

WITH MORE THAN 50  
YEARS OF EXPERIENCE IN  
COMPRESSOR TECHNOLOGY  
AND HIGHLY COMMITTED  
EMPLOYEES, OUR FOCUS IS  
TO DEVELOP AND APPLY THE

ADVANCED COMPRESSOR  
TECHNOLOGIES TO ACHIEVE  
STANDARD SETTING  
PERFORMANCE FOR LEADING  
PRODUCTS AND BUSINESSES  
AROUND THE WORLD.

# COOLING WITH CONSCIENCE®

**SECOP**



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compressor technologies to achieve standard setting performance for leading products and businesses around the world.

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#### A PASSION FOR PERFECT COOLING

To make a difference and set new standards in the fast moving and challenging global market of refrigeration continues to be our great passion at Secop. We develop and utilize excellent technology to deliver a competitive advantage to customers.

The KXV, based on our award-winning XV variable speed compressor, is the latest example on how we aim for perfect cooling. Combining low noise-emission and high energy-efficiency – and using only natural refrigerants – the innovative and compact KXV is about to add a new dimension to the business – our way of “Setting the Standard”.

At Secop we also have top focus on the development within DC powered compressors. For years they have been utilized mainly in the automotive sector but their advantages are now becoming increasingly obvious in other segments. For this reason we have renamed our mobile business area “DC-Powered”. With this new name we manifest our sincere commitment to benchmark solutions across all segments and all markets.

Over the last 5 years we have increased our global presence and visibility. The brand Secop has during that time become even more synonymous with quality and competitive innovation. We are proud today to show our commitment to the market by having direct sales, application and logistics services present in the US, Asia, North- and Southern Europe. Together with our increasing network of committed Secop agents and distributors worldwide we are ensuring even greater visibility in years to come.

Our commitment to global sustainable refrigeration is clear and simple and we strive to make a difference wherever we can. We want to do this in a straightforward, fast and reliable way. If this is not your opinion – please let us know.

Enjoy your read.

Mogens Sørholm  
President & CEO, Secop

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# ABOUT SECOP HISTORY



## A NEWCOMER WITH 60 YEARS OF EXPERIENCE.

Formerly known as Danfoss Compressors, Secop is only new by way of name in today's advanced compressor market.

In fact, Secop is one of the founding fathers of modern compressor technology with an experience that goes back to the start of the 1950's. When demand increased for something smarter than iceboxes for refrigeration.

The first hermetic Danfoss compressor entered the market in 1952 and revolutionized with its compact "Pancake" design the possibilities of producing private refrigerators.

From then on Danfoss Compressors set the standard and have ever since influenced the global market with innovative compressors of superior quality and value.

Changing name to Secop in 2010, when acquired by the German investment group, Aurelius AG has not changed much.

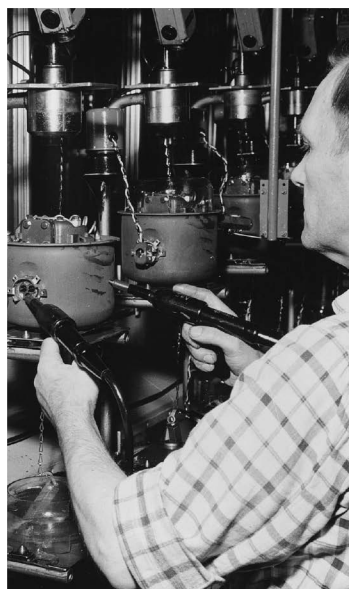
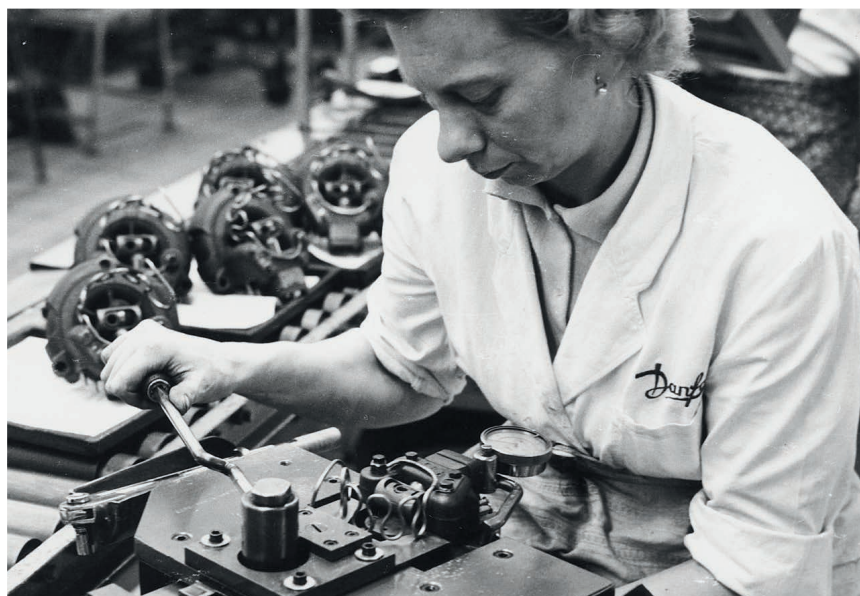
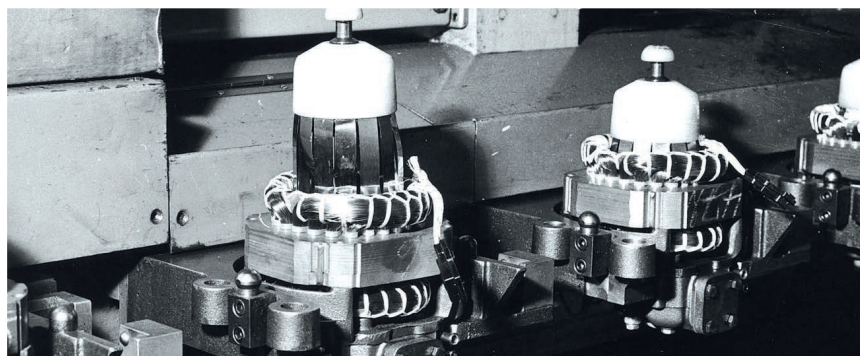
The headquarters are still situated in Flensburg, Germany and we have production facilities located throughout the world. The position as the global expert with a sustainable vision still holds true.

With highly committed employees, Secop develops, applies and supports advanced compressor technologies in order to raise the performance for leading products and businesses around the world.

See some of our major milestones of standard setting technologies and developments in the timeline below.

<b>1956</b> Production facility and headquarters in Flensburg, Germany founded.	<b>1970</b> Introduction of SC compressors. The birth of a standard setting platform in the light commercial market.	<b>1990</b> Introduction NL compressors.	<b>1992</b> Introduction PL compressors.	<b>1999</b> Start of production with natural refrigerant R290 (Propane).	<b>2005</b> Introduction GS compressors.	<b>2008</b> Production facility in Wuqing, China founded.	<b>2013</b> Introduction of the XV compressor. Opening a new chapter in refrigeration history. Secop acquires ACC Fürstenfeld, Austria.
<b>1958</b> Start up production of PW compressors.	<b>1972</b> Introduction FR compressors.	<b>1977</b> Introduction TL and BD compressors.	<b>1993</b> Start of production with natural refrigerant R600a (Isobutane). Production facility in Crnomelj, Slovenia founded.	<b>2002</b> Production facility in Zlate Moravce, Slovakia founded.	<b>2010</b> Introduction SLV-CNK.2 and SLV-CLK.2 variable speed compressors. Introduction BD1.4F Micro DC compressor. Introduction of DLX and NLU compressors.	<b>2015</b> New generation of energy-optimized propane compressors. New variable speed platforms for household and light commercial applications.	







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# ABOUT US LOCATIONS

**SECOP**

## ONE BRAND. GLOBAL PRESENCE.

As a global company, we are well aware of our commitment to meet market requirements and customer needs everywhere. For this reason, we have globalized our operations, to secure delivery, reliability and improve manufacturing productivity.

Production facilities are located in Austria, Slovakia and China. They all follow the same manufacturing practice and approved quality control systems. The Austrian site is well-known for its highly advanced manufacturing technology and the Know-How and expertise of the innovative R&D team.

Secop's headquarters are situated in Flensburg, Germany. Here you will find our R&D, Sales Department and Support Function.

## PRODUCTION PLANTS

### Austria

Secop Austria GmbH  
Jahnstraße 30, 8280 Fürstenfeld

### China

Secop Compressors (Tianjin) Co., Ltd.  
Wuqing Development Zone, No. 27, Kai Yuan Road  
301700 Tianjin

### Slovakia

Secop s.r.o.  
Továrenská 49, 953 01 Zlaté Moravce

## HEADQUARTERS

### Germany

Secop GmbH  
Mads-Clausen-Str. 7  
24939 Flensburg

## SALES OFFICES

### China (Shanghai)

Secop Compressors Co., Ltd.  
1603C, Oriental Century Plaza Business Center No. 345  
Xianxia Rd., Changning District Shanghai 200050

### China (Guangzhou)

Secop Compressors Co., Ltd.  
1309, Olympic Park Building  
Luoxi New City, Panyu District Guangzhou 511431

