

How to

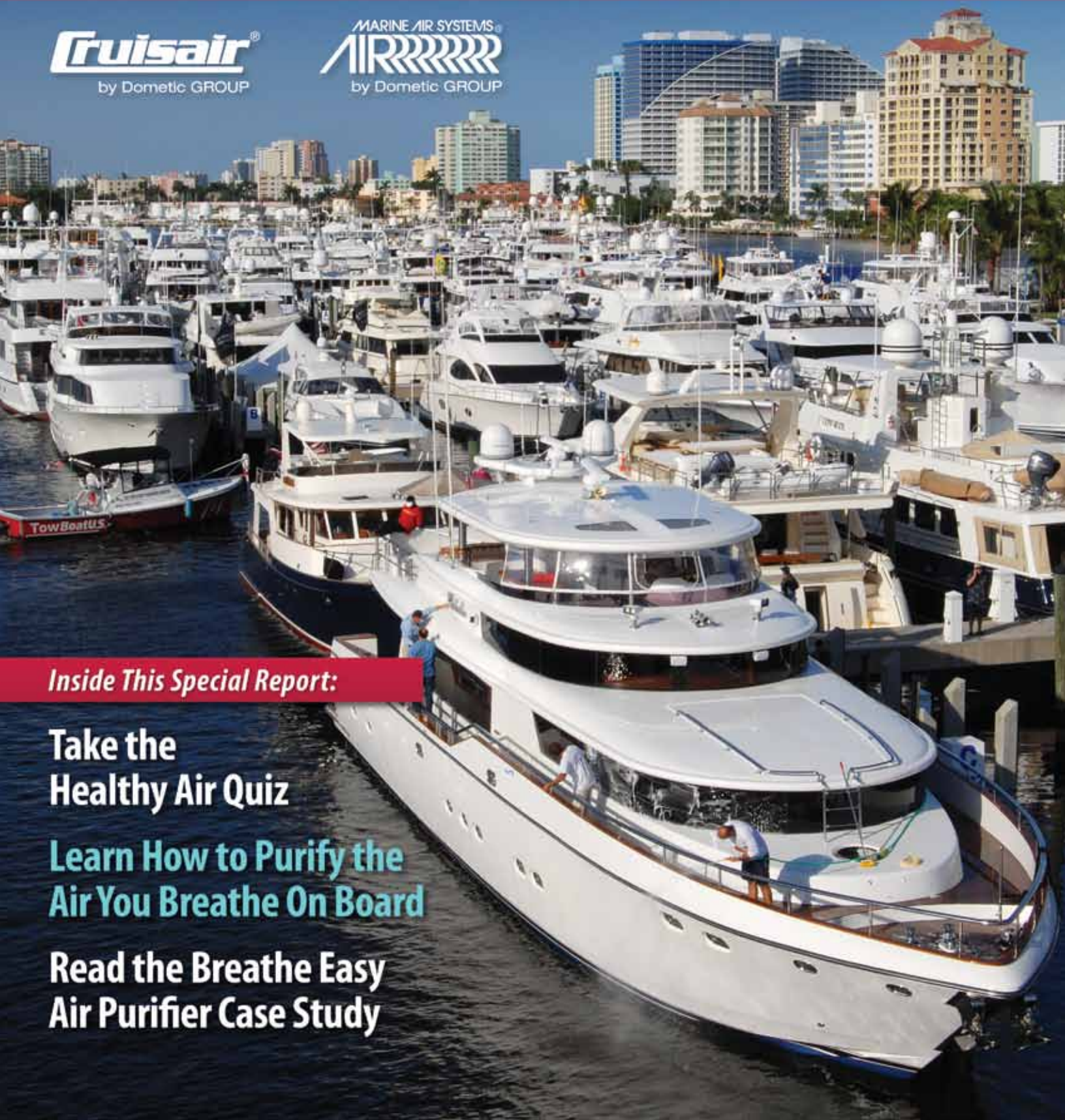
Eliminate Boat Odors

L-2807 Rev. 20120309

A FREE Special Report by Dometic Group, Marine Division

Cruisair[®]
by Dometic GROUP

MARINE AIR SYSTEMS[®]
AIR
by Dometic GROUP



Inside This Special Report:

**Take the
Healthy Air Quiz**

**Learn How to Purify the
Air You Breathe On Board**

**Read the Breathe Easy
Air Purifier Case Study**

**WATCH THE BREATHE EASY™
AIR PURIFIER VIDEOS AT:**



www.dometic.com/behealthy



Poor quality air inside your boat can aggravate allergy and asthma symptoms



Unpleasant cooking odors can linger for hours in your boat's confined spaces



Tobacco odors can make the air you breathe seem heavy and stale

LIVE HEALTHY, BREATHE EASY ON BOARD

Now you can reduce biological contaminants and stop odors on your yacht with the Breathe Easy™ In-Duct Air Purifier!

