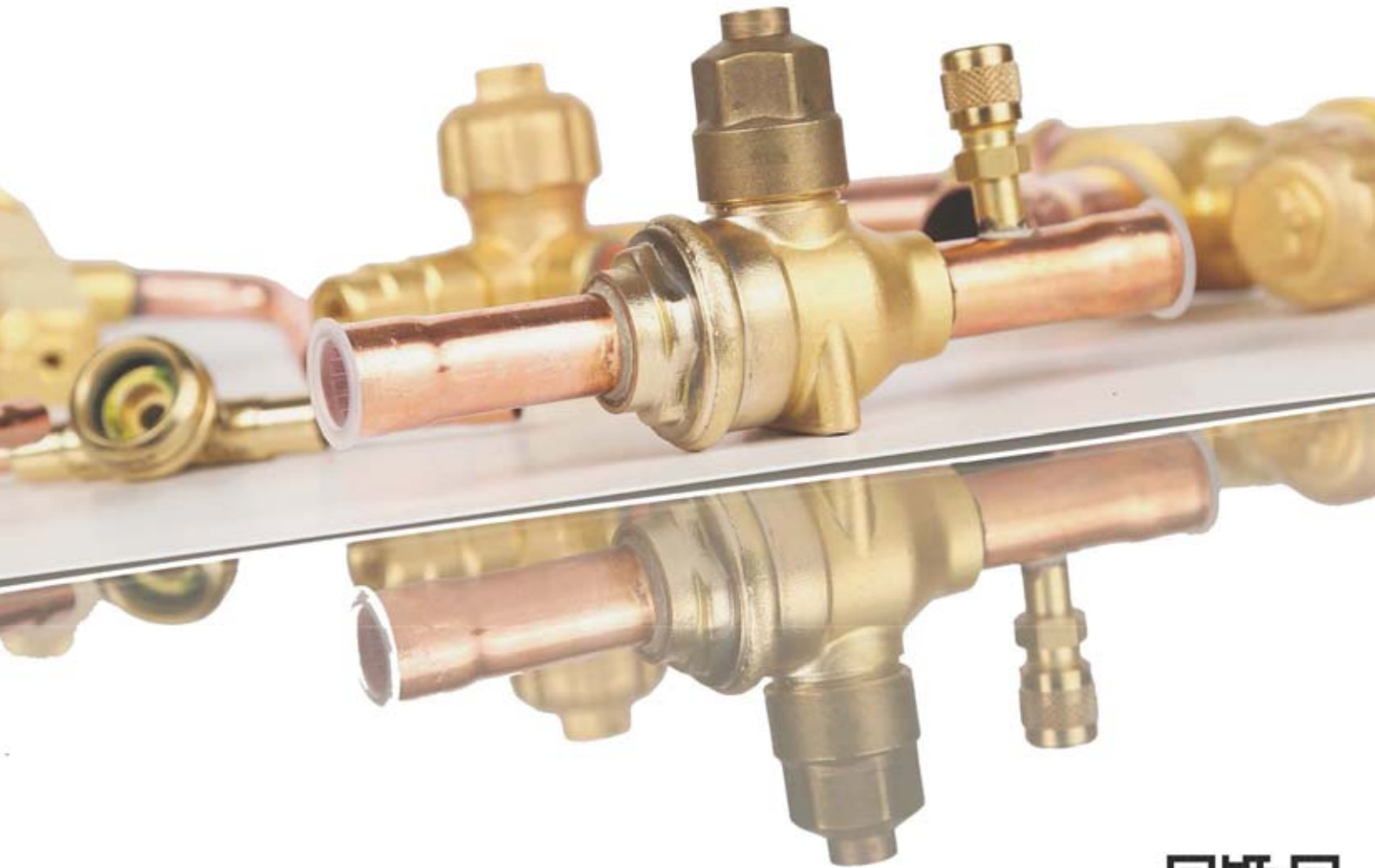


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**WEBİNAR DAVETİ**

**İSKİD, Türkiye İklimlendirme Sektörü  
2021 Verilerini Değerlendiriyor**

26 Nisan Salı  
Saat: 15:00-16:00



**Volkan ARSLAN**  
İSKİD  
Yönetim Kurulu Üyesi  
İstatistik Komisyonu Üyesi



**Ayk Serdar DİDONYAN**  
İSKİD  
Yönetim Kurulu Başkanı



**Seda OLCAN**  
İSKİD  
İstatistik Komisyonu Başkanı

**PROGRAM**

<p><b>15:00-15:05</b> Volkan ARSLAN Moderatör Açılış, Hoş geldiniz</p> <p><b>15:05-15:15</b> Ayk Serdar DİDONYAN Türkiye'nin Dünü ve Bugünü</p>	<p><b>15:15-15:35</b> Seda OLCAN İSKİD İstatistikleri Toplama Süreci &amp; Bireysel ve Ticari İklim Sistemleri Türkiye Pazar ve İhracat Verileri</p> <p><b>15:35-15:50</b> Volkan ARSLAN Merkezi Sistem Türkiye Pazar ve İhracat Verileri</p> <p><b>15:50-16:00</b> Soru-Cevap</p>
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the heat pump market will grow in the coming years to mitigate the world's energy crisis and natural gas dependence."

Volkan Arslan shared the statistics on the market data concerning rooftops, fan coil units (FCUs), air handling units (AHUs), and chiller units. According to him, the import rate of rooftop product categories declined by 90% between 2018 and 2021, owing to a rising number of domestic producers and increased competition for imports in the market. He stated that part of the market losses due to the pandemic were offset, and rooftop sales in the domestic market increased by 25% in 2021. "The size of the domestic market is 600 sales volume," he said. "37% of the

Seda Olcan and Volkan Arslan revealed some of the data on product groups in the main categories, part of the statistics 2021 data, collected with the participation of 72 companies. Sharing the statistical data on split-type air conditioners, variable refrigerant flow (VRF) systems, and heat pumps with the participants, Seda Olcan said, "Since the number of employees working from home or summer houses increased due to the pandemic outbreak, this has expanded the split-type air conditioner market at retail and wholesale sales levels. Production of split-type units was over 1.5 million, while domestic sales exceeded 1 million. In 2021, there was 42% growth in sales of residential single-split and multisplit models, as well as commercial multisplit air conditioners on the domestic market. Exports of split air conditioners saw record growth of 120% in 2021. We expect urban transformation and new housing projects to accelerate the sales revenue of split-type air conditioners as of the last quarter of 2022." Including the VRF market in her presentation, Seda Olcan said, "Given the decline in public investments, VRF systems are the product group that was the least impacted by the crisis. Though the VRF market was predicted to shrink in 2021 due to higher exchange rates and problems in component supply chain and logistics, the market grew by 7% in domestic sales and by 13% in exports based on outdoor units. The mini-VRF market achieved 20% growth with increased housing in coastal areas. Despite the 13% decline in imports, the VRF indoor unit market achieved 14% growth and ended 2021 with upward production. Compared with the last three years, the all-time-high export rate in 2021 signifies Türkiye's success as a regional distribution base for VRF systems. According to global statistics, Türkiye is the largest VRF market in Europe." Sharing İSKİD's statistics regarding the air-to-water (ATW) heat pump market, Seda Olcan said, "High energy bills and demand for comfort led to interest in heat pump systems since many employees went to their summer houses. ATW heat pump imports increased by 59%. There was a trend toward monobloc heat pumps due to the higher copper pipe costs. The sales rate increased to 40% in 2021, compared with 26% in 2018. We predict that

domestic market consists of rooftop packaged units with gas burners and 6% consists of water-cooled packaged units. There may be an increase in product unit pricing, due to the Ecodesign production and requirements in the coming period." Pointing out the FCU market data, he said, "There was a 42% decline in imports of FCUs between 2017 and 2021. Previously at a level of 50,000 sales, the import amount decreased to a level of 30,000 units. Although the production rate has decreased compared with five years ago, it has remained at a level of 90,000 units for three years. The sales volume of 120,000 has decreased to 70,000 in the domestic market. This is because hotel and hospital investments show a decreasing trend. Also, investors prefer VRF solutions instead of FCU and cooling units in such large projects. Yet, from another optimistic perspective, there was a 43% increase in exports over the same period. As the number of manufacturers and new export regions increased, exports increased." Sharing the data regarding the FCU types in the domestic market, he said, "The ceiling-concealed type accounted for 80%, the 2-pipe type represented 55%, the cassette type accounted for 12%, and the electronically commutated (EC) type represented 5%. Use of the EC type will increase in the Turkish market in the coming years." Introducing data on the AHU product groups in his presentation, Volkan Arslan stated, "AHU exports increased up to 95% between 2017 and 2021. We supply 99% of the products from domestic manufacturers while importing 1% of products. With the increase from 10,000 units to 16,000 in 2021, the increase reached up to 60% in production capacity. We predict that export sales will exceed the sales in the domestic market within a couple of years, as domestic manufacturers focus on foreign markets." Mentioning the chiller unit sales on the domestic market as 1,500 units, Volkan Arslan said, "We observed a 33% decline in the chiller unit market for five years, yet there was 20% growth in 2021, compared with the previous year. This is a positive development." The Q&A session was the last part of the webinar in which industry representatives and national and industry media representatives took part.



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## OUR VISION

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- Enter the world market.
- Continuously R & D work with innovative technology to continue.
- Maintain customers at all times in competitive market conditions.
- To progress towards becoming a brand by giving importance to customer satisfaction.

## OUR MISSION

- To be behind all conditions of the product we sell.
- To give importance to customer satisfaction by acting in line with customer suggestions and complaints.
- To ensure that our company, employees, customers and suppliers are happy.
- To produce without damaging the environment and human health.



TÜRK STANDARDLARI ENSTİTÜSÜ



## ISKID "Indoor Air Quality" awareness project

For a while now, İSKİD has been engaged in a comprehensive project to increase awareness of the importance of "indoor air quality" for health and performance. It has created [ichavakalite.org](http://ichavakalite.org) in this regard, which primarily provides relevant information on indoor air quality. The website contains information about indoor air quality, methods to test and improve indoor air quality, articles about air conditioning use during the pandemic, and answers to frequently asked questions. Again, within the framework of the project, it compiled the "Indoor Air Quality in Schools" brochure, which covers the essential ventilation and indoor air quality principles for school administration, teachers, and students, and distributed it at some schools as well as at events and fairs. İSKİD plans a series of presentations for the upcoming period to increase awareness of "indoor air quality" for teachers, students, and parents at schools.

İSKİD frequently hosted webinars on "indoor air quality" on Zoom to take advantage of the digital world, which has become increasingly widespread in our lives throughout the pandemic. The goal of these webinars was to reach a wider audience. İSKİD contacted influencers with higher



social media followings who are fit for the project goal to spread the webinar events to a larger audience. Influencers posted and shared on their own accounts to promote these webinars to a wider audience.

Press releases with insights were sent to

the national and trade press as part of the project's media relations. İSKİD sponsored "Dünya İçin Bir Şey Yap" (Do Something for the World), which aired as eight episodes on the national broadcasting company Bloomberg HT channel. With the support of İSKİD member companies, "Dünya İçin Bir Şey Yap" which airs on Bloomberg HT every Saturday at 14:30, informs the public and increases awareness about "indoor air quality and its importance" and "the impacts of indoor air quality on our health" accompanied by expert guests. You can view the program's contents on the İSKİD YouTube channel.

İSKİD keeps in touch with the associations to spread the word about the project abroad. For further information on the İSKİD Indoor Air Quality Project and its procedures: [iskid@iskid.org.tr](mailto:iskid@iskid.org.tr).





# High Performance Air Quality Solutions

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- ✓ | Units supplied with MCC-DDC panel.



ventilation



cooling  
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filtration



humidification  
dehumidification

## ISKID was awarded as part of the "Investment in the Future Awards-NGOs 2021"



ISKID ranked second under the category of "Work" in "Investment in the Future Awards-NGOs 2021" with its "University-Industry Collaboration."

The final meeting of the "NGOs for Sustainable Development" project, which was conducted in collaboration with Türkiye IMSAD (Association of Turkish Construction Material Producers) and ÇEDBİK (Turkish Green Building Council), with coordination and assistance from the Directorate for EU Affairs, was held on the evening of Tuesday, June 28, at Dedeman Hotel Gayrettepe. At night, NGOs engaged in sustainable activities in the categories of EVENT, WORK, and PROJECT received awards as part of the "Geleceğe Yatırım Ödülleri-Sivil Toplum 2021" ("Investment in the Future Awards-NGOs 2021"). ISKID was awarded second place in the "WORK" for its activities carried out in the context of University-Industry Collaboration. Ozan ATASOY, the ISKID and Türkiye IMSAD Board Member, presented the award to ISKID Chairman of the Board Ayk Serdar DIDONYAN.

Speaking about the award, ISKID Chairman of the Board Ayk Serdar DIDONYAN expressed his gratitude, saying, "We are delighted to get such a noteworthy award with our University-Industry Collaboration projects this year in which we mark the 30th Anniversary of our association. This shows that we are on the right track. I want to express my gratitude to the academicians, association professionals, and members of our ISKID commission who contributed to our effort. I'd also like to thank Türkiye IMSAD, CEDBIK,

and the Directorate for EU Affairs for hosting such a lovely evening.

It conducts activities within the scope of ISKID University-Industry Collaboration to promote applied and qualified education so that engineering students have a clear grasp of the Air Conditioning and Ventilation industry and reach well-trained professionals. Regular monthly meetings are held with the academic staff of the Engineering Faculties to develop current projects based on student needs and expectations. Industry representatives attend classes as guests and share up-to-date information about the air conditioning industry. Scholarships are awarded to engineering students in need. Student groups get the opportunity to tour the factories and R&D facilities of ISKID member companies and observe manufacturing firsthand. Internship opportunities are also given by exchanging the details of students interested in doing internships with the member companies. Student committees were developed to closely monitor school student concerns and changes to assist students needing technical studies. Technical and practical webinars are provided for students. Plus, ISKID follows university career days and gives information about the industry. Again, as part of this, the book "İklimlendirme Sektöründen Genç Mühendislere "Mesajınız Var" (For Young Engineers of the Air Conditioning Industry: You Have a Message), in which industry leaders and experts of the air conditioning industry for many years recounted their professional experiences, was presented and distributed in schools.



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## Among the connoisseurs present Hüseyin Erdem was the guest at İSKİD Industry Talks



On Friday, June 24 at 10:00, Tunç KORUN, the 6th Term Chairman of İSKİD's Board, moderated the second session of the İSKİD Industry Talks series, which featured Hüseyin ERDEM, among the connoisseurs of the Turkish Air Conditioning and Installation Industry.

Hüseyin ERDEM, Chairman of the MTMD (The Mechanical Contractors' Association) Board, spoke about the Turkish Air Conditioning and Installation industry in the 1980s and 1990s, the first large-scale projects, Türkiye's first mechanical company, TOKAR, which is known as the industry's school. In the second session of the "İSKİD Industry Talks", he explained how he got started in business there. Later, he shared his knowledge and experience in the family-run business, carrying the same surname. He took the audience on a nostalgic journey.

The 15th Term Chairman of the Board, Ayk Serdar DIDONYAN, gave the opening remark to the second of the "İSKİD Industry Talks" series, which was organized via Zoom to conserve the history and knowledge of the Turkish heating, cooling, ventilation, and air conditioning industry for future generations. "As the 15th Term of Board of Directors, we seek to pass on the expertise and experience of our industry specialists, who are guests of the "İSKİD Industry Talks" program series", Didonyan stated. He continued, "We believe that the İSKİD Industry Talks will play a key role in forming and preserving the industry's memory."

In the program "İSKİD Industry Talks," Hüseyin ERDEM answered Tunç KORUN's questions in a comfortable chat

setting surrounded by coffee smell. He shared his unique experiences with the audience. He talked about large mechanical installation projects completed in Türkiye in the 1980s and before, as well as in the 1990s, the Tokar company, known as the industry's school. He also spoke of the company's founder - Todori Karakaş, who had important contributions in the mechanical installation industry over the years.

Hüseyin ERDEM, Chairman of the Board of MTMD, stated that the importance of the Mechanical Installation Industry is not fully acknowledged in Türkiye and that people working in different fields of expertise also occupy mechanical installation works in projects. Yet, according to him, this creates trouble since the mechanical installation requires expertise. Erdem continued with suggestions for the next generation, saying, "The Mechanical Installation industry needs highly skilled and specialized people. For a successful career, young people, in particular, must be patient. They can advance in the industry by adopting discipline and perseverance. While climbing the career ladder, they must have time for themselves and their social surroundings and fulfill their personal growth by partaking in hobbies.

The program concluded with İSKİD Chairman of the Board Ayk Serdar DIDONYAN presenting appreciation to Hüseyin ERDEM, who continued to answer questions from the audience.

The "İSKİD Industry Talks" is available on İSKİD's YouTube channel.



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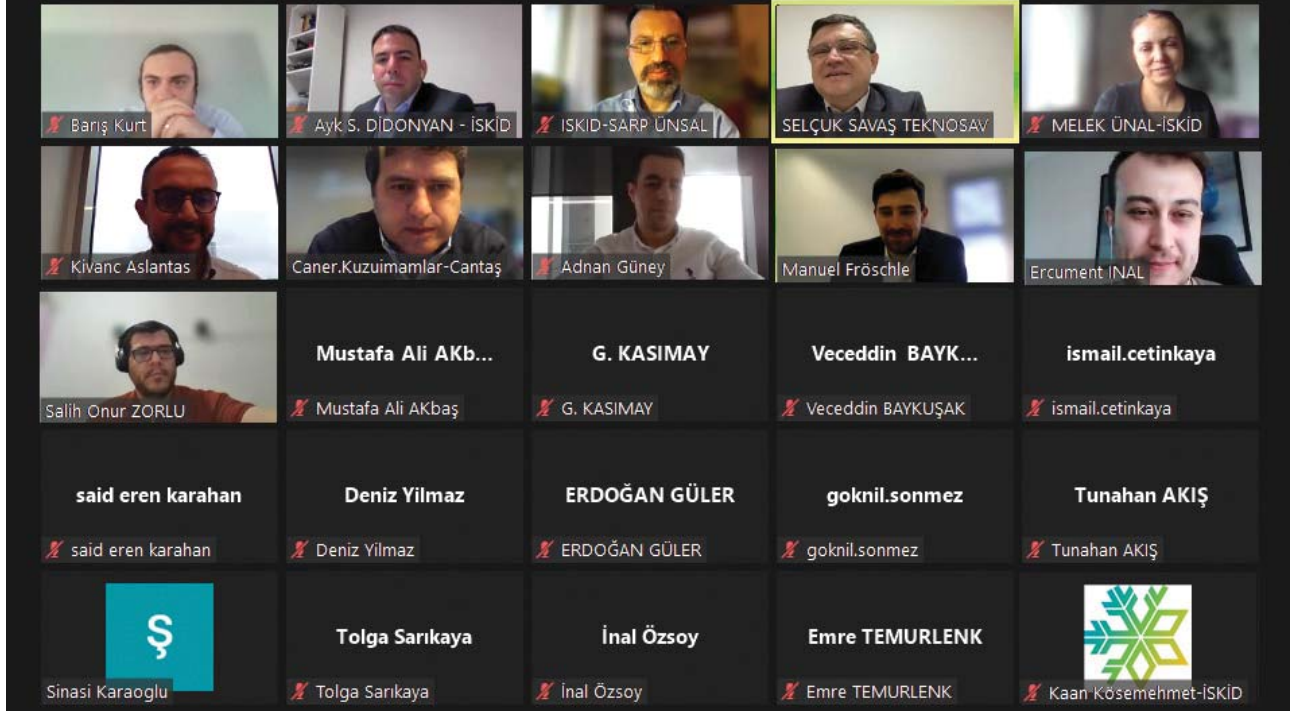


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## ISKID webinars are very popular



ISKID intensively works for the growth of the Turkish HVAC&R industry and its position as a global player through technical webinars organized with the help of its member companies.

Topics such as Natural Refrigerants, VRF Systems, Green Building Solutions, Environmental Heat Pump Technologies and Examples, and the Importance of R&D are presented to industry professionals in webinars, in which the Turkish HVAC&R industry receives much attention.

Additionally, as part of İSKİD's program for University-Industry Collaboration, mechanical engineering students from engineering faculties throughout Türkiye participate in "Career Days" webinars. Through these webinars, students can learn more about the Turkish Air Conditioning Industry and have a deeper understanding of it. Furthermore, the webinars hosted under the title "Career Days" aim to support students' career development by providing up-to-date knowledge about efficient CV preparation and interview methods by professionals from career consultants.

