Welcome
From Katsuhiro Tetsuya, Director of Daikin Reefer Container Sales Division

Welcome to this special edition of the Daikin Reefer newsletter, which has been published to coincide with our visit to Asia Fruit Logistica in Hong Kong on 4-6 September. We are delighted to be attending an event that will give us a chance to strengthen our existing relationships, make new ones and exchange ideas with industry colleagues. The potential in Asia is huge and we are excited to show our commitment to growers and shippers of fresh produce in this region.

We have seen significant growth in shipments to Asia and expect that pattern to continue as wealth in this region increases and the demands of consumers evolve. Our Active CA technology can play a key part in driving this growth. For that reason, in this newsletter we have focused on the opportunities created by this technology, which reduces oxygen levels fast and controls air composition during transportation, allowing high and low respiration fruit to be transported by sea and arrive in fresh condition.

This technology is now tried, tested and ready to make a difference to growers and shippers across the world. We are delighted to be able to tell some of their stories in this newsletter. For example, Cox’s apples are being shipped from Tauranga, New Zealand to the European ports of Rotterdam and London with a transit time of around 55 days. Artichokes from Peru are being shipped from New Zealand to Rotterdam and London with a transit time of around 55 days. Artichokes from Peru now go by sea rather than air, resulting in savings throughout the value chain.

CMA CGM CLIMACTIVE

Daikin Active CA technology is tried, tested and trusted by shippers across the globe

Controlled Atmosphere (CA) technology has been used in reefer containers for many years. However, not all CA systems are the same. Daikin Active CA system is the only active – rather than passive – technology on the market. The difference is crucial. Unlike passive CA, which relies on produce respiration, Daikin Active CA delivers nitrogen rich gas to the reefer container with inbuilt equipment, reducing oxygen density rapidly.

This puts the fresh produce to “sleep” faster, leading to longer shelf-life at the destination and minimising the loss of water content.

Daikin Active CA is based on vacuum pressure swing adsorption (VPISA), an active atmosphere separation technology that can create the optimal controlled atmosphere very quickly. VPISA uses the mineral adsorbent zeolite to capture a large quantity of nitrogen from the air and transfer it into the reefer container, allowing oxygen levels to be quickly reduced, without the need for additional nitrogen gas injection.

The system has been extensively tested and applied to real world shipments of fresh produce. Daikin Reefer works hand-in-hand with shippers and exporters to ensure that each container load is correctly calibrated such that the produce reaches end consumers half way across the world in optimal condition.

Many of these shipments have been executed by the CMA CGM Group, a world leader in shipping and logistics. CMA CGM has the second largest global reefer fleet with 385,000 TEUs of reefer containers and 288,000 reefer plugs.

At the 2018 Asia Fruit Logistica, CMA CGM announced the launch of CLIMACTIVE, its advanced technology CA system which uses Daikin Active CA.

In the past year, the carrier has used CLIMACTIVE to ship Cox’s apples from Tauranga, New Zealand to the major European ports of Rotterdam and London with transit times of around 55 days.

Applies are low respiration fruits. They, and similar low respiration products, are generally considered difficult to transport under passive CA. However, by reducing the oxygen level without relying on cargo respiration, Active CA can be used regardless of voyage length to transport a much broader range of perishable cargoes.

The Cox’s apples from New Zealand arrived at their destination fresh and ready to be consumed.

In another CMA CGM shipment, avocados were transported from Colombia to the Middle East. Active CA has distinct advantages for use in South America, which has rapidly become a major source of fresh produce for global markets.

Blueberries are a fruit that can rapidly degrade. But with CLIMACTIVE/Active CA, a consignment was successfully shipped from Peru to Europe and arrived in good quality even after 35 days at sea. In this case, the technology was doubly important as the produce did not immediately go to market.