- Eliminate unpleasant pet, tobacco, cooking and other odors.
- Reduce mold spores, bacteria, viruses and fumes.
- Enhance air quality.
- Cleaner air may lessen allergy and asthma symptoms.
- Special UV light produces no harmful ozone.

As air circulates through the unit, non-ozone producing ultra-violet light reduces biological contaminants like mold spores, bacteria and viruses that pass through the system.

UV light energy activates the titanium-dioxide catalyst on the surface of the nano-mesh structure. The molecules of pollutants and odors that come in contact with the catalytic nano-mesh structure are reconfigured into non-toxic elements.

Recirculating air makes multiple passes through the purifier, continuously improving air quality. Significantly cleaner, healthier air exits the system with up to 99.9% reduction in bacteria and fungi, and up to 98% reduction in volatile organic compounds.

HOW SAFE IS THE AIR YOU BREATHE?

Nothing affects your health like the quality of the air you breathe. Healthy food and clean water are important, but you breathe air every minute. It travels to every cell in your body. Make sure your boat's indoor air is healthy air.

"Inhalation is the primary exposure route of concern related to mold."

— US Center for Disease Control

WHAT ARE YOU DOING TO PROTECT YOUR HEALTH?

Indoor air can easily be five times more polluted than outdoor air.

Unpleasant odors are an obvious sign of poor air quality, but many contaminants are odorless and more frequently evidenced through physical reactions like coughing, sneezing, sore throat, and watery eyes.

- Volatile organic compounds (VOCs) emanate from some carpets, fabrics, furnishings, and other commonly used products.
- Mold spores are often produced in damp environments.
- Pollen can be carried indoors on the air or on hair and clothing.
- Viruses and bacteria get trapped indoors and also contaminate the air.

TAKE THIS QUICK HEALTHY-AIR QUIZ

QUESTION	YES	NO
Is anyone smoking indoors?		
Is the humidity regularly above 50 percent?		
Can you see or smell mold or mildew?*		
Are there leaks or standing water anywhere?		
Are household chemicals stored onboard?		
Have you recently painted or added new furniture or carpeting?		
Have you used pesticides recently?		
Do outdoor fumes enter the cabins?		
Do you frequently use scented air fresheners to mask odors?		
Do health issues improve when you leave the boat and return when you come back onboard?		

If you answered "yes" to any of these questions, you may have poor air quality. Take healthy action now!

"Molds produce a variety of volatile organic compounds which are responsible for the musty odors associated with fungal growth."

— US Center for Disease Control

HELP REDUCE ALLERGY AND ASTHMA SYMPTOMS

Seventy-five percent of people live with someone who has allergies, asthma, or some other respiratory disease. Common particles such as dust, pollen, and pet dander aggravate these conditions and easily enter the confines of a boat.

Pollen is the most pervasive allergen. Just opening an exterior door can allow millions of these particles inside. Even pets that are bathed frequently can collect and carry pollen, dust, mold, and other allergens on their fur.

Reducing allergens from your air may reduce symptoms of allergies and asthma.

* The Breathe Easy Air Purifier does not eliminate the source of ongoing mold and mildew problems.

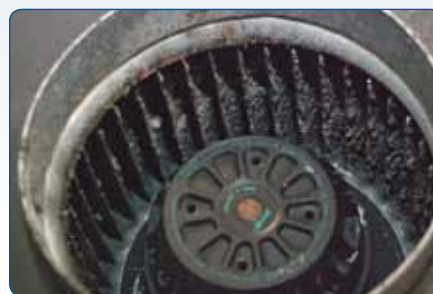
DID YOU KNOW?

Many short- and long-term health problems can be traced to poor air quality.

For more information on air quality and potential health concerns, visit these US Environmental Protection Agency web pages:

www.epa.gov/iaq/voc.html

www.epa.gov/iaq/biologic.html



Mold thriving on a blower's fan blades in a yacht's air conditioning system



Mold growing on insulation in a yacht



Mold spreading inside a yacht's wall panel

HOW THE IN-DUCT BREATHE EASY™ AIR PURIFIER WORKS

Please refer to the corresponding illustration below.