### 3. İSKİD URGE Project successfully continues

It's been 2.5 years since the 3. URGE project was launched in March 2020. The project's training and consultancy services continue according to the activity plan. The "Total Quality Management in Production and Lean Manufacturing" consulting service started in April 2021 and finalized in February 2022 and then "Lean Office Processes" activity was launched in June 2022. The BIM consultation process continues with the willing companies. Other consultancy activities, which are planned to be started before the end of the year, continue in line with the demands of the participating companies and the project roadmap. At the end of 2022, a plan was made to organize 6 trainings with the project participant companies, and work continues in this direction. Export Marketing Methodologies in B2B Goods and Services



Export, Supply Chain Management, Cost Accounting training were successfully completed. Other training topics included in the project roadmap are also planned by evaluating with the participating companies.





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# Turkish Refrigeration Industry Maintains Rapid Growth

Air conditioning and refrigeration are vital technologies widely used in all aspects of life. We have seen how essential the cooling chain is in such issues as medicines, vaccines, and their storage worldwide. Once again, it cannot be denied that air conditioning and refrigeration systems are crucial in the food industry, which is essential for human existence and preserving foods in a suitable environment. Refrigeration systems are used throughout the whole process, from food production through transportation and sale, to fulfill basic demands.

ISKID actively keeps up its webinars and training initiatives that instruct and teach the industry on using environmentally friendly refrigerants instead of F gases, decreasing the effects of global warming, and reducing energy consumption by improving the energy efficiency of equipment through commission studies that apply the idea of "sustainable cooling".

ISKID Chairman of the Board Ayk Serdar Didonyan stated that cooling systems and elements are the third biggest sub-sector of the HVAC&R industry with an export of around 842 million dollars in 2021, citing statistics from the Turkish Cooling Industry. In the first 6 months of 2022 (January-June), our export figures for Cooling Systems and Components totaled to about 510 million dollars, representing a 29,7% increase."



## Energy-efficient products are in demand

Consumers of air conditioning in recent years have increased their expectations for the products they choose, including not just price but also eco-friendly, energy-efficient devices. Construction companies are also affected by this situation. Construction companies, which once preferred to purchase the least expensive equipment for their projects, now demand extended warranty terms and to have these devices examined by a professional before purchases.

This warrant serves as a marketing strategy for project sales. Qualified products manufactured in our country are vastly favored. This trend is now transforming the air conditioning industry.

A significant element in reducing energy consumption is speeding the transition to high-efficiency products. According to a study conducted by ISKID with its members, the power savings in the case of replacing non-ERP compliant equipment with a product with an A++ energy level (assuming an air conditioner is utilized for 500 hours per year) is nearly 20% of the Keban Dam's yearly production. Given the recent increases in energy prices, this is a fairly significant amount of savings that will help to reduce the current account deficit.

## ISKID scholarship students visit member companies

ISKID scholarship students visited Systemair HCC Dilovasi factory (Kocaeli Demirciler Organized Industrial Zone) and Vestel's Levent Headquarters (Istanbul); both are member companies of ISKID.

On Thursday, February 17, as part of the Universities-Industry meetings, a student group of 3rd and 4th-grade mechanical engineering students from Istanbul Teknik University and Istanbul Ticaret University visited Systemair HCC Dilovasi Kocaeli factory. The prospective engineering students, who also visited the factory's production and R&D teams, got information from the authorities about the R&D department, the functioning principles of the products, and other production-related technical issues. The students had a productive day since their questions were answered comprehensively.



On Thursday, February 24, fourth-year mechanical engineering students from Marmara University, Istanbul University, and Istanbul Ticaret University visited Vestel's Levent headquarters, where they met product management, sales, and marketing department employees and learned about the company operations. Students who were informed about employment and business follow-up in various Vestel departments had the opportunity to gain crucial information about their education and professional business life during their visit.





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## 2022 Convegno Mostra Expocomfort was held in Italy, and 139 Turkish companies participated



From June 28 to July 1, 2022, Milan, Italy, hosted the MCE - Mostra Convegno Expocomfort Fair, an international trade fair on renewable energy and air conditioning.

Türkiye is a partner country, and 139 Turkish companies attended the fair.

Mustafa Varank, Minister of Industry and Technology of the Republic of Türkiye, who visited the Turkish Air Conditioning industry's booths at the fair, remarked that the strong links between Italy and Türkiye are reflected in bilateral trade, adding, "Currently, air-conditioning products manufactured in Türkiye are exported to more than 200 countries. As a country, we highly value fair participation to better understand and lead global manufacturing trends. We are glad that this year 139 of our companies participated in such a significant event as members of the partner country."

Minister Varank noted that they regularly track industrial developments and that nowadays,

products that consume less energy, cost less, perform better, are smarter, and are more environmentally friendly are the primary variables influencing client choices. He said many policies, such as the Paris Agreement and The European Green Deal, will become mandatory.

Minister Varank explained that the Ministry of Industry and Technology is continuing to make essential preparations to manage this process better and transform obligations into opportunities: "We established the Air Conditioning Industry Technical Committee to collaborate more closely with the industry. Because of its deep connections, the air conditioning industry, as you know, has a considerable multiplier impact. Every investment and every innovation in this industry has the potential to boost the economy. In this regard, we promote the establishment of R&D centers to increase the industry's technological capacity. We supply the industry with cutting-edge technologies and certified infrastructures that require considerable investment."

In his statement, the Chairman of the Board of Turkish HVAC&R Exporters Association - ISIB, Mehmet Şanal, said: "We started making fresh investments in Türkiye by determining strategic products. Because of the challenges in supply caused by the pandemic and the tendency of high pricing, the need to diversify supply chains is obvious. Türkiye is in a highly fortunate position in this regard, and new investments have begun to flow into the country. This is likely to keep rising, in our opinion."

**ISKID had a successful fair by participating in the MCE Mostra Convegno Expocomfort Fair with their booth.**

ISKID represented the Turkish Air Conditioning Industry by having a booth at the fair. During the Fair, ISKID presented the ISKID Magazine, which covers current developments in the Turkish Air Conditioning Industry as well as a new project and product news from member companies, with visitors at its booth. The HVAC&R Industry Guide was distributed, which covers statistics on the Turkish Air Conditioning Industry.

Marta San Román, the Secretary General of AFEC (Spain), and Marta Hernández, authorized person of the Climatizacion Madrid exhibition, were both interviewed during the fair. Possible collaboration potential between the two associations was discussed in the Climatizacion Madrid exhibition.

Bilateral talks with representatives of the EUROVENT Association contributed to developing collaborations.

After a lengthy pause, the fair featured advanced and productive programs, which offered the chance to closely follow the trends, developments, and challenges in the industry.



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# The 2022 Eurovent Summit will be held in Antalya on October 25–28



Together with the European EUROVENT Association, ISKID (Air Conditioning and Refrigeration Manufacturer's Association) will host this year's Eurovent Summit, the largest HVAC&R industry gathering in Europe, which takes place every two years.

The Eurovent Summit's main theme is "Building Bridges". It aims to establish bridges between Europe and its surrounding regions with more sustainable, community-

friendly, environmentally sound industrial goods and systems for manufacturers, consultants, planners, installers, trade unions, and bureaucrats.

By bringing together more than 500 significant industry professionals from Europe and beyond, the Eurovent Summit hopes to encourage new relations. Current industry developments will be covered in sessions and panels for experts working in the areas of " Heating, Ventilating and





Air Conditioning (HVAC), "Process Cooling" and "Cold Chain Technologies for Food" throughout the four-day summit's more than 50 meetings.

Meetings on the Turkish Air Conditioning Industry will take place during the day, and activities will be conducted at Antalya's historical sites in the evening. Meanwhile, another goal is to introduce Türkiye's cultural diversity.

Participants at the Eurovent Summit Antalya will be able to join free "Product Group" meetings, where product-

based advancements in the HVAC&R industry are discussed, opinions on EU legislation are formed, and emerging trends in the industry are explored. Industry professionals at the summit will learn about the most recent advancements in the air conditioning industry in Europe and worldwide.

On 25 and 26 October, İSKİD and TTMD will organize 2 half-day seminars titled "New Technologies and Trends in HVACR" at Eurovent Summit Antalya 2022. Simultaneous translation from Turkish to English will be provided in the seminar.





## 2022 Eurovent Summit is around the corner

The event season is now in full swing and here is your chance to participate at the EUROVENTSUMMIT to be held with the theme 'Building Bridges'. The event is scheduled to take place on 25-28 October 2022 in Antalya, Türkiye.



The 2022 Eurovent Summit with the theme #BuildingBridges will focus on connecting manufacturers and consultants, planners, installers, trade associations and policy makers, between Europe, the East and beyond, towards more sustainable and circular products, and towards a more socially and environmentally responsible industry.

This four-day event is organised by Eurovent, Eurovent Certita Certification, Eurovent Market Intelligence and Türkiye's Air Conditioning and Refrigeration Manufacturers' Association ISKID. It has support from many partners, including local and international media and associations and is sponsored by industry leaders including UL (BridgeBuilding Partner), J2 Innovations (BridgeBuilding Partner), Baltimore Aircoil Company and CEIS (BridgeBuilding Supporters). Turkish Airlines is the official carrier of the 2022 Eurovent Summit.

The event is the major European high-profile gathering for Indoor Climate (HVAC), Process Cooling, and Food Cold Chain Technologies industry representatives. The previous edition in Seville, Spain reached an attendance of more than 530 participants consisting of manufacturers, policy makers, contractors and installers. Having been postponed from 2020 due to the COVID-19 outbreak, the 2022 Eurovent Summit expects to unite 500+ key industry stakeholders

from Europe and beyond with the goal of building bridges together.

The programme highlights include, for instance, the well-known Eurovent Innovation/HUB, a dynamic policy panel discussion on the first Summit night, and a dedicated parallel bilingual seminar programme for consultants in English and Turkish, organised by the local associations ISKID (Türkiye's Air Conditioning and Refrigeration Manufacturers' Association) and TTMD (Turkish Society of HVAC and Sanitary Engineers).

The organisers cordially invites all ISKID Magazine readers to join the 2022 Eurovent Summit in Antalya. Information on the hotel reservation, costs and transportation has now been added on the Summit website. Make your flight bookings with Turkish Airlines, the official airlines, using the promocode provided on the website, and book your hotel room as soon as possible, as discounted rates are available only until Tuesday 16 August 2022. More information on the programme, agenda and registration will be gradually announced via the Summit website. Stay up to date and subscribe to the latest updates via [www.eurovent-summit.eu](http://www.eurovent-summit.eu) and the Eurovent LinkedIn page, following the hashtag #BuildingBridges.





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## Remarks of Mehmet Şanal, Chairman of the Board of ISIB



Turkish HVAC-R sector entered 2022 efficiently and in a coordinated way with its all stakeholders, including from marketing to sales and communications to execution, and keeps progressing.

Turkish HVAC-R sector gained a growth of approximately 11.7 percent with an export size of 3.4 billion dollars in the first six months-period of 2022, compared to the same period of the last year. Excluding the Heating Systems and Elements product group, we increased our exports in all sub-groups of products. We achieved exports of 680 million dollars in Heating Systems and elements, 510 million dollars in Cooling Systems and Elements, 456 million dollars in Air-Conditioning Systems and Elements, 1.3 billion dollars in Installation Systems and Elements, 381 million dollars in Ventilation Systems and Elements, and 86 million dollars in Insulation Systems and Elements.

We are exporting in a ratio of approximately 60 percent to EU countries. The countries where we export most are Germany, Italy, the United Kingdom, France, and Spain. While the unit price per kilogram in the sector was 4.6 dollars in 2021, it rose to 5.2 dollars as of the first 6 months of 2022.

We envisage that our country's foreign trade size will increasingly continue in 2022. To maintain continuity as a sector with a foreign trade surplus is our primary objective

for 2022. Apart from the European countries, we wish to increase our market share in Middle East countries, Africa, and South America countries that show potential and where our country can not have the market share it deserves.

As the sector, we set the goals of a growth of 15 percent and an export size of 7 billion dollars for the end of 2022. Our most important goal this year is to become a sector with a foreign trade surplus.

We re-started to participate in exhibitions, which we suspended due to the pandemic, in 2022. We will participate in more than 20 exhibitions during the entire year. We participated in 12 exhibitions for our exporters in the first six months of 2022, and also we organized Sectoral Trade committees for Uzbekistan, Brazil, and Argentina. Furthermore, we also organized a procurement committee for the committee coming from the North African countries.

With the initiatives of our Association, Türkiye has become a Partner Country at the Mostra Convegno Expocomfort Exhibition held in Milan in July, which is one of the most important exhibitions in our sector. A total of 139 exporting companies attended the exhibition. Our exporting companies made critical business connections with the advantage of Türkiye being a partner country at the exhibition, which was opened, and attended by Mr. Mustafa Varank, Minister of Industry and Technology of the Republic of Türkiye.





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# Excellent prospects for Chillventa 2022: Innovations, networking, and future prospects

It is the hub of the international refrigeration, air conditioning, ventilation and heat pump experts: Chillventa, the world's leading trade fair for refrigeration technology.



Chillventa, the leading international fair for refrigeration technology and the most important gathering of international refrigeration, AC, ventilation and heat pump experts will celebrate its comeback in Nuremberg from 11-13 October 2022. Already, all participants are feverishly anticipating this massive reunion at the first on-site edition of the event since 2018. The community's commitment to what is the highlight of its calendar remains unabated, while the need to finally make business contacts face-to-face again and share trends, solutions and knowledge with one another is greater than ever. Intensive preparations are currently under way for the Chillventa CONGRESS the day before the fair and the extensive, three-day supporting programme.

It's that time again! As the barometer of trends in international refrigeration, AC, ventilation and heat pump technology, Chillventa is in the starting blocks and ready to provide the answers to the questions currently affecting the industry. Once again, it will offer the ideal venue to enjoy personal encounters and forge new business contacts. "The fantastic commitment shown by the entire community is the inspiration for our current intensive planning phase. The display areas are already well booked, and we are once again seeing a strong international presence, so the outlook for October is ideal. Naturally, prospective exhibitors can still register to secure the remaining slots," says Elke Harreiß, Exhibition Director Chillventa at NürnbergMesse.

"The relief is palpable: We are back in the game again with our trade fairs! The first events successfully took place in Nuremberg again at the beginning of March and included a highly international fair with more than 850 exhibitors from 53 countries and around 20,000 visitors from 111 countries. This gives us an enormous boost for Chillventa and shows that even under pandemic conditions, trade fairs can still be held safely and successfully," says Petra Wolf from the NürnbergMesse management board.

### Stay well informed about the latest industry issues

As well as being the showcase for the entire spectrum of products and services in refrigeration technology, insulation technology, C&I and automation, AC systems, ventilation and heat pumps, Chillventa is also renowned for its concentrated knowledge transfer and wide-ranging programme. The Chillventa CONGRESS, which starts the day before the exhibition, provides high-calibre insights into topics currently affecting the industry. The trade forums provide industry-specific information about the various aspects of refrigeration, AC, ventilation and heat pump technology.

### Become an exhibitor today

Seize the opportunity to present your solutions and innovations in refrigeration, AC, ventilation and heat pump technology to a wide audience of industry professionals as you experience the unique atmosphere of the first on-site round of the event since 2018. Reserve your stand today to exhibit at Chillventa in Nuremberg from 11 to 13 October 2022: [www.chillventa.de/en/exhibit](http://www.chillventa.de/en/exhibit)



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# CONNECTING EXPERTS.

# ISKAV TAB (Testing, Adjusting and Balancing) Certification Program



Founded in 1997 by the leading firms and education associations of Turkish HVAC-R Industry, ISKAV-Heating, Refrigerating, Air Conditioning Research and Training Foundation continues its education, certification, and publication operations related to air conditioning industry.

TAB (Testing, Adjusting, and Balancing) operations in existing and new building projects must be performed by expert technicians and engineers.

If the measurement of the water and air aspects of mechanical systems in buildings is balanced accurately, it will offer its users a comfortable environment and provide its investor an energy-efficient building at a low operating cost.

The preparation of separate training programs for technicians and engineers who will perform TAB practices, offering training by academics and professionals, holding theoretical and practice exams, creating an examining board, and issuing certificates to those who succeed are performed by ISKAV. Certificated technicians and engineers can extend their certificate expiration date through scores obtained for activities such as their TAB practices, the training they receive, organizations they attend, and their published articles. ISKAV also follows up on the validity of the certifications.

Having equipment determined by ISKAV, firms that employ a sufficient number of ISKAV TAB Certified technicians and engineers and are organized to perform TAB practices are certified as "ISKAV TAB Certified Firm".

If an employer files a complaint or disagrees regarding the work conducted by ISKAV TAB Certified Firms, ISKAV forms

an independent committee to investigate the issue and prepare a report. Thus, ISKAV provides the follow-up assurance regarding the performed practices.



The book involving the summary of estimates, specifications, and business conduct for ISKAV TAB practices is available in English and delivered to individuals and institutions upon request.

Theoretical and applied training and theoretical exams of the TAB certification program for technicians and engineers can also be held online. For the practice exam, examinees need to be present at ISKAV TAB Applied Training and Exam Center for a day.

ISKAV TAB Certification program accepts requests from abroad. Also, ISKAV TAB Certified firms hold the experience and equipment to conduct TAB practices abroad successfully.

Following your application to ISKAV, you can benefit from our certification program, and we can enable our ISKAV TAB Certified firms to communicate with you.

ISKAV TAB engineer certificate program has carried out 9 training periods since 2016. There are 33 ISKAV TAB engineers and 1 ISKAV TAB technician in the programs attended by 104 national and international participants.

The 10th term ISKAV TAB engineer certificate program will be opened on October 5, 2022. You can contact ISKAV for participation in the program and details.

## Address and Contact

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## Signatures for Participation in “ISK-SODEX 2023”, the Leading Exhibition in HVAC-R Industry, are now set



The sales for the “International ISK-SODEX 2023 Exhibition”, scheduled to be organized at Istanbul Expo Center between October, 25th and 28th, 2023, by Hannover Messe Sodeks Fuarçılık under the “Healthy Indoor Climate Solutions” motto have started. The exhibitor companies are signing the contracts for their stand areas.

Over 850 participants are expected to exhibit at ISK-SODEX 2023, which has started sales for areas of about 42.000 sqm. Always serving as an area of attraction for the Asia and North Africa territory, ISK-SODEX is expected to attract huge interest from European countries, as well, in 2023. At this exhibition, which is geared to host participants also from Germany, Italy, and France, the products operated by alternative energy, systems designed for the availability of clean and comfortable interior air quality, and smart HVAC&R automation systems, as well as high-performing and multi-functional products consuming lesser energy, will come to the foreground.

Considered to be the biggest event in its region for HVAC&R industry, ISK-SODEX will enable visitors to enjoy personal witness to thousands of products and services of wide variety in a multitude of industries, from heating, refrigeration, air-conditioning, ventilation, insulation to pump, valve, fitting, water treatment, fire prevention, pool, and solar energy systems. The Exhibition has been moved to Istanbul Expo Center merely with an eye to enabling participants and visitors to have easier access, as well as to offering them a better exhibition experience.

“ISK-SODEX 2023”, as an exhibition geared to host professionals from HVAC&R industry which closed the year of 2021 with exports amounting to US\$6,2 billion. The air conditioning sector realized over US\$ 2.2 billion export with 15.2% increase compared to the same period of 2021, during the first 4 months of 2022. The exhibition will provide a platform ensuring an exchange of information between visitors from all around the globe and experienced participants.

Thanks to Forum Area, Masters League and Conferences, which are parts of the exhibition, as well as cooperation’s with the leading industry foundation and associations, this exhibition will also enable participants and visitors to establish and develop business contacts as well as to have a personal awareness of what’s going on in the industry in terms of innovations and developments.

With the support of Turkish Republic of the Ministry of Commerce, and under the organization of Turkish HVAC&R Exporters Association (ISIB), B2B Meetings, will greatly contribute to the trade volume of the sector. During the B2B Meetings in 2021, 300 professional buyers from 53 countries met with the participants of the ISK-SODEX Fair.

Making its debut in 1997, the ISK-SODEX Exhibition, in its 2021 version, achieved a trade volume potential of 500 Million Dollars that would be realized until 2023. The ISK-SODEX 2021 Exhibition had been visited by 86 thousand 217 people from 95 countries.



INTERNATIONAL HVAC&R, INSULATION, PUMP, VALVE, FITTING,  
WATER TREATMENT, FIRE PREVENTION, POOL AND SOLAR ENERGY SYSTEMS EXHIBITION

# ISK-SODEX ISTANBUL

## HEALTHY INDOOR CLIMATE SOLUTIONS

### 25-28 OCTOBER 2023

**NEW VENUE**  
ISTANBUL EXPO CENTER



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Deutsche Messe



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Türkiye



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THIS FAIR IS ORGANIZED WITH THE TOBB (INSPECTION OF THE UNION OF CHAMBERS AND COMMODITY EXCHANGES OF TURKEY)  
IN ACCORDANCE WITH THE LAW NUMBER 5174

# UL Solutions is BridgeBuilding Partner of 2022 Eurovent Summit

Brussels, Carugate, 19 July 2022. UL Solutions, a global service provider to the HVACR industry and beyond, has become an official BridgeBuilding Partner (sponsor) of the 2022 Eurovent Summit taking place from 25 to 28 October in Antalya, Türkiye.



