

3. If HV has not been restored, call CosaTron for help or replacement of HV section.



**At this point, assume HF is good, AC power to system is good, and HV is operating, but levels are low.**

1. While monitoring your Test Kit adjust the HV output control located on top of the HV module.
2. If HV levels cannot be adjusted to desired levels, go to Test A and perform steps 1 - 5.
3. If HV has not been restored call CosaTron for help or replacement of HV section.



**At this point, assume HV is good, AC power to system is good, and HF is 0 (zero).**

1. Check HF circuits fuse for continuity.
2. Locate the HF output control on the generator PCB and adjust it clockwise to increase the HF level.
3. Go to Test A and perform steps 1 - 5.
4. If HF has not been restored, call CosaTron for help or replacement of the HF section.



**At this point, assume HV is good, AC power to system is good, and HF is operating, but at low levels.**

1. Locate HF output controls on the generator PCB and adjust it clockwise to increase the HF level.
2. Go to Test A and perform steps 1 – 5.
3. If HF has not been restored call CosaTron for help or replacement of HF section.

## CosaTron

6304 Benjamin Rd, Suite 502

Tampa, FL 33634

813.886.1717 t

[info@cosatron.com](mailto:info@cosatron.com)



# CosaTron Systems Troubleshooting Guide

Your starting point in this guide depends on your CosaTron system(s) failure level, this guide applies to all CosaTron models. This guide is intended for systems that were operating correctly and have developed a fault.

With the CosaTron system power turned off, attach Model 7300, 7600 or 7700 Test Kit, or acceptable device to the appropriate braid or screen electrodes and determine:

- A. If no HV and HF start at TEST A
- B. If low HV and HF start at TEST AA
- C. If no HV and HF is Ok, start at TEST B
- D. If low HV and HF is Ok, start at TEST BB
- E. If no HF and HV is OK, start at TEST C
- F. If low HF and HV is OK, start at TEST CC

At this point remove Power Generator Cover and temporarily disable the cover safety switch by using electrical tape to hold the cover safety switch in the depressed position. Turn the CosaTron Power Generator on/off switch to the "ON" position.



**Is AC power present on the generator PCB?**

If Yes:

1. Check HV and HF electrodes in the plenum for isolation from their surroundings. Only CosaTron accessories should be installed, such as the bleed resistor.
2. Check to see if any accessories are causing the failure of the system. Disconnect these accessories.
3. Check HV and HF cables for leakage, continuity and mechanical connection integrity, from the generator to the electrodes.
4. Check ground continuity from the Power Generator to the electrode frame in the plenum.
5. Check for PVC track and insulator contamination at the electrode assemblies.
6. If you have been instructed to complete TEST A steps 1 - 5 as part of another level of instruction, you should now return to that section and continue.

If not, continue with step 7, below:

7. Check generator enclosure AC circuit breaker and circuit fuses for continuity.
8. Check to see if all AC power interlocks are engaged.
9. Check the plenum door switch(s) wiring for integrity.
10. Check for proper plenum door switch mechanical activation.
11. Check for interruption of AC power from customer-supplied controls (ON/OFF switches, AIR PRESSURE switches, AIR VELOCITY switches, etc).
12. If normal operation of your system has not been restored contact CosaTron.



**Assume AC power is present on the PCB. If HV and HF levels are low:**

1. Check to see if the incoming AC power is low. If so, proceed when AC power is restored to normal.

*Note: If system is equipped with a bleed resistor on the HV electrode, disconnect it from the electrode before testing for HV output.*

2. While monitoring your Test Kit with the system on, adjust the appropriate output control for either, HV or HF circuits until acceptable levels are reached as shown below:

HF ranges 500-800VAC/rms.	650VAC/rms.	Normal	Mesh Screen
HV ranges 22-28 KVDC	25 KVDC	Normal	Mesh Screen
HV ranges 22-28 KVDC	24 KVDC	Normal	Braid Screen

3. If HV and/or HF levels can't be adjusted up, go to Section A, perform steps 1 - 5, then return to this point.
4. Call CosaTron if levels can not be restored.



