



Carnival Corporation Launches Website Featuring Advanced Air Quality Systems

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New microsite features information, videos, animations, photos and graphics to showcase innovative systems that enable its cruise ships to meet global standards for clean air and water

MIAMI, July 17, 2019 /PRNewswire/ -- [Carnival Corporation & plc](#) (NYSE/LSE: CCL; NYSE: CUK), the world's largest leisure travel company, today announced the launch of a new dedicated [Advanced Air Quality Systems website](#) that features relevant background information, videos, animations, photos and graphics to highlight the environmental benefits of using the innovative technology commonly referred to as exhaust gas cleaning systems or "scrubbers."

As a key element of Carnival Corporation's commitment to sustainable operations, Advanced Air Quality Systems enable overall cleaner air emissions from ships both at port and at sea. These systems are proven to be a safe and effective solution for compliance with International Maritime Organization (IMO) 2020 regulations for sulfur, while also meeting international air and water quality standards.

The new website features key facts, figures and performance results that detail how Advanced Air Quality Systems work in the small confines of a cruise ship, using sea water to remove virtually all the sulfur from engine exhaust, preventing it from entering the atmosphere, improving air emissions and supporting sustainable operations in the global shipping industry.

Advanced Air Quality Systems have been used for decades on land as a proven and effective way to significantly reduce sulfur oxide (SO_x) and particulate matter produced by an engine's operation. As part of its commitment to developing innovative solutions that support sustainable operations, Carnival Corporation began pioneering this technology breakthrough in 2006, enabling Advanced Air Quality Systems to operate efficiently and effectively in the small confines of a cruise ship.

"Our Advanced Air Quality Systems are an important part of our strategy to improve air quality in port and at sea, a strategy that also includes the use of liquefied natural gas (LNG), shore power and marine gasoil (MGO)," said Mike Kaczmarek, senior vice president for marine technology for Carnival Corporation. "Due to the success we have had improving air quality with these systems, we decided to launch a dedicated website to help educate the public on the environmental benefits of Advanced Air Quality Systems and their effectiveness as a solution for meeting and exceeding the upcoming IMO regulations, while we continue to expand the technology throughout our fleet."

As of July 2019, the company has installed over 220 Advanced Air Quality Systems on 77 of the more than 100 ships in its fleet, with a goal of installing nearly 400 scrubber systems over time in its multi-engine ships. By 2020, the company expects 85 percent of its global fleet to be fitted with Advanced Air Quality Systems at an investment of over \$500 million.

The website features a number of third-party scientific studies that further validate that Advanced Air Quality Systems improve air quality and exceed major air and water quality standards with no adverse impact on the environment. A [new study](#) that includes third-party analysis by DNV GL, a leading classification society and recognized advisor for the maritime industry, shows that Advanced Air Quality Systems are a safe and effective means for compliance with the IMO's 2020 requirements on the global shipping fleet, which include regulations for cleaner air emissions and strict wash-water quality standards.

The study concluded that the wash-water samples from the Advanced Air Quality Systems were below the limits set by several major national and international water quality and land-based water discharge standards, which provides further proof of the quality and safety of the wash water, even when compared to criteria like the World Health Organization's (WHO) drinking water guidelines. In fact, when measured against IMO standards, the average wash-water test results in this study were over 90% lower than IMO limits. In the majority of samples, the materials were completely undetectable in the laboratory testing process.

Other benefits of the technology are highlighted on the new site, including that extensive testing has confirmed that Advanced Air Quality Systems in many ways outperform low-sulfur MGO in providing cleaner overall air emissions from ships. The systems remove almost all of the sulfur from engine exhaust and about 75% of all particulate matter (PM), and they are especially effective in removing small particulates. Additionally, studies show that exhaust from these systems has proportionally less PAH (polycyclic aromatic hydrocarbons) and lower nitrous oxide (NO_x) when compared to MGO emissions.

Coupled with other complementary technologies that also have ecological advantages, including launching the world's first-ever cruise ships powered in port or at sea by LNG, and promoting the use of shore power, Advanced Air Quality Systems will help Carnival Corporation meet its own aggressive 2020 sustainability goals and international, national and local regulations for the over 700 ports the corporation's ships visit each year.

About Carnival Corporation & plc

Carnival Corporation & plc is the world's largest leisure travel company and among the most profitable and financially strong in the cruise and vacation industries, with a portfolio of nine of the world's leading cruise lines. With operations in North America, Australia, Europe and Asia, its portfolio features Carnival Cruise Line, Princess Cruises, Holland America Line, Seabourn, P&O Cruises (Australia), Costa Cruises, AIDA Cruises, P&O Cruises (UK) and Cunard.

Together, the corporation's cruise lines operate 103 ships with 243,000 lower berths visiting over 700 ports around the world, with 19 new ships scheduled to be delivered through 2025. Carnival Corporation & plc also operates Holland America Princess Alaska Tours, the leading tour company in Alaska and the Canadian Yukon. Traded on both the New York and London Stock Exchanges, Carnival Corporation & plc is the only group in the

world to be included in both the S&P 500 and the FTSE 100 indices.

With a long history of innovation and providing guests with extraordinary vacation experiences, Carnival Corporation has received thousands of industry awards – including recognition by the Consumer Technology Association™ as a CES® 2019 Innovation Awards Honoree for OceanMedallion™. A revolutionary wearable device that contains a proprietary blend of communication technologies, OceanMedallion enables the world's first interactive guest experience platform transforming vacation travel on a large scale into a highly personalized level of customized service. The prestigious CES Innovation Awards honor outstanding design and engineering in consumer technology products.

Additional information can be found on www.carnival.com, www.princess.com, www.hollandamerica.com, www.seabourn.com, www.pocruises.com.au, www.costacruise.com, www.aida.de, www.pocruises.com, and www.cunard.com.

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