CHILLVENTA eSPECIAL

Refrigeration | AC & Ventilation | Heat Pumps

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Ice cold: Trading in illegal refrigerants

In early July 2020, investigators at the port of Rotterdam seized 14 tonnes of partially fluorinated hydrocarbons (HFCs) from China, which were being illegally imported into the EU. Looking toward the forthcoming Chillventa eSpecial, we spoke with Felix Flohr, Sales and Marketing Manager and Regulatory Specialist Refrigerants at Daikin Chemical Europe, and Volker Weinmann, Head of Policy, Environment and Professional Associations at Daikin Airconditioning Germany, about this illegal practice, its consequences and possible solutions. Get your ticket for Chillventa CONGRESS (13-15 October 2020) now.

Felix Flohr, when we talk about illegality, we also have to look at the law and legislation – for example, the EU Regulation on fluorinated greenhouse gases. Tell us something about this.

Felix Flohr: The original “F-Gas Regulation” was passed in 2006 and governed matters like system controls, certification of employees and tightness testing, and also put in place the first restrictions on use. A new F-Gas Regulation came into force on 1 January 2015, whose key element was the “phase-down”, in other words the reduction of fluorinated refrigerants and thus the contribution made by fluorinated gases to the greenhouse effect. This involved setting caps on the market in terms of CO_2 equivalents, and the introduction of a quota system to gradually reduce the permitted volume of CO_2 equivalents on the market. A baseline was set in 2015 to begin the process, followed by a reduction of seven percent in 2016-17. We are currently in the second stage, with a prescribed reduction of 37 percent, and from next year the cap will be set at a reduction of 55 percent. At that point we will therefore have only 45 percent of the baseline CO_2 equivalent volume of fluorinated gases available to us.

Has the industry cooperated in developing the Regulation, and does it support the EU’s efforts to achieve reductions?

Flohr: Yes, the sector was consulted via the various professional associations, and we at Daikin Chemical Europe are very happy with the Regulation, since it enables us to plan reliably. We know that the emissions

caused by these substances have to be reduced, and the quota system sets us a specific framework.

Volker Weinmann: From a device manufacturer's position, too, the steady increase in the prescribed reductions posed a challenge to begin with, including changes in technology. That led to new products appearing on the market that work with even greater energy efficiency and also greatly assist us in our own efforts to improve climate protection.

So the F-Gas Regulation has been a kind of driver of innovation for the industry?
Flohr: You could put it that way, yes. The reduction process has also led to huge numbers of new developments in the area of refrigerants. The result is an entirely new generation of refrigerants, which have either come into being or are still in development.

Weinmann: … And it has given us a major boost in the direction of the circular economy, in other words professionally treating refrigerants already in existence in the market. This was exempted from the "phase down" that we mentioned earlier, so treatment is both financially appealing and meaningful from an environmental angle.

That is something we will look at in more detail, since the F-Gas Regulation has also led to a problem with illegally imported refrigerants.
Flohr: Unfortunately, that is true. The EU Regulation has created a closed market. As the European Commission wished, prices for refrigerants have risen. This was meant to regulate the market and create incentives to switch to refrigerants with a lower Global Warming Potential (GWP). But the discrepancy between the quite low prices in China and the higher prices in the EU now mean material is being transported to Europe illegally. We can definitely consider it a form of organized crime.

What sort of scale are we talking about?
Flohr: This year we have roughly 115 million tonnes of CO_2 equivalent available. In 2018 our association commissioned a study to compare Customs data – in other words, export and import data from a range of sources. The study concluded that 19 million tonnes of CO_2 equivalent had been directly imported into the EU market illegally, most of it from China.

On top of this is an uncertain volume of 15 million tonnes of CO_2 equivalent that was transported from China to countries neighbouring the EU, but we do not know what subsequently happened to it. There was no corresponding growth in the industry in these countries, and there has been no re-export. In total, therefore, we are talking about 34 million tonnes of CO_2 equivalent that has found its way into the EU as additional, illegal refrigerant. That is almost a third of the volume that is available for the entire market.

Are you able to explain how such a huge volume can be imported unnoticed?
Flohr: It happens in different ways. Smaller quantities are genuinely smuggled – for example, using goods vehicles whose LPG tanks are filled with refrigerant to cross the EU borders. But illegal imports of refrigerants into the EU also take place on a grand scale, with entire containers being transported. One way seems to involve declaring the containers as transit imports, in which the EU is only meant to be a transit region on the way to Russia or Ukraine. But these deliveries then suddenly become “lost” somewhere. It is also a fact that Customs simply cannot keep control over everything right now. In the context of the coronavirus pandemic in particular, Customs officers obviously have other priorities than just fluorinated gases.

But someone also has to buy the goods. How does that work?
Flohr: The illegal refrigerants are actually sold via eBay or other Internet platforms. If you are a buyer, however, you should be able to tell the goods are illegal, since we are obliged by law to sell refrigerants only in returnable cylinders, which we take back again after use. But the illegal refrigerants are often sold in disposable bottles.

What is the industry’s position on this?
Flohr: There is quite an interesting discussion on this right now, driven by the Ministry of the Environment, calling for tighter monitoring of the supply chain and bringing the end users of illegal refrigerants to account. But this is still under discussion, as I mentioned.