UL Solutions is a global leader in applied safety science. The organisation transforms safety, security, and sustainability challenges into opportunities for customers in more than 100 countries. UL Solutions delivers testing, inspection, and certification services, together with software products and advisory offerings, that support customers' product innovation and business growth.

UL Solutions will assume an active role in the Summit's flagship event Eurovent Innovation/HUB focused on #BuildingBridges between innovation and sustainability. Mr Dustin Steward, Director and Global Industry Lead for Appliances, HVAC, and Components at UL Solutions, will contribute to the event with a keynote speech dedicated to lower GWP refrigerants.

In this respect, Steward remarked: "While low GWP refrigerants are more environmentally friendly, manufacturers must be mindful of the additional layers of risk involved in their use. As a leading independent safety science organisation, UL Solutions has conducted extensive research on flammable refrigerants and has developed thorough expertise to support manufacturers during the design of their next-generation products." Steward highlighted that, "among UL's available services in fact, there is the unique Modelling and Simulation programme that helps us to predict flammable refrigerant behaviour in circuits and potentially critical areas. Through this advanced analysis, manufacturers can lower the number of physical prototypes needed for certification tests. On top of that,

a faster assessment of product design revisions meets both environmental and process acceleration issues that manufacturers committed to sustainability are pursuing."

This year's EUROVENTSUMMIT is co-organised with ISKID, the Turkish Air Conditioning and Refrigeration Manufacturers' Association. It aims at #BuildingBridges between manufacturers and consultants, planners, installers, trade associations and policymakers between Europe, the East and beyond, toward more sustainable and circular products and a more socially and environmentally responsible industry.

Among other activities, participants can look forward to a rich seminar programme focused on both ventilation and refrigeration organised by ISKID and TTMD (Turkish Society of HVAC and Sanitary Engineers) with involvement from UL Solutions in English and Turkish. There will also be an interactive policy panel on the first night, which will connect many different stakeholders in the industry. Stay tuned for updates on the speakers and the soon-to-be-launched registration via [www.eurovent-summit.eu](http://www.eurovent-summit.eu) and the Eurovent LinkedIn page.

## Related documents and links

All related documents and files can be found in the respective sections in the right sidebar.

- Eurovent Summit and UL Solutions logo files
- Press images
- PDF version of the Press Release





# Why UL Solutions?

## Stay abreast of market entry requirements.

At UL Solutions, a global safety science leader, we apply deep industry technical expertise, vast regulatory knowledge, strong connection with regulators and the resources of a worldwide network of laboratories and dedicated, local service. We help you gain global market acceptance, faster, and improve safety, risk management and market success.

UL Solutions International Italia S.r.l., a Notified Body for the CE marking and UL Solutions International (UK) LTD U.K., an Approved Body for the UKCA marking, help appliance manufacturers address the needs of consumers, users and, more generally, all interested parties by giving them confidence and to demonstrate that the products have met the specified requirements by an impartial third-party body.

UL Solutions scope of services include the following directives and regulations that allow uninterrupted support for customers needing global market access services:

- Machinery Directive (CE) and Machinery Regulation (UKCA)
- ATEX Directive (CE) and ATEX Regulation (UKCA)
- Boiler Efficiency Directive (CE and UKCA)
- Gas Appliances Regulation (CE and UKCA)
- Pressure Equipment Directive (CE) and Pressure Equipment (Safety) Regulation (UKCA)
- EMC Directive (CE) and EMC Regulation (UKCA)
- Radio Equipment Directive (CE) and Radio Equipment Regulation (UKCA)
- Construction Products Regulation (CE and UKCA)
- Marine Equipment Directive (CE) and Marine Equipment Regulation (UKCA)
- Personal Protective Equipment Regulation (CE and UKCA)

Visit us at [UL.com/Market Access](https://www.ul.com/Market-Access) to learn more.



**Safety. Science. Transformation.™**

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# Eco-friendly filtration systems fight pollution



The European Environment Agency (EEA) completed new research on cancer cases across the continent and environmental impacts. The research revealed that exposure to pollution causes 10% of all cancer cases in Europe. Designing systems and developing solutions to reduce air pollution since 1986, domestic manufacturer Bomaksan both protects human health with its filtration systems and boosts production efficiency with eco-friendly systems.

New research conducted by the European Environment Agency revealed that pollution is linked to 10% of cancer cases in Europe. Exposing the effects of cancer and the environment, the research also demonstrated that 2.7 million people are diagnosed with cancer each year due to pollution. Also, dust and smoke generated during production processes are known as adverse pollution.

Thus, pollution collection and filtration allow production processes to run more efficiently and safely.

As the first company to receive a grant from TUBITAK for its R&D projects, Bomaksan utilizes filtration systems to ensure more efficient use of air, aiming to prevent environmental pollution. With its BOAsmart, DUFILmini, and TOFILbench designs, Bomaksan, the brand equipping its innovative systems with alternative air cleaning technologies, reduces industrial air pollution and prevents employees from breathing air contaminated with harmful dust.

## Air pollution monitor for up to 50 devices

The BOAsmart product family provides instant air quality monitoring and automatically offers solutions based on air purification needs. The product provides the ability to be programmed with wifi and an advanced application and allows monitoring air pollution levels of up to 50 devices in businesses or schools. Moreover, the product can also control each of these devices. Anyone with an iOS or Android device can benefit from this technology. Also, the BOAsmart product family has an on-demand air purification approach which boosts energy efficiency by easing the burden on employers. With its "AUTO" mode, it accelerates its speed when the indoor air is polluted, reducing energy consumption after air cleaning.

## Protecting the future with eco-friendly filters

BOAsmart offers notable advantages to its users with its DUFILmini series mobile filter unit design. DUFILmini stands out for meeting users' demands and even exceeding their quality expectations. With its highly efficient 3-stage cassette filters, 360-degree rotating acrobat suction arm, radial fan with high efficiency and suction power, filter occupancy sensor, and filter operating hours counter, the product contributes to both human health and production efficiency. Its reliable and long-lasting system also helps its users increase their manufacturing capacities.

## Cost and energy saving with TOFILbench

Developing sustainable designs with the vision of creating a more livable planet, Bomaksan has recently launched its TOFILbench series. The brand allows reducing maintenance costs with the high-quality filtration system of its new product. Creating solutions to the dust, smoke, and oil vapour problems in Türkiye's industrial dust collection and filtration with its practical and efficient systems, Bomaksan increases the efficiency, capacity, and reliability of the facilities with the TOFILbench series designed for the emission of medium and high-level dust and smoke particles. With its adaptable structure, the series also provides its users with increased plant productivity, enhanced energy efficiency, reduced heat losses, and low maintenance costs.





# Daikin Türkiye, the choice of International Projects, grew to become Europe's 2nd largest VRV manufacturer

Daikin Türkiye, a major project overseas, launched the VRV technology outdoor unit manufacturing plant on May 25, 2022, with the participation of Industry and Technology Minister Mustafa Varank and numerous officials, with a 13 million Euro investment that was completed in 4 months. Daikin Türkiye has become Europe's second-biggest VRV manufacturer with this investment.



Daikin Türkiye's exports will grow by 100 million Euros with the commissioning of the new production plant in Sakarya/Hendek, up from 262 million Euros in the fiscal year 2021 results. Developed with Japanese technology and recognized as the item with the best seasonal efficiency in air conditioning systems, 30% of the VRV outdoor units are locally utilized. 70% are affiliated to the Middle East and will be exported to Tajikistan, Georgia, Northern Iraq, Mongolia, and TRNC.

Having begun exporting with the new VRV manufacturing line launch, Daikin Türkiye continues to be the product of choice for globally renowned projects with its product portfolio. It was also the choice of Medeni Dinc Mall, the city's largest shopping and entertainment area that also houses apartments in Ashgabat, Turkmenistan's capital. Daikin, who comprehensively realized the air-conditioning solutions for this large project, earned yet another significant success. The project, comprised of 17 buildings spanning a total of 240 thousand square meters of shopping, catering, office, and residential areas, received an entire HVAC system. The comfort and savings rate of the spaces were optimized in the project by employing 16 EWAD-T-C Screw

compressor Chillers, 72 AC Units, 660 FWA series Floor Type Fan Coil Units, and 1467 FWA series Concealed Ceiling Type Fan Coils. The outstanding performance of Daikin products in large-scale projects and the consistent performance of Turkmenistan's service network were major factors in choosing Daikin products for such a significant project. Daikin, who also served as a consultant to the project developed by Turkmenistan's most prominent architects and designers, will continue to work to ensure its success abroad.



# Four Ecrh – Rooftop Four Ecrh – Rooftop Unit



Rooftop units, which can heat and cool through the direct expansion refrigerant system and meet the fresh air need of the space in a single unit, are designed to be placed outside and bring the room air to the desired conditions with air ducts.

It works with high efficiency and minimum energy consumption with its rotor heat recovery system, thermodynamic heat recovery system, fully automatic control system and economizer dampers. In cases where outdoor weather conditions are suitable, it can also condition the room air with its "free-cooling" feature in order to reduce energy consumption.

Rooftop Unit is produced in 8 different models, 3 different series and air flow range of 4.400-35.200 m<sup>3</sup>/h, offering the opportunity to work from 100% return air to 100% fresh air. The cooling system can operate as asymmetrical, double-circuited according to the desired capacity. In the Rooftop Unit with asymmetric double circuit, energy efficiency is brought to the fore with its 3-stage capacity control. Eco-friendly R32 gas, high efficiency and quiet working hermetic scroll compressors, expansion valves at each coil inlet, check valves, drier and sight glasses are used in the refrigeration cycle. The blowing air to pass over the indoor coil is provided by statically and dynamically balanced, high-efficiency, radial, single-suction, EC plug fans. The air

passed over the outdoor coil is provided by high-efficiency axial fans which is suitable for outdoor conditions and has direct coupled electric motors. It can also be used with ISO Coarse (G4) filters and optional ePM1 (F7) filters on the fresh air and return air side.

The ENERGY series Rooftop Units which compliance with the ERP2021 regulations, the heat lost between the fresh air and the return air can be recovered thanks to the rotor heat/energy recovery exchanger, which is accordance with ERP 2018 and has thermal efficiency of at least 73%. In addition, electric, water and natural gas heater options are available according to your needs. Thanks to the fully integrated automation system used in the Four ECRH series rooftop units, it can work in full compliance with different building automation protocols (Modbus, BacNet, LonWorks, etc.).

## **DOĞU HVAC took its place in Elazığ Elysium Shopping Center with Rooftop Packaged Air Conditioner Units.**

Elysium Shopping Center, one of the oldest and most valuable locations of Elazığ, at Çaydağcra junction, hosts one of the largest shopping centers in the region with a closed area of 70,000 m<sup>2</sup> and more than 450 apartments. The shopping center serves the people of Elazığ and the surrounding area with its 15 thousand m<sup>2</sup> social area and 160 stores.

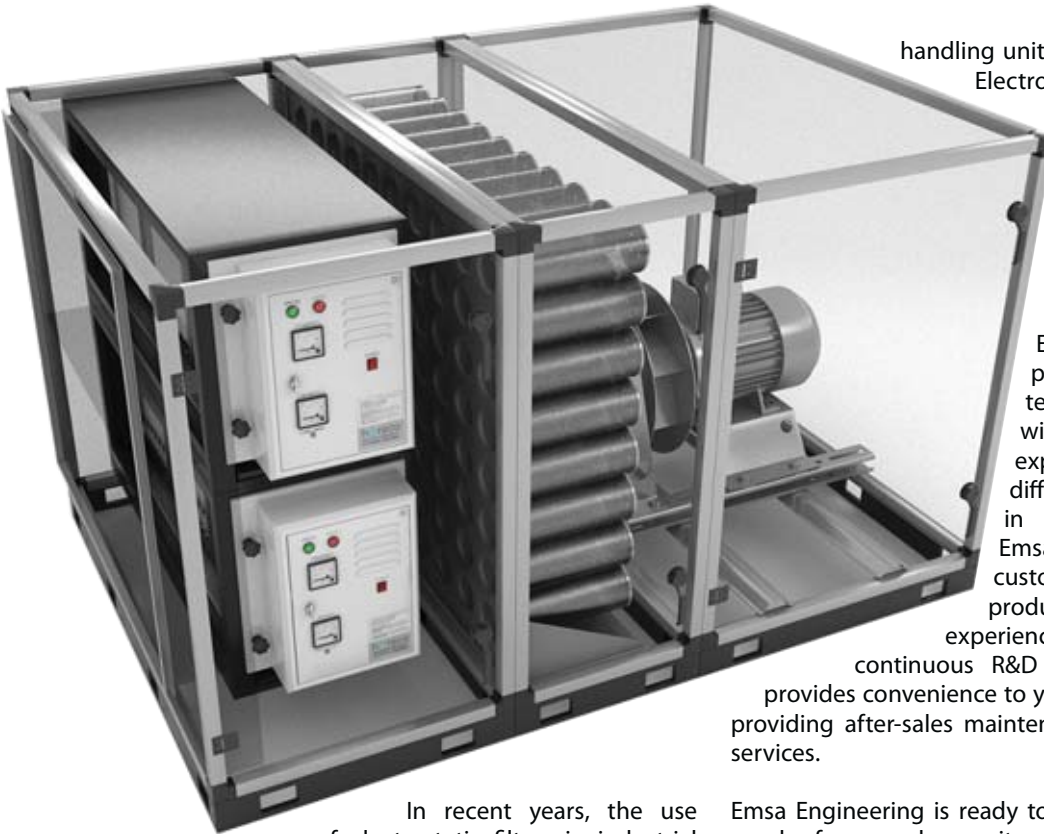
DOĞU HVAC, produces Rooftop Units in 3 different series, in the 30-180 kW cooling and heating capacity range, with R32 refrigerant gas, in compliance with ErP 2021 regulations.

11 Rooftop Units in the 60-180 kW capacity range bring the atmosphere of the Elysium Shopping Center to the desired conditions, providing a total of 1550 kW heating and cooling capacity.





# Emsa Engineering manufactures high quality electrostatic filters



handling units has become very common. Electrostatic filters, which are the most essential part of ecological units with a cost efficiency of up to 99% with 100% domestic production and original design, are now very close to you with Emsa Engineering.

Emsa Engineering proved product quality standards in terms of customer satisfaction with higher than 30 years of experience and hundreds of different electrostatic filters in more than 20 countries. Emsa provides fast shipment to customers by using sustainable production techniques with an experienced professional team and continuous R&D studies. Emsa Engineering provides convenience to you, our valued customers, by providing after-sales maintenance and technical support services.

In recent years, the use of electrostatic filters in industrial kitchen ventilation systems and air

Emsa Engineering is ready to meet the electrostatic filter needs of your ecology units with its remote or on-site after-sales services and high satisfaction rate.



# Air Cooled Water Chiller with Integrated Free Cooling and Adiabatic Cooling



ERBAY Water Chillers are designed to outdoor installation and provide chilled water leaving temperatures which are given on capacity tables in our factory carrying out EN ISO 9001:2015 Quality Management System. The Units are supplied to ready for installation. All connections, oil and refrigerant charge and required tests are made in our factory. Our units are in conformity with health and safety requirements of European Union directives and relevant harmonized standards.

**Main Body:** Chassis of the unit is made from steel sheet iron and it's designed in special construction for able to carry weights on it. Frame and covers of the unit also made from galvanized steel sheet iron. Frame of the unit is removable connections completely and it's painted with electrostatic powder paint.

**Cooling Compressor:** 1 or 2 pieces semi - hermetic compact screw compressors are used according to customer request. Screw compressors as it's characteristics can operate without maintenance need for a long time. Maintenance of the screw compressors are quite simple because of the less amount of the moving parts in it. Screw compressors are equipped with discharge shut-off valve, check -valve that prevents to return back of the refrigerant from the discharge line, oil level switch, oil sight glass, oil separator, oil filter, crankcase heater, capacity control solenoids, vibration dampers, motor protection device and temperature sensors (PTC).

**Condenser:** Air cooled condensers are manufactured by collating special profile aluminium fins on copper tubes. Copper tubes are expanded special process in order to increase thermic conductivity between copper tubes and aluminium fins. By this means heat transfer reaches to maximum level.

**Fan:** The high efficient axial fan which is directly coupled with the motor, noiseless bearing, balance statically and dynamically is mounted on the device to provide the condensation of the refrigerant in the condenser.

**Evaporator:** Direct expansion evaporator is manufactured in Shell & Tube form and special high efficient copper tubes are fixed

to steel tubesheet holes with tube expander method. It's allowed to maintenance and clean up because of the removable tube bundle. Evaporators are in conformity with EN 14276-1 and EN 13445 standards and designed for chilling glycol brines. External surface of evaporators and compressor suction lines are insulated with insulation material with suitable thickness.

**Electrical Control Panel:** The panel is designed to IP54. To operate the Unit automatically and securely, the panel is composed of two different sections. The first section is power section and the other one is control section. The panel is equipped with enough number of contactors, thermic, fuses and on-off switches. The panel and wiring are in conformity with EN 60204-1 standard.

**Microprocessor Control System:** Microprocessor Control System is used on the unit. By means of this; entering and leaving water temperatures, entering water temperature of free cooling coil, ambient temperature, refrigerant pressures on suction and discharge lines, occurred superheat temperature, operating times of compressors, all faults occurred on the system and all alarm history can be seen on digital screen and also capacity control can be made easily. Microprocessor control system decides to which modules (mechanical and/or free cooling) will be active depending on ambient temperature and required water leaving temperature. Operating times of each compressor is balanced so optimum efficiency is provided on multi compressor units.

**Components of the Cooling Circuit:** To operate the Unit automatically and securely; electronic expansion valve, drier-filter, sight glass, relief valve, flow - switch, high - low pressure switch and shut - off valves are included.

**Adiabatic System:** Adiabatic Cooling System is optional and it's integrated to mechanical cooling module of the unit and works in summer season. This system is based on spraying water intermittently from special nozzles on to a nonmetallic mesh. The water on the mesh provides an adiabatic cooling effect on the entering air of condenser. Thereby entering air temperature is reduced and depending on it, the unit works with lower condensing pressure energy consumption of the unit is decreased and cooling capacity is increased.

**Free Cooling Coil:** Coils are manufactured by copper tubes and aluminum fins. Coils can be manufactured with epoxy coated fins on request. Current overload protected, high efficient direct drive axial fans which have noiseless bearing are mounted on the unit to provide cooling of entering water. Besides there is air discharge connection on the coil.

**3-Way Valve:** 3-way valve which is controlled with servomotor opens or closes the entering ports depending on incoming signal from microprocessor. 3-way valve works on/off.

**Hydraulic Kit:** Hydraulic Kit is optional and comprises circulation pump, closed expansion vessel, safety valve, manometer, suction-discharge shut-off valves and brine filling connection.



# All Stars to FKS Air Handling Units



FORM has released new Eurovent certified FKS air handling units (AHUs) to provide customers with the best possible solution for all types of project requirements.

FKS air handling unit, which has a world-class competitive performance, is attracting great attention from domestic and international markets.

It stands out especially with T2 (TT Class) in Thermal Transmittance class and TB1 (TBF Class) in Thermal Bridging class values which represent very low energy loss.

FORM FKS Air Handling Unit, which can be produced in 60 different modules with a flow rate between 1,000 m<sup>3</sup>/h and 100,000 m<sup>3</sup>/h, has a special steel casing structure and 60 mm double skinned panels with thermal barrier PVC profile.

FKS air handling units meet the required level of indoor air quality while maintaining the humidity and the temperature under control. With modular, flexible and environment friendly solutions, it provides ideal comfort for commercial and residential buildings while providing high energy savings.



# Ercan Teknik & E.C.A Solutions for Cooling System Valves with Maximum Durability and Adaptation



**ERCAN TEKNİK and E.C.A's refrigerant valves, draw all attention towards themselves in the cooling market with their high performance and durability features.**

Although E.C.A. is the biggest valve manufacturer in T rkiye, for more than 50 years they have focused on water, steam, sanitary and gas valve production. With the collaboration of E.C.A. and ERCAN TEKNİK engineers, the new refrigeration valve range has been introduced to the market almost 10 years ago. With "continuous improvement" motto, E.C.A. became the preferred brand passing its European competitors in T rkiye. Currently Turkish HVAC-R market uses 85% of E.C.A. with its esteemed brand and high quality. E.C.A. product range covers all CFC, HFC, HCFC, HFO and Natural Refrigerants excluding the Ammonia (NH<sub>3</sub>). Nowadays the E.C.A. CO<sub>2</sub> product range becomes very popular in Europe due to the F-Gas Regulation and its wide range of products.