**At this level, assume HF is good, AC power to system is good, and HV level is O (zero).**

1. Go to Test A and perform steps 1 - 5.
2. Check HV fusing circuit, if any (older models)



### The Market Leader in Purifying

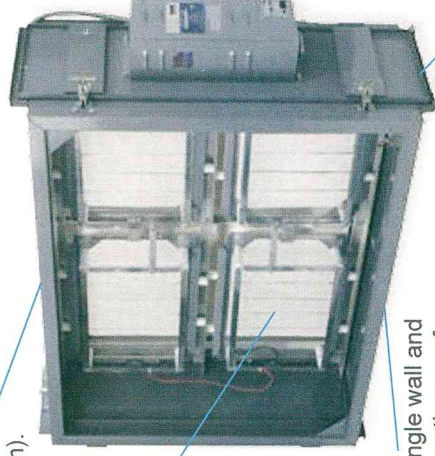
### Indoor Air Quality for Over 50 years

For over 50 years CosaTron® has been dramatically improving the quality of indoor air. Our patented technology reduces submicron particulate matter from your building by increasing the effectiveness of your filters. Laboratory examination and independent air quality analysis has unequivocally proven that CosaTron tackles all airborne quality issues with unparalleled effectiveness. From pollen and industrial corrosive environments, to smoke and viruses, only CosaTron will cost effectively demonstrate significant air quality improvement and reduce your energy costs. With over 30,000 systems installed worldwide, CosaTron is the recognized market leader in indoor air quality improvement for any application.

Construction is of galvanized steel (18 gauge minimum).

All plenums 72" (183 cm) and wider have two access doors and two plenum safety door switches.

The Power Generator(s) are not weather-proof or waterproof. They must be inside the building or inside a host plenum.



The plenums are single wall and are not insulated, weatherproof or waterproof. They must be inside the building or inside a host plenum.

Left hand hinged access door is standard.

### CUSTOM SYSTEMS

Custom Systems are designed and manufactured to meet your specific air purification requirements. Our entry-level 1000 series includes custom framing, electrode assembly(ies), bleed resistor(s) and power generator(s). The model 1100 is shipped in its component parts for easy installation and assembly in to your existing plenum. Our most popular air cleaning solution will improve your indoor air quality and reduce energy consumption by reducing the amount of outside air you use in your air handler. Your cleaning and maintenance costs are also likely to see a cost reduction.

### MANY CUSTOM PLENUM SYSTEMS ARE AVAILABLE

Each solution is tailored to provide the ideal answer for new or existing installation in:

- Airports
- Animal Facilities
- Archives
- Auditoriums/Arenas
- Bowling Alleys
- Casinos/Gaming Facilities
- Churches
- Conference/Convention Centers
- Data/Communication Centers
- Dining/Restaurants
- Firing Ranges
- Hospitals/Medical Facilities
- Industrial Control Rooms
- Libraries
- Money Counting Operations
- Museums
- Theme parks

### Series 3000 Models

- 1200** Electrode Plenum Assembly with door mounted generator.
- 1350** Combination Electrode/Face Loading Filter Plenum with door mounted generator. CosaTron (side access) with a face loading filter section (up to 32" deep) with room for pre-filters and final filters.
- 1250** Electrode Plenum Sleeve Assembly. Designed for installation in new or existing air handling plenums. No Side Access. Generator shipped loose.
- 1400** Side loading Bag Filter Plenum. Available in a variety of sizes to accommodate any filter arrangement.
- 1300** Combination Electrode/Side Loading Filter Plenum with door mounted generator (shown at left). CosaTron in a plenum (up to 32" deep.) with a pre-filter and a final filter rack
- 1450** Side loading Bag Filter Plenum. Available in a variety of sizes to accommodate any filter arrangement.
- 1315** Combination Electrode/Side Loading Filter Plenum with door mounted generator. CosaTron in a plenum (up to 32" deep) with a pre-filter and final filter rack. Designed for outside air applications. (please refer to our Application Guide for employing 20-25% less outside air).



## 650 POWER GENERATOR

The Model CU-650 solid state Power Generator provides the high-voltage (HV) direct current (DC) and high-frequency (HF) alternating current (AC) to the electrode assembly in the air-handling plenum.

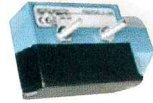
One generator is designed to provide sufficient HV and HF output to handle air through a plenum with a cross-sectional area of B ft<sup>2</sup> (0.7m<sup>2</sup>) to 96 ft<sup>2</sup> (8.9m<sup>2</sup>). When this cross-section area exceeds 96 ft<sup>2</sup> (8.9m<sup>2</sup>), a second power generator will be required.