Weinmann: We are trying to make it clear to our customers that using illegal refrigerants is also fraught with uncertainties. For example, the declarations on the container often differ from what is actually in the bottles.

That means there is a greater risk of faults affecting plants serviced using these products. But as manufacturers our influence is unfortunately limited. Our customers – in other words, plant manufacturers who acquire and maintain our devices – have even had to use refrigerants purchased from the end customer for maintenance purposes. That is a clear indication for us that end users are also among the purchasers of illegal refrigerants.

What is the sector's position on the idea of tighter controls over the supply chain?

Flohr: That is a double-edged sword: if you increase the level of documentation required, which means more administration, then the costs will go up. The bottom line is that the product becomes more expensive, which means even more incentives for illegal smuggling. It would be important not only for the authorities to perform more monitoring but also to have the tools to directly penalize the use of illegal refrigerants. In any case, the level of administration is already relatively high, since it has been a requirement since the first F-Gas Regulation to maintain log books to document which refrigerant is used in which system.

Weinmann: The initiative by the Environment Ministry as it stands is already a practical approach as I see it. But the increased documentation requirements that are being considered, and the barriers they would involve, could ultimately affect the plant manufacturers who are already acting in compliance with the law, by creating problems they cannot overcome. That must not be allowed to happen, which is why we consider the draft legislation needs to be improved.

What specific steps are you taking as a refrigerant and device manufacturer?

Weinmann: We have put in place a Europe-wide strategy to convert all systems with a particular fill limit, in other words air-conditioning systems with up to 14 kilowatts of cooling power, from R410A to R32 so we can reduce their GWP to one-third of its current value. We have also looked at the individual markets like France and Italy to see what barriers they have in terms of their national building guidelines, and tried to see what solutions exist for overcoming them. In addition, two of our VRV device series are filled with treated refrigerant ex-factory, which has saved about 150 tonnes of R410A throughout Europe, but Felix will be able to tell us more about that.

Flohr: As refrigerant manufacturers we have pursued a number of approaches. One is our investments in a closed circular system: we already had a plant that would take back CFCs, HCFCs and hydrocarbons, which we could then use to make raw materials for further chemical production. We have expanded the plant in Frankfurt am Main to enable us to treat used refrigerants to restore their original function and ensure they are every bit as good as brand new product. There is also an interesting side story to this treatment plant: it is run using excess heat from a neighbouring processing unit, which means it needs no additional power. At the same time we have developed refrigerants that can be used in the service area to replace old refrigerants with a high GWP. The substitute product R407H, which is thermodynamically and practically equivalent to R404A, is in the same safety class but its GWP is only half as high. In addition, the sector has developed a new class of refrigerants, HFOs, which have a GWP of only around 1 and are combustible to only a limited extent – which represents a really good compromise overall, enabling systems to be both safe and, more particularly, energy-efficient.

Was all this the result of the F-Gas Regulation?
Weinmann: No, but it confirmed and supported our own corporate position on the question of climate protection and the Paris climate goals. In 2018, at a corporate level, we announced our Environmental Vision 2050, under which Daikin aims to be a carbon-neutral company by 2050, and we are making major investments in the circular economy as part of our efforts to make this happen.

Flohr: I can only agree. Environmental concerns are very important to us. Our regular efforts are focused on ensuring safe refrigerants reach the market, making energy-efficient systems possible, along with a reduction in power consumption and CO_2 emissions. We also believe in the concept of the circular economy, and we are happy with every refrigerant we can take back for treatment. For us, that is the future.

Can you put that in perspective for us? When will the proportion of treated refrigerants on the market exceed that of new product?
Flohr: That is hard to say right now, but from 2030, according to the F-Gas Regulation, we will only have 21 percent of the original volume from 2015 still available. It will happen some time between now and then. Thanks to

our huge investments in plant technology, in any case, we are well equipped to treat used refrigerants to make them accessible to the market again.

Let us return briefly to the question of environmental and climate protection. Why are you so strongly committed in these areas?
Weinmann: Our entire company is backing the goals of the Paris Agreement. We are also adhering to the UN's Sustainable Development Goals, to which we are contributing as part of our business activities. Our parent company is therefore driving forward our commitment to environmental and climate protection at a global level. And as part of our Environmental Vision 2050, we have of course undertaken to be carbon-neutral by 2050, not only in terms of product manufacture but throughout our entire product life cycle. That is unusual in this sector to begin with.

Excellent. Will this theme have a part to play at the Chillventa eSpecial?
Weinmann: We traditionally have a very strong commitment to Chillventa. Once again this year, Felix and I will be visible at the eSpecial in any case, and can be contacted in person via the "matchmaking" function. Felix will also put in an appearance in connection with the European Fluorocarbons Technical Committee (EFCTC). And as the Second Chairman of the Information Centre on Heat Pumps and Refrigeration, I will be giving a lecture on the hydrogen study by Fraunhofer IEE and illustrating the practical utilization of hydrogen. After all, if we consider that, sooner or later, we will only have access to renewable energy obtained from wind, PV systems and water, it makes sense to use this electricity as efficiently as possible. In this context, using heat pumps to heat buildings is much more efficient than making use of hydrogen, which is being promoted in various quarters right now, even though producing it is a highly energy-intensive process.

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Thank you for the in-depth interview and these interesting insights.

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