**E.C.A. Refrigeration Product Range:** Bi-flow Ball Valves, 2-3 Way Motorized Ball Valves, Safety Valves, Sight Glasses with Moisture Indicator, Changeover Valves, Y-Filters, Service Valves, Check Valves, Solenoid Valves.

**SMART SYSTEMS WITH ENERGY EFFICIENCY THANKS TO 40 YEARS OF KNOWLEDGE AND EXPERIENCE FROM ERCAN TEKNİK!**

As it is well known, 40 years of existence in a sector brings with a strong experience and solutions. With this experience and skills, Ercan Teknik team; offers high-level systems to their customers. For Ercan Teknik, it is also important to reduce costs in systems with eco-friendly methods. Therefore, Ercan Teknik solutions consist of eco-friendly equipment focused on minimizing consumption while maximizing energy efficiency in applications.

## Ercan Teknik Solutions

### **RIPEN-IT:**

Thermoregulation, Humidification, CO<sub>2</sub> Level Control, Air & Gas Homogenization, C<sub>2</sub>H<sub>4</sub> Level Control, Periodically Generation of Food Quality & HACCP Reports, Live monitoring of the Ripening Process, Complete Control of the Refrigeration Cycle.

### **POT-8-0:**

Precision Thermoregulation, Humidification, CO<sub>2</sub> Level Control, Air & Gas Homogenization, Free Cooling via Outdoor Air, Periodically Generation of Food Quality & HACCP Reports, Alarm Management & Notification via email or SMS, Potato Core Temperature Monitoring up to 3 different probes, Daily Potato Core Temperature Reduction Algorithm.

### **FRESH as EVER:**

Thermoregulation, Humidification, CO<sub>2</sub> Level Control, C<sub>2</sub>H<sub>4</sub> Level Control (optional), Complete Control of the Refrigeration Cycle (Split Units), Inverter Compressor Management, Digital Scroll Compressor Management, Condensation Management, Management of up to 3 Evaporators in a single Room.

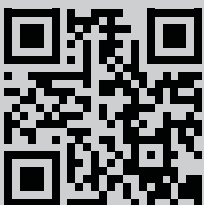
### **DRYCOOLER**

DRY Cooler application; manages pump stations, adiabatic coolers and heat exchangers with advanced ventilation regulation. The flexibility of this application allows it to work in combination with many other applications. Application can work either stand alone or integrated to a chiller unit as a free cooling source.



# ERCAN TEKNİK Inc.

Your Partner in Food Conservation Automation



# Flexibility in design, quality in production, saving in energy, customer happiness in service is the general policy of FANMAK



FANMAK family is engaged in production in Atasehir / Istanbul. Following the changing world technology and aiming to use the technology at the best level, Fanmak aims to increase production and service quality based on international standards.



Fanmak ventilation equipment, heating and cooling systems with its expert staff with many years of experience in the sector has succeeded to become one of the most sought after companies in the market with its superior service quality, customers in numerous regions in Türkiye, offering all kinds of efficiency, proving the quality conscious and experienced personnel with many small to largesized companies serve quality product and after.

Asian region. The air handling unit supply of Tajikistan Rogan Dam will be done by Fanmak until 2026. Products were sent to another important project, the Iraq Skytower project, and there are still some devices that are still in production. Apart from these, intensive exports are made to many countries such as Iraq, Tajikistan, Kazakhstan, Turkmenistan, Libya, Uzbekistan, Georgia, Azerbaijan, Austria and Kosovo.

In our facilities where quality standards are produced, all products are carefully controlled at the input and post-production stages. In line with customer demand, Türkiye and according to world standards, following the developing technology, continuously improving the quality of products and systems to provide quality products to our customers with team spirit and understanding.



Fanmak exports to many countries, especially the



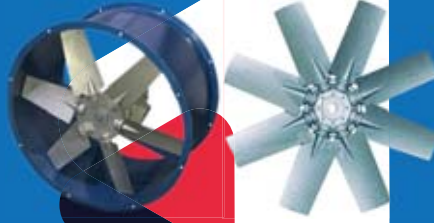
# More Than 15 Countries Choose The Quality Of Fanmak



## OUR PRODUCTS



**Air Handling Unit**



**Axial Fan**



**Roof Top Air Conditioner**



**Pool Dehumidifier**



**Heat Recovery Unit**



**Air Cooled Chiller**



**Fan Coil Unit**

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🌐 [fanmak.com.tr](http://fanmak.com.tr)

# Frigoblock launches new product series with R455a Refrigerant



As transition from traditional refrigerants to low-GWP refrigerant system solutions is going through more severe restrictions due to F-Gas regulations, alternative mixed refrigerants which has no or low impact to the environment has been introduced to the market to be able to meet these standards. One of the most promising alternative refrigerants is R-455a which has GWP<150, wide range application temperature and higher COP levels with respect to traditional and alternative refrigerants. Seeing such improvement in the refrigerant manufacturing technology, FRIGOBLOCK has decided to adapt its product portfolio and introduce its brand-new technology using R-455a refrigerant.

**Using R-455a Refrigeration Systems can be advantageous as it has;**

- Higher efficiency in medium and low-temperature applications with respect to R-404a,
- Higher capacity per circuit vs. R-290 and lower safety risk,
- 46% lower capital cost and 36% operational cost vs. R-744 condensing unit (MT),



- More simple, safe and easy to maintenance vs R744 and R-290 systems,
- Smaller systems which conclude in reduction of power consumption,
- Much more versatile as it can cover low, medium-temperature and AC/chiller applications,
- Wide range of application area as it can be suitable for; cold rooms, convenience rooms, small/medium sized markets and large supermarkets,
- GWP<150 making it applicable through all restrictions covered by F-gas regulations





# Friterm Offer Adiabatic Cooler System for a Sustainable Future



**Adiabatic Cooling Pad System for Dry Cooler**

In dry cooler and air cooled condenser, finned heat exchangers are cooled with ambient air and ambient temperature is the cooling limit.

As a result of global warming, systems are now being designed for a higher ambient temperature. In dry cooler systems, water cooling temperature is usually 5 C above of the ambient dry bulb temperature. With using the adiabatic cooler system, cooling water temperature reduces below the ambient temperature in dry coolers and the condensation temperature reduces in air-cooled condensers.

The use of air-cooled condensers in ammonia cooling plants increase, especially in regions where water and wastewater costs are high. For efficient design, the condensing temperature of ammonia condensers is approximately 10-12 K above the ambient temperature. Depending on temperature limit of compressors, max ambient temperature and the load profile of the plant, adiabatic cooling pad option is used to reduce condensing temperature.

Friterm offers adiabatic cooling systems to increase product efficiency of dry coolers and air cooled condensers. In Friterm three different adiabatic cooling systems; direct water spray, ecomesh water spray system and adiabatic cooling pad system are available.

In spray system, a defined wetting of the finned surface is not possible. Nozzle angles is changed due to winds and

sprayed water might be more than evaporating water.

In the systems with adiabatic cooling pads, the pads are placed in a special casing which is mounted in front of the fin block and can be easily installed and disassembled in non-need seasons. Dry and hot ambient air is pre-cooled by passing through wet cooling pads. The temperature of the air that contact with the wet cooling pads is approximated to the wet bulb temperature. Unlike with spray coolers, the operating times in wet mode are not limited. The coolers can therefore operate with a floating set point. Adiabatic cooling pad system save both electricity and water.



**Adiabatic Cooling Pad System for Ammonia Condensers**

# GEMAK offers “Product Selection Programme”



**GEMAK Product Selection Program**

Main Page | Sections | My Project (0) | Actions | Help | Languages | Exit

Capacity: 10000 Watt

Min/Max Range: 10 / 10

Inlet Air Temperature: 0

Evaporation Temp.: -8

Refrigerant: R404A

Altitude: 0

Fin Material: Aluminum

Series Selection: Select

Fin Spacing: Select

Number of Fan: Select

Fan Diameter: Select

Stock: Select

Single Unit Selection: Select

Distance: 3 / 120

Max. Length: 10000

Max. Width: 10000

Max. Height: 10000

**Evaporator Product Selection List**

Model	Capacity Watt	Heat Transfer B	Air Flow m <sup>3</sup> /h	Fan Diameter	Number of F.	Total Power Inp	LWA dBA	LPA dBA
8 GNE 35.3.6	10 000.00	38.2	7200	350	3	0.41	69	47
8 GTT 35.3.2 M	10 000.00	43.3	7500	350	3	0.50	69	47
4 GNE 35.3.4	10 520.00	47.9	7050	350	3	0.41	69	47
8 GNE 45.2.6	10 650.00	38.6	8400	450	2	0.49	76	54
6 GNE 45.2.5	10 750.00	41.6	8600	450	2	0.49	76	54
4 GNE 50.1.6	10 800.00	58.6	5100	500	1	0.68	77	55
8 GTT 40.2.2 M	10 900.00	48.4	6300	400	2	0.32	88	66
6 GNE 50.1.8	9 000.00	41	5300	500	1	0.68	77	55
4 GTT 35.2.2 M	9 050.00	55.1	4500	350	2	0.33	67	45
4 GNE 50.1.6	9 150.00	44.7	5350	500	1	0.68	77	55

Dimensions | Technical Specifications | Fan Specifications

Technical drawing showing dimensions: A: 1720 mm, B: 510 mm, C: 365 mm, D: 1530 mm, F: 485 mm, G: 429 mm, ØDis: 16 mm, ØOut: 28 mm.

Engineered by RCAD/MAP Product Innovation Engineering

Follow @productselect

Gemak provides Standart product selection software which is available free on our web site [www.gemakltd.com](http://www.gemakltd.com) with multiple language options like English, German, Russian, Italian and Arabic. Gemak standart product selector software is an application developed to select the most appropriate standart condensers and evaporators by entering the parametres

such as capacity, operating conditions, fin spacing, diemensions etc.

With its motto “Quality First” GEMAK has identified its success with the quality product policy. Our Quality Management System is of a structure in which all employees feel that they are a part of the system and evaluate their work. Aiming to achieve continuous

improvement, our company continues to work with a customer oriented approach. Focusing on customer satisfaction our company has the principle of assuring customers with its products and product quality. Diversity of products, opting to use international standards and advance technologies is the proof of this mindset.



# Ges Teknik R&D



Ges Teknik was founded by our executive Muzaffer Kazakoglu, whose HVAC practices date back to 1995. Since 2003, we aim to bring intelligence to the HVAC products in the Turkish market.

Ges Teknik export and marketing manager Gokce Aydinli emphasizes that the combination of the HVAC experience and the technological know-how practice empowers Ges Teknik Team to create tailor-made solutions and rapidly meet the HVAC Equipment manufacturers' unique expectations.

She also added that Ges Teknik has designed several types of controllers for different HVAC equipment, including Fan

Coil Unit, Energy Recovery Ventilator, Compact AHU, Trench Heater controllers. BACnet is the standard feature of these products. Many Smartart-branded HVAC controllers are powering the HVAC Equipment of our customers and creating comfort and energy savings. Mrs. Aydinli summarizes the her colleagues' feelings: "This brings priceless satisfaction to the Ges Teknik R&D team."

### Fan Coil Thermostats

The latest releases completed the fan coil thermostat product range and provided a control for different fan and valve combinations. These vary from 3 stage or EC fans, on/off or modulating valves.

In order to meet the demands of the end user and commissioning team, all of our models are identified as fully parametric.

### BMS I/O Modules

The latest addition to our product range is the Smartart I/O modules with 28 I/O and 42 I/O models.

One of the most feasible solutions to collect the scattered data from the field is to use the communicating I/O modules.

Smartart branded modules with Bacnet / Modbus are the cost effective solutions to fit the automation needs of our customers.

To find out more information about our Smartart products, visit [www.smartart.com.tr](http://www.smartart.com.tr) website.



# Güven Soğutma continues investing in quality and service



Güven Soğutma is entering the second half of 2022 with two big investments.

We moved our central sales office from Istanbul Dolapdere to Bomonti. We aim to increase service quality in our new 800 m<sup>2</sup> sales office in Bomonti Business Center, Istanbul.

We established a new GVN metal processing center and started offering processed metal sheets. Our new facility is established on an area of 1000 m<sup>2</sup> and includes new laser cutting machine and press bending machine.

Our company produces liquid receivers and compressor protective equipment and increases its equipment variety suitable for eco-friendly air conditioning liquids each day. We are happy to inform you about our expanded product range. Now, our customers can reach quality products and wide varieties at best prices. We have firstly included the German DEKA company, which produces liquid and oil control equipment, and then the engineering experience of American Parker Sporlan to the value-added product sales we initiated with the Italian OLAB brand, which manufactures valves and connection equipment for cooling systems.

Thanks to our nearly 35 years of experience in HVAC&R industry, product groups such as filter driers and vibration eliminators have been added to the GVN brand. Exporting to 65 countries and having sales representatives in 45 countries, Güven Soğutma, powered by its customers needs, continues to take bigger and firmer steps each day.



<b>GVN (Türkiye)</b>	<b>OLAB (ITALY)</b>	<b>DEKA (GERMANY)</b>
<ul style="list-style-type: none"> <li>• Liquid Receivers</li> <li>• Collectors</li> <li>• Suction Line Accumulators</li> <li>• Filter Drier Shells</li> <li>• Mufflers</li> <li>• Oil Strainers</li> <li>• Oil Level Regulators</li> <li>• Oil Reservoirs</li> <li>• Oil Separators</li> <li>• Liquid Line Filter Driers</li> <li>• Vibration Eliminators</li> </ul>	<ul style="list-style-type: none"> <li>• Solenoid Valves</li> <li>• Check Valves</li> <li>• Ball Valves</li> <li>• Safety Valves</li> <li>• Sight Glasses</li> <li>• Oil Pressure Valves</li> <li>• Change Over Valves</li> <li>• Humidity and Liquid Indicators</li> <li>• Fittings</li> </ul>	<ul style="list-style-type: none"> <li>• Electronic Level Sensors</li> <li>• Electronic Oil Level Regulators</li> </ul>
		<p><b>PARKER / SPORLAN (USA)</b></p> <ul style="list-style-type: none"> <li>• Thermostatic Expansion Valves</li> <li>• Electric Expansion Valve</li> <li>• Filter Drier</li> </ul>



# IMAS offer innovative products and solutions in the HVAC&R industry



As IMAS, we offer innovative products and solutions in the areas of cooling, air conditioning, and ventilation for commercial, industrial, and institutional buildings and residences. Our expertise in air conditioning combines technology and engineering with our experience and global vision; we increase the quality of the product in the areas where our customers work & live and the product in the production process.

During our half century of production and marketing experience in the air conditioning sector, we have been the pioneer and implementer of many innovative ideas. In our modern factory in Izmir, air and water cooled split and package type air conditioners, radial-axial fan, open-closed type water cooling tower, fancoil units, special type air

conditioning systems, precision controlled air conditioners, water chillers, unit heaters, power plants, and ventilation cells are produced.

## **Daphne / Daphne HT / Daphne W**

### **Standard Features:**

- Scroll compressors
- Shell & Tube evaporator
- Microchannel condensing coil
- Axial fans with IP54 protection class electric motors
- High efficiency units in the HT series
- Water cooled units in the W series

Our air and water cooled chiller models have 50 kW - 1000 kW capacities.



# Imbat; Tenacity of 30 Years of Experience, Novelty of Consistent Innovation



Imbat's export turnover has developed rapidly in the last 5 years. We have reached 70% export in the first half of 2022 and are well on our way to become a true World-class player in the HVAC industry. Imbat now provides products and services to more than 50 countries, and for good reason.

Imbat takes pride in designing every single unit it sells. It allows Imbat to have highest level of confidence in the solutions it provides. The sheer Engineering power under Imbat's roof is formidable to say the least and it has been a potent contributing factor in adapting to different World markets. Imbat has the capability and know-how induced Engineering flexibility to navigate different market needs with ease and has been implementing optional and market specific solutions to its standard models.

Moreover, Imbat is a producer at heart. The company focuses on what it does best, which is up-most quality design, production and quality control. Imbat, then relies on companies in different countries who already are established players in their respective markets and trains their service and maintenance teams to provide service to its units.

Imbat's ability to design new prototypes and adapt to various market conditions are owed to its extensive R&D organization. The Turkish government recognized this and awarded Imbat to be one of 13 official R&D centres in the Turkish HVAC industry. Having efficient and quality Engineering as a central value, and production as its fundamental expertise, Imbat has embarked on extremely successful design adventures most producers wouldn't dare to consider.



Imbat is proud to announce that first PCA rooftop series called HORUS are on site and in operation. PCA rooftops provide climatization to the parked airplanes and are designed to endure a continuous 12.000 Pascal static pressure.

Further, Imbat introduced its mobile rooftop series in 2019. They are designed for EU conditions, Ec-design2021 compliant, use F32 refrigerant and are extremely high efficiency units. They are sold to rental companies who rent them to various different events and organizations which are extremely especially popular in Western Europe. Imbat's current biggest markets for his line is Germany and Austria. Until today, they have successfully climatized World-class events like Berlin Air Show and G7 Summit as well as providing much needed air circulation and climatization to many churches, concert halls, industrial areas, art galleries and showrooms.

Imbat is going through a planned rapid growth phase in close control and in-row climatization units. They are used in server rooms, electronic equipment rooms, laboratories, museums and anywhere the temperature and humidity levels should be kept in precise levels. As the need for telecommunication and server rooms increase, so does the investment in the close control and in-row units. Imbat is here to provide full solutions with models that ensure +/-1°C temperature and +/-2 relative humidity, while having an advanced software and micro-processor systems. The design allows optionalities such as Ec or plug fans, variable airflow options, remote control, BMS system integration, free-cooling, 100% fresh air options and more.

Overall, Imbat is under-going a controlled rapid growth in many of its product portfolio. The framework for the growth has been solidified in 30 years of know-how and experience of designing air conditioning units for many different applications and environments. Imbat has made it into its mission to provide maximum efficiency, maximum performance, top of its class quality units along with optimum solutions for its customers and partners. Imbat is dedicated to become the World-citizen it deserves and is taking solid steps toward its mission every day.



30<sup>TH</sup>  
YEAR

# Imbat is life!

Imbat is behind the comfort of everyday areas and ideal air quality with green products and 30 years of experience.  
**Imbat is life, life is Imbat!**



- Rooftop air conditioner
- Water chiller group
- Cold storage
- Close control air conditioner
- Pool dehumidification unit
- Tropical rooftop air conditioner
- Mobile rooftop air conditioner
- Rooftop unit for passenger boarding bridge
- Preconditioned air unit for aircraft

# KARYER Heat Exchangers



KARYER is one of the leading manufacturers & exporters of Heat Exchangers, Evaporators and Condensers capable of realizing both serial and custom projects. Our 44 years of experience enables us to export 77 countries in 6 continents (mainly in Europe) by ISO 9001:2015, ISO 14001:2015, ISO 45001:2018, ISO 27001:2013, CE, UL, EUROVENT, PED, EAC certified standards, while 60% of our turnover is obtained from export sales. KARYER won the ISIB Successful Exporters Awards in two separate categories in 2019. KARYER was nominated as the First company that "Exports Most Heat Exchangers" among heat exchanger manufacturers and the third company that "Exports to Most Countries" in Refrigeration and Air-conditioning industry.

The product range of KARYER contains Heating & Cooling Coils, DX- Evaporators, Condenser Coils, Unit Coolers, Blast Freezers, Air Cooled Condensers, Air Coolers, Condensing Units (w/o compressor), Dry Coolers, Oil Coolers and Air to Air Heat Recovery Heat Exchangers.



## KARYER presented new product series "Banana Unit Coolers"

Banana fruit, has a high commercial value, should be kept at the right temperature, humidity and proper conditions for ripening and storage. It is aimed to ensure that all bananas in the cold room ripen more quickly and evenly. Banana unit coolers are designed slightly different than traditional unit coolers as they require specific conditions for the fruit. EA-DR and ED-DR model banana unit coolers are able to reach small and medium amount of cooling needs for cold storage of bananas. The products have been optimized to operate effectively in low temperature differences and to provide low humidity loss. Sucking or blowing fans which have high static external pressure are used in the products. The coils, in unit coolers, are compact in addition to their thermally highly efficient performance.



EA-DR and ED-DR banana unit coolers, are designed copper tubes with high thermal efficiency and suitable for different usage conditions. Manufactured with electrostatic powder painted galvanized sheets to resist corrosion with attractive view in addition to its rigidity. In addition, easily removable screwed side covers and hinged drain pans are used for installation and maintenance operations. The unit coolers are offered with coated foil, stainless steel casing, EC fan options according to customer needs. Upon request, heating coils with electrical heaters can also be added to the products.

EA-DR and ED-DR banana unit coolers are optimized with the highest efficiency. Our company guarantees the right banana unit coolers with reliable engineering and quality manufacturing.