When electrode sets are installed in separate plenums, one generator will be required for each electrode assembly in each plenum. The power generator is normally mounted on the outside of the plenum wall and must be within 9' (2.75m) wire length of the electrode assemblies. The generators

can also be mounted inside the plenum on rooftop units to protect them from the elements. (The power generator enclosure is not weatherproof or waterproof).

The CU-650 Power Generator is equipped with an input power "ON/OFF" switch. This interrupts the input power when access is required to the plenum section housing the electrodes. The generator is pre-wired at the factory for the input line voltage required. A label on the input power compartment indicates the preset input voltage. A High Voltage bleed resistor kit is included.

Indicator lamps on the face of the cabinet are provided that indicate the "ON/Off" condition of the HV and HF power output. A circuit breaker in the incoming power circuit is also provided.



## SAFETY DOOR SWITCH

The safety door switch is an essential part of all Cosatron products and is designed for safe operation of the system.

One safety door switch assembly is located inside each plenum access door or filter rack door and is wired into the line voltage circuit using No. 14 or larger wire to interrupt input power to the power generator when any access door is opened. Any plenum access or filter rack door within the immediate vicinity of the electrodes must be similarly equipped. When Cosatron

supplies packaged plenum type units, they will be equipped with safety door switch(es) and activating mechanism as standard. Optional switches are available for Cosatron units being mounted within existing plenums.

In normal installations, the safety door switch assembly is mounted inside, to the top of the plenum as shown. When this is impractical, an optional mounting bracket is provided to allow mounting the assembly to the side of the plenum. In such an installation, the special "plunger" must also be installed on the corresponding side of the access door.

## OPTIONAL ACCESSORIES

- Remote Indicator Lamp Unit
- Remote Coupler Unit
- Electrode Sensor Unit
- Safety Door Switch Assembly
- Bleed Resistor
- Magnehelic Differential Pressure Gage
- Differential Pressure Switch

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Address:



www.cosatron.com

(813) 886-1717

info@cosatron.com

6304 Benjamin Rd, Suite 502

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Advanced Technology for Indoor Air Quality

STANDARD PLENUM SYSTEMS

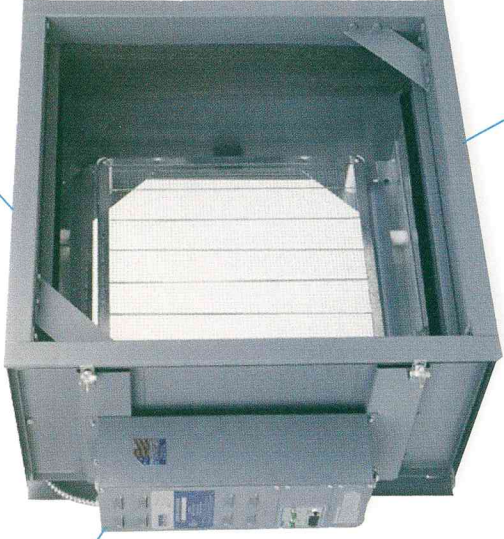
# Series 2000

## KEY HIGHLIGHTS

- Eliminate odors, dust, gases, bacteria, pollen, smoke and a host of other contaminants from treated air spaces
- Help meet code requirements for acceptable indoor air quality.
- Save energy by reducing outside air
- Save on cleaning and day-to-day maintenance

The Power Generator(s) are not weather-proof or waterproof. They must be inside the building or inside a host plenum.

Construction is of galvanized steel (18 gauge minimum).



The plenums are single wall and are not insulated, weatherproof or waterproof. They must be inside the building or inside a host plenum.

## STANDARD PLENUM SYSTEMS

Standard plenum systems are modular package versions of the CosaTron® patented Series 1000 system. These self-contained, packaged versions of the custom series 1000 units are designed to adapt to standard air-handling units up to 40 tons, either as retrofits or during initial construction. The Series 2000 systems provide the ideal answer for installations such as: Clean Rooms, Social Halls, Casino High-Roller Rooms, Conference and Meeting Rooms, Lounges and Cafeterias, Medical Labs, Offices and Waiting Rooms, Residences and more.