- 1 Biological contaminants like VOCs, mold spores, bacteria, and viruses pass through the air conditioning duct and into the air purifier system.
- 2 UV light energy activates the titanium-dioxide catalyst on the surface of the nano-mesh structure. The molecules of pollutants and odors that come in contact with the catalytic nano-mesh structure are reconfigured into harmless, non-toxic elements. Vortex action maximizes air contact with the catalytic surface.
- 3 Significantly cleaner, healthier air exits the photocatalytic air purifier.



HOW TO HELP PURIFY YOUR BOAT'S AIR

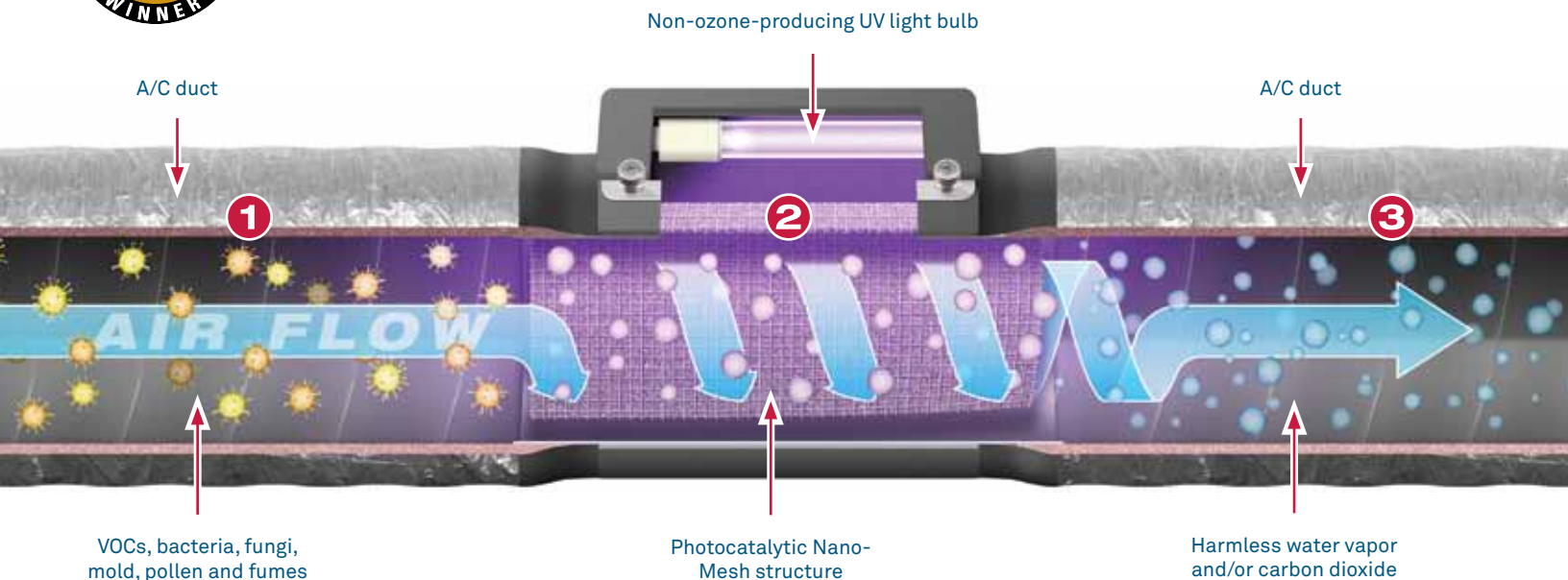
Dometic's Breathe Easy UV Air Purifier installed in the ducting helps purify the air going into the cabins as it leaves the blower. Air quality continuously improves with each pass through the purifier.

The Breathe Easy Air Purifier reduces pollen, mold spores, viruses, bacteria, VOCs, and unpleasant odors from the air such as tobacco smoke, pet and cooking odors. It operates silently within the ductwork of your air conditioning system to make your onboard air fresher, cleaner, and healthier with each pass through the system. Using innovative photocatalytic nano-mesh technology with ultraviolet (UV) light, the Breathe Easy continuously improves air quality by reducing biological contaminants and VOCs.

UV light reduces biological contaminants like mold spores, bacteria, and viruses that pass through the air purifier system. UV light energy also activates the titanium-dioxide catalyst on the surface of the nano-mesh structure. The molecules of pollutants and odors that come in contact with it are reconfigured into non-toxic elements. The photocatalytic nano-mesh structure is safe and powerful, and the UV bulb uses a specific frequency of light that produces no harmful ozone.

