

Interview by Peter Edwards, Global Gypsum Magazine

In discussion: Ryan Cekander, Climate Recovery

Climate Recovery has recently launched the CR® Duct System for heating, ventilation and air conditioning (HVAC) systems. This disruptive technology does away with the HVAC sector's traditional use of galvanised steel ducts that are subsequently insulated, providing a range of benefits for glasswool producers, distributors, on-site installers, building users and the environment. Here we speak to Climate Recovery's Ryan Cekander about the system, which recently won *Global Insulation Product of the Year* for 2017...



Above: Ryan Cekander developed the business plan for the CR® Duct System. He has a Bachelors and Masters in Marketing from Illinois State University and is currently involved in global market development for Climate Recovery.

Global Insulation (GI): Please can you introduce Climate Recovery as a company?

Ryan Cekander (RC): Climate Recovery was the idea of Göran Bernhardtsson and Peter Wallin. Göran, a Swedish engineer and executive, has a great deal of experience in the HVAC industry over the past 30 or so years. He was managing director of Fläkt Installation, which now, as Fläkt Woods, is one of the largest HVAC companies in Europe. He also built up and sold a company called Pluggit, which concentrated on domestic ventilation, mainly for the German market.

He sold Pluggit at the same time as he was coincidentally redesigning his home. He was there, putting up the galvanised steel of the HVAC system and thought, *'by the time I have put up this metal and someone else has insulated it, I will have spent insane amounts of money. Why are we doing it this way?'* He was particularly concerned with the use of galvanised steel, which contributes to increased zinc levels in the environment.

Peter Wallin had technical design experience with companies such as Boeing and Scania and had built up his own design and engineering company, Devellum in Sweden. With Peter's technical know-how and Göran's knowledge of the HVAC market, they set up the company Climate Recovery and together started to work on what would become the CR® Duct System.

The project proper began in 2008. From the start, the driving goal was to do away with the use of steel entirely, from a sustainability and weight perspective and, moreover, to industrialise the fragmented sheet metal ductwork market. Over the course of the next seven years they designed, redesigned and refined the product.

I did some preliminary work on a business case for investment into Climate Recovery in 2011, then properly joined the company in mid-2013 when it was closer to market readiness. Our hard work came to fruition in 2015 when we gained a 1/3 shareholder in the form of Bergschenhoek, a leading Dutch manufacturer and distributor of galvanised sheet metal ductwork.

GI: That was a major pitch for Climate Recovery, wasn't it..?

RC: Yes, because we directly approached the type of company that its development would disrupt and asked it to help us! Luckily for us, they saw the benefits of our approach and wanted to see this product come to market. We had been in contact since 2013. Bergschenhoek ordered its first stock at the end of 2015 and the first sales were in January 2016.



Right: A range of CR® Duct System ducts and fittings.



Left: Climate Recovery's production facility in Kalmar, Sweden.

had allocated an entire day for the installation of traditional steel and insulation. With the CR[®] Duct System, the system was installed in just one hour. Other cases are not as rapid as that but in the worst case scenario we only see it taking around as long as the installation of the steel ducts of traditional HVAC systems, with insulation already included.

Another benefit is the possibility of the duct being

either hexagonal or rectangular in the ceiling of the building. This means that existing structures in the building, be they water mains, gas, other ducts, whatever, can be avoided without the need for complicated bends. As each bend decreases the efficiency of the system, this provides an advantage for the final user of the building, or whoever is paying the bill. Instead of navigating around an obstacle and losing 6-7Pa, the CR[®] Duct System can avoid it while losing just 1Pa, save time in mounting and have a larger diameter throughout the system.

The HVAC system will often define the internal ceiling height. With the CR[®] Duct System, we can gain back around 20-30cm of ceiling space, which is another benefit for the final user. Also, natural sound damping benefits mean that no added dampers are necessary; with up to 6dBA/m silencing, the total system cost can be lower.

GI: The name Climate Recovery suggests particular advantages for the environment. What are they?

RC: When I first started working for the company, Göran and Peter gave me free reign to change the name if I wanted. However nothing really stood out as better than Climate Recovery. That's because the whole concept saves around 80-90% of the CO₂ emissions compared to standard steel and insulation HVAC products in terms of the embodied material. On top of that we have savings on transport fuels, installation time and in-use savings that I mentioned.

Below: The CR[®] Duct System is flexible enough to pack flat, while retaining its rigidity when it is installed.



The CR[®] Duct System

GI: Please can you introduce the CR[®] Duct System?