# Maximum Energy Efficiency and Minimum Sound with Üntes EC Motor Fancoil Units



Üntes EC Motor Fancoil Units stand out thanks to their unique and aesthetic design, silence, easy assembly and space-saving size. Eurovent Certified EC Fancoil units offer maximum energy efficiency and minimum sound, therefore creating a comfortable space.

- Maximum Energy Efficiency, Minimum Sound
- Eurovent Approved High Performance
- Fully Compliant with the Current Eco-Design Criteria

## Low Energy Consumption

Üntes EC Motor Fancoil Units consume up to 75% less electricity, especially at mid and low speed. Thus they reduce operational costs significantly in projects using more units. Üntes EC Motor Fancoil Units are environment-friendly thanks to their low electric consumption and efficient design.

## Precise Temperature Control

EC Motor Fancoil Units can control the room temperature more precisely when used with thermostats with proportional and automatic control features. Thus, creating a more comfortable ambient for users.

## Low Sounds

Aside from consuming less electricity and being high performance, one of EC Motor Fancoil Units' unique features is running thanks to their brushless motor design silently. Having no brushes means the impeller spins over a magnetic field without any friction, reducing the sound caused by the motor.

## Eurovent Certified High Performance

During manufacture, EC Motor Fancoil Units go through extensive tests at Üntes laboratories in accordance with the quality standards. The EC Motor Fancoil Units are also approved and certified by Eurovent.

## Affordable

Üntes EC Motor Fancoil Units reduce operational costs significantly thanks to their energy-efficient design and low energy consumption feature, and they can pay off the initial investment costs in 3 to 4 years.



## Üntes introduces a new series of rooftops that meet eco-design criteria

Having been in the air-conditioning business for over 53 years, Üntes announced late last year that it had collaborated with the Sweden-based NIBE Group, which is known for its heat pumps and has more than 15,000 employees worldwide. So, it continues its investments and R&D activities uninterrupted.

Having been an exporter of rooftops to the Middle East market for almost three years with its Tropical Rooftop Series, Üntes is now introducing its new ECO-SER series rooftop device, which meets Eco-design standards.

Offering flexible options with ten distinct models based on varying capacity demands, ECO-SER distinguishes itself with its 100% fresh air operation, ErP 2021-compliant design criteria, and eco-friendly R454B gas with a low GWP value.

The unit contains a gas burner heating module, electric or water heating, cross-flow, plate heat recovery choices, and a control system called the Effective Efficiency Control System (the EEC System), which prioritizes high efficiency.

# ISO 16890 General Ambient Ventilation Filter Tests



The ISO 16890 standard is the new standard that has replaced the EN779:2012 standard. This standard covers Coarse filters (Class G), Medium filters (Class M) and Fine filters (Class F). MGT Filter performs tests within the framework of ISO 16890 standard, exposing a filter to particles from 0.3 µm to 10 µm in size. This means testing the filters in conditions much more similar to real life and getting a product with the performance you expect.

MGT Filter performs tests on its products according to ISO 16890, EN 779 and ASHRAE test standards. Eurovent, which is independent, also has tests done on the capacity and performance test data of the products it produces in order to ensure "proven/confirmation".

R&D activities are carried out according to the pressure and efficiency performance results of the filter. In line with the customer's request, filter testing service is also offered.

## EN 1822 and ISO 26463 High-efficiency Hepa-Ulpa Filter Tests

Efficient air filters (EPA), high efficiency air filters (HEPA) and ultra-low penetration air filters (ULPA), filters produced for ventilation and air conditioning systems such as clean room applications are tested according to EN 1822 and ISO 29463 standards. MGT Filter tests every product it produces according to these standards and determines the filter performance.

R&D activities are carried out according to the pressure and efficiency performance results of the filter. In line with customer demand, filter testing service is also offered to customers.

## ISO 16890 General Ambient Ventilation Filter and EN 1822 Media Tests

MGT Filter makes detailed comparisons by pre-testing the media produced by raw material manufacturers. The selection of the most suitable quality raw materials is supported by the test results obtained from here. Pre-tests of raw materials before filter production are carried out with this system and controls are carried out.





**30**  
YEARS

30 YEARS OF EXPERIENCE  
IN CLEAN ROOM AIR FILTRATION

**MGT**<sup>®</sup>  
AIR FILTERS



# TESTED, CERTIFIED, QUALIFIED PRODUCTS FOR BETTER AIR QUALITY

**MGT Filter**, with its 30 years of experience, continues to add value to human health by producing the best performance products in its high-tech production facilities.



ISO16890 TEST UNIT



EN 1822 TEST UNIT



ROBOTIC PRODUCTION LINES



FACTORY

WE CLEAN **THE AIR**

**OF THE WORLD**

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# Refkar produces innovative and eco-friendly products with its new factory in Kırklareli / Türkiye



Refkar was established to offer technologically advanced and high-quality products for the refrigeration industry in 2008.

The company was first established with 300 m<sup>2</sup> operating area and 2 employees. Based on a long experience organized in a new structure within years, moved into its new plant located in Kırklareli, with 3000 m<sup>2</sup> indoor production area and more than 55 employees. Choosing to specialize in shell and tube type heat exchanger production, Refkar is now one of the few companies producing equipment for HVAC-R industry. Since the year it was established, Refkar kept investing to keep up with the technological innovations. Moving into their new factory, Refkar improved its CNC machinery and added new advanced production machinery such as an automatic tube bender, finning machine and robotic welding machine.

In corporation with their Italian solution partner Unilab, S.RL, Refkar also launched its updated Selection Software this year, making its solution partners operations run more smoothly. The updated version of the software is available can be downloaded directly from Refkar's web page.

Refkar is an environment-friendly company with an ecologic conscious and works to impose this on everyone.



Refkar embraces reliability as its key value. Seeing Refkar's customers as their business partners "we will work hard to provide better service and top-quality products for our business partners" companies chairman Şant Özbülül says.

Exporting to over 35 countries at this moment, Refkar keeps participating in local and international exhibitions, trade missions and summits to present its products and services.





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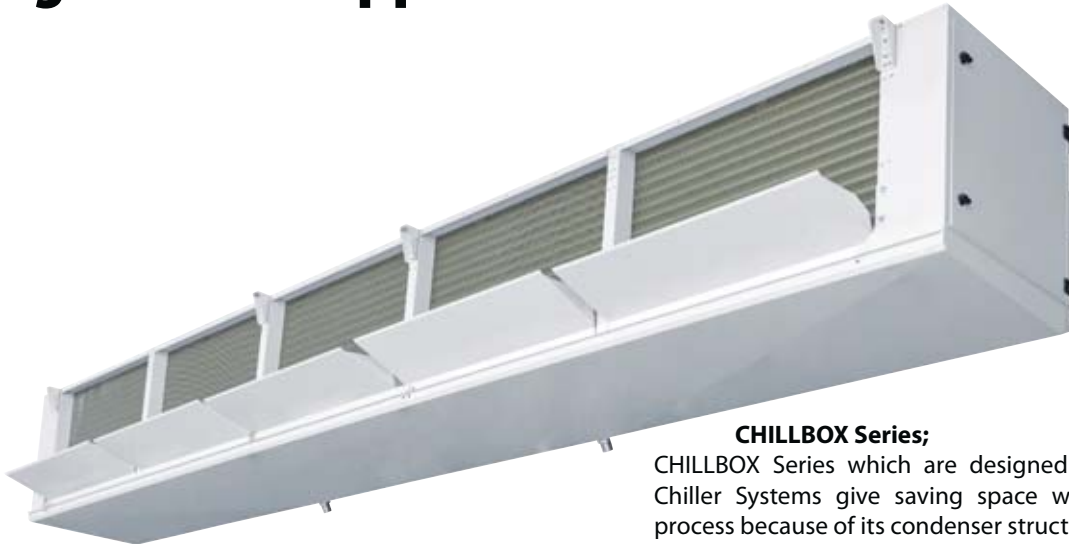


Updated Selection Software  
available on our web page

Обновленная  
Программа Подбора



# New Generation Unit Coolers for Agriculture Application



### CHILLBOX Series;

CHILLBOX Series which are designed for small capacity Chiller Systems give saving space while its installation process because of its condenser structure.

The range of the CHILLBOX Condensers are consist of from 2pcs. Ø400/Ø800 to 3pcs. Ø500mm fan diameter and 2,1-2,5mm fin spacing.

The capacities of CHILLBOX series are varying from 24kW to 121kW. The capacities are given in the catalog for dT:15°C.

As a Company Quality Policy, first quality material usage is very important subject also for this new series.

SARBUZ Family is racing with herself about increasing her turnover, export percentage and quality bar by long term customer relations and supports.

SARBUZ HEAT EXCHANGERS Industry and Commerce Inc. was established in 1953 with the purpose to serve HVAC-R industry. Through its gradually increasing experience and knowledge by years, SARBUZ has started manufacturing finned type of heat exchangers in 1974. Sarbuz manufactures evaporators, condensers, heating and cooling coils, steam coils, dry coolers and oem coils for over 40 years for the companies which are active in the HVAC-R, energy and mobile refrigeration industry and also provides finned type heat exchangers for different companies in the country or internationally.

SARBUZ serving you customers by their new design SBA series evaporator and CHILLBOX Type Condenser.

### SBA Agriculture Type Evaporator;

SBA series evaporators that is created for fruit and vegetable cold rooms, makes the room cold perfectly without any speck on the fruits because of its special design.

The range of the SBA Agriculture Type Evaporator is consist of from 2pcs. Ø450 to 6pcs. Ø500mm fan diameter and 8mm fin spacing.

The capacities of SBA series are varying from 6,2kW to 66,4kW for SC2 conditions. The capacities are given in the catalog for different condition as To:+2/Te:-3 in addition to Eurovent SC conditions.

The serie are designed with 1/2" copper pipe, aluminum foil and galvanized steel painted RaI-7035. Electrical defrost as HT (without drip tray heaters) or LT type (with drip tray heaters) as optional. Defrost systems are 100% testing by the residual current circuit breaker tester to ensure that there is no any leakage.





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SINCE 1974  
**SARBUZ**<sup>®</sup>  
HEAT EXCHANGERS



# Savaslar continue its successful works in the refrigeration sector in the country and abroad



Savaslar company having signed many national and international projects had started its activities in 1981 under leadership of Prof. Sabri SAVAS, one of the veterans of industrial refrigeration sector.

SAVAŞLAR LTD.ŞTİ. is one of the leading companies of its sector aiming to fulfill completely its responsibilities to its customers, workers, suppliers and sector companies since 1981 to present day. Until today, it has worked out to present products with long-life, environmentally friendly, highly efficient, low energy consumption and pioneer in innovation.

SAVAŞLAR LTD.ŞTİ. shall continue its national and international successes for cooling equipment of cold chain, production and assembly of cold room panels and doors, production of cold rooms in containers, cooling of electric panel rooms and electrical panels of industrial plant

facilities, production of equipments for process cold water need and special process solutions. It shall provide customer satisfaction in futures as well as today with TEKNOSAV - FRISAV - PANELSAV branded products





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**İstanbul Bölge Müdürlüğü:** İnönü Mah. Dolapdere Cad. 12/A **ŞİŞLİ - İSTANBUL / TÜRKİYE**  
Tel: +90 212 291 03 84 • Faks: +90 212 291 03 85



# Systemair exports innovation to the world



Systemair, the innovative leader of the HVAC industry, meets the needs of tomorrow with its advanced technology and solutions. Aiming to create sustainable benefits with the guidance of R&D studies, the company provides added value both to the sector and to the world on a macro scale with its strong technological infrastructure and foresight.



General Manager of Systemair Türkiye, Ayça Eroğlu stated that as the leading global supplier of HVAC products, they aim to make fresh air accessible to everyone. She shared that their goal is to transform Türkiye into the most powerful production center in the group with the new-patented products they have developed with an innovative perspective.

“As Systemair Türkiye, we have been the market leader for nearly 10 years in the air handling units market, with providing fresh air for giant projects such as factories, shopping malls, airports, city hospitals and industrial facilities. Behind our success, we have a strong team that produces non-stop for our mission of accessible fresh

air for everyone. In this way, as one of Türkiye's largest HVAC companies, we sell the products and systems we manufacture in our factory in Dilovası to the world, and export to more than 25 countries. We continue our mission of improving indoor air quality in every step we take.”

Stating that they use their strongest weapon, R&D and innovation, to carry Systemair Türkiye to a point beyond time, Ayça Eroğlu continued: “In this context, we focus on exports with our technologies we developed in Türkiye R&D Center, and we make strategic moves that will increase the added value in exports in our industry, where the effects of globalization and competition are intense.”



# Exporting Innovative HVAC Solutions

**As Systemair Turkey;** we manufacture the ventilation products that people need in every aspect of their life with our strategic product planning studies and advanced technology.

With our goal of exporting to all continents of the world, **we constantly increase our market share and export our technology to more than 25 countries.**



# Thermoway Heat Exchanger Solutions for HVAC Experts



Thermoway Inc. since its establishment, it has been following the technological developments, making needs oriented designs regarding customer expectations, and making growth oriented investments every day by observing the principles of energy efficiency and environmental protection.

For these purposes, Thermoway Inc. it expands its product range by adding new products to its product range.

- Our new monoblock products are designed for positive and negative working conditions. You can access technical information about our products through our selection program with 2 different designs as Evaporator type.

Capacity Range: between 561W – 3514W  
Lamella Spacing: 6mm - 8mm  
Fan Diameter Range: From Ø300mm to Ø350mm

- In our newly designed TLG series condensers, thermal efficiency has been increased and energy efficiency has been brought to the forefront by using inner grooved pipes and changing the lamella surface structure.

Capacity Range: between 17,8kw - 709,4kw  
Lamella Spacing: 2,1mm - 2,5mm  
Fan Diameter Range: From Ø500mm to Ø800mm

- Box series condenser units designed in line with customer demands are designed to be able to install many types of compressors and auxiliary equipment, and 4 different types (TBOX, MBOX, SBOX, HBOX) are offered to our customers.

Capacity Range: between 2kw - 224kw  
Lamella Spacing: 2,1mm - 2,5mm  
Fan Diameter Range: From Ø250mm to Ø800mm

Thermoway Inc. it will continue to work with the aim of improving its machine park day by day, ensuring that its personnel are trained in a way that will ensure their development, and making product traceability possible under all conditions by improving the quality management system and will continue to be your reliable business partner by offering new products to our customers.

For the further information please visit our website:  
<http://www.thermoway.com.tr/>



# Heat Exchanger Solutions For HVAC Experts

**ThermoWay**  
Heat Exchanger Solutions

# İklimlendirme Uzmanlarına Isı transferi çözümleri



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# Ulpatek Filtre continues its activities for a better future...



ULPATEK leads the industry in terms of filtration, whose significance is better comprehended with the pandemic. Answering the filter demands of this period by offering solutions with engineering know-how rather than the popular approach, that is, just producing and selling, Ulpatek has pioneered the industry with its production quality and guidance in identifying the filter classes to be inserted in the "Air Cleaner Devices", whose usage areas were expanded during this period. Although "indoor air quality" was more widely recognized in particular industrial practices until the pandemic, its importance in office spaces, meeting rooms, hotels, gyms, stores, and similar day-to-day living spaces was a part of our post-pandemic daily life is now better understood. During this period, air purifiers with HEPA filters have become the most frequently-utilized devices in our living spaces. Manufacturing filters for air cleaner devices to combat the pandemic, Ulpatek also produces custom design filters for its national and global business partners.

After managing to achieve growth aims despite the pandemic conditions and conducting successful R&D activities, ULPATEK ended 2021, the year that created a difference in product support, product development, and engineering activities with the brand's thriving R&D engineers and professional employees in the R&D

department. With the activities conducted in its filtration testing laboratories called ULPALAB, the brand continues to offer the optimum filtration solutions to the industry.

Besides the improved and updated version of its available product group, Safe Change Housing-BIBO, equipped with cutting-edge technology and test systems, ULPATEK also exhibited all its ventilation filter groups manufactured under the standards at the ISK SODEX fair and the CPHI Worldwide 2021 fair organized in Italy. Moreover, the brand introduced its "Laminar Flow Unit for Weighing and Sampling" and "Laminar Flow Unit with Fan Filter (FFU)" during the same events. "Safe Change Housing-BIBO" in the high-tech product category was the most notable product group in these fairs.

At the ISK SODEX and CPHI Worldwide 2021 Milan fairs, the brand highlighted the significance of proper filtration yet again, exemplifying the ideal engineering practices to protect the environment, processes, and human health. Regarding filtration, the fairs focused mostly on how enhancing the energy performance of buildings with the ideal engineering solutions affects the total cost.

With the awareness of elevating its brand value via the positive feedback received from the partner companies regarding product quality and performance, Ulpatek also continues to excel in the European market with its product quality and engineering activities.

ULPATEK Filtre manufactures cartridges under the ISO 16890 standard, metal oil slingers, bags, panels, rigid filters, also EPA (E10, E11, E12), HEPA (H13, H14) and ULPA (U15, U16, U17) filters and gas turbine filters in accordance with the ISO 29463 & EN 1822 standards, cylindrical and cartridge filters, active carbon filters (AFV), fan filter units (FFU), safe change housing, laminar flow units, and hygienic air conditioning equipment.

As a global brand selected by many companies in the hygiene industry, including medicine, food, hospital, and electronics industry, with its expertise in air filtration, Ulpatek Filtre continues to increase its market share in over 76 countries each day. Aiming to expand its partnerships, the brand will also attend the fairs of the German Filtech to be held in March this year and the Italy Mostra Convegno Expocomfort, which has been rescheduled to take place in June.

With the motto of "High Quality Filtration for a Better Future" in mind, ULPATEK Filtre will continue its journey with firm steps by increasing its product range while maintaining its quality in 2022.





# Advanced Filtration for a better future!

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Activated  
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Dust Collection and  
Gas Turbine Systems



Ceiling Type  
HEPA/ULPA Filters



HEPA Terminal  
Hood Filters



High Capacity  
HEPA Filters



Fan Filter Units



Cartridge Activated  
Carbon Filters

## CLEANROOM EQUIPMENTS



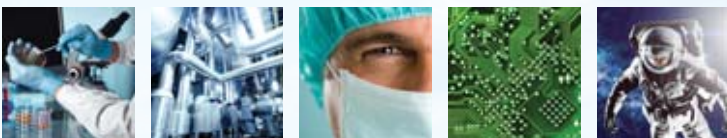
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- **Anti vibration dampers.**

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Integrated touch pad screen allows controlling the fan speed, temperature, timer, alarm, and mode options.

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Monitoring system also allows monitoring whether the car park ventilation system is operation, or any problem (detection, signalization, connection etc.) that might arise.

V Remote Eye Jet Fan Remote Monitoring System allows you to control Venco Car Park Ventilation with your smartphone, tablet or computer through Wi-Fi or wired internet connection.

Thus, it prevents loss of life and property.



# Review of Certification Procedure for Inverter Air Conditioner

Considerable technology advancement in comfort air-conditioners designs over the past few decades have seen a substantial development in the variable speed compressor operation (inverter air-conditioner). Most of the current international standards allows the intervention when testing these units to provide the setting parameters, while some still forbid it to prevent manufacturer interference.

This study reviews the testing methods of the two types of air-conditioners in the different scientific literature and international standards. The results showed that it is not possible to test the IAC unit on a fixed rating capacity without providing the setting parameters such as the compressor speed and frequency and the fan speed. To guarantee no further interference from the manufacturer, using a third-party certification body has showed an efficient solution until further development of the testing methods.

## Introduction

Interest for air-conditioning (AC) systems has exponentially expanded worldwide throughout the most recent couple of decades. The global market size was valued at 106.6 billion USD in 2020 with an expected compound annual



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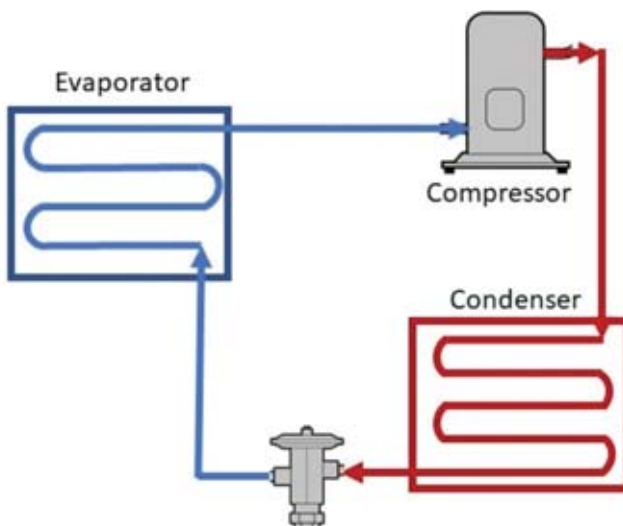
growth (CAGR) of 6.2 % until 2028[1]. The expanding rate of electricity and aggressive effect on the environment from power generation pushed to substantial developments in the variable speed compressor (inverter). The inverter segment account for 50% of the market in India [2] and is projected to expand globally at a CAGR of 7.7% [1] in a 6-year period. This growth is attributable to inverter AC's (IAC) due to the difference in operation comparing to conventional AC's.