### USA

Secop Inc.  
4000 Northfield Way, Suite 600, Roswell, GA 30076

### Russia

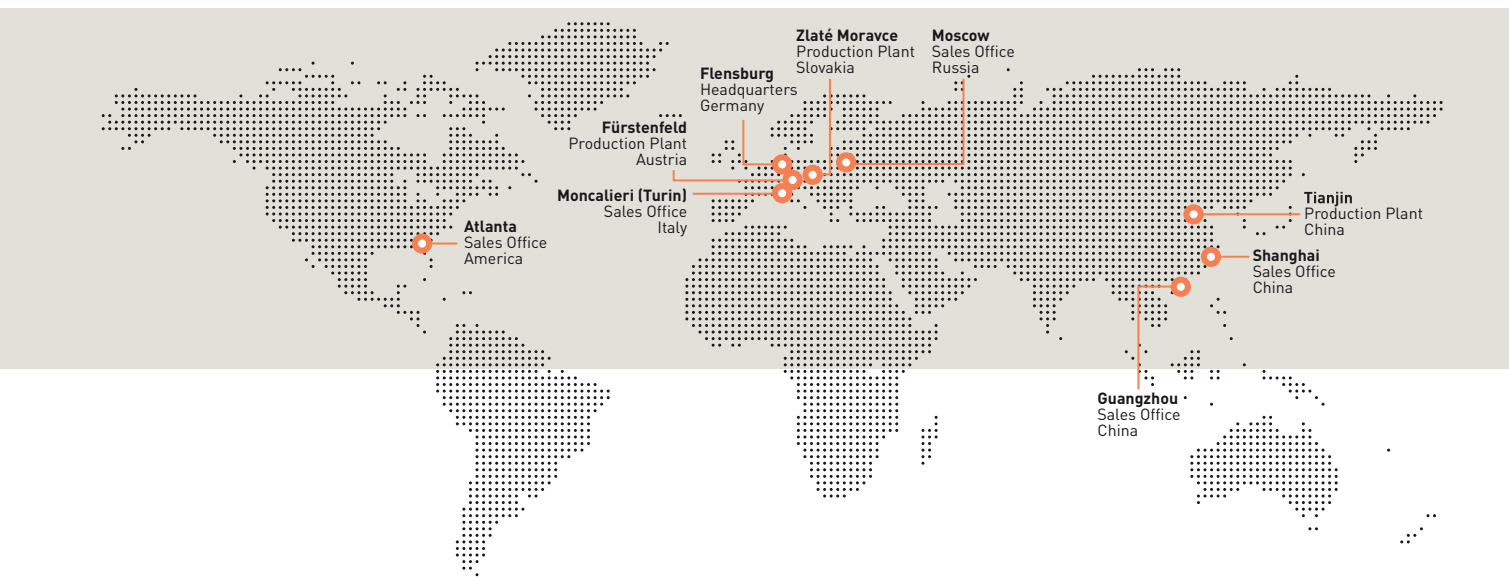
Secop GmbH  
1. Kasatschij per. 7, 119017 Moscow

### Italy

Secop Italia Srl  
Piazza Vittorio Emanuele II, n°3  
10024 Moncalieri (Turin)

### Turkey (Liaison Office)

Secop GmbH Türkiye İzmir İrtibat Bürosu  
6111 Sokak No:25 D:9, 35560, Karşıyaka-İzmir



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# ABOUT US PEOPLE



## COOL THINKING. PASSIONATE WORK.

Cool thinking is an important part of how we do things at Secop along with the commitment we have to increase value for our customers.

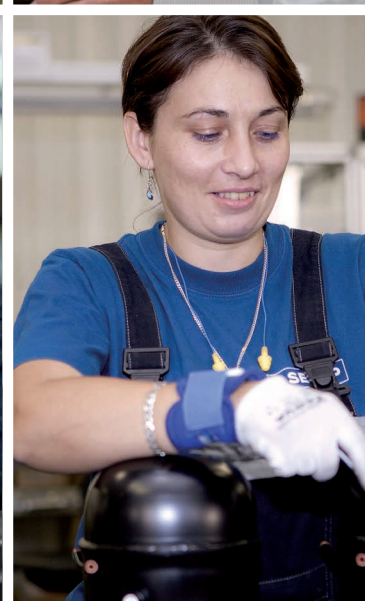
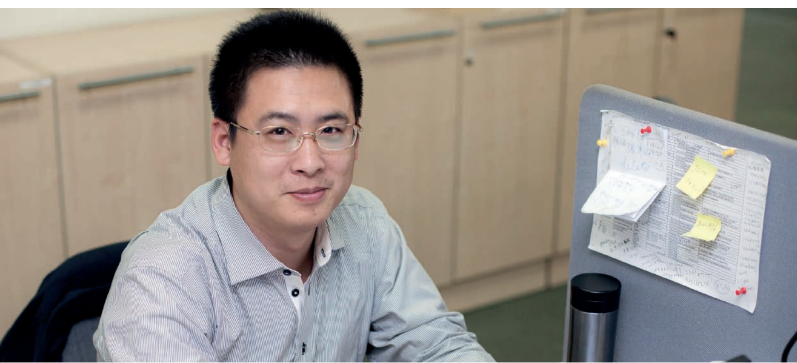
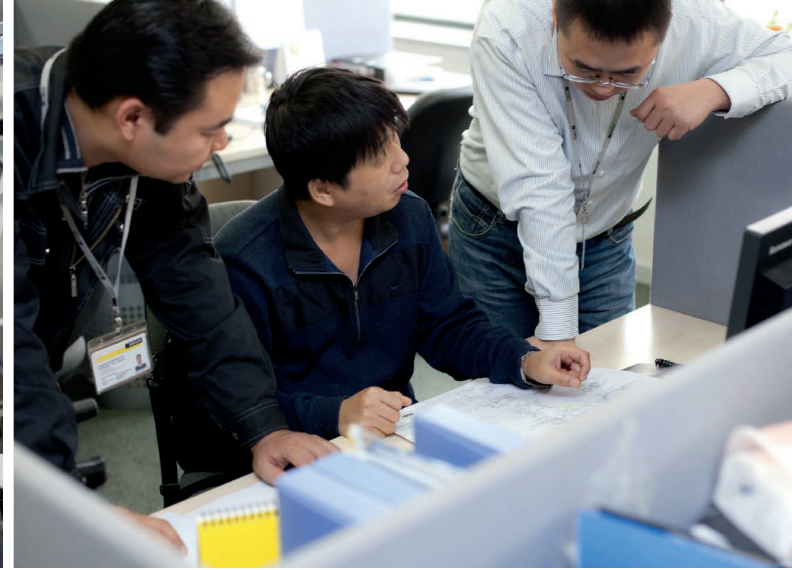
Together they drive us to understand our clients businesses, their challenges and the many possibilities in today's world of advanced compressor systems.

The cool thinking prevents us from "jumping on to any bandwagon". Instead it pushes us – right from the start - to see things differently.

When you see things differently, you will challenge the status quo and create something truly new.

This is what we work for and what we are passionate about. Knowing that our own progression and achievements is the key to the success of our customers.







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# APPLICATION AREAS



- **HOUSEHOLD**
- **LIGHT COMMERCIAL**
- **DC-POWERED**

Secop creates and supports advanced compressor solutions within three application areas: household, light commercial and mobile. In all core areas we

are dedicated to be a fast-moving and long-term reliable partner that shapes the marketplace and our customer's business.





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# HOUSEHOLD REFRIGERATION



## DELIVERING EVERYDAY SATISFACTION.

Intelligent household compressor solutions hold a special place in Secop. Household solutions are what started the business in the first place, with the revolutionary “Pancake” compressor for refrigerators in 1952.

Our vast knowledge, our expertise and close cooperation with market leading customers defines our reputation as today’s most advanced provider of high-performing solutions. Covering the entire field of household appliances:

- Refrigerators
- Freezers
- Combinations
- Tumble dryers and heat pumps

Whatever your needs and requirements are, at Secop we are always one step ahead of the competition. Offering new standards of satisfactory compressors that are low on noise, low on energy but high on sustainability.



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# LIGHT COMMERCIAL REFRIGERATION



## HIGH PERFORMANCE. LOW ON COST.

At Secop, we have the same drive and ambition as we did more than 40 years ago and still have no intention of changing it:

We keep designing and delivering smart, reliable and cost-effective compressor solutions for the light commercial market.

We offer a full range of applications, amongst others:

- Beverage coolers
- Glass door merchandise
- Display cabinets
- Commercial refrigerators and freezers
- Dispensers

Our leading position at Secop is due to two things:

We have close work-relations with customers, suppliers and partners. We always know their challenges, opportunities and need for innovative solutions.

Secondly, we make continued investments in leading technology, making sure that we increase competitiveness, in terms of cost-efficiency and sustainability.

We quite simply, strive to create the 'sweet spot' where performance is improved and costs are reduced.





We have more than 35 years of experience, developing direct current compressors and helping customers benefit from the opportunities of mobile refrigeration technology.

With a deep insight of the usage across various applications we have earned a position as market leader, working with OEM-customers.

# DC-POWERED REFRIGERATION



## COOL AND CONNECTED WHEREVER YOU ARE.

The world is moving faster than ever before. So is the demand to be cool, calm and connected. Wherever things are taking you.

At Secop, we have been a part of this challenge for the last 35 years. Developing direct current compressors and helping customers benefit from the opportunities of DC-powered refrigeration technology.

With our deep insight and knowledge of compressor usage across various application areas, we have earned the position as a global market leader. Especially within the automotive and truck industry.

Applications include amongst others:

- Truck refrigerators
- Battery cooling for telecom
- Car mini bars
- Vaccine coolers

The success of Secop is very much due to our strong and innovative team that supports customers with everything from design changes and project management, to approval procedures and product platforms.

We are committed daily to build success for our customers. Shaping their businesses, while shaping the very future of cool comfort.





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# SECOP XV COMPRESSORS

## THE FUTURE IS NOW



Research, development and intelligent solutions continues to be a top priority at Secop. The new X-Series compressor range is our latest benchmark, breaking new ground with its ability to combine an extremely small size with extreme high performance.

Based on a completely new and innovative platform, the XV variable capacity compressor:

- Ensures up to 40 % efficiency compared to the highest efficient standard compressors
- Sets new low noise standards with 32 dB(A)
- Increases cooling volume by having the revolutionary low height of 100 mm
- Reduces costs and sensitivity towards raw material fluctuation, due to an extreme low weight of 4.8 kg

Whether we talk about efficiency, noise, size, weight, quality or handling processes, the XV compressor increases total value and efficiency.

One of the leading household brands, BSH Group (BSH Bosch und Siemens Hausgeräte GmbH) has joined the development of the intelligent XV compressor closely.

With this new series, BSH is looking forward to set new standards itself and also have much greater flexibility in production, due to its adaptable capacity for various applications.