Another shipment of Peruvian blueberries, and some from Morocco, was also successfully shipped to the USA under CLIMACTIVE/Active CA and cold treatment. Other examples of CMA CGM successfully deploying its CLIMACTIVE reefer technology include shipments of cranberries from Mexico to Asia at sea for more than 40 days, Kent Mangos from Peru to Europe over 35 days, and Cantaloupe Melons from Costa Rica to the Middle East in 50 days.

And in perhaps the most exciting application, the combined technologies enabled the conversion of Peruvian artichokes from air cargo to sea for long distance transportation, resulting in massive savings in per kilo shipping costs.

“Through our fruitful collaboration with DAIKIN, CMA CGM is pleased to offer our innovative CLIMACTIVE solution. This allows us to go a step further in catering to the needs of our clients in the fresh fruits and vegetables sector,” said Mr. Eric Legros, CMA CGM Vice-president, Specialised Products and Value Added Services.

Goods are delivered using CLIMACTIVE
New commodities find distant markets with Daikin Active CA technology

Early three decades of growing global trade have lifted hundreds of millions of people into middle income status. With that growing wealth, people in all corners of the world now demand more diverse food, much of which entails transporting fresh produce thousands of kilometres from origin to destination.

Perishable foods continue to breathe, or respire, after harvest. They consume oxygen while releasing CO2, water content and ethylene, all of which accelerate their maturity and limit shelf life. So, controlled atmosphere (CA) technology was developed to reduce the oxygen content in containers to slow respiration.

However, CA has traditionally been ‘passive’, meaning the rate at which oxygen in the container is reduced can be quite slow, during which time the produce continues to respire and so keeps maturing before it can get to market.

To address this issue Daikin Reefer developed its Active CA technology, fast-working, simple and highly reliable technology that creates an optimal controlled atmosphere in about half the time of a passive unit.

The Daikin Active CA system is based on vacuum pressure swing adsorption (VPSA), an active atmosphere separation technology that is able to create the optimal controlled atmosphere very quickly. VPSA uses the mineral adsorbent zeolite to capture a large quantity of nitrogen from the air and transfer it into a reefer container, allowing oxygen levels to be quickly reduced by dilution, without the need for additional gas.

During transit, the Active CA continuously manages air composition using nitrogen purge control and cargo respiration to maintain the container’s carbon dioxide level.

Proven technology has been used throughout to ensure a high level of reliability. The design of the unit’s oxygen-conserving LiteTEC-5X component was adapted from Daikin Reefer’s oxygen concentrator, developed for use in the medical industry, which requires very high levels of reliability. The Active CA system has also been designed to be as compact as possible for ease and speed of installation on reefer containers.

After its initial launch, the breakthrough technology was rapidly endorsed and adopted by container shipping lines and produce shippers alike, because they saw in it the potential to expand trade horizons: transporting all manner of perishables from producers to consumers that had not hitherto traded together.

Not only does this prevent potential cargo damage, it allows the Active CA to be installed in older, used containers, whose air tightness may be slightly inferior.

Another important application for Active CA has been found with snow peas (sometimes called mangetout).

Europe imported around 30,000 tonnes of fresh peas in 2017, which were mainly sugar snaps and snow peas from developing countries, primarily Guatemala, Zimbabwe and Kenya. The market for this produce is competitive and much more focused on quality than common peas and beans, especially among retailers. Shippers have started using Daikin Active CA for snow pea shipments due to the technology’s performance in conserving humidity during transit. This ensures that the produce gets to market in a ‘fresh-picked’ state.

Other vegetables, like asparagus, have been shipped with Active CA from the USA and Mexico to Japan, and from Peru into North America, opening up opportunities to convert transportation from air to sea. Traditionally, such rapidly maturing produce has relied on air freight to get to market, but Daikin Active CA means that the produce can arrive fresh at destination despite a month or so at sea. Good results have also been reporting for shipping lettuce from the USA to Asia, where Active CA’s humidity conservation prevents brown stains appearing on the lettuce leaves. Also, a growing global taste for exotic fruits like pitahaya (dragon fruit) and guava can now be met through using Active CA.