An AC is a mechanism designed to maintain and control the air temperature and humidity within an area. The operation is typically performed by a simple refrigeration (vapor compression) cycle (Figure 1)

A typical refrigeration cycle uses an electric motor to drive the compressor. The two most common types of compressors are the 'fixed speed' type

and the 'variable speed' (inverter) types. With conventional 'fixed-speed' air conditioners, the compressor is either on (working to 100% capacity) or off. An inverter in an air conditioner is used to change the compressor's motor speed to drive variable refrigerant flow in an air conditioning system to achieve the desired temperature conditions in indoor space. It maintains the desired temperatures without wild fluctuations. Figure 2 shows the difference in room temperature fluctuation between fixed speed and IAC units. IAC provide ability to control the speed of the compressor motor which helps in continuous regulation of temperature. It also helps in saving energy and power with the help of a variable speed compressor. Additionally, other benefits such as no temperature fluctuations, longer durability, faster cooling, and reduced noise in comparison with non-inverter ACs are expected to fuel the demand for inverter technology.

The fundamental difference in operation required further investigations through the years to validate the efficiency of testing and rating IAC units using the same methods of conventional AC's. Mavuri et al. [3] tested IAC using the calorimeter test method. The results showed that to test the IAC on part load on specific room temperature conditions, it should either be in a locked mode where the instruction for fixing the compressor speed is supplied by the manufacturer and the capacity is directly proportional to the compressor



**Figure 1. Simple refrigeration cycle**



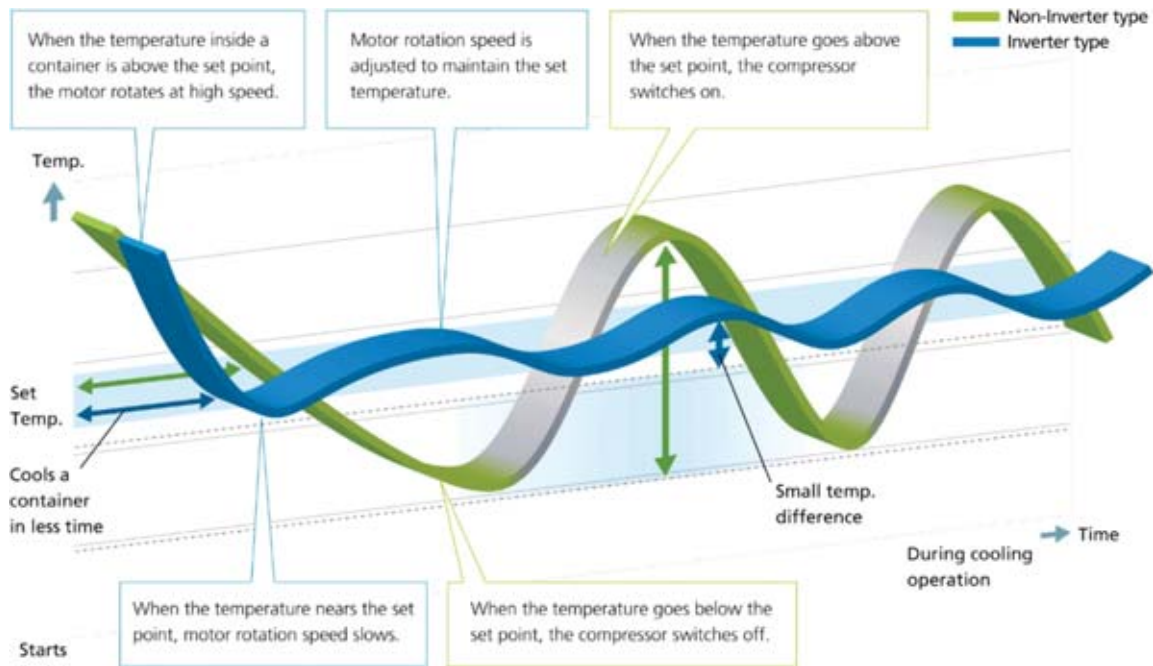


Figure 2. Room temperature operation for AC and IAC[11]

speed, either testing the IAC in a field operation mode by fixing a thermal load instead of fixed room temperature or capacity. The dependency of the unit capacity to the compressor frequency has also been showed in a thermal model created by Hui et al.[4]. Another study [5] on the effect of unlocked test using the calorimeter room method on the Minimum energy Performance Standards (MEPS) on IAC results in some unit failing to comply with the MEPS requirements and consumed much higher level of electricity compared to a fixed load or locked capacity test. This result is far from real life performances since it was proven by several field studies that IAC enormously reduce power consumption in comparison to conventional AC's such as Almogbel et al. [6] who studied the energy consumption of an AC and an IAC for 108 days, and showed 49% less energy consumption of the IAC comparing to conventional AC.

Despite clear scientific evidence of the difference in operation of the conventional AC and IAC, there is no definitive solution in the international regulation to differentiate the testing procedure of these two types of units. This article presents the adopted solutions of the regulation's commissions in different countries and the feedback and experience of Eurovent Certita Certification (ECC) body for this matter.

**Inverter Air-Conditioner Testing schemes**

For a variety of HVAC equipment, many testing methods have been developed. Heating balance method (calorimeter room method) and enthalpy difference method are commonly used for testing HVAC equipment.

Calorimeter Room (Figure 3) test heat balance test device is a room air conditioning performance test device. The method of calibrating the performance of air conditioner with calorimeter test bench is called Room heat balance method. The basic principle is based on the law of conservation of thermodynamics (the first law of thermodynamics): that is

$$\text{Input Energy} = \text{Output Energy}$$

The air enthalpy difference method (Figure 4) is a way to test the performance of the air conditioner by measuring the enthalpy and the circulating air volume of the air at the inlet and outlet of the air conditioner. It consists of measuring the enthalpy difference of the inlet and outlet air inside the air conditioner chamber and calculate the air conditioner capacity through the heat exchanger air flow. The enthalpy is measured by measuring the temperatures of dry and wet bulbs (T-Ts method).

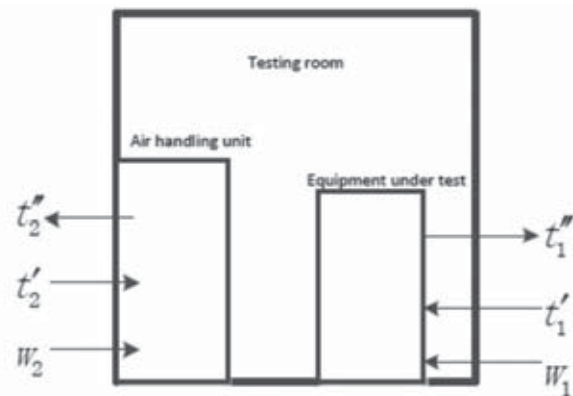


Figure 3. Calorimeter Room method schematic [7]

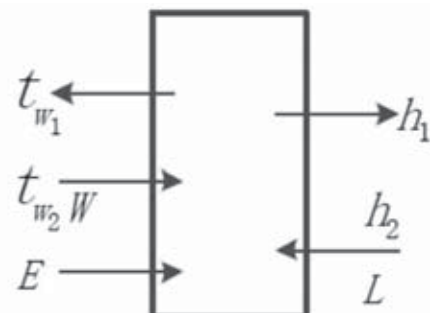


Figure 4. Enthalpy difference method schematic[7]

When testing the IAC freely without setting the parameters from the manufacturer, the capacity of the unit would not be constant even if the ambient temperature is constant. The internal control of the unit will compensate for the thermal load of the room. The IAC unit will be checking the air temperature from time to time using its own sensor and will adapt with the capacity being delivered to compensate the thermal load. If the unit determine that the temperature is going down in a cooling capacity test then the unit will realize that the capacity delivered is too much and it will reduce the capacity by reducing the compressor frequency. On the opposite side, if the ambient conditions are going up, then the unit would increase the capacity by increasing the compressor frequency and the fan speed and the electronic expansion valve on both sides of the unit. During the test of IAC, to maintain the unit on a fixed capacity, the operational parameters of the unit should be fixed (compressor frequency, electronic expansion valve and the fan speed). As one can see from how both testing methods function, the IAC with a variable capacity could not be tested using the calorimeter room method and is too difficult to test using the air enthalpy method.

Therefore, in the current state of available technology, testing an IAC should require setting fixed parameters such as compressor speed and frequency and in some cases fan speed and the expansion valve opening. This could be done by manually involving a thermostat included in the unit or automatically with a preset parameters in what is called testing mode. This procedure aims to convert the IAC unit into a fixed speed compressor unit for testing purpose.

**International regulations and standards for testing IAC's**  
The test procedures for Air Conditioners are slightly different between each governing body. With different climates and equipment markets in each country, the high and low temperature test conditions each test procedure are slightly different. This section discusses the scope of each test procedure and reviews their similarities when testing the IAC's[8].

### - ISO

The ISO standard 5151, which is incorporated either by reference or in full by many countries, applies to non-ducted air-cooled ACs and air-to-air heat pumps, and small ducted ACs and heat pumps. The scope of the standard covers both packaged and split systems but limits the split systems to multi-split systems controlled by a single thermostat. The standard specifies that single capacity, variable capacity, and multiple capacity units are also covered.

### - Australia

The Australian standard, AU/NZ 3823.4.1, covers air-cooled ACs and air-to-air heat pumps. This test method is the ISO 16358 standard, which incorporates the entire scope of ISO 5151, ISO 13253, and ISO 15042. ISO 13253 covers ducted air-cooled air conditioners and ducted air-to-air heat pumps. ISO 15042 is the test procedure that covers multi-split and multi-circuit non-ducted systems. Both single and variable capacity systems are covered.

### - China

The Chinese standard GB/T 7725-2004 test procedure applies to non-ducted units with a cooling capacity below 14 kW. The units can be either water-cooled or air-cooled.

### - European Union

The EU test procedure covers both packaged and split system ACs and heat pumps. These products can be variable capacity by any means, ducted or non-ducted, single-split or multi-split systems. The definition for multi-split from the EU aligns with the US definition (below). As for IAC's the EN 14511 clearly states that the setting of the frequency shall be done for each rating condition. The manufacturer shall provide in the documentation information about how to obtain the necessary data to set the required frequencies and/or the fan when different from the maximum one to set on the control device for a given rating condition.

It even allows when skilled personnel with knowledge of control software is required for the start of the system, the manufacturer or the nominated agent should be in attendance when the system is being installed and prepared for tests.

### - Japan

The Japanese standard JIS B 8615-1:2013 and JIS B 9612:2013 applies to packaged and split system ACs with a rated cooling capacity of 10 kW or less. Japan references ISO 5151 for its standard, with country specific adjustments to the testing conditions.

### - Korea

Korea's standard KS C 9306 2017 test procedure is limited to packaged and split systems with a rated cooling capacity of 35 kW or less. The main deviation in scope from the other countries is the exclusion of split systems with multiple indoor units.

### - United States

The test procedure established by the United States was updated in 2017, and a new test procedure will go into effect in 2023. The current test procedure covers both heat pumps and ACs configured as single package units and split system units. The standard specifies that the split system units can be designed as multi-head mini split, multi-split, and multi-circuit systems.

As a US certification body, the AHRI standard 1230-2010 allows skilled personnel from the manufacturer to intervene to set the control software for an IAC. In addition to setting the compressor frequency needed to operate at targeted nominal capacity.

### - Canada

The Canadian testing procedure are presented in the CSA EXP07 SCOP, ICOP. It allows using both air enthalpy and calorimeter room methods depending on the type of the unit. It covers both fixed and variable speed compressor types.

In all the presented standards, variable capacity units are currently tested at fixed compressor speeds. When installed, the speed of the compressor increases/decreases dynamically to condition the space. To test these units in a fixed-speed mode, a lab/testing body must contact the manufacturer to upload specific software or connect specific equipment to force the unit into a testing mode. The necessity of manufacturer intervention when testing these units opens up the procedure to interference by allowing changes to be made to the unit that are not present when operating in the field.

While there is no other available solution in the present, both Canada and the EU are working to establish dynamic



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load-based test procedures for room air conditioners and heat pumps. These proposed test methods (CSA EXP07 and EN 14825) use an adaptation of the psychrometric approach to introduce sensible and latent heat loads to the indoor room and test the unit's control scheme for managing space temperature. The goal of developing these test procedures is to reflect the operation of a unit more closely in the field, which would better characterize unit operation at lower temperatures, better represent the efficiency gains associated with variable speed equipment and eliminate the ability to override controls. There are other initiatives such as keeping the same test method but introducing verification after or before the test to check that the inverter unit run at the same parameters in real life conditions than those used for the test.

These test procedures are in the process of being developed, and some have raised concerns that the inherently dynamic nature of such test approaches may make them difficult to reproduce. Until one of these methods is valid enough, referring to a third-party certification body that controls the communication between the laboratory and the manufacturer could be the best available solution for testing an IAC by allowing the manufacturer to provide the required parameters for testing while ensuring no further modifications or intervention on the unit.

**Eurovent Certita Certification (ECC) feedback and experience**

Established in 1993, Eurovent Certita Certification is recognized as a world leader in third-party product performance certification in the Heating, Ventilation, Air Conditioning, and Refrigeration fields. In the Technical Certification Rules document (TCR)[9] for the Air-conditioners, it covers in its scope Comfort air cooled air conditioners and air/air heat pumps rated up to 100 kW cooling capacity. The program follows the standards EN 14511 and EN 14825 for the testing methods and procedures. All the certified products and performances are available the ECC website [10].

In application of the Certification Manual (CM) and the TCR of the program, ECC forbid any direct communication between the manufacturer and the laboratory. The communications should be restricted with those allowed by the standards such as installation/ start up procedure and information about the compressor frequency and fan speed for the case of inverter. This information is collected using a locked document provided to the manufacturer by ECC and the necessary information are then transferred to the laboratory. Any further required information by the laboratory should be acquired by the intermediate of the certification team.

Currently ECC have 6217 certified Air-Conditioner on its website. The IAC's represent the larger part of these products (Figure 5). The control of all communication between the laboratory and the manufacturer guarantees the testing body should have all the required information for following the testing standards while restricting the intervention of the manufacturer not allowing any changes to be made to the unit that are not present when operating in the field. This could be visible in the results of the 2020 surveillance campaign where 7% (Figure 6) of the tested seasonal efficiencies has been rerated, even though that the

manufacturer provided the setting parameters for the IAC's as allowed by the standards.

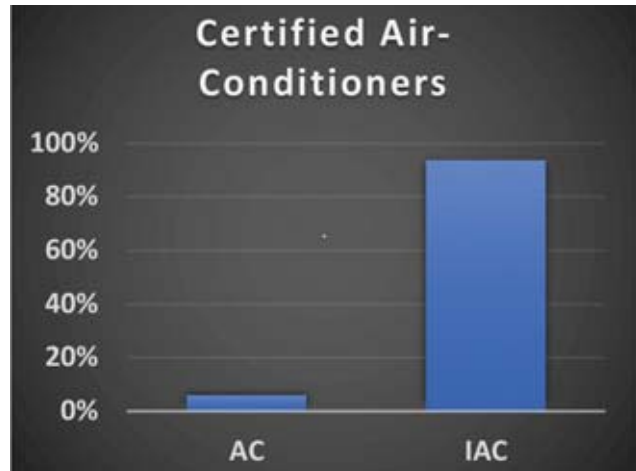


Figure 5. Certified Air-Conditioner by ECC Following 2021 campaign



Figure 6. Test results for the 2020 campaign

**Conclusion**

IAC and AC have a different type of compressor and though different functionality. According to the reviewed established test procedure, IAC's are currently tested at fixed compressor speeds. To achieve that, the current test standards allow IAC manufacturer to lock the compressor speed for a desired rated capacity. This could be done by setting the parameters of the unit on each of the targeted capacity tests. This requires an allowed intervention of the manufacturer when testing these units which opens the procedure to interference. The EU and Canada are working on other test methods to prevent this intervention, in the meanwhile using a third-party certification body such as ECC proved to be an efficient method to perform the test while guaranteeing the minimum required intervention of the manufacturer.

References list available on [eurovent-certification.com](http://eurovent-certification.com) website.



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# Commissioning Process and Benefits in Buildings, Operations in Türkiye and Current Situation



For the 24th issue of ISKID Magazine, we made an interview "Commissioning Process and Benefits in Buildings, Operations in Türkiye and Current Situation" with Mr. Cüneyt MERT, Chairman of the TTMD Commissioning Committee, and Mr. Emre ÖZMEN, a member of the TTMD Commissioning Committee and the former chairman of the Committee.

## **Mr. Emre ÖZMEN**

### ■ Can you tell us a little about yourself?

I was born in Konya in 1972. I graduated from Konya Anatolian High School in 1990. I graduated in Mechanical Engineering from Istanbul Technical University in 1994.

Then, I completed my master's studies at the same university, in the department of Robotics, in 1997. I've been working on building management systems as a professional engineer and manager in the HVACR industry since 1994. I have worked and been working in many committees and commissions in leading professional NGOs such as TTMD and ISKAV in areas such as energy, Cx, design, and training. I am also a member of ASHRAE technical committees such as Cx and Control Theory. As the Turkish TTMD representative for the REHVA-supported Eurovent Building Commissioning Certification Program COPILOT, I provided consultancy services. I am a founder and managing director of EON GRUP, which offers design and consultancy services in Türkiye and abroad, as well as GEPA GRUP, which offers Cx (BID) services.



### ■ What does the concept of Commissioning mean in buildings?

In many spheres of life, commissioning is really a multi-component procedural integration used to ensure that a task or process develops in line with the objectives.

However, our focus is limited to commissioning in buildings. This is the quality-oriented process of ensuring that all systems and parts of a building or industrial facility are planned, developed, built, tested, energy-efficiently operated, and maintained in line with the owner's or end-user's needs.

The commissioning process applies not just to new projects but also to existing structures or structures and systems undergoing extension or restoration.

"Continuous commissioning ensures that what is planned in the building is designed, that what is designed is realized, that energy efficiency, an up-to-date system manual, operational team competency, user comfort, and safety are all met.

The commissioning process for buildings is designed to ensure that all systems provided to the building owner or the company and specified by the building owner at the start of a project comply with the "Owner Project Requirement-OPR" document.

### ■ Where should Türkiye stand in terms of Commissioning in the near future? What studies have been conducted on this?

In our country, commissioning is still in its infancy. The concept is novel in our country. TTMD Commissioning Committee held the first workshop on this in Istanbul in 2019. In our country, there are just a few competent commissioning companies. There are couple of requests for commissioning per year in Türkiye. We can't say that commissioning is an industry in Türkiye currently. Furthermore, in the few projects that demand commissioning, the commissioning company is involved in the process after the preliminary design procedures, material procurement, and even after manufacturing begins, or the commissioning tests are completed. As a result, it is too late to address some problems, and specific issues cannot be resolved. The advantage is obviously still not reset, but part of the benefit that can be obtained is lost.

Turkish investors are unfamiliar with this concept. Raising the understanding and awareness of architects and designers, particularly in commissioning, is essential. It is clear that architects and designers have a guiding and directing influence on investors. Likewise, non-governmental groups should be able to collaborate on this issue.

Commissioning will significantly benefit our country. Almost all of the projects that demanded commissioning until 2020 had foreign partners. However, with the value and support



given to the issue by forward-thinking directors such as Mr. İsmail Hakkı ÖZKURT from Emlak Konut Real Estate Investment Company Inc., a subsidiary of T.C. Ministry of Environment, Urbanisation and Climate Change, and Mr. Yakup SATOGLU from Türkiye Vakıflar Bankası TAO, the building commissioning process has been requested and carried out for the first time in government projects of a high degree of significance in our country currently. It is a significant and encouraging step for our country in terms of expanding the commissioning process in the construction industry.

The tender package is of great importance in the commissioning process. Because inaccurate or incomplete tender documents may result in a misleading evaluation in the tendering process, such issues may arise from poor commissioning company choice, improper budgeting, or inadequate coverage. In such cases, the investor experiences losses and disappointments first and foremost. This, unfortunately, tarnishes the reputation of the commissioning concept. The investor must first prepare the (RFP-Request for Proposal) specification for a successful tender. Following are some recommendations for significant sub-headings to include in the standard;

- Applicable Standards
- System List
- Sampling Rates
- Service Period
- Payment Terms
- Draft Work Plan
- Reporting Tools to Be Used
- Required Qualifications of Commissioning Personnel (Experience, Language, Certificate, etc.)
- Required Qualifications in Commissioning Company (qualifications/work completions)
- Guarantee (Professional liability insurance etc.)
- Auction (Price conditions if the project takes longer than expected or the project size changes)
- Documentation License

- Documentation Details Requested from the Commissioning Contractor (reports, cx plan, matrices, construction methods, test formats, error-solution log, etc.)
- Working Area and Conditions to be Provided to the Commissioning Contractor
- Document Confidentiality Agreement

Even the finest commissioning tender package with full and adequate material won't be enough on its own. For selecting the other disciplines I mentioned above that will effectively participate in the process, relevant commissioning criteria should also be included in the tender packages. Despite this, certain difficulties may arise during the implementation process, which causes the commissioning process to take longer.