In that respect, the XV is already on the way to become a vital part of a new generation of innovative home appliance solutions at BSH Group and other leading household brands.





**SECOP**  
**XV7.2KX**  
220 - 240 V / 50/60 Hz  
LBP LST/HST CE  
only with electronic controller | **108H**  
**7100**  
**R600a**  
  
   
**MADE IN SLOVAKIA**



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# DLE/NLE-CN – ENERGY-OPTIMIZED PROPANE COMPRESSORS



Secop enhances its successful R290 compressor program with the release of a new generation of propane compressors for LBP and MBP applications like bottle coolers, ice-cream cabinets and commercial refrigerators.

The new DLE and NLE compressors are tailored for commercial use and capable of replacing products made for high-global warming potential (GWP) refrigerants such as R404A and R134a. With optional run capacitors the efficiency can be increased further if required.

With these compressors, Secop perfectly meets the increasing market demand for the highest efficiency while utilizing natural refrigerants with very low GWPs.

Given their outstanding versatility and reliability, Secop's new generation of energy-optimized propane compressors achieve maximum performance for an array of refrigeration/freezer applications.

Secop's ingenuity goes beyond enhancing the technical aspects and performance. The flexibility of this new line not only simplifies but also mainstreams demand forecasting and supply management by streamlining and abridging the order process to just one compressor.

A GWP of three is achievable with our powerful, efficient R290 DLE-CN and NLE-CN compressors, designed for LBP/MBP applications like bottle coolers, commercial freezers, food retail and ice-cream cabinets, etc.. These compressors represent a giant energy efficiency leap for Secop's propane compressor technology - More to come...

Make the switch now to replace R404A and R134a systems with environmentally friendly R290 and save additional cost by utilizing smaller compressor platforms, providing unique new opportunities in your market.

The compressors are available for 220-240 V / 50 Hz and 115-127 V / 60 Hz.





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# NEW MARKETS NEW OPPORTUNITIES



Being a global market leader in compressors for more than 50 years, comes with a responsibility and a need to act.

At Secop, we act with the understanding that the future is now. It is the innovation we deliver today that transcends into the future of tomorrow. Our goal is to create and support new products and technologies, to the benefit of the customers and the environment.

Battery cooling for telecom is one example. In today's global environment, the ability to get in touch with others is equally important in remote areas as it is in big cities. High speed data and voice communication connect people in virtually every corner of the world, instantly.

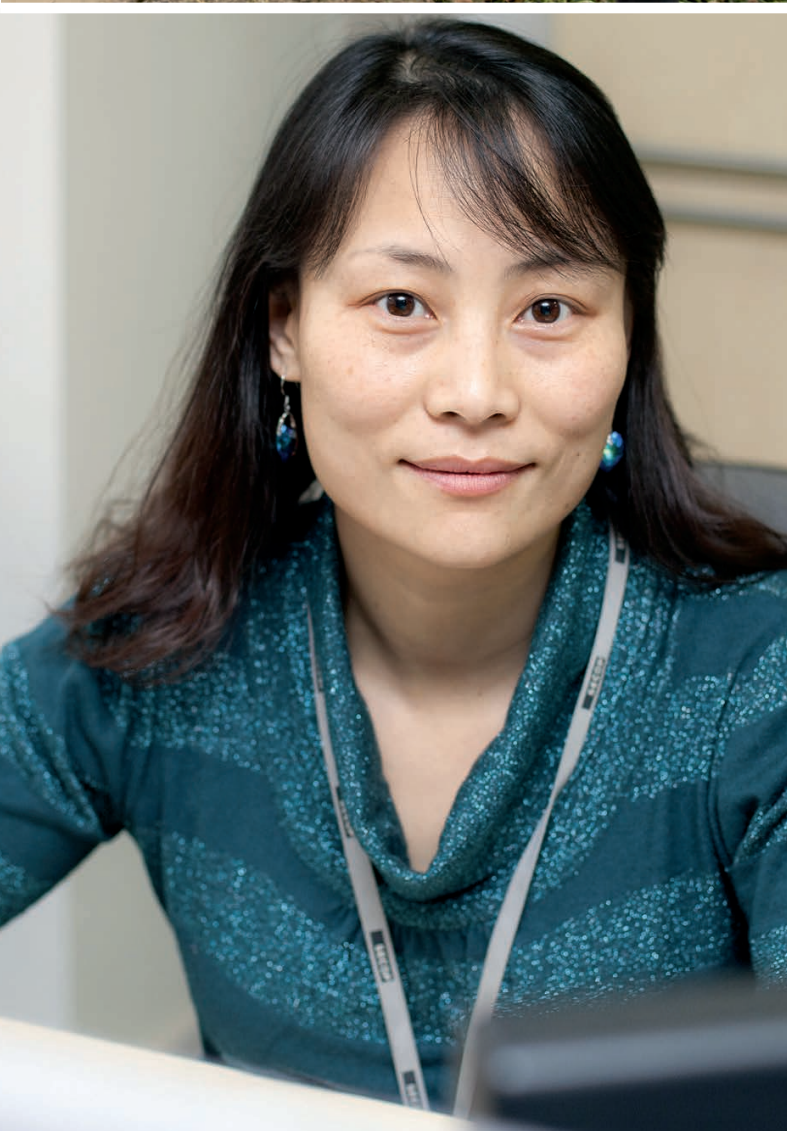
With base stations often placed in remote areas and in different environmental conditions. Ensuring maximum uptime is a challenge for all telecom service providers.

The innovative direct current compressors from Secop are instrumental in reducing system complexity, keeping the optimal temperature for batteries at 25°C and extend the life of the batteries while saving energy. In fact, the low lifetime costs enable payback as fast as within 14 months.

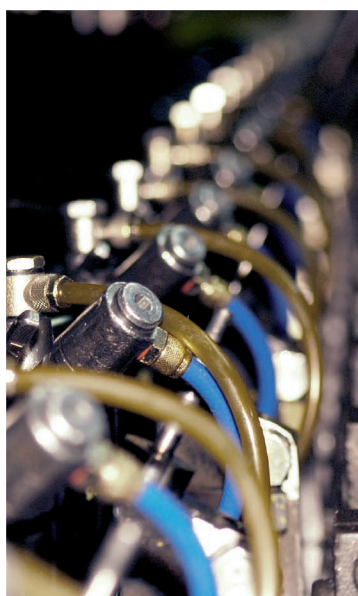
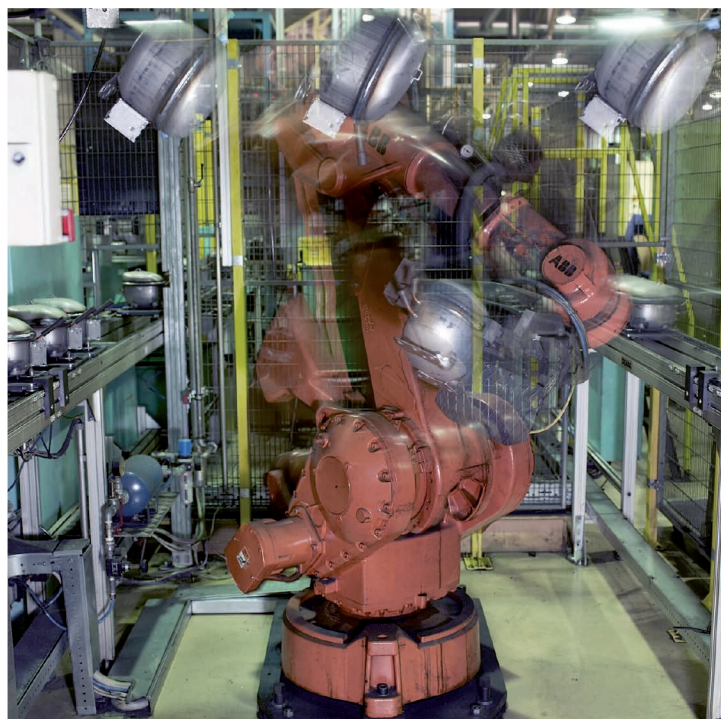
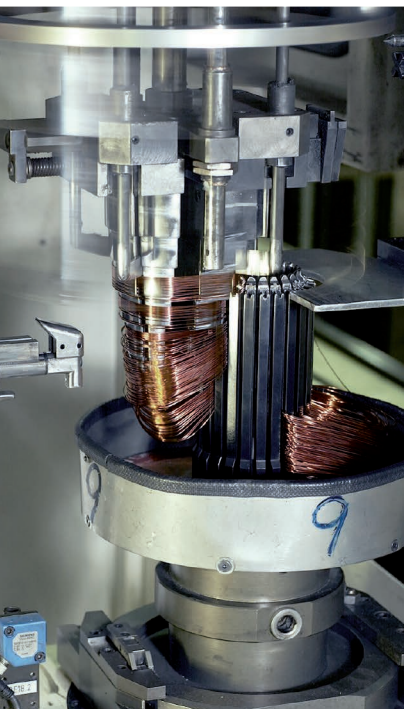
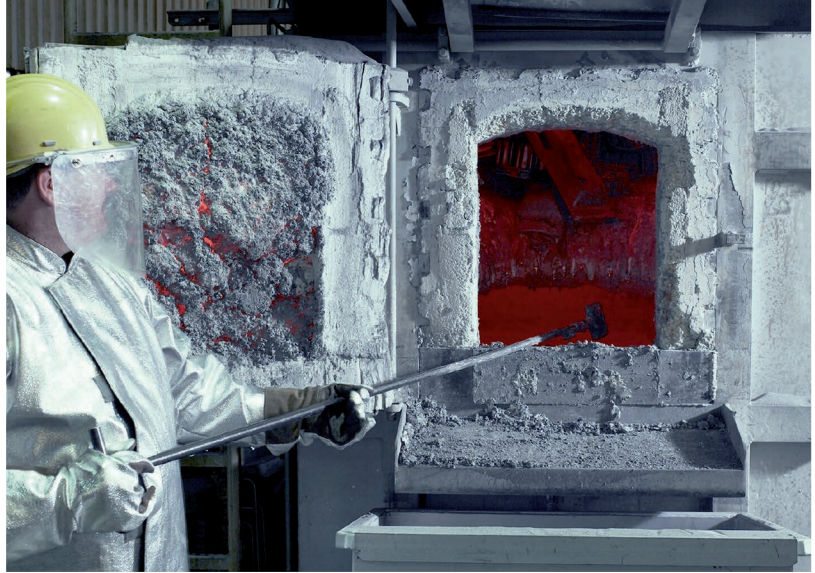
Furthermore, we continuously expand our business in key global markets. Both the USA and the fast growing Chinese market have our focus.

