

Case Story | Oil-free Turbocor® chillers

Denmark's new **climate-friendly** hospitality giant depends on **Turbocor® oil-free technology**



Very low chiller
TEWI with G.Ind.
oil-free chillers using

R1234ze

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The new Alsik hotel in Southern Denmark sets a higher standard in energy-efficiency and is built to reach 76% CO₂-neutrality. A main contributor is the 900-kW chillers by Clint (a company of G.I. Industrial Holding) which features award-winning Danfoss Turbocor oil-free compressors.

Oil-free technology can save up to 40% energy and is operating with ultra-low Global Warming Potential (GWP) refrigerant HFO-1234ze.

As the largest four-star hotel in the German-Danish border region, and now Sonderborg's latest prominent landmark, the Alsik has been constructed in the former industrial port area, on the banks of the Alssund strait and the Flensburg Fjord.

The renowned Copenhagen firm, Henning Larsen Architects, designed the 70 metres high building of 24,800 square metres and 19 floors. Danish pension fund PFA and Bitten & Mads Clausen's Foundation, major shareholders of Danfoss, are supporting Alsik. Danfoss has supplied the hotel's energy-efficient technology.

Sustainability was built into Alsik from the very start of construction. Intelligent control of all engineering plants, low energy cooling, reuse of surplus heat and reduced flow

temperatures are just examples of what Danfoss does to help minimize Alsik's energy use and resulting environmental impact.

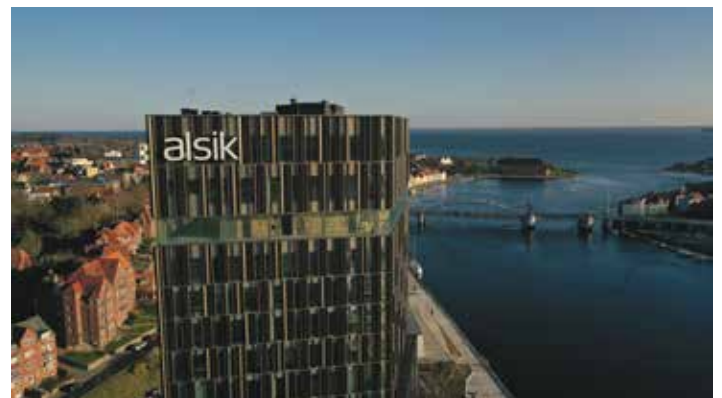


Figure 1: Alsik hotel in Sonderborg - Denmark

"In the construction of Alsik, Danfoss products are integrated as far as possible. The sustainable solutions are incorporated intelligently, so that the short-term focus does not harm the long-term - and vice versa. Building sustainably is about prioritized options," says John Knudsen, Project Director for the Bitten and Mads Clausen's Foundation.

The Alsik is built to reach 76% CO₂-neutrality. A main contributor is the chiller that features the award-winning Danfoss Turbocor oil-free compressor.

The Turbocor is combining low indirect CO₂ emissions from its low energy consumption and low direct emissions – coming from the ultra-low-GWP level of the refrigerant. This ensures low running costs and carbon footprint. On top of this, there will be low maintenance costs with high system reliability resulting from Danfoss oil-free technology and ADC*-tested component portfolio.

“We started using Turbocor technology more than 10 years ago. We have already hundreds of units running worldwide. For this specific project in Denmark, we proposed Turbocor and our Turboline chiller to reach the highest efficiency and the lowest GWP available in the market,” says Francesco Fadigà, Technical Director, G.I. Industrial Holding SpA, and he adds :

“The market is asking for lower environment impact in air conditioning. For this reason, we have invested a lot of resources in R&D, in a new lab facility and in the relationship with our partners such as Danfoss who has the widest portfolio and expertise for oil-free systems.”

For Bjarne Knudsen, project leader at IM Koleteknik A/S, it was the first time he'd been involved in installing a solution like Turbocor, which consists of three Turbocor oil-free chillers.

“The installation part is very easy and smooth, you simply calibrate the bearings and then you slowly start up. I am really impressed by how silent the Turbocor runs; actually, we have been back to check several times to see if it was, in fact, running, but it is just very quiet. I will definitely recommend Turbocor be used in more installations in the future,” Bjarne says.

“It makes me proud to install this system which is both oil-free and uses the low-GWP R1234ze – this is truly an environmentally-friendly solution and a perfect fit for cooling systems inside building technical rooms.”



Figure 2: Danfoss Turbocor TG compressor operating with R1234ze

Facts on the Alsik cooling system:

- **Turboline chillers** by Clint, a Company of G.I. Industrial Holding
- **900 kW cooling capacity**
- **3 Danfoss Turbocor TG 310** oil-free compressors
- **Danfoss BPHE, MCX controller, ETS 50 and 250 expansion valves, PT1000 sensors, NRV check valves, GBC shut-off valves and SGP sight glass**
- **HFO-R1234ze**
- **GWP<1**
- **Today's lowest chiller TEWI** (Total Equivalent Warming Impact)



Figure 3: Turboline oil-free chiller by Clint

*ADC: Application Development Centers