## HOW THE SERIES 2000 WORKS

Like all CosaTron products, the CosaTron Series 2000 is a contaminant control system that provides cleaned re-circulated air where needed. Series 2000 systems control the build-up of offensive odors, dust, gases, pollen, bacteria, smoke other contaminants generated by activity in an area or infiltration from other areas.

Submicron contaminants, such as odor and dust— too small to be captured by the normal filters in an air-handling system — make up about 98% of indoor contaminants. These contaminants remain in the area, clinging to ceilings,

walls, clothing, office equipment, desks, draperies, carpets, sensitive electronic equipment and people. CosaTron increases the natural coagulation of particulate matter. Larger particles are then picked up in and returned in the air current or drop to the floor where they are picked up as part of routine cleaning operations. CosaTron is not a collector; instead the unique solid state technology increases the efficiency of your filters. Unlike other systems, CosaTron does not ionize the air and turn your building's occupants into walking air filters. The CosaTron does not use ozone injection, a practice scorned by the EPA.

## SERIES 2000 MODELS

### 2100

The Model 2100 is a low profile version (either 16" or 20" high and up to 60" wide) for installation above most lay-in ceilings. It installs easily with your air-handling unit, fan terminal unit, heat pump, small cabinet fan, fan coil unit, or in the ductwork. The CosaTron Model 2100 is delivered complete with HV and HF indicator lamps, circuit breaker and ON/OFF switch.

### 2200

The Model 2200 is available in standard plenum sizes of 24", 36", or 48" high through 96" wide. It installs easily with your air handling unit, cabinet fan or in the ductwork. The CosaTron Model 2200 is delivered complete with HV and HF indicator lamps, circuit breaker and ON/OFF switch. The Model 2200 is designed to seamlessly integrate with Model 1400 and 1450 Filter Plenums, or with filter plenum sections manufactured by filter companies.



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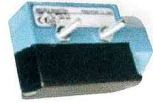
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can also be mounted inside the plenum on rooftop units to protect them from the elements. (The power generator enclosure is not weatherproof or waterproof).

The CU-650 Power Generator is equipped with an input power "ON/OFF" switch. This interrupts the input power when access is required to the plenum section housing the electrodes. The generator is pre-wired at the factory for the input line voltage required. A label on the input power compartment indicates the preset input voltage. A High Voltage bleed resistor kit is included.

Indicator lamps on the face of the cabinet are provided that indicate the "ON/Off" condition of the HV and HF power output. A circuit breaker in the incoming power circuit is also provided.



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The safety door switch is an essential part of all CosaTron products and is designed for safe operation of the system.

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## OPTIONAL ACCESSORIES

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Advanced Technology for Indoor Air Quality