RC: The CR[®] Duct System is a plug-and-play HVAC duct and fittings system that does not use sheet metal, without sacrificing the benefits that using sheet metal brings to traditional HVAC systems. It consists of two major elements, ducts and fittings, that offer a range of dimensions. Both consist of a cured glasswool insulation core, surrounded by a multi-layer metallic foil inside and out. Glasswool offers obvious thermal conductivity properties along with flexibility and it is strong enough to be rigid when installed. That means that we can maintain the air pressures and hence the efficiency of the system in use. The foil provides a vapour barrier, reduces sound and further prevents the spread of fire.

GI: What are the other benefits compared to conventional HVAC systems?

RC: There are benefits for different stakeholders. Due to the fact that we can vacuum pack parts for dispatch, distributors gain a massive advantage in terms of how many pallets they need in the warehouse. Around 80-90m of pre-insulated duct can be stored on a single pallet 2.5m high, instead of perhaps 20-30m of steel ductwork. And that's without taking into account the pallet space for the insulation that has to be added on separately with the traditional methodology. The distributor may also be able to enter the insulation sector if they were previously only in the HVAC market, or vice versa.

Before it gets to site, the distributor and the installer sees reduced transport costs. The installer then gets to handle a much lighter product. The weight-saving is around 50% compared to a traditional HVAC system. The actual installation takes less time and exposes the workers to fewer risks. The system also helps with workspace organisation because the system takes up less space prior to installation.

One of the most remarkable advantages is the potential time saved on site. In October 2017 we completed an installation at a villa. The installer



Right: A CR® Duct System installation shown circumnavigating an obstacle.



GI: What is the actual overall benefit in CO₂ terms?

RC: That's a good question and will depend on a lot of factors, how far the product is transported, the temperature outside on any given day and the size and shape of the system itself. In the future we hope to pin this down enough to establish an Environmental Product Declaration (EPD) for the system. There is a lot of work to be done in that respect, because we have to do a lot of due-diligence with our suppliers and also refine our own production process.

GI: What is the biggest disadvantage of the CR® Duct System compared to HVAC systems?

RC: The number one problem in terms of growing the business is the higher installation cost of the CR® Duct System. It sometimes takes a lot to convince potential clients that, in the longer term, our system is better for them financially. We have to convince them that it is more expensive in material terms but far less costly in terms of transport, labour and in use. This will become easier for us in the future as we scale up the production and the level of automation.

Another smaller but significant concern is that we have a smaller range of products than the established steel-based HVAC system providers. They have catalogues of parts like an old phone book and a product that can be used in every possible situation imaginable, which is quite an attractive resource for installers.

Production

GI: What were the major hurdles encountered when developing the product?

RC: When I first started working for Climate Recovery in August 2013, it was still in product development. For the first year and a half we were in

the workshop developing prototypes almost full-time and doing tests. At the start it took us almost three hours to make the largest duct and they would not always come out right. There were problems with the application of the internal foil. We were taping it to the element and then heating them from within through the foil. Often, when we took the tape off, the foil would rip and the prototype would be of little use. We had some demoralising days when we would make two large prototypes and the foil would just come straight off right after they were made.

Another major hurdle was getting the correct specification of glasswool so that we could compress the finished product in a vacuum bag without damaging it.

GI: Where is the CR® Duct System made and how does the production process operate at present?

RC: All manufacturing currently takes place at our production facility in Kalmar, Sweden. The process is protected by around a dozen patents that concern production, materials and designs.

For the ducts, we roll uncured glasswool onto a mandrel with a specific dimension, cure it in an oven for a specified amount of time and then remove it from the oven and the mandrel. Then we apply foil to the inside and outside of the product. Then it is placed in a vacuum packing machine, which compresses the duct for dispatch.

For the fittings, we put glasswool into a press instead of the mandrel. We have a wide range of presses, depending on the part. The process is then fairly similar, except that we have to construct the fittings in two parts. It's currently more of a hands-on process than the ducts.

GI: From where are materials sourced?

RC: We have had a couple of glasswool suppliers and we are investigating further suppliers at present. The major issue is that we are looking at securing uncured glasswool and we also need special additives added to it, as well as the correct fibre length. We represent a fairly demanding customer by combining those various demands. The chemical composition of the additives is not always of the highest importance to an uncured glasswool manufacturer, but it is to the success of our production process. That's one of the reasons that the process took so long to develop. We had to explore the original sources of everything added to the glasswool, not just the glasswool itself.

GI: How long does it take to make a single piece?

RC: At present we can produce a duct in around 12 minutes, which, at full speed, works out at around 10,000 ducts/yr. A fitting takes 20 minutes, although we have three machines that can work in parallel.