We are already well established with the manufacture and sale of compressors in China and are determined to challenge our Chinese competitors, whom may undercut our solutions on price, but not on quality, performance and innovation.

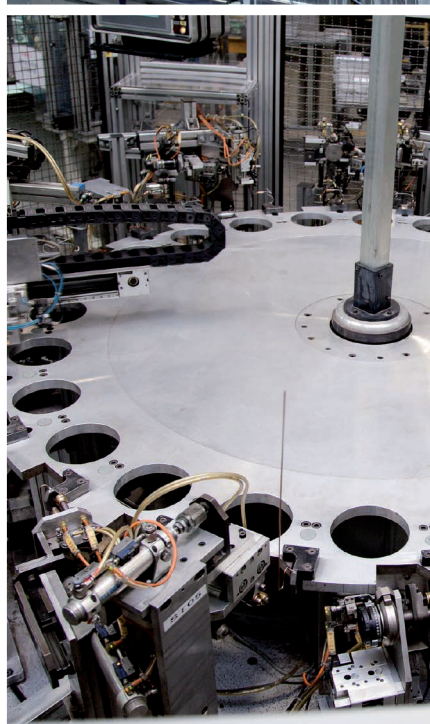
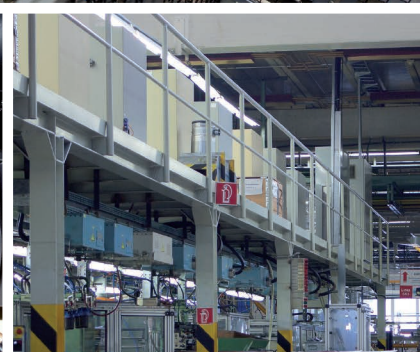
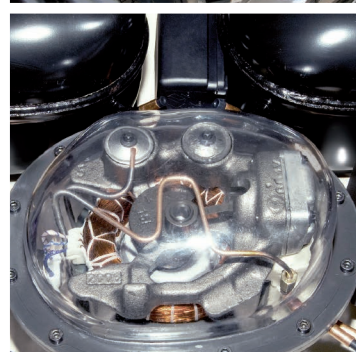
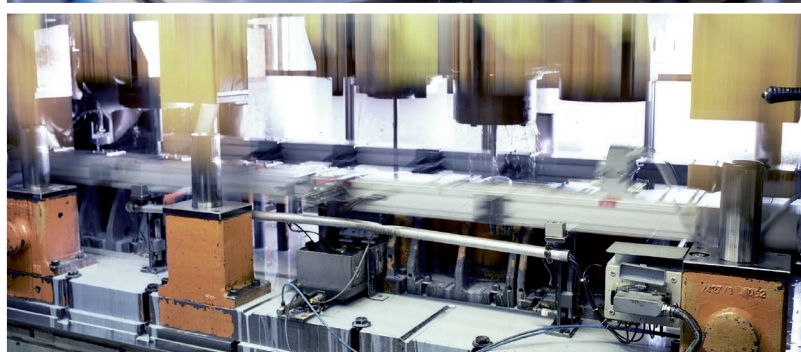
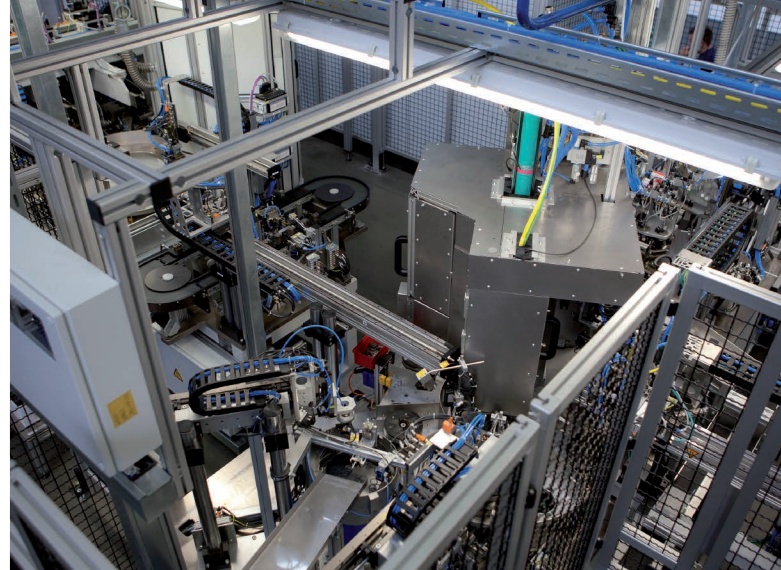
In light of current developments, we see a significant potential for years to come, for our core businesses and our diverse range of high-efficient and energy-saving compressors.













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# CASE STORY KIRIAZI

## INTRODUCING ENVIRONMENTAL-FRIENDLY EFFICIENCY THINKING



The leading Egyptian home appliance manufacturer, Kiriazi wanted to move in a more sustainable direction. By incorporating the high-performing Secop XV8.0KX compressor and zero ozone refrigerants they now have the best conditions to offer environmental-friendly products with considerable energy savings.

Secop has had a strong relationship with Kiriazi for many years. It is a relationship that even dates back to the time when Secop was known as Danfoss Compressors and it has always build upon technical cooperation and close knowledge sharing.

In order to stay ahead in a growing and highly competitive Middle Eastern market, it was only natural for Kiriazi to turn to Secop for advice and new improved solutions.

### SWITCHING TO EFFICIENT SUSTAINABILITY

Improvements evolved around two significant changes. Above all, Kiriazi switched to the environmental-friendly refrigerant R600a. It is a refrigerant with zero ozone depletion (ODP) and a negligible global warming potential (GWP). This alone would secure Kiriazi advantages over their nearest competitors.

Secondly, Kiriazi got introduced to Secops newly developed XV8.0KX compressor. It is a compressor that not only meets the latest demands. It also exceeds them.

The XV8.0KX combines high performance with low energy consumption and low noise. Moreover, in contrast to fixed compressors, it is able to adjust the supplied cooling capacity of the compressor, ensuring a much more balanced temperature.

Together, the new refrigerant, the new compressor and the close collaboration with Secop have led to a new level of sustainable and environmental-friendly thinking at Kiriazi.

### INCREASING PERFORMANCE FROM B TO A+

Tests are vital to this kind of process and testing and optimization are still going on in order to create the best possible household solution with the XV8.0KX compressor.

It is important that the XV8.0KX can match pre-existing designs and conditions and still be able to unfold its unique cooling capacity.

Regarding efficiency, tests show that original energy consumption levels already have decreased considerably. But both Kiriazi and Secop expect to gain even further 40% savings when final tests are over.

This will ensure a huge leap in energy classification from B to A+ and provide Kiriazi with a new vital selling point.

### PRESENTING A NEW COOL STANDARD

The new solution with the XV8.0KX compressor is so far carried out on one Kiriazi household product – and there is more to come. The forthcoming KXV9.5KX will display even higher performance and capacity and new XV variants for extreme challenging environments are also about to set new standards.

The plan is to continue the close and fruitful collaboration and over the next years launch a new standard for high-performing and environmental-friendly household products that sustains Kiriazi's position in the market.





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# CASE STORY GORENJE

## SILENCE IS THE NEW SOURCE OF GREAT STRENGTH



The quieter a compressor is the better, especially when it comes to household applications. Gorenje - one of Europe's leading manufactures in the business - got themselves a high performing weapon with the Secop DLE-KK compressor.

The market in household appliances has always been a very competitive one. Everything suggests that competition will only increase further in the future.

Gorenje has been one of the leading European home appliance manufactures for more than 60 years and has every intention in keeping that position, continuously seeking ways to improve their performance with the newest in technology.

In that context, the new DLE-KK compressor from Secop caught the attention of Gorenje.

It was able to meet their wish for a single compressor that could offer new market standards regarding low noise levels, flexibility and high performance.

### CHALLENGING THE COMMON COMPRESSOR STANDARDS

One of the key benefits of the DLE-KK compressor is that it is up to 50 % quieter than comparable compressors.

Additionally with noise levels becoming an increasingly dominant parameter in modern household appliances, the interest of Gorenje was obvious.

Low noise has become instrumental in elevating the quality of end-user experiences.

Moreover, the DLE-KK compressor is very flexible in design, compared to competitors.

Thus, it immediately helped Gorenje to cut down the need for different compressor solutions with 66% fewer variants. The DLE-KK can be used in many kinds of appliances without considerable adjustments. Its versatility has improved on both product development and daily operating costs at Gorenje.

### LOW ON NOISE - HIGH ON FLEXIBILITY

There is great satisfaction at Gorenje with the collaboration on the DLE-KK compressor and plans for future elaborations are already being planned.

With its low noise level, it not only supports future market trends. It also supports the need for greater flexibility without compromising environmental impact or the need for high flexibility.





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# CASE STORY A+++ CHEST FREEZER

## INCREASE CABINET NET VOLUME TO 27.7 LITRES BY USING AN EFFICIENT SECOP DELTA COMPRESSOR



Sometimes a little change can transform the business. With the aid of the ultra-efficient and ultra-compact Secop DELTA compressor it is now possible to increase performance, storage and cost savings to a whole new level in chest freezers.

The DELTA hermetic compressor series from Secop has been a popular choice in domestic refrigeration in recent years. The key to its success is the combination of its superior energy efficiency and very small size.