### **For example;**

- Limited knowledge of commissioning among commissioning team partners
- Insufficient commissioning budget
- The Commissioning team failed to complete the material supply control, commissioning tests, and/or TAB phases
- Applying an earlier date for the building opening or delaying the commissioning tender (performance tests for various systems cannot be performed due to the building opening)
- Inadequate start-up
- Incomplete TAB process
- Inadequate contractor team to test
- Poorly calibrated or inadequate test equipment
- Poor documentation (lack of calculation, design, approved materials, checklists, commissioning documents, and TAB documents as well as operation, training, usage, and warranty documentation, as well as updated projects)
- Lack of coordination (setback-ineffective leadership in bringing the commissioning team partners together)
- Inadequate training process (instructor, training tools, training program)

The adoption of National Commissioning Standards/Guidelines for our country is something I believe is necessary, as well as the Commissioning tender package.

### **■ What are the standards of Commissioning in buildings?**

The two most well-known and widely used certification organizations worldwide are ASHRAE and NEBB (The National Environmental Balancing Bureau), both of American origin. CIBSE (The Chartered Institution of Building Services Engineers) in the United Kingdom sets regulations and provides trainings within the scope of British Standards. Almost all major projects in the Middle East require commissioning. However, there was no local commissioning standard when Europe is considered, and this is when the issue is becoming more well known. Commissioning-related studies began in France in 2017 under the supervision of REHVA (Federation of European Heating, Ventilation, and Air Conditioning Associations),

which brings together more than 130,000 engineers and industrial associations from 27 countries in Europe. The COPILOT program, launched in collaboration with Eurovent, provides training and certification for independent ISO-accredited audit and commissioning services. Upon the call of REHVA, as the TTMD Commissioning Committee (Cüneyt Mert, Devrim Gürsel, and I), we participated 11 times in and contributed to the structure and development workshops of the EUROVENT-COPILOT BUILDING COMMISSIONING CERTIFICATION program held in Paris between 2017 and 2019. Experts from France, Italy, Spain, Portugal, Hungary, and Latvia also participated in these studies. The COPILOT Certification is now the new benchmark for building performance (GEN - 1071.00). In this regard, COPILOT has the potential to close a significant gap in the European Union and position itself as a benchmark. The certified commissioning procedure will begin in Türkiye soon, especially after the European Union becomes involved.

### **■ What are the advantages of Commissioning in buildings?**

As commissioning originated in the United States, to give an example from ASHRAE, the "Commissioning Process for Buildings and Systems" was defined in ASHRAE Standard 202-2018. As a result, commissioning is a quality-assured process that includes every aspect of the planning, delivery, verification, and risk documentation of technical operations carried out in buildings. The commissioning of a building ensures its high quality, helps maximize energy efficiency, environmental protection, and livability, and optimizes building operation. This process improves operational efficiency, indoor air quality, and livability while assuring that building components are properly functioning and that plans are effectively and quickly carried out. Commissioning provides preventive and predictive maintenance plans, as well as customized instruction manuals, training, and operation and maintenance (O&M) processes. All parties involved in the building construction and operation process gain considerably from commissioning.

Above all, it reduces the building's lifetime operating costs. Together with improvements in indoor air quality and operational efficiency, the quality of resident health and job performance improve. It is important to highlight the documentation part of the commissioning process. The building gets a priceless technological heritage in the form of documentation. Professor Walter Grondzik, who took part in the workshop we organized on the commissioning process from (ASHRAE) the USA, emphasized that it is strange for a multi-million dollar building not to have a bigger user handbook. He pointed to the fact that a very thick handbook is given in the USA when you purchase a new sports car for \$30,000-40,000. For all of us, this was a powerful illustration.

An up-to-date "system manual" for a building is provided due to commissioning. Furthermore, because the owner of the building will be the owner of a commissioned building, the sale price of the building increases. The improvement in



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staff productivity also shortens the return on commissioning investment. If the goal is to get a green building certificate such as LEED or BREEAM, it gives the chance to gain extra credits (for example, LEED, 4 points) in scoring.

It eliminates the risk of installing a problematic system that would incur costs over the course of the building life and guarantees that the design objectives are realized in the best feasible way. Furthermore, the designers accompany the implementation of the systems they develop and participate in the verification process. The responsibility cycle is not broken. The designer gets valuable feedback for future projects by conducting an outcome analysis.

Errors made during the process can pose problems for the contractor and cost extra money and time. Some errors may not be fixed later. To summarize, it offers significant advantages to the contractor as well.

Even though years have gone since the temporary work was completed, we frequently find cases where the contractor has not yet received the letter of guarantee. However, if there is commissioning, the letter of guarantee can be immediately taken once the specified process is completed. It is a transparent system. A subcontractor never gets into trouble because of another subcontractor or any other process, thanks to the reconciled, transparent, precise, and documented procedures. The number of warranty-based contractor recalls, and remanufacturing is decreasing. Unless there are compelling reasons, if the work time is extended, the cause or the possibility of an extension can be clearly determined without discussion. All contractors can keep up-to-date on the construction process thanks to transparency in manufacturing and management. So, commissioning here ensures that the project is delivered properly.

Regarding building users, commissioning guarantees trouble-free, safe buildings with enhanced indoor air quality and higher user comfort.

When it comes to operators, commissioning is the assurance of buildings with trouble-free, enduring, effective, and informed operation, excellent energy efficiency, up-to-date technical documentation, and an experienced, well trained operation team.

Commissioning is a process that will increase profits while reducing energy use and greenhouse gas emissions. For instance, a review of 5-year data obtained from commercial buildings where commissioning was conducted in the United States showed that the commissioning's simple payback (SPB) periods were relatively short (only in terms of energy savings, an average of 4.2 years for new buildings, 1.1 years for existing buildings).

### ■ What is the Building Cx process? What is not? Can you provide us with the historical background?

The concept of commissioning was originally introduced in the United States with the warship project in 1798. Public

Services and Procurement Canada first used it on buildings in 1977.

When this concept first entered our lives, it was frequently mistaken for TAB (Testing, Adjusting, Balancing) processes. However, it is now understood that the TAB processes are among mechanics-related centers and that it is not the same thing. The TAB process is of great importance in the Commissioning process for the mechanical discipline since it verifies the testing, adjusting, and balancing of air and water systems. In Türkiye, ISKAV is providing the unique TAB certification programme. We appreciate and recommend ISKAV TAB certification services as it is equivalent to international TAB certifications on quality basis and it is local.

However, since the Commissioning process covers all technological systems in the building (Mechanical, Electrical, Fire, Automation, and Special Systems), it carries out the technical verification documentation, communication activities of processes at all stages of pre-design, design, construction (device selection, device procurement, field installation, start-up, TAB, performance testing, system manual, training process, seasonal testing etc.), and building occupancy/operation phases. The TAB activity evaluated within the commissioning process.

Whenever there is a dispute in the process, the OPR (Owner Project Requirements) document is always checked. It is compared to the building owner's demands for the mechanical system. The commissioning company keeps an "issue and resolution log" that covers the whole process, and either notes deviations and solution recommendations in this log or reports them to the building owner via a review report. The building owner can get back to the TAB company and renew the procedures if necessary. The building owner determines the significance of each error in the error and solution diary, issue and resolution log whether it is minor or not.

The commissioning company can also participate in the TAB process as an observer. Commissioning isn't project management either. It is limited to technological procedures. Project management is a business process discipline that will realize the project goals by managing all operational elements, including budget tracking, resource planning, administrative audit, tracking of the primary work schedule, logistics planning, coordinating, and occupational health and safety management. The commissioning company can also be a subcontractor of the project management company. The commissioning team can have a member from the project management company. Plus, it goes beyond simply filling the incomplete list. It isn't supervision. It isn't about conventional forms. It isn't a quality assurance/quality control program for contractors. It isn't a management backup. It involves more than just testing in the end. It is more than merely start-up. It is more than just planning and reviewing. It isn't designing. It is not contract management.





**Mr. Cüneyt MERT**

■ **Can you tell us a little about yourself?  
(Education and professional life)**

I was born in Mugla in 1969. I graduated in Mechanical Engineering at ITU in 1992. I've been a professional engineer and manager in the plumbing industry for construction and factory MEP (Mechanical, Electrical, and Plumbing) systems since 1990. As the Turkish TTMD representative for the REHVA-supported Eurovent Building Commissioning Certification Program COPILLOT, I provided consultancy services. I am a founder and managing director of DECOM, which offers consultancy services in Türkiye and abroad, as well as GEPA Group, which offers Cx services.

■ **You are the Chairman of the TTMD Commissioning Committee. Can you please provide us with some basic information about your operations?**

The Commissioning Committee's primary operations began with the REHVA-supported Eurovent Building Commissioning Certification Program. Co-pilot certification was introduced in Europe as a result of this initiative. We both participated in this effort as a committee and are currently working to spread commissioning and set standards across Türkiye. As Cx is a multidisciplinary endeavor, our Committee comprises more than only mechanical engineers. The Committee has architects, civil engineers, electrical engineers, facility management professionals, business experts, and design specialists. The building envelope Cx group is a sub-working group in the Committee and is one of the important commissioning operations.

Our Committee drew up the tender specifications for Cx projects, which we can define as the first significant document and presented it to the relevant NGOs. This document will be made public by publishing it with its final revisions on the TTMD website.

The spread of the Cx process throughout the industry, beginning with construction projects, is our primary goal. As a part of the dissemination, we want to improve the industry by preparing guidelines and annexes that define Cx operations in Türkiye and keeping the opinions of non-governmental organizations in mind.

■ **On 15-16 November 2019, TTMD held a workshop with the participation of its worldwide associations, including AICARR, ASHRAE, ISHRAE, and REHVA. What changes were made in our country following the workshop? In what ways did the workshop contribute?**

I must start by saying that it was one of TTMD's most successful workshops to date. The expert speeches on this topic demonstrated how significant Cx activities are worldwide and how much the industry needs this.

The translation of foreign terminology into Turkish was among the workshop's most effective activities. Naming the concept of Commissioning as BID (Documentation, Communication, Verification) with the cooperation of NGOs. We can see that this concept is now recognized and used in many jobs in the industry. The Turkish equivalents and abbreviations of the words used in practically all BID activities were specified in the workshop, as the workshop declaration demonstrates.

We can observe that the industry has taken steps towards dissemination since the workshop. Among these steps, one of the most important is that the BID process has been included in World Bank-supported energy efficiency operations. Moreover, we see that many construction projects now include the Commissioning process.

The tender specifications for the commissioning projects, which are in the workshop final declaration and were developed by the ETMD, ISKAV, and MTMD working groups and the Committee, were developed and presented to the industry under the coordination of TTMD. As the TTMD Committee, we are working to achieve the workshop results by maintaining the same collaboration on other issues.

■ **How can Türkiye collaborate and develop projects with other countries, especially those in the Europe an Union, to promote the concept of Commissioning?**

As you know, the Cx process has progressed dramatically in the United States and England. The European Union made the first moves in this direction in 2018 with the Co-Pilot program. We from the TTMD committee —Emre ÖZMEN, Devrim GÜRSEL, and I— made a significant contribution to this program on behalf of Türkiye. I think dissemination projects can be carried out in collaboration with REHVA, which supports the program. The most significant issue is to be able to prove to the investors how the Cx process contributes to time and energy savings, which is the most crucial element for today. The dissemination is lengthy, but it is essential to reach the investor. The collaboration of all NGOs can speed up the process of reaching out to investors. Investors in Türkiye first collaborate with project management companies or design studios when it comes to dissemination. However, the Cx process begins with the investor determining the Cx authority. It will become more common when project management companies or design groups demand the Cx process from investors. Organizing panels to inform project management groups and designers about the BID process would speed the dissemination. As we develop our own guidelines and appendices in Türkiye, I believe the process will run smoothly. I believe that demand will rise as a result of the global energy crisis, underlining the importance of the Cx process.

# Eco-Design Requirements in Air Handling Unit Selection and Case Study



**Mr. Koray Gezer**  
ISKID Eurovent AHU Mirror  
Working Group Member



**Mr. Serhan Taylan**  
ISKID Eurovent AHU Mirror  
Working Group Member

This study, which is valuable and significant for our industry, was prepared on behalf of the ISKID Eurovent AHU commission by dear esteemed commission members Koray Gezer and Serhan Taylan, under the aegis of ISKID Eurovent AHU Mirror Commission President dear esteemed Arel Arsoy.

## 1. Introduction

Today, energy consumption growth has prompted various changes in the air-conditioning and ventilation industry, as well as in many other fields. Because of rising operational costs and the relative value of energy, the aim is to develop more efficient systems with certain restrictions when

making unit selections/designs by informing users and manufacturers. The environmental impact will be decreased as a result of the efficient systems that will be implemented. Furthermore, the CE marking in air-conditioning and ventilation systems is included to Eco-Design requirements. For getting their products CE-marked, manufacturers have to develop products that comply with the regulations. The project companies have to choose products and system installations that conform with the regulations.

This study discusses the requirements for an air handling unit used as a non-residential ventilation unit within the scope of the 1253/2014 regulation. It defines Eco-Design compatibility calculations, and examines Eco-Design compatibility through exemplary calculations on two different air handling units.

## 2. ErP Definition, Regulation, Scope and Definitions

### 2.1. What is ErP?

To reduce energy consumption and promote energy efficiency because of the limited natural resources, the EU (European Union) enacted the EuP (Energy Using Products) in 2005, adopting the Kyoto Protocol. In 2009, it was renamed ErP (Energy Related Products). [1]





**2.2. The EU Commission Regulation No. 1253/2014**

Implementing Directive 2009/125/EC, 1253/2014/EU regulation entered into force on January 1, 2016. The minimum requirements were further increased in 2018. The regulation is mandatory in all EU member countries and it specifies that any product that does not comply with the Eco-Design requirements cannot be placed inside the EU market. The legislation governing the use of the CE marking on products became effective in Türkiye on October 1, 2021 (Sgm: 2021/18). [2]

ErP	2020	2030
Greenhouse Gas Emissions	-20%	≤-40%
Renewable Energy	20%	≥ 32%
Energy Efficiency	20%	≥ 32,5%

**Table 1. The figures that the EU hopes to attain in the coming years**

The main objective of the ErP directive is to minimize energy consumption and CO2 emissions. In this regard, the EU has set the aims outlined in the table below for the coming years. [3]

**Eco-Design, in this context, directs**

- designers and project managers to request high-efficiency technologies,
- manufacturers to build high-efficiency products,
- consumers on how to protect the environment and improve resource efficiency,
- standardization that is independent of the product manufacturer, and
- that the details in the specifications be removed.

**2.3. Scope**

The legislation covers both non-residential and residential ventilation units. This study focused on non-residential ventilation units. This legislation does not apply to ventilation products in the following circumstances: [4]

- When the power is less than 30 W (per airflow),
- For axial or centrifugal fans with a single body,
- Ex-Proof fans,
- Single-stage smoke extraction fans, unless used for daily ventilation,
- Fans that constantly move air over 100°C,
- Fans designed for temperatures exceeding 65°C,
- If the air is 40°C or temperature around the fan motor rises,
- Supply voltage higher than 1000V AC or 1500V DC,
- Fans used to vent toxic, corrosive gases,
- Air handling units with built-in heat pumps,
- Kitchen hood.

All fans utilized in the air handling unit are, in the first place, required to adhere to the ERP 327/211 rule in accordance

with the regulation 1253/2014. [2] The ErP Regulation has allowed for the investigation of the energy-saving potential of numerous energy-consuming products and the establishment of minimum requirements for energy efficiency. As a result, mandatory limit values for fans were set in June 2010. According to the regulation, a fan is a device with nozzles, blades, and, if any, a control circuit next to the fan motor. The objective was to enforce a minimum efficiency limit on fan specifications in the European market. The first phase went into effect in 2013. [2]

**2.4. Definitions**

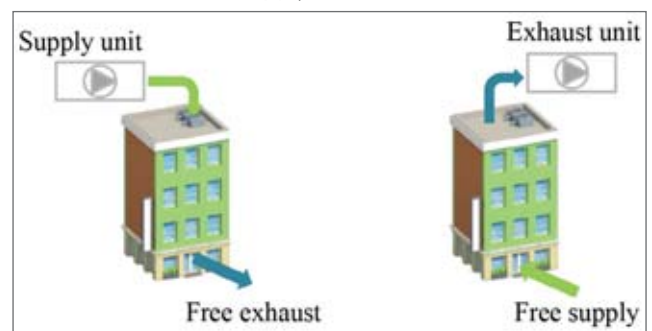
Ventilation Units (VU) are electrically powered units that replace the air utilized in a building or a part of a building with fresh air. They are made up of at least one fan, a fan motor, and a casing. Ventilation units are classified as follows. [4]

- Residential Ventilation Unit (RVU): These are ventilation units having an air flow rate of less than 250 m<sup>3</sup>/h. Units with air flow rates ranging from 250 m<sup>3</sup>/h to 1000 m<sup>3</sup>/h might also be designated as residential ventilation units, depending on the manufacturer's statement.
- Non-Residential Ventilation Unit (NRVU): These are ventilation units having an air flow rate of 1000 m<sup>3</sup>/h or above.

In this study, non-residential ventilation units are considered, and calculations are conducted within this context.

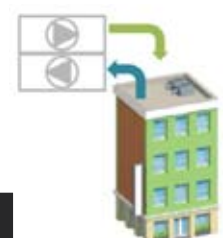
This regulation categorizes ventilation systems based on the air flow direction as follows. [4]

- Unidirectional Ventilation Unit (UVU): They are ventilation units used in building ventilation systems, where either the supply or exhaust is uncontrolled.



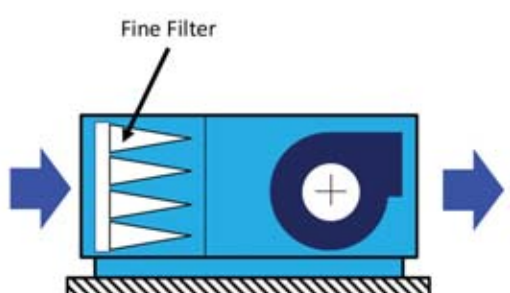
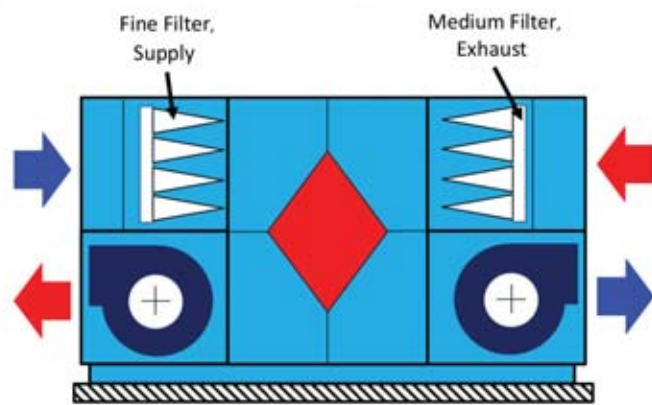
**Picture 1. Unidirectional Ventilation Unit**

- Bidirectional Ventilation Unit (BVU): They are ventilation units used in building ventilation systems that employ separate fans for supply and exhaust.



**Picture 2. Bidirectional Ventilation Unit**

Within the scope of the regulation, reference configurations for UVU and BVU have the features listed in the table below.