Peruvian avocados have been shipped from Peru to India using Daikin Active CA

Take Peru and India. With a transit time of more than 50 days at sea, the two countries had seen little previous opportunity for commercial exchange in fresh produce. Now, using Active CA shippers have begun transporting Peruvian avocados to India, a country which is starting to rival China in creating a consumer middle class numbering in the hundreds of millions.

A further innovation used in Daikin Active CA relates to maintaining the pressure inside the reefer container. With other types of CA, the inside of the container is under negative pressure. This means that if the container is slightly old and lacks air tightness, oxygen from the outside atmosphere is bound to get inside the container.

This can easily result in cargo damage and limit the quality of container to which the CA device can be fitted. But with Active CA, the positive pressure inside does not let external air ingress in to the container.

Exotic fruits such as the pitahaya (dragon fruit) can now be shipped worldwide using Active CA
Grupo Arato

Peruvian superfood specialist Grupo Arato tests Daikin Active CA technology for containerised shipments of its fresh produce.

“The richness of our land and low variability of weather conditions allows us to maintain a constant supply of top-quality products,” says Grupo Arato. “We pride ourselves on strict control mechanisms and open communication channels to ensure customer satisfaction.”

Grupo Arato is part of Mission Produce, a global leader in the production and distribution of fruits.

The company is currently conducting on-site tests with two refrigerated containers fitted with Daikin Active CA technology to safeguard the quality of sensitive fresh produce in transit to overseas markets. Grupo Arato cultivates Hass avocados in Chao and Viru Valley districts of La Libertad province and also in Olmos district in the province of Lambayeque. Altogether Grupo Arato has over 3,000 hectares of crop land.

Peru’s superb agricultural climate produces some of the world’s most famous and fast-emerging superfoods and in recent years the country has become a significant exporter of in-demand products for health-conscious global consumers. With significant government backing, the Peruvian food industry has set ambitious export growth targets, not least to Asian markets where consumers are especially concerned with healthy natural products.

By continuously adjusting the mix of atmospheric gases inside the container – principally by reducing CO2 and CO2 and increasing nitrogen – Daikin Active CA technology slows down the ageing process for fresh produce during transit. This allows a wide range of sensitive and exotic fruits and vegetables to be transported in better condition for longer periods of time, extending shelf life and enabling producers to reach export markets in a cost and environmentally effective way by sea rather than air.

Daikin Active CA solution is based on technology developed for demanding medical applications plus vacuum pressure swing adsorption (VPSA), an active atmosphere separation technology that can quickly create the optimal controlled atmosphere. VPSA uses the mineral adsorbent zeolite to capture a large quantity of nitrogen from ‘everyday air’ and transfer it into the reefer container.

Daikin Active CA solution is based on technology to safeguard the quality of sensitive fresh produce in transit to overseas markets. Daikin Reefer is committed to helping perishables transport the fruit over long distances using its Active CA technology to open up new opportunities.

The fruit is particularly popular with consumers in China, which is responsible for over 90% of exports from Taiwan every year. Frustratingly, it has been difficult for growers and shippers to transport the fruit over long distances, because of the speed with which it can spoil in normal reefer containers and the need for refrigeration at the point of sale.

Daikin Reefer, in close collaboration with shippers in Taiwan, has taken part in a research project to see if its pioneering Active CA technology can solve this problem. Taiwan’s Ministry of Science and Technology has funded a research team at NTU to test long distance transport of custard apples using this technology. The custard apple, known by a number of different names such as the atemoya fruit, is a tree of the family Annonaceae. Atemoya is a hybrid between sugar apple and cherimoya: P. J. Wester of Florida produced the first hybrids in 1908. It has a pleasant taste similar to that of custard, hence the name. The fruit is also good for the health conscious, as it is low GI, naturally sweet, an excellent source of vitamins C and B6 and contains potassium.