Coolers and fridges usually take much of the attention when it comes to innovation. But when our engineers analysed the application of our DELTA compressor, it turned out that in a chest freezer the advantages could be even bigger, reaching an A+++ energy efficiency categorization, at a very competitive cost, while adding additional net volume.

### INCREASING STORAGE VOLUME WITH 27.7 LITRES.

The extremely small compressor is innovatively mounted in the cabinet with a click-in-solution, completely avoiding the traditional compressor compartment inside the freezer, resulting in a storage volume increase of 25 to 30 litres. Secondly, the internal shape becomes cubic, making it easier to produce and assemble as well as more user-friendly for the final customer.

### HIGHLIGHTS

- Superior Efficiency → A+++ categorization (A+++ -20% feasible without vacuum panels)
- Compact compressor design → Increased cabinet net volume to 27.7 litres (cubic shape)
- 7% index improvement through increased cabinet volume
- New mounting system reduces costs, size and noise
- Compressor weight is less than 4 kg → Reduced shipping and storage cost
- Uses refrigerant R600a with a GWP of 3

### REDUCING NOISE AND OPTIMIZING ENERGY EFFICIENCY.

The increase of storage volume is not the only benefit from mounting the DELTA compressor inside the chest freezer. The noise generated is also lower than before, by up to 8 dB(A).

Through the improved relation between the surface and the internal volume, the energy index is further improved by 7%.

### LOWER MANUFACTURING COSTS ENSURE HIGHER SAVINGS.

With the DELTA solution, chest freezers become the cabinet class with the highest advantage through its A+++ energy efficiency rating. The benefits are:

- Large savings potential for freezers with high absolute consumption (large volume/low temperature)
- Savings in production cost and little or no use of vacuum panels

With lifetime savings that can amount to the price of the cabinet itself, an A+++ chest freezer with the DELTA compressor is set to transform a thing or two in refrigeration.







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# CASE STORY VESTFROST SOLUTIONS

## SECOP XV COMPRESSOR – A NEW STANDARD FOR COOL SAVINGS



Danish Technological Institute has together with EUDP and the producer Vestfrost Solutions made comprehensive energy tests of commercial wine coolers. Results show that the variable speed Secop XV5.0KX compressor ensures a 47% overall energy savings compared to wine coolers with fixed speed compressors.

Design and usability are important matters in the light commercial market, but above all rates cost-efficiency. The refrigerators, freezers and coolers are always in use. This is why improved energy efficiency along with increasing environmental standards is so essential to the business.

Together with Danish Technological Institute and EUDP – a program that furthers new energy-friendly technologies – the Danish producer Vestfrost Solutions made numerous tests, both in laboratories and 'real life' in order to ensure that their new wine coolers also would set a new standard for energy savings.

### WINE COOLER + XV COMPRESSOR WITH VARIABLE SPEED = UP TO OVERALL 47% ENERGY SAVINGS

The criteria included a compressor that could combine high performance and low energy consumption with temperature precision and low noise. Tests demonstrated that the Secop XV5.0KX was a very good match.

In contrast to fixed compressors the XV5.0KX is able to adjust the supplied cooling capacity of the compressor to the needed cooling capacity of the cabinet by operating at different speeds.

This rules out the constant stop-and-go-motion and leads to a more balanced cooling temperature and reduces energy consumptions considerably. Results showed the Secop XV5.0KX compressor managed the same high performance as the fixed compressors but used 36% less energy.

### BEST IN CLASS + BEST IN FIT

The XV compressor made the Vestfrost Solutions wine cooler take a best-in-class-leap from energy efficiency class B to energy efficiency class A+ and provided simultaneously improvements on noise levels – an instrumental feature when choosing wine coolers.

Furthermore, the compressor was able to demonstrate great flexibility. Due to its extreme small size and weight it only took minor adjustments to make the Secop compressor fit in with the pre-existing cabinet.

With the XV5.0KX it is possible to reduce energy consumptions without big appliance design changes.

### A NEW COOL FOR WINE COOLERS

Vestfrost Solutions has been pleased with the outcome and so has the different end-customers who already have had the chance to try out the 'upgraded' wine coolers.

They mention the new cooling qualities as something to look out for and naturally the prospect of saving both energy and total costs.





With more than 50 years of experience in compressor technology and highly committed employees, our focus is to develop and apply the advanced

compressor technologies to achieve standard setting performance for leading products and businesses around the world.

# CASE STORY MANITOWOC ICE

## TAKING ENVIRONMENT-FRIENDLY COMPRESSORS TO THE NEXT LEVEL



Fuelled by an increasing market interest in environment-friendly systems, Manitowoc Ice turned to Danfoss and Secop with the idea of designing ice machines that would improve customer's sustainability efforts by operating on natural refrigerants.

The commercial food service and related industries rely daily on large quantities of ice for food displays, safety, preparations, drinks etc.

What matters most is the ability to produce ice in the most reliable and cost-efficient way and still meet the ever-increasing demands regarding sustainability.

In order to keep ahead of both competition and legislation the Wisconsin-based manufacturer of commercial ice machines, Manitowoc Ice, asked Danfoss and Secop to help take their product portfolio one step further.

The aim was simple but ambitious: Develop ice machines operating on natural refrigerants and set a new global standard for environmental friendliness.

### CONVERTING TO NATURAL REFRIGERANTS

The first collaborative project was Manitowoc's 500-pound ice machine. To convert the ice machine to natural refrigerants, Secop replaced a compressor using R404A, a hydrofluorocarbon (HFC), with a new compressor designed for R290, a hydrocarbon (HC-Propane).

Knowing it would also help reduce energy use, Secop chose to install one of its SC Series compressors (SC18CNX) for the R290, which features a reliable, compact design, specially

optimized valves and a motor with international protection – optimized for R290 and meeting all the safety demand using hydrocarbons.

To further improve the efficiency, a unique thermostatic expansion valve was installed, this optimized the charge and regulate the injection of the refrigerant. A new micro channel condenser was also added.

The results were impressive. Although replacing the normal R404A, the new system is able to maintain ice production capacity at the same high level, while staying within the 150 g charge limit. Moreover, there is 20 to 30 % savings on energy with comparable ice machines.

So far, the collaboration has led to the development of two new models within Manitowoc's Indigo Series and a Q-Series under-counter unit.

### READY TO RESHAPE THE MARKET

With the addition of energy efficient hydrocarbon ice machines, Manitowoc has gained a new competitive edge, showing that it is possible to create sustainable solutions without compromising reliability and production capacity.

The ice machines are being manufactured and sold to the European market, but there is no doubt that Manitowoc cannot wait to reshape more markets, especially USA.

"We believe the R290 ice machines will become much more relevant here in the United States over the coming years –and we'll be prepared with environmentally friendly and energy efficient ice machines when that day comes", says Greg Erickson, Field Marketing Manager at Manitowoc Ice.







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# CASE STORY VITRIFRIGO

## INCREDIBLE ENERGY AND COST SAVING POTENTIAL ON MINIBARS



DELTA compressors from Secop help to ensure the world's most cost-efficient minibars. Using non-toxic natural gas refrigerant and reducing energy consumption to a minimum, the ultra-efficient Secop DELTA compressor helps Vitrifrigo to introduce a new series of minibars and a future standard within the business.

Nearly every hotel room in the world has a minibar. Every single one of them uses a lot of energy, in fact, way too much. One of the reasons is that most minibars still make use of traditional absorption technology. It means that cooling takes longer time and is more expensive to run.

Secop has together with the leading Italian manufacturer, Vitrifrigo, come up with a solution that replaces the usual absorption method with modern compressors. Specifically using Secop's DELTA hermetic compressor a new level of environmental-friendly efficiency has been possible.

### SIGNIFICANT SAVINGS WITH A+++ COMPRESSOR TECHNOLOGY

The DELTA compressor series is characterized by being ultra-efficient, ultra-compact and very low on noise, just 33 dB (A), which is similar to a quiet whisper in a library. The idea was: If everything else in refrigeration can take advantage of these features, why should minibars not have the same possibility?

### HIGHLIGHTS

- Superior efficient minibars with the highest possible A+++ EU energy rating
- The ambient temperature is reduced four times faster than with the absorption method
- New DELTA compressor mounting system reduces costs, size and noise
- DELTA compressor weight is less than 4 kg → Reduced shipping and storage cost
- Uses refrigerant R600a with a GWP of 3

A comparison between Vitrifrigo's NEXT DM A+++ minibars with a DELTA compressor and minibars based on absorption technology shows significant improvements.

The NEXT DM A+++ minibar:

- Runs over 85% more economically
- Cools 4 times faster
- Reduces atmospheric emission 430 times

Besides easier mounting and less noise, a small calculation perhaps displays the most vital difference between the two technologies:

Using just 0,14 kWh/d compared to the absorption minibars' 0.85 kWh/d, every single NEXT DM minibar will save up to 52 Euro in energy per year. For a single hotel with 50 rooms it adds up to 2.600 Euro per year.

No other minibars have refrigeration technology that can showcase the same figures or savings. In fact, the combination of Secop's DELTA Compressor and Vitrifrigo's engineering sets a new global standard for comfort and cost-efficiency in the business.

### ABOUT VITRIFRIGO

Part of the Rivacond Group, Vitrifrigo is an Italian manufacturer of refrigerators specifically for boating, automotive and Ho.re.Ca. trade. Vitrifrigo is synonymous with cutting-edge technology and guaranteed efficiency.





We have more than 35 years of experience, developing direct current compressors and helping customers benefit from the opportunities of mobile refrigeration technology.

With a deep insight of the usage across various applications we have earned a position as market leader, working with OEM-customers.

# CASE STORY AUDI/DOMETIC

## SECOP BD1.4F-AUTO COMPRESSOR FOR AUDI'S FLAGSHIP



Secop has developed a battery-driven compressor that will be used in Audi's flagship A8 to keep the beverages cold.

The cool box developed by Dometic uses around two third less energy compared to similar electrical versions which do not have a compressor.