The Breathe Easy Air Purifier's three-dimensional photocatalytic nano-mesh structure provides maximum surface area for maximum elimination of airborne contaminants that contact it. The nano-mesh structure is constructed of metalized foam. This minutely intricate construction provides 2200% more surface area for holding the molecular catalytic coating than is possible with a simple screen structure. This unique design also provides scant air resistance, so there is no noticeable decrease in air flow.

In addition, through the science of nanotechnology, the titanium-dioxide catalyst is restructured at the molecular level to have an increased number of contact surfaces. This formation puts 70% larger molecules on the contact surface and dramatically improves reactivity with contaminants.



SCIENTIFIC TESTING PROVES EFFECTIVENESS

The effectiveness of the Breathe Easy Air Purifier In-Duct Tube was proven by independent analysis conducted by Environmental Diagnostics Laboratory.

In their test, the Breathe Easy In-Duct Tube was installed in the re-circulating ventilation duct of a specially constructed test chamber that was inoculated with chemical and microbiological contaminants. Temperature, pressure, and relative humidity remained constant throughout the experiment.

INOCULATION PROCEDURE

Before inoculation, baseline samples were taken for contaminants such as bio-aerosols, aerosols, total particle counts, surface mold, and VOCs. Next, the test chamber was inoculated with chemical and microbiological contaminants.

CHEMICAL CONTAMINANTS

Individual beakers containing 50 ml each of the following volatile chemicals were placed on a table in the test chamber to disperse into the air through evaporation:

- DIFCO BBL™ 212527 – Acetone/Isopropanol (1:3)
- Formby's Tung Oil Finish – Varnish (Aliphatic Hydrocarbons)
- Aramflex 520 Adhesive – Synthetic resin with hydrocarbons and ketone solvents
- Lamp Light Ultra Pure Lamp Oil™ - Tetradecane, Pentadecane, and Hexadecane
- Diesel Fuel – Mixture of Hydrocarbons
- Nail Polish – Ethyl and Butyl Acetate, Nitrocellulose, Xylene

MICROBIOLOGICAL CONTAMINANTS

Suspensions of the following microbiological contaminants were prepared in a 1:1 ratio with distilled water then mixed in an aerosolization container for release into the test chamber:

Bacteria

- *Alcaligenes faecalis*
- *Pseudomonas aeruginosa*
- *Staphylococcus aureus*

Fungi

- *Aspergillus niger*
- *Penicillium citrinum*
- *Pithomyces chartarum*

(Viability of the microbiological contaminants was verified by growing cultures on respective microbiological media.)

“Fungi can cause a variety of infectious and noninfectious conditions.”
 — US Center for Disease Control

BREATHE EASY™ AIR PURIFIER TESTIMONIALS

“The crew had consistent problems with sore throats and coughs. So we’ve gone to Dometic. We discovered the air went from being almost heavy and saturated to being a lot lighter. It was easier to breathe...cleaner. It’s fantastic.”

— James Rose-Innes, First Mate, Cheoy Lee 95', Fort Lauderdale, FL

“After cleaning up a diesel fuel leak from the generator, we still had a persistent petroleum odor. I installed the portable Breathe Easy Air Purifier in the galley. A week later all odors were completely eliminated.”

— John H. Thommen, Owner Tiara 33', Guilford, CT



Exterior of the Breathe Easy Air Purifier test chamber at Environmental Diagnostics Laboratory



In-Duct Breathe Easy Air Purifier tube installed in the test chamber's ventilation system



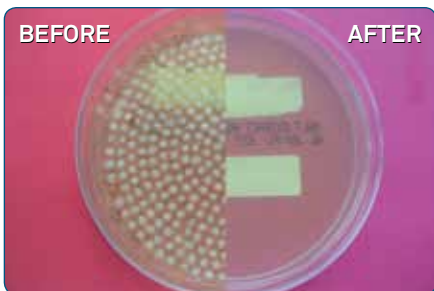
Monitoring of the test chamber during testing



Inspection of the Breathe Easy Air Purifier test chamber



Sources of VOCs inside the test chamber



Bacterial colonies in a petri dish from test chamber air samples taken before (left) and after testing of the In-Duct Breathe Easy Air Purifier

PRE-TEST ANALYSIS

After aerosolization of the microbiological contaminants into the test chamber, and in conjunction with the previous and ongoing dispersion of volatile organic chemicals, post-inoculation environmental samples were collected for bio-aerosols, aerosols, surface mold, total particle counts, and VOCs. Their levels were recorded.

TESTING

The Breathe Easy Air Purifier In-Duct Tube was turned on and the re-circulating ventilation system was activated.