As the pictures show, the fruit can vary in shape and colour ranges from green or jade to a dark green depending on variety, turning to yellow and eventually almost black. All have a skin with a bumpy exterior hiding white flesh.

The Active CA also creates a moisture rich environment that can spoil in normal reefer containers and the need for refrigeration at the point of sale. Daikin Reefer, in close collaboration with shippers in Taiwan, has taken part in a research project to test long distance transport of custard apples using this technology.

Active CA technology rapidly creates a nitrogen-rich environment within the cabin, putting the fruit in the best possible condition. It may be at hand, however, as Daikin Reefer has been working with National Taiwan University (NTU) and Taitung District Agricultural Research and Extension Station to test whether the fruit can be transported over long distances using its Active CA technology. This project builds on the company’s tradition of pushing the boundaries of refrigerated transport to open up new opportunities.

The Taiwan custard apple varies in shape, size and colour.
Taiwan custard apples
Active CA research bears fruit in Taiwan (continued)

The first round of trials has clearly shown the effectiveness of this market-leading technology. Custard apples stayed firm after five weeks, with samples taken after two, three and four to assess progress.

Daikin Reefer has provided full collaboration for these experiments by providing the technology, along with extensive onsite support and guidance. This is part of a culture at Daikin Reefer that welcomes the opportunity to work in partnership with institutions such as NTU in an open and collaborative manner. These projects also reinforce the science behind Active CA technology and, crucially, reveal how effective it can be in opening up new markets. Installing the technology is straightforward, as the kits can be retrofitted at a shipper’s desired location, reducing the cost and making it easier to deal with seasonal peaks in demand.

Thanks to this beneficial partnership, it should now be possible to ship Taiwanese custard apples to South East Asia, the Middle East, Europe, and Canada.

Avocados are a high-respiring cargo, which means that they need a carefully controlled atmosphere to ensure that, when shipped over long distances, they arrive in the right condition. The journey from South Africa to Europe is around 6,000 nautical miles, taking approximately 26 days. The successful collaboration between Daikin Active CA technology and leading container shipping company ONE’s expertise has delivered the answer for growers and shippers. ONE formed in July 2017 after the merger of three Japanese carriers and now operates more than 240 vessels with around 1.5 million TEU capacity. Last year the container shipping business bought 14,000 new reefer containers and launched its COOLvantage product at Asia Fruit Logistica, a demonstration of the company’s commitment to investing in this market and enhancing the global trade of perishable goods.

As a business Daikin Reefer remains completely committed to supporting shippers and shipping lines in accessing new markets, expanding trade opportunities, and delivering added value by protecting cargo and enabling efficiency improvements.

This collaboration is just the beginning. Daikin Reefer welcomes the opportunity to collaborate with other shippers in the region and across the world to see where the Active CA technology can take them.

Where growers of Taiwanese custard apples have led, others will follow. European consumers may soon be familiar with the magnificent variety of Asian fruit with the flavour, appearance and freshness that consumers in this region value. Fruits such as pomelo, jackfruit, wax apples, lychee, rambutan, durian, mangosteen, guava, longan, starfruit, dragon fruit and breadfruit could find new markets—and maybe even one day consumers there will be ready for the durian!

ONE COOLXtend CA+
Active CA helps shippers extend their services

“From toast topping to guacamole, desserts and smoothies, the versatile avocado is an increasingly popular health food. Demand is growing all over the world – China imported only two tons of avocados in 2010, but more than 32,100 tons in 2017. In the US the high price of the fruit led to a scandal this summer over restaurants serving “fake” guacamole.

Other shippers on this route had been using passive CA, which takes longer to create the right atmosphere and is less effective if used in a container that lacks air tightness.

To grow well the avocado needs a climate without frost and little wind, as well as well-aerated soils. The best conditions are found in a number of countries including Mexico, the US, Spain, Peru and South Africa, where the season runs from February / March to September.

Avocados grow, new routes will follow in Asia.