At full speed that works out at 18,000 fittings/yr. We rely on a lot of manual labour and that is causing some bottlenecks at the process.

GI: What are the company's expansion plans?

RC: In the near term we will scale up our existing plant to 24/7 production using the current processes. Then we will upgrade with new equipment to drastically improve our degree of automation and our production rate. We will be able to make a duct every minute, with fittings coming out at one every two minutes. Annually that means around 60,000 fittings and 120,000 ducts running one shift.

We have recently been discussing a second production site in Poland with a new production partner. The exact location is to be determined. That partner will produce the system via a licence agreement. We are very clear that licencing this technology is the way to go, as the process can be far more sustainable and applicable to local needs if it is made close to specific markets.

Markets and future

GI: How many systems have been sold so far?

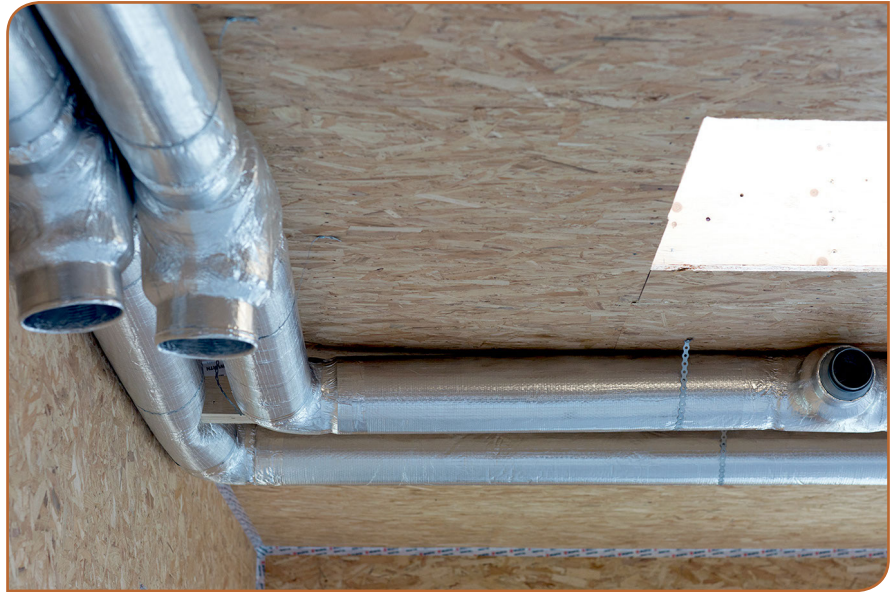
RC: We now have over 100 references but the vast bulk of those came in 2017 rather than 2016. The amount of business conducted across the two different years are like chalk and cheese. We expect that our growth will continue in 2018.

GI: Where are the big future markets?

RC: We are currently devoting a lot of attention to this question. The best market to target in terms of size is clearly North America because they insulate everything. The technology is slightly behind that of Europe, so there is even more of an advantage to be had compared to Europe. Of course, North America is also where the biggest established players are, which could be a major risk for the business.

We often wonder if it is better to go to developing markets where competition is lower and the mind-set is not so set-in-stone with respect to what an HVAC system 'has to be.' However, it is potentially tricky to build the market at the same time as build the new production systems. We are still learning about the material. In conclusion, we have spoken to potential licensees in Asia, Middle East, North America and India. We are very interested in continuing those discussions.

GI: What is the biggest threat to the business and widespread adoption of the CR® Duct System?



Above: This installation shows the ability to go round to rectangular to save energy and installation costs.

RC: From a global rollout perspective a significant problem is that we are so supplier orientated. We need to know what is in, and have control over, the content of the uncured glasswool. This is possible in Europe but elsewhere it could prove more difficult.

GI: What is the five year target for Climate Recovery?

RC: If we had 1% of the European insulated duct market in the next five years, that would constitute hitting a major target.

GI: How much would you have to produce to satisfy that demand?

RC: We would need three duct plants along the lines of what we will have at Kalmar and in Poland and five or six plants making fittings. It is not out of reach but the lead time for production licensing is around 12 months. We also don't know what the market may be like. There may be another innovative company that disrupts *our* market. We could be looking to change the insulation material to mineral wool, which would open up the marine markets to our products.

GC: In principle could the system be used for liquids or powders?

RC: I can guarantee you that there are lots of applications for this that we have no idea about. I would encourage those with new ideas to get in contact with us!

GC: Thank you for your time today Ryan.

RC: You are very welcome indeed!