It cools the contents to refrigerator temperature, no matter how warm the weather is.

Would a music centre with 19 loudspeakers tempt you?  
Or what about an air pillow massage, built into the back rest?

### PERFECT PERFORMANCE/DIMENSION RATIO

There are plenty of options for wealthy people to consider when they work their way through the list of optional extras on the new A8 – German car producer Audi's flagship model.

One of the options for the back seat is a discreet built-in fridge box. The compressor in the refrigerator is made by Secop. It ensures cool beverages for the drive. The compressor is called BD1.4F-AUTO and is the market's smallest battery-driven compressor.

### DOMETIC COOLER BOX

The refrigeration company Dometic produces the fridges where Secop compressors are installed before it is all assembled on the Audi production line.

The Dometic group is a customer driven, world-leading provider of leisure products for the caravan, motor home, automotive, truck and marine markets.

This car specific refrigerator has been developed in close cooperation with Audi for the model A8. The elegant yet compact compressor refrigeration has been harmoniously integrated in the hole once utilized for the ski bag, thus, saving space. The refrigerator has a net volume of 10 litres and storage facilities for bottles, cans and small snacks.

The silent and reliable working Secop compressor assures maximum cooling performance, even freezing is possible. The innovative inner light concept highlights the luxury character of this Dometic product.

### HIGH QUALITY STANDARDS

This is the first time Secop will deliver compressors to the automotive industry, and it is a bit of a challenge.

This industry implements some of the world's strictest quality requirements, and the reality is that it does not accept any errors. This means that each and every compressor is thoroughly tested before it leaves the assembly line.

### FEATURES AND BENEFITS

Secop's BD1.4F-AUTO compressor helps in reducing the amount of electric power used in automotive applications.

- Using less electric power - lower fuel consumption
- Flexible controller - fits to various HMI designs
- Less weight & size - lower fuel consumption
- Perfect performance/dimension ratio
- Customer-specific solutions







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# CASE STORY COOL CONTAINERS

## SECOB BD COMPRESSORS DELIVER RELIABLE TEMPERATURE CONTROL TO NEW COLD CHAIN CONTAINER



PharmaPort 360™ container,  
copyright Cool Containers

Global demand for biological-based drugs is increasing and with it, the demand for reliable, efficient and cost-effective temperature controlled transportation. Today's high value pharmaceuticals, vaccines, biologics and other temperature-dependent materials require an unbroken cold chain from production to patient. They must also be capable of withstanding wide fluctuations of ambient temperatures. To meet this demand, Cool Containers - Ohio (USA) recently introduced the PharmaPort 360™, an innovative, temperature-controlled freight container that uses Secop BD direct current compressors distributed by Danfoss. The PharmaPort 360™ exceeds rigorous healthcare industry standards for temperature-sensitive compliance during transportation.

Until recently, manufacturers turned to a variety of shipping options that relied on gel packs, dry ice and operating compressors to effectively cool their temperature-sensitive products during transport.

The PharmaPort 360™ container maintains strict temperatures, allowing it to tolerate a significantly wider range of extreme ambient temperature changes while eliminating the need for gel packs, dry ice or compressors that run during transport.

The Secop BD compressors operate prior to shipment, freezing the container's cold plate so that cold energy can be stored and used during transport to maintain specified temperatures.

The innovative cargo container assures safe, door-to-door transport for optimum viability of contents upon arrival. Rather than moving from one cold transportation unit to the next, the container itself is moved, without the need for a refrigerated truck or temporary refrigerated holding locations.

### APPROVED BY THE FAA

Cool Containers has secured approval from the U.S. Federal Aviation Administration (FAA) for use of the PharmaPort 360™ in commercial and military air transport. Because the unit's compressors and heaters are inactive during transport, the container is approved for use in lower decks of wide body passenger aircrafts, and can also be loaded into upper deck positions of narrow and wide body freighter aircrafts.

In addition to FAA approval, the PharmaPort 360™ meets or exceeds World Health Organization "Cold Chain Storage and Distribution" guidelines. The containers are available from UPS Temperature True, the company's dedicated temperature sensitive service.

### EFFICIENT AND RELIABLE

Cool Containers are pleased with the energy performance of the unit and the compressors that support it. Cool Container's energy usage studies have shown that charging the PharmaPort system (with the Secop compressors running) over a 12-hour period requires less than six kilowatt-hours, or only about \$ 0.50 worth of electricity. Choosing Secop BD compressors distributed by Danfoss to be part of the solution was not difficult. Cool Containers was looking for the best, most reliable transport compressor - and Cool Container already has a good experience with the Danfoss product line.

The compressors are tailored for transport and are unsurpassed to tolerate changeable climatic conditions and vibrations under harsh road conditions around the world. They feature silent operation, a compact, lightweight design, speed/capacity control and energy optimization for efficient and reliable performance, so important to the design team. (Copyright Danfoss EnVisioneering<sup>SM</sup> 2012)







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# CASE STORY VIBOCOLD/EUROENGEL

## PORTABLE FREEZERS HAVE BECOME A COOL SOLUTION FOR THE DANISH HEALTHCARE SYSTEM



F0915 NDH container control board,  
copyright Euroengel Srl

The Danish commercial refrigeration distributor Vibocold- has successfully brought Euroengel's portable freezers to Denmark's healthcare system. With the use of Secop's hermetic compressors which are specifically designed for mobile use, the freezers have turned out to be extremely suitable for transportation of blood samples and other perishable goods.

The combination of new blood sample procedures and stricter regulations on medical transportation has created a demand for cooling solutions with greater precision and greater versatility. The portable freezers from Euroengel, which are based on innovative Secop compressor technology, have become a big success for Vibocold. So far, Vibocold has distribution in almost every region in Denmark. One of them - the region of Northern Jutland - has already 17 portable freezers in use.

### CENTRALIZATION CREATES NEW TRANSPORTATION NEEDS

The decision to move the treatment of blood samples from the general practitioners to a few laboratories has created a need for high quality portable freezers. During transportation from the clinic to the laboratory, the blood must have a constant temperature of 21 degrees Celsius. Otherwise, the risk of delaying the sample or destroying increases. "The portable freezers from Euroengel prevent this due to an electronic thermostat, constant ventilation and an integrated heater. This keeps the temperature within the range of +/- 1 degree - even under extreme weather conditions", explains Uffe Nitschke, Sales Consultant at Vibocold.

### A PRODUCT WITH NUMEROUS BENEFITS

A number of things distinguish the portable freezers from Euroengel from other solutions. "First of all, there is the overall quality of the box. Then there is the rotomoulded cabinet that makes the freezers very durable, hygienic and easy to clean, which is very important when transporting this kind of perishable goods. Moreover, it has had a positive effect on sales that the freezers are easy to mount and very competitive on price", continues Uffe Nitschke.

### CUSTOMIZED SOLUTIONS AND ADJUSTMENTS

The versatility of the freezers using Secop's BD80F compressors, which is a result of the close cooperation between Euroengel and Secop, has also made it easy to create customized solutions and adjustments.

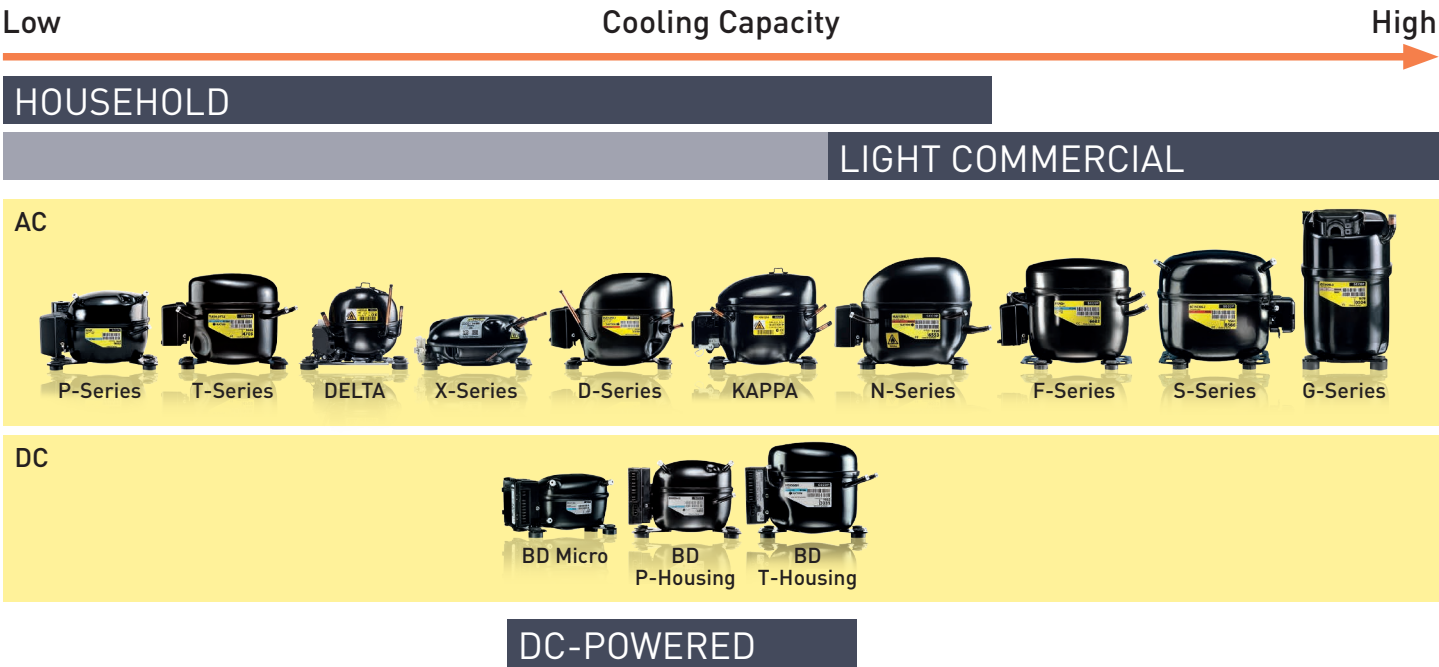
"We can mount extra batteries with timer function so the freezers can start up by themselves in good time in the morning. We have also developed solutions with external batteries for small portable freezers used for short distance transportations; i.e. transportation from one department to another in hospitals where the freezers ensure that the cooling chain is not broken on the way. For many of these purposes we mount wireless temperature monitoring, which has become something of a speciality for us, ends Uffe Nitschke.