“Daikin Active CA technology is the right solution for us because it offers an innovative and efficient approach to cargo care, allowing shippers and shipping lines to enter growth markets like this one in an environmentally friendly way,” said Mr Bharadwaj. “We have enjoyed working using the market’s only Active CA solution in our COOLXtend CA+ service and look forward to exploring where this partnership can take growers and shippers next. This is only the beginning.”

ONE is also at Asia Fruit Logistica this year – you can visit them at Hall 5 Booth U02 to find out more about how they are using Daikin Active CA technology to deliver the best results for growers and shippers of fresh fruit and vegetables.
Daikin history

Daikin Reefer celebrates 50 years of market-leading reefer innovation

In September 2018 Daikin Reefer proudly celebrated its 50th anniversary. Central to the evolution of the refrigerated container market since its beginnings, Daikin Reefer was one of the first major reefer manufacturers in 1968 and we have maintained our position as a leading industry innovator ever since.

As a leading global supplier of container equipment, we have supplied over 250,000 units to more than 300 shipping lines and leasing companies across the world. Our customer base continues to grow year-on-year in both the operating and leasing market sectors. As global populations and average salaries grow and as free trade agreements enable products to be transported between more countries than ever before, our reefer technology ensures that consumers worldwide have access to quality, perishable produce that has travelled long distances. From fruit, vegetables, meat and fish, to wine, dairy products, flowers and even pharmaceuticals, Daikin Reefer’s commitment to cargo care over the past 50 years has continuously pushed the boundaries of refrigerated transportation to enable the carriage of new cargoes on diversified routes.

“Even after 50 years, Daikin Reefer remains at the forefront of the industry as the reefer segment continues to expand, helping both shippers and shipping lines to access new markets, expand trade opportunities, and deliver added value to their customers.”

Mr Shin Furuta, President, Daikin Reefer

One example of Daikin Reefer’s commitment to quality, reliability and innovation is our proprietary Daikin Active CA (controlled atmosphere) technology. The only active - rather than passive - system on the market, Daikin Reefer’s latest Active CA technology enables food and other sensitive, perishable produce to be transported in optimal condition for longer periods of time, extending shelf life and opening up more market opportunities for shippers and shipping lines.

In addition to high respiring cargo, with Active CA it is now also possible to transport products with low respiration rates that are generally considered difficult to transport under passive CA. By reducing the oxygen level without relying on cargo respiration, Active CA can be used regardless of voyage length to effectively transport the broadest spectrum of perishable cargo: leafy vegetables, blueberries, cherries, lychees and organic grapes with a low respiration rate for example, together with produce such as avocados, bananas and cut flowers that have a higher respiration rate.

Unlike passive CA, which relies on produce respiration, Daikin’s Active CA delivers nitrogen rich gas to the reefer container with inbuilt equipment, reducing oxygen density rapidly. This puts the fresh produce to “sleep” in a matter of a day or so, leading to longer shelf-life at the destination. During transportation, produce loses its water content from respiring. Active CA’s puts the produce to sleep quickly, minimising loss of water content and preserving its freshness for longer. Critically for produce such as avocados, bananas and cut flowers with Active CA this can be done in less than half the time when compared to passive systems which means the produce can be transported for longer periods of time and over greater distances, creating new revenue streams for shippers.

With advances in technology, shipping is now capable of transporting cargoes that previously had to be carried by expensive air freight. Daikin’s Active CA is providing shipping lines with the capability and versatility needed to better compete for new cargoes, such as cut flowers, asparagus, custard apples and strawberries. And shippers are benefiting from the cost reduction achieved by sea rather than air transportation.

As Mr. Shin Furuta, President, Daikin Reefer concludes: “Known worldwide for the reliable carriage of frozen and chilled cargoes, Daikin Reefer remains wholly committed to supporting shipping lines and shippers in protecting cargoes, safeguarding quality, and achieving efficiency over the next 50 years and beyond.”
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