Environmental conditions inside the chamber were continuously monitored for total particle counts, VOCs, relative humidity, temperature, and pressure. In addition, gravitational settling plates for the bacteria and fungi bio-aerosols were also monitored.

POST-TEST ANALYSIS

After completion of the test, the Breathe Easy Air Purifier In-Duct Tube and the re-circulating ventilation system were switched off. Environmental samples were collected for bio-aerosols, aerosols, surface mold, total particle counts, and VOCs. Their levels were recorded and the results were analyzed.

TEST RESULTS

“Our findings show that in accordance with the manufacturer’s claim, the equipment/technique is effective in reducing the indoor air pollutants, both biological as well as chemical.”

— Environmental Diagnostics Laboratory, Clearwater, FL

The air-purification test results for more than 20 contaminants are shown below.

Reduces Microbiological Contaminants Up to 99.9%			
Bacteria	✓	Pollen Grains	✓
Fungi	✓	Fungal Elements	✓
Opaque Particles	✓	Surface Mold	✓
Skin Cell Fragments	✓	Others	✓

Reduces Chemical Contaminants Up to 98%			
Acetone	✓	Hexane	✓
Benzene	✓	Isopropyl alcohol	✓
Cyclohexane	✓	O-Xylene	✓
Ethylacetate	✓	Toluene	✓
Ethylbenzen	✓	Total Particles	✓
Heptane	✓	Total VOCs	✓

IT'S CLEAR

If you want cleaner, healthier air inside your boat, install a Breathe Easy™ Air Purifier.

BREATHE EASY CASE STUDY

TOURNAMENT FISHING BOAT CLEARS THE AIR WITH IN-DUCT BREATHE EASY TUBES

Plagued By Unhealthy Air



The *Big Oh*

Champion sport fishing vessel the *Big Oh* and its crew spend many days at sea competing in some of the world's biggest tournaments. During tournament season, when boat owner Gray Ingram lives aboard his boat, he noticed that cooking and other odors lingered in the saloon, and that his sinuses became congested when sleeping on-board.

Due to the damp and confined nature of on-board living spaces, stuffy, smelly and unhealthy air is common on boats of all sizes. The build-up of fumes, odors, mold, and volatile organic compounds (VOCs) create problems for many boaters. Poor ventilation leads to dampness that causes unpleasant smells and contributes to health issues such as eye and respiratory-tract irritation.

Cooking on-board, especially meals featuring fish, added another dimension of pungent, lingering odors to the indoor environment of the *Big Oh*.

Salvation Through In-Duct Air Purification



Breathe Easy In-Duct Air Purifier installed in the ductwork of the *Big Oh*

To remove the contaminants that caused odors and unhealthy air, Ingram installed two of Dometic's Innovation Award-winning In-Duct Breathe Easy tubes to purify the air. The first Breathe Easy was installed in the boat's saloon to eliminate cooking odors, and to eliminate the contaminants causing his breathing problems, a second was installed in the master stateroom.

Designed to work silently within the ducting of a yacht's air conditioning system, the Breathe Easy tubes use ultraviolet light and photocatalytic nano-mesh technology to remove up to 99.9% of the biological and chemical contaminants — including the odors of tobacco smoke, mildew, mustiness, chemical vapors, and toilets. The result is fresher, cleaner and healthier air for everyone on board.

With each re-circulating pass through the air conditioning system equipped with Breathe Easy tubes, the contaminated air aboard the *Big Oh* became cleaner, healthier, and odor free.

The Sweet Smell of Victory Over Bad Air

"We cook a lot on-board, and the Breathe Easy gets rid of the smells real fast," said Ingram.

"I live on-board when we travel and always had problems with congestion and sinus drainage, but have not had a problem since we installed the Breathe Easy," he said.

Ingram added, "I'm very pleased with the product and will definitely have Breathe Easy units on-board any new boats I get in the future."

BREATHE EASY™ IN-DUCT AIR PURIFIER TESTIMONIALS



"I live onboard when we travel and always had problems with congestion and sinus drainage, but have not had a problem with that since we put the Breathe Easy on the boat. I'm very pleased with the product."

"We do a lot of cooking onboard and the Breathe Easy gets rid of the cooking smells real fast."

— *Gray Ingram, Sportfishing Tournament Champion*



"The crew had consistent problems with sore throats and coughs. So we've gone to Dometic. We discovered the air...went from being almost heavy and saturated to being a lot lighter. It was easier to breathe... cleaner. It's fantastic."

— *James Rose-Innes, First Mate 95 ft. Motor Yacht*



The In-Duct Breathe Easy™ Air Purifier

It's New Technology, It Improves Air Quality, and It's Available Now!



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