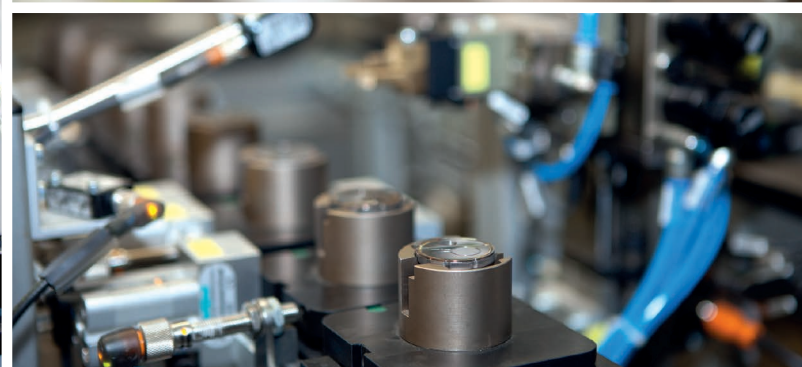
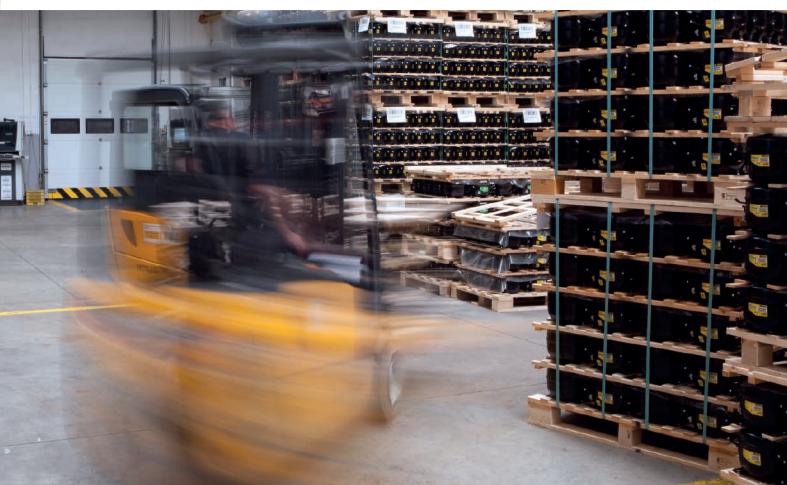


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# PRODUCT RANGE



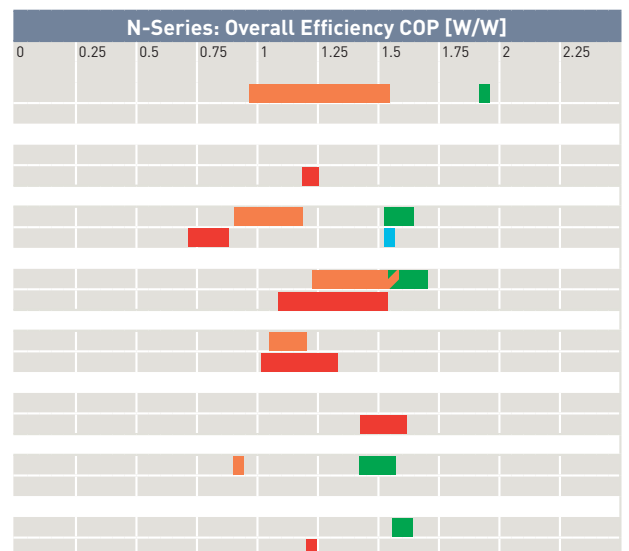
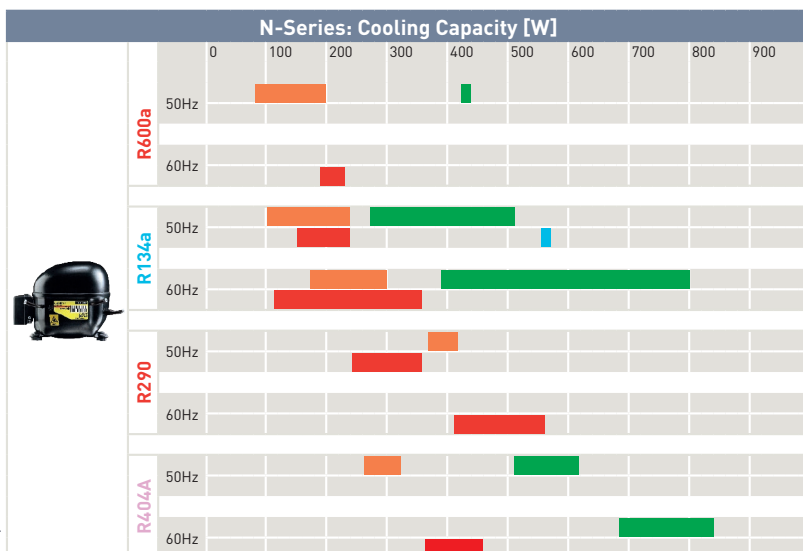
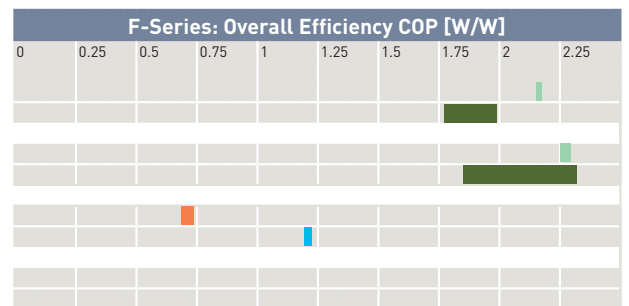
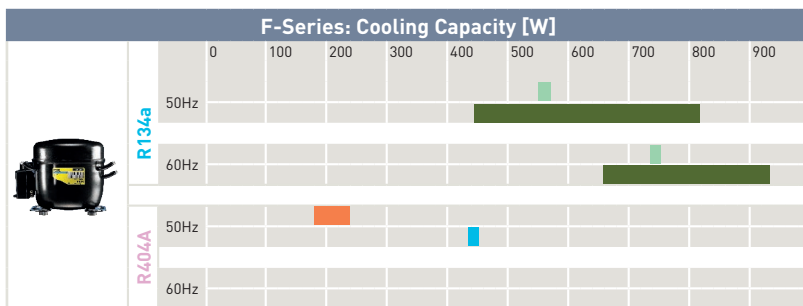
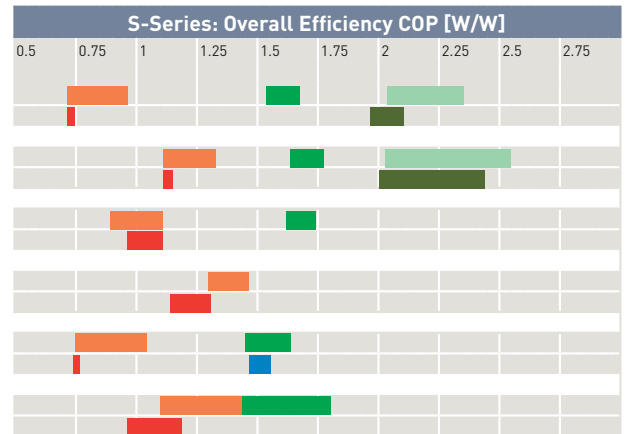
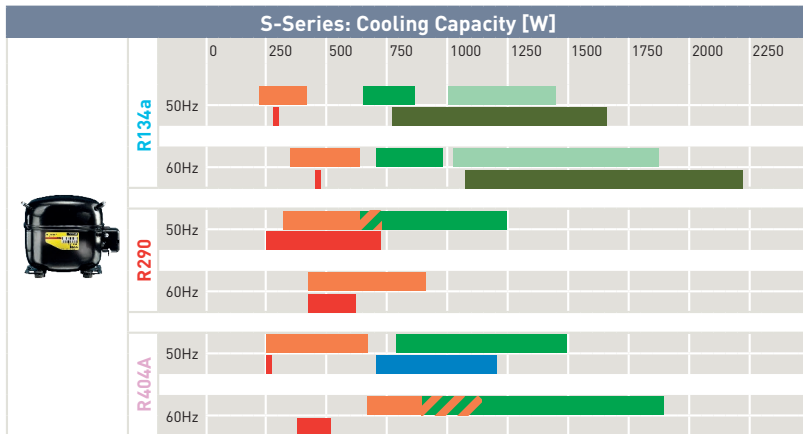
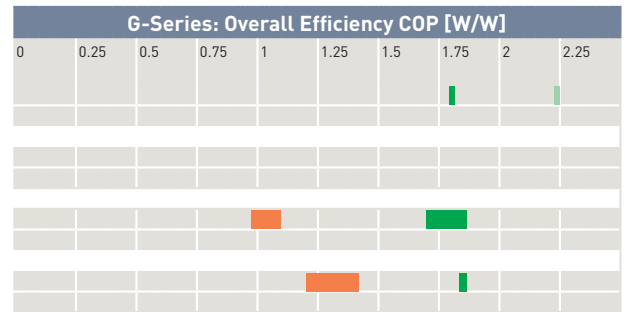
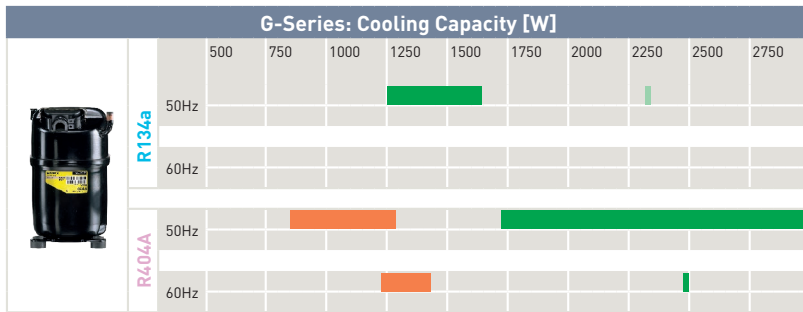