 <p style="text-align: center;"><b>Unidirectional Ventilation Unit</b></p>	 <p style="text-align: center;"><b>Bidirectional Ventilation Unit</b></p>
<ul style="list-style-type: none"> <li>- Must consist of a casing and all necessary equipment,</li> <li>- Having at least one fan with three or variable speeds,</li> <li>- Must include a clean fine filter on the supply-side,</li> </ul>	<ul style="list-style-type: none"> <li>- Must consist of a casing and all necessary equipment,</li> <li>- Having at least two fans with three or variable speeds,</li> <li>- Must include a clean fine filter on the supply-side and a clean medium filter on the exhaust-side.</li> <li>- Heat recovery is a must,</li> </ul>

**Table 2 Reference configuration features for UVU and BVU [1]**

According to the regulations, units must conform with minimum requirements to complete the Eco-Design compliance assessment. The table below shows the requirements for Unidirectional Ventilation Units. [1]

ErP - Tier		Minimum Requirement
Fan Efficiency $\eta_s$ [%]	$P \leq 30$ kW	$6.2 \times \ln(P) + 42$
	$P > 30$ kW	63.1
Internal SFP Value (Reference Configuration) $SFP_{int, limit}$ [W/(m <sup>3</sup> /s)]		230
Variable Speed Drive in Fan		Required
Pressure Switches for Filter		Required

**Table 3. Minimum requirements table for Unidirectional Ventilation Units**

P represents the power taken by the fan motor in the selected condition. The table below shows the requirements for Bidirectional Ventilation Units. [1]

ErP - Tier			Minimum Requirement
Thermal By-Pass in Heat Recovery System (HRS)			Required
Thermal Dry Efficiency (EN308) $\eta_t$ [%]	Run-around Coil (HRS)		68
	Other HRS		73
Internal SFP Value (Reference Configuration) $SFP_{int, limit}$ [W/(m <sup>3</sup> /s)]	Run-around Coil (HRS)	$Q < 2$ m <sup>3</sup> /s	$1,600 + E - 300 \times q / 2 - F$
		$Q \geq 2$ m <sup>3</sup> /s	$1,300 + E - F$
	Other HRS	$Q < 2$ m <sup>3</sup> /s	$1,100 + E - 300 \times q / 2 - F$
		$Q \geq 2$ m <sup>3</sup> /s	$800 + E - F$
Heat Recovery System Efficiency Correction $E$ [W/(m <sup>3</sup> /s)]	Run-around Coil (HRS)*		$(\eta_t - 0,68) \times 3000$
	Other HRS**		$(\eta_t - 0,73) \times 3000$
Filter Correction $F$ [W/(m <sup>3</sup> /s)]	Reference Configuration		0
	M5 Filter: No		150
	M7 Filter: No		190
	M5 + F7 Filter: No		340
Variable Speed Drive in Fan			Required
Pressure Switches for Filter			Required

\*E=0 if the efficiency is less than 68%.  
\*\*E=0 if the efficiency is less than 73%.

**Table 4. Minimum requirements table for Bidirectional Ventilation Units**

### 3. Calculations

#### 3.1 Internal Specific Fan Power ( $SFP_{int}$ )

The following formula calculates the  $SFP_{int}$  value for UVU:

$$SFP_{int} = \frac{\Delta P_{Clean\ Fine\ Filter}}{\eta_{Fan}} \quad (1)$$

Here,

$$\Delta P_{Clean\ Fine\ Filter} = \text{Clean filter pressure drop [Pa]}$$

$$\eta_{Fan} = \text{Fan static efficiency at the selected point [%]}$$



The  $SFP_{int}$  value for BVU can be calculated with the following formula:

$$SFP_{int} = \frac{\Delta P_{Clean\ Fine\ Filter} + \Delta P_{HRS\ Supply}}{\eta_{Fan\ Supply}} + \frac{\Delta P_{Clean\ Medium\ Filter} + \Delta P_{HRS\ Exhaust}}{\eta_{Fan\ Exhaust}} \quad (2)$$

Here,

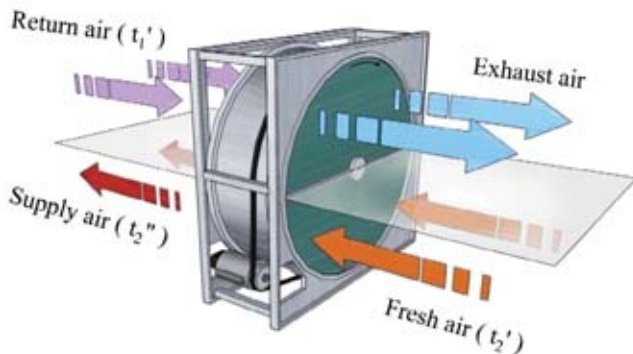
- $\Delta P_{Clean\ Fine\ Filter}$  = Clean filter pressure drop [Pa]
- $\Delta P_{HRS\ Supply}$  = Heat recovery supply-side pressure drop [Pa]
- $\Delta P_{HRS\ Exhaust}$  = Heat recovery exhaust-side pressure drop [Pa]
- $\eta_{Fan\ Supply}$  = Supply-side fan static efficiency [%]
- $\eta_{Fan\ Exhaust}$  = Exhaust-side fan static efficiency [%]

### 3.2. Thermal Efficiency, Thermal Efficiency Correction

The following is the formula for calculating heat efficiency in NRVU systems with heat recovery:

$$\eta_{t_{nrvu}} = \frac{t_2 - t_2'}{t_1' - t_2'} \quad (3)$$

- $\eta_t$  : Thermal efficiency of the HRS [%]
- $t_2$  : Temperature of the supply air leaving the HRS and entering the room [°C]
- $t_2'$  : Temperature of the outside air entering the HRS [°C]
- $t_1'$  : Temperature of the exhaust air leaving the room and entering the HRS [°C]



Picture 3. Thermal efficiency calculation temperatures of the HRS

#### The thermal efficiency must be calculated considering

- the dry bulb temperature reference conditions,
- equal supply and exhaust airflow rates,
- when the difference in temperature between the indoor and outdoor air (without condensation) is 20 °C (return air 25 °C, fresh air 5 °C),
- and without considering heat gain from fan motor and internal air leakage.

As of January 1, 2018, for thermal efficiency correction in the run-around HRS the following formula must be used:

$$E = (\eta_t - 0,68) \times 3000 \quad (4)$$

If the thermal efficiency ( $\eta_{t_{nrvu}}$ ) in the run-around HRS is less than 68%,  $E = 0$ . In other HRS, the following formula must be used:

$$E = (\eta_t - 0,73) \times 3000 \quad (5)$$

If the thermal efficiency ( $\eta_{t_{nrvu}}$ ) is less than 73%, the value must be  $E = 0$  in other the HRS.

### 3.3 Filter Correction

As of January 1, 2018, filter correction (F) must be taken as follows:

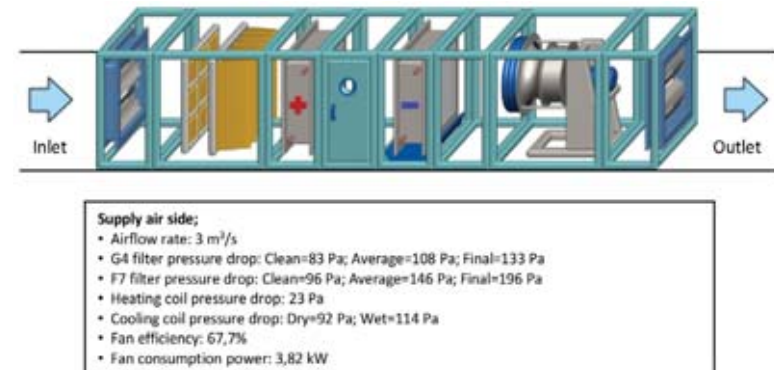
- If there is no M filter in the bidirectional unit exhaust-side,  $F = 150$ .
- If there is no F filter in the bidirectional unit supply-side or unidirectional unit,  $F = 190$ .
- If there is no M filter in the bidirectional unit exhaust-side and F filter in the supply-side,  $F = 340$ .

## 4. Case Studies

Some examples can be examined for unit selection meeting Eco-Design requirements in the selection of air handling units. This part describes the examples for UVU and BVU, as well as the relevant calculations.

### 4.1 Unidirectional Ventilation Unit

Let's examine the exemplary air handling unit for the unidirectional ventilation unit in Picture 5 below.



Picture 5. Exemplary unidirectional ventilation unit

According to the minimum requirements indicated in Table 3 of the selected unit, the supply-side fan has been selected with at least three or variable speeds and a filter change warning signal on the filter.  $SFP_{int,limit}$  value in the selected unit is as shown in Table 3:

$$SFP_{int,limit} = 230 \text{ [W/(m}^3\text{/s)]}$$

If the calculated  $SFP_{int}$  value is less than 230 [W/(m³/s)], it will be in compliance with the ErP regulation. The formula 1 calculates  $SFP_{int}$  value as

$$SFP_{int} = \frac{\Delta P_{Clean\ Fine\ Filter}}{\eta_{Fan}} = \frac{83}{0,677}$$

$$SFP_{int} = 122,6 \text{ [W/(m}^3\text{/s)]}$$

Because the calculated  $SFP_{int}$  value is less than the  $SFP_{int,limit}$  value, one of the ErP requirements is met. Fan efficiency is another requirement for unidirectional ventilation units. Given that the fan power consumption is 3.82 kW, Table 3's calculation gives the following result:

$$P = 3,82 \text{ kW} \leq 30 \text{ kW} \rightarrow \eta_s = 6,2 \times \ln(3,82) + 42 =$$

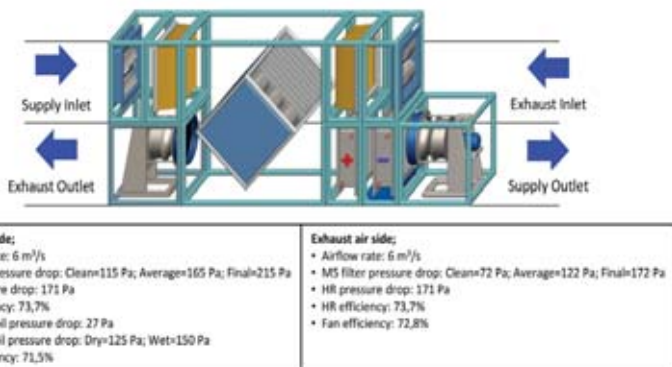
Given that the fan system efficiency is greater than the calculated value;

$$\eta_s = 66 > \eta_{s,limit} = 50,3$$

the selected air handling unit is a product that meets the Eco-Design requirements.

#### 4.2 Bidirectional Ventilation Unit

Let's examine the selection of an air handling unit for the bidirectional ventilation unit shown in Picture 4



Picture 4. Bidirectional ventilation unit with drummed HRS

When selecting thermal by-pass in the HRS, a supply air fan with at least three or variable speeds, and a filter change warning signal on the filters have all been specified.

Given that the  $SFP_{int,limit}$  value  $Q = 6 \text{ m}^3/\text{s} \geq 2 \text{ m}^3/\text{s}$  according to Table 4, the following formula must be used:

$$SFP_{int,limit} = 800 + E - F$$

Since it is the other HRS according to Table 4, E was calculated as

$$E = (\eta_t - 0,73) \times 3000 = (0,737 - 0,73) \times 3000 = 21 \text{ [W/(m}^3/\text{s)]}$$

The F value must be calculated through the following formula due to incompatibility with the reference configuration as the selected unit has no M5 filter on the supply-side:

$$F = 150 \text{ [W/(m}^3/\text{s)]}$$

$SFP_{int,limit}$  value is calculated as

$$SFP_{int,limit} = 800 + E - F = 800 + 21 - 150 = 671 \text{ [W/(m}^3/\text{s)]}$$

The selected air handling unit will have met the Eco-Design requirements if the value obtained when  $SFP_{int,limit}$  is calculated is less than 671 [W/(m³/s)]. When the relevant values are placed in the Formula 2, it results in the  $SFP_{int}$  value as

$$SFP_{int} = \frac{\Delta P_{Clean\ Fine\ Filter} + \Delta P_{HRS\ Supply}}{\eta_{Fan\ Supply}} + \frac{\Delta P_{Clean\ Medium\ Filter} + \Delta P_{HRS\ Exhaust}}{\eta_{Fan\ Exhaust}}$$

$$SFP_{int} = \frac{115+171}{0,715} + \frac{0+171}{0,728}$$

$$SFP_{int} = 634,9 \text{ [W/(m}^3/\text{s)]}$$

Given that the calculated  $SFP_{int}$  value is less than the  $SFP_{int,limit}$  value;

$$SFP_{int} = 634,9 < SFP_{int,limit} = 671$$

the selected air handling unit is a product that meets the Eco-Design requirements.

Case studies were examined while choosing the two separate air handling units (BVU and UVU) above. Units are available in a variety of configurations and functionalities based on the project requirements. The Eco-Design compatibility of units in various scenarios can be tested through the calculation. According to the general communiqué, it is crucial that Eco-Design requirements be met, particularly for the usage of CE marking in air conditioning and ventilation units.

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# The Northern Aegean Dream: Assos and Bozcaada





*With their historical richness and natural charms, Assos and Bozcaada, located in the North Aegean, which has a high oxygen rate due to the rich vegetative cover of Mount Ida, offer an exceptional holiday opportunity to their tourists.*



## Where history and nature harmonize: ASSOS



Located in the Ayvacik district of Çanakkale, Assos is one of the touristic hotspots that fascinate visitors with its historical texture, deep blue water and tranquility.

Overlooking the nearby island of Lesbos, built on the rocks Assos was among the most significant settlements of ancient times. Archaeological excavations and research carried out in the area reveal that Assos has a history dating back to the Bronze Age.

The city was founded by the Aeolians in the 7<sup>th</sup> century BC. Then, it came under the sovereignty of the Lydians in the 6<sup>th</sup> century BC.

The city, which joined the Delian League in the 5<sup>th</sup> century BC, began to acquire strength with the Kingdom of Pergamon and Roman dominance. Being ruled by the Ottoman Empire in the 14<sup>th</sup> century, Assos was among the first Anatolian regions where Christianity spread.

Aristotle, one of the most outstanding scholars of the Classical Period in Ancient Greece, also lived here for a while. In 347 BC, he founded a school of philosophy here and studied the science of life.

### Sights & Historical Landmarks in Assos



The Temple of Athena

Among the historical sites worth seeing in Assos are the Temple of Athena, the Ancient City, and the Ancient Harbor.

#### **The Temple of Athena**

Constructed around 530 BC and situated at the city's highest point, the Temple of Athena honors Athena - one of the Olympian goddesses. The earliest and the only "Doric order" temple constructed in Anatolia offers a breathtaking view of the island of Lesbos and the Aegean Sea.





Roman-era theater

### **The Ancient Theater of Assos**

The theater was constructed in a natural rock cave on the ancient city's southern slope facing the island of Lesbos. In terms of building style and design elements, the 5000-person amphitheater is a Roman-era theater. The theater can now seat 1500 people and host a variety of festivals and concerts.

### **Agora**

Agora is one of the most vibrant gathering areas in the ancient city. The Agora was placed on terraces on the southern outskirts of the ancient city, with the stoas (porticoes) on the north and south and the parliament building (bouleuterion) on the east. Stoas were covered walkways and sitting places that provided shelter from the



The Temple of Athena

rain and sun. Around the Agora, there are also "gymnasion" constructed for athletic training along with the ruins of a Byzantine church.

### **Assos Restaurants**

The Assos cuisine is mainly centered on seafood as it is a coastal town. The most popular are those made using grouper, sea bream, octopus, swordfish, sea bass, and shrimp. Again, appetizers and salads made with regional olive oils and herbs provide tourists with a varied menu. Herbed pancakes and Turkish-type ravioli are other must-try local delicacies.

### **Accommodation**

Various kinds of accommodation are available at the hotels and boarding houses in the Ancient Harbor. Hotels and boarding houses are also available around Kadirga Bay - the island's longest shoreline- for those who want to stay away from the city center.

### **How to get to Assos?**

You can get to Assos, 540 km from Istanbul, by car or bus.



## Bozcaada, the island where no one dies



Bozcaada Streets



The famous historian Herodotus once said, "God created Tenedos so that people may live longer".

With its serene beaches, cobbled streets, whitewashed island houses, and people playing backgammon on the corners, this island in the north of the Aegean Sea offers a unique chance for those who want to break away from modern life for a while. Bozcaada, also known as Tenedos, is Türkiye's 3<sup>rd</sup> largest island, covering 40 square kilometers. The only district without a village in Türkiye is Bozcaada, located in Canakkale. Bozcaada, 6 km off the mainland,

is known for its wineries and sea tourism. The island is among the Aegean's oldest settlements. Bozcaada, known in mythology as Tenedos, appears in Homer's Illiad, which narrates the Trojan War.

Viticulture in Bozcaada has a long history as the island itself. Bozcaada is among the areas in the world with some of the oldest vineyards. Grape clusters are seen on the Tenedos coins before Christ. The peculiar Bozcaada red grapes Karalahna and Kuntra, as well as the white grapes Çavuş and Vasilaki, have claimed their places in viticulture.

## Sights & Historical Landmarks in Bozcaada



Bozcaada Castle

### Bozcaada Castle

The castle is situated at the island's harbor. Its precise ancestry is unknown, although it was used by the Genoese, Venetians, and Byzantines. It is among Türkiye's finest-preserved castles. During Mehmet II's rule as an Ottoman Sultan, the castle was constructed in its present condition. It had substantial renovations in 1703-1706, 1714-1726, and 1815. The castle is in two sections: the bailey and the citadel. The castle's southern facade has a width of 10 m. A 250-meter drawbridge separates the castle from the island.



Wind Turbines and The Polente Lighthouse

The sections encircled by walls contain a water cistern, arsenal, infirmary, headquarters, well, fountain, mosque, workshop, and military posts. There is an ethnographic exhibition and an open-air museum, originally established in 1996 with public funding.

### Windmills

The ancient windmills of a thousand-year history were used to grind wheat by the islanders and are stones with a diameter of 4 meters and a height of 6.5 meters.



**Bozcaada Museum**

In 2013, UNESCO recognized the Bozcaada Museum as the entity that best reflects the island culture. The museum houses relics from the Ottoman era, documents, artifacts from the Dardanelles War, things used by Greek and Turkish islanders in their households and workplaces, artisan animations, winemaking supplies and equipment and a lot of other documents and items.

**Wind Turbines and The Polente Lighthouse**

Wind turbines and the Polente Lighthouse, which offers a magnificent sunset view, have become symbols of Bozcaada. The Bozcaada Wind Farm has 17 wind turbines that were constructed in 2000. Wind turbines produce enough electricity to power the island for 30 times its population. The Polente Lighthouse, located at the end of the wind turbines and constructed in 1861, is 32 m above the water. When coupled with the wind turbines, the Polente Lighthouse, which directs sailors, presents a spectacular

sight. Renting a bike or taking one of the minibusses that depart from the island center will get you to the wind turbines and the Polente Lighthouse on the western cape of Bozcaada.

**Beaches in Bozcaada**

With its turquoise beaches, Bozcaada also has a lot to offer to sea lovers. The most well-known and popular beaches and bays for water skiing, windsurfing, and sailing are Ayazma Beach, Habbele Beach, Mitos Beach, Tuz Burnu Beach & Aquarium Bay, Çayır Bay, Beylik Bay, and Sulubahçe Bay.

**Wineries**

Amadeus, Yunatçılar, Corvus, Gülerada, Talay, and Ataol are the six wineries in Bozcaada. Talay, Amadeus, and Corvus wineries offer wine tasting tours during summer. There are also wine bars in the Amadeus and Corvus wineries where you may taste as much as you wish. What's more, you'll discover how wine is made.

## Bozcaada Restaurants

As Bozcaada is an island, it has a variety of tasty seafood alternatives. The island cuisine is based on dishes made with fish and octopus and dishes made in Aegean olive oil. The Bozcaada jams also appeal to sweet lovers. Among the local delights are tomato and red poppy jam, unique to the island. Bozcaada mastic almond cookies are among other local tastes. The island bakeries and patisseries are excellent choices; make sure to taste these famous cookies.

## How to get to Bozcaada?

Those traveling by car can reach Bozcaada in the Geyikli Yükyeri Ferryboat Pier through Çanakkale and then take a car-ferry to the island. On a daily basis, some bus companies run trips from metropolitans to Bozcaada throughout the summer months. However, Geyikli is the bus's final terminus since omnibuses aren't allowed to cross through the island. You can take the ferry from here to the island.



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# READY FOR THE FUTURE WITH VRV IV<sup>+</sup>

**BY NEW DAIKIN SCROLL COMPRESSOR**  
**\* LOT21-ErP 2021 COMPLIANT**



**37  
PATENT**

- Superior Performance in Partial Loads
- The Higher Seasonal Efficiency

\* Seasonal efficiency is calculated in accordance with 2009/125 / EC Ecodesign (ErP) directive ENER Lot 21 (EU) 2016/2281 regulation. Minimum seasonal efficiency conditions are determined in 2 stages. VRV IV+ outdoor unit serie is already compatible with LOT21-Stage 2 minimum efficiency conditions (heating  $\eta_{s,h}$  137%, cooling  $\eta_{s,c}$  189%) were effective in 1/1/2021.





# WITH ÜNTES, FRESH AIR IS UNDER CONTROL



## UTFP Thermofresh Plus Series Heat Recovery Units

- Compatible with latest Ecodesign regulation requirements
- 8 Different sizes up to 3.600 m<sup>3</sup>/h airflow rate
- Design without profile (without thermal bridge)
- 40 mm thick double skinned casing structure
- Counter-flow heat recovery system up to 90% thermal efficiency
- Proportional flow control powered by highly efficient ec plug fans
- Electrical pre and post-heater options
- DX and water heating/cooling coil options
- IP 67 panel option
- Minimum energy consumption with advanced automation control system
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