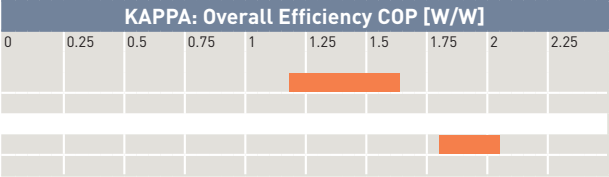
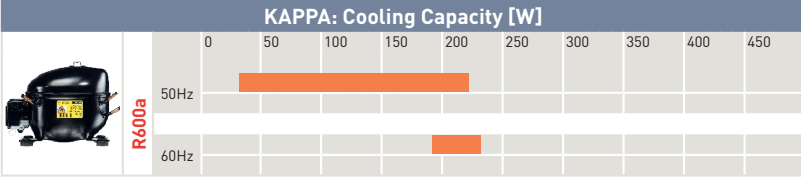
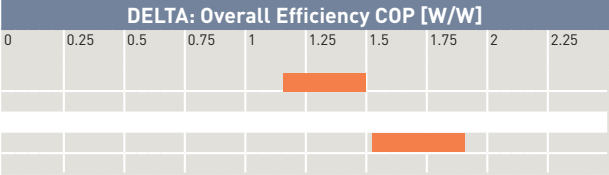
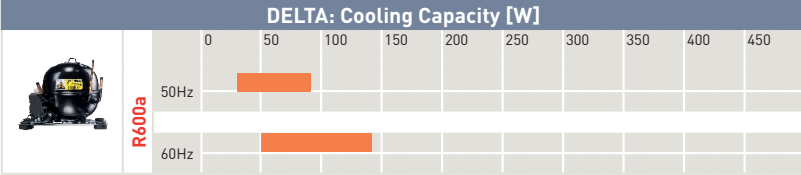
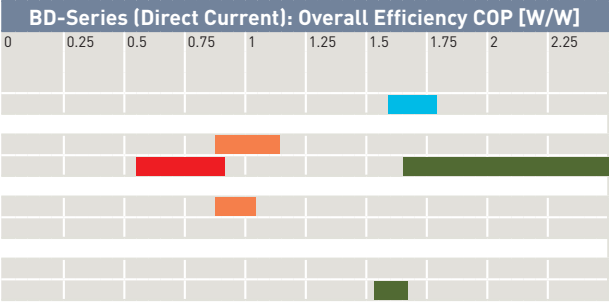
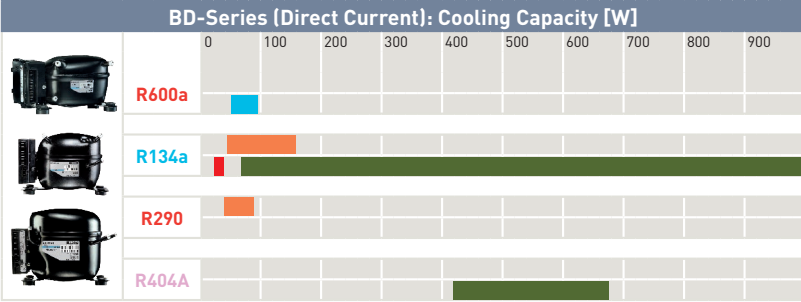
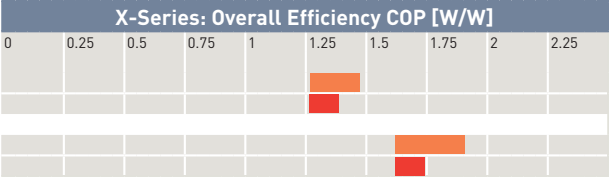
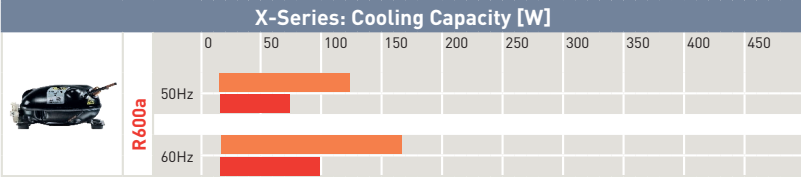
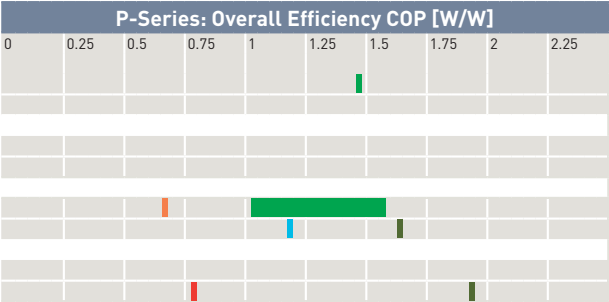
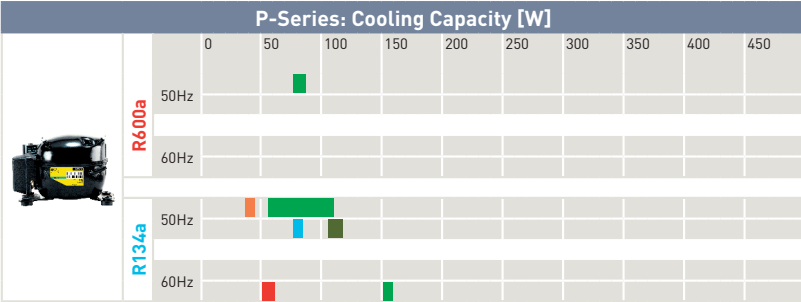
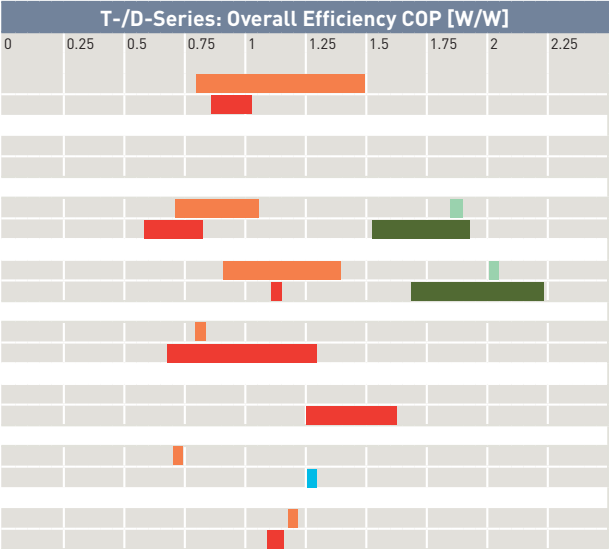
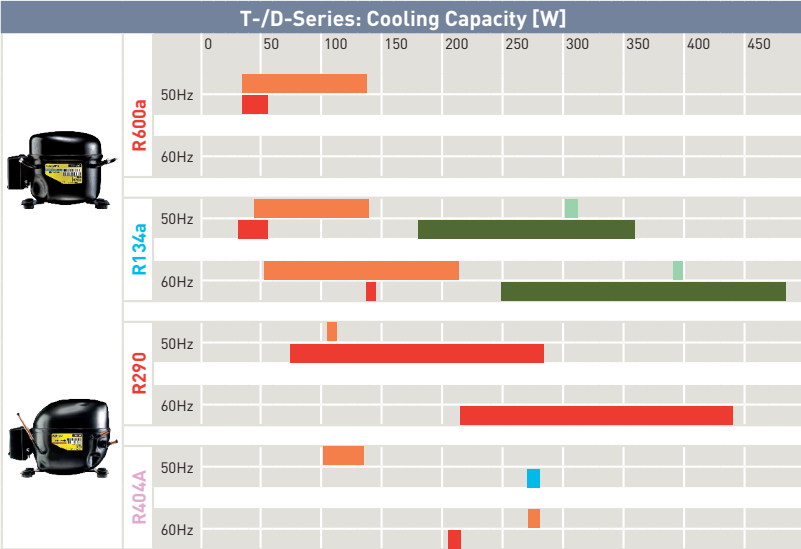


# PRODUCT PORTFOLIO

SECO<sup>P</sup>







	50 Hz	LBP	MBP	HBP	LBP+MBP	MPB+HBP	LBP+MBP+HBP
T <sub>evap</sub>	[°C]	-25	-10	5	-25	-10	5
T <sub>cond</sub>	[°C]	55	45	50	55	45	50
T <sub>suc</sub>	[°C]	32	20	20	32	20	20
T <sub>liq</sub>	[°C]	55	45	50	55	45	50

	60 Hz	LBP	MBP	HBP	LBP+MBP	MPB+HBP	LBP+MBP+HBP
T <sub>evap</sub>	[°C]	-23.3	-6.7	7.2	-23.3	-6.7	7.2
T <sub>cond</sub>	[°C]	54.4	54.4	54.4	54.4	54.4	54.4
T <sub>suc</sub>	[°C]	32.2	35	35	32.2	35	35
T <sub>liq</sub>	[°C]	32.2	46.1	46.1	32.2	46.1	46.1

# LEADING TECHNOLOGY THE RESPONSIBLE WAY



At Secop the development of leading compressor technologies always goes hand in hand with social and environmental responsibility.

We think it is the least we can do, helping our customers to meet regulations and help building a better world.

This means all Secop compressors are designed to save energy and reduce emissions in customer applications all over the world.

It also means that we carry out environmental manufacturing practices wherever we operate.

It means we are a participant of the Global Compact, an initiative of the United Nations for businesses that are committed to aligning their operations and strategies with ten universally accepted principles in the areas of human rights, labour, environment and anti-corruption.

And it means choosing a Secop compressor is choosing high-performing solutions that cool with a conscience – now and in the future.

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