# Model CU-650 Power Generator



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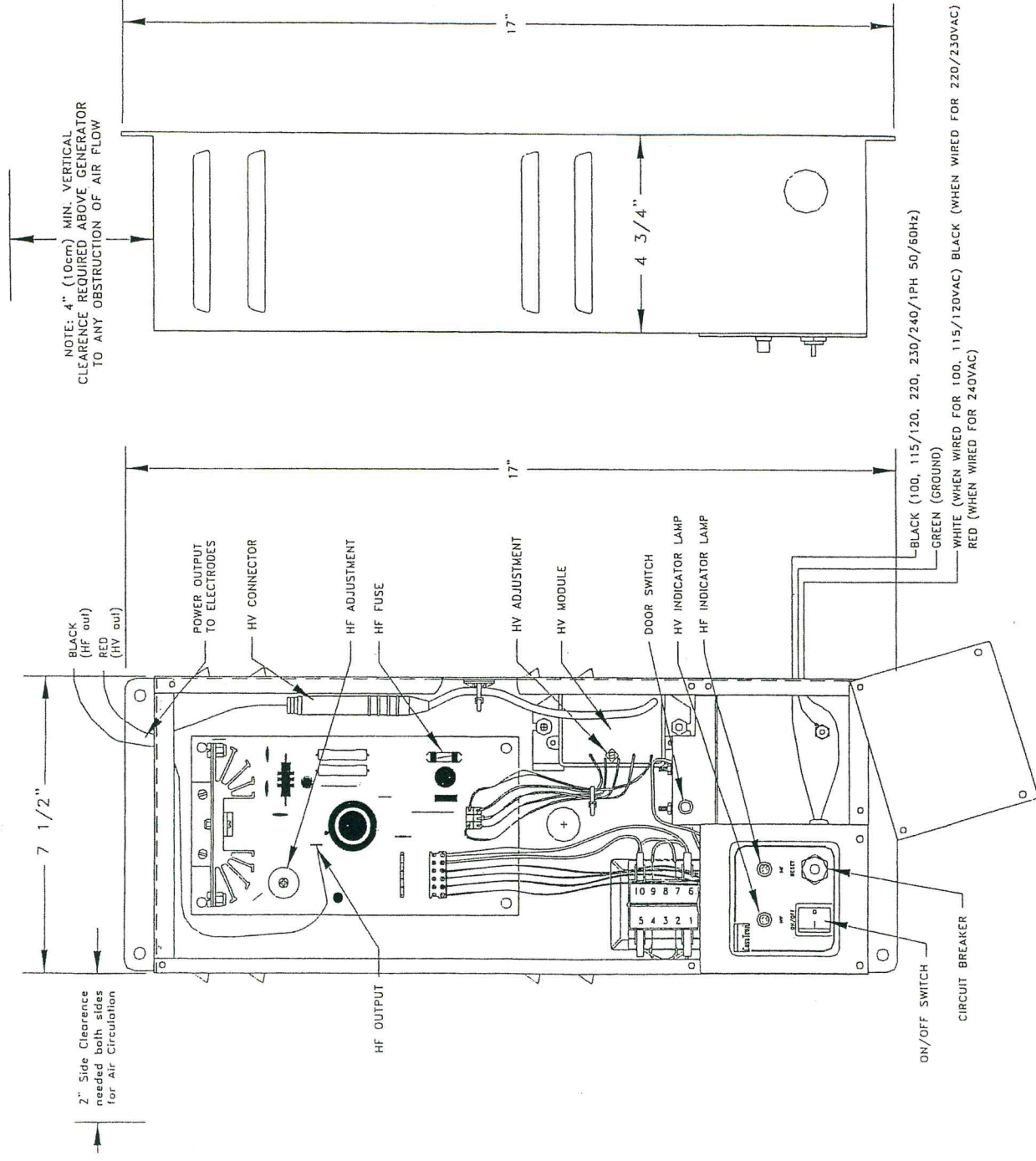
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Indicator lamps on the face of the cabinet are provided to indicate the "ON/Off" condition of the HV and HF power output. A circuit breaker in the incoming power circuit is also provided.

# Specifications-Model CU 650



Note: Power Generator must be located within 9' (2.75m) wire length of the electrode assembly.

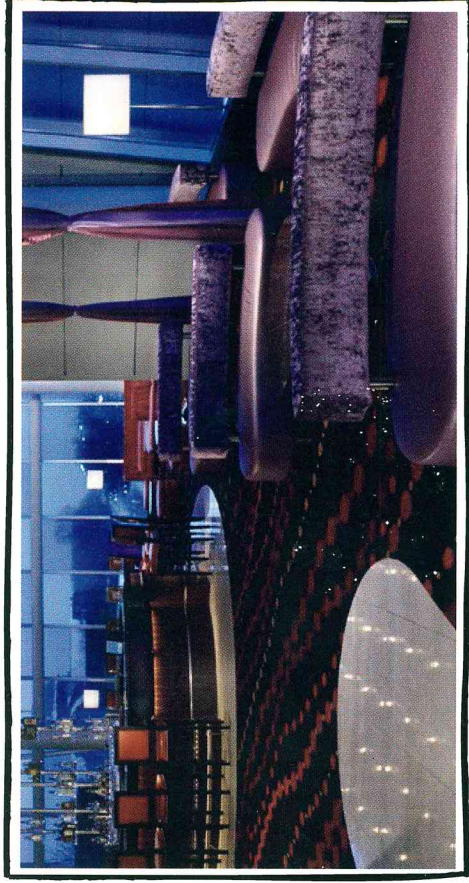
Nominal HV Output:	25,000 VDC (22,000 to 29,000 VDC) ± 10% (10 micro-amps)	Maximum Plenum Cross Section Area:	96 ft <sup>2</sup> (8.9 m <sup>2</sup> ) electrode face area
Nominal HF Output:	600 (500 to 800 VAC, 3S0 micro-amps)	Maximum Electrode Face Velocity:	625 FPM (190 MPM)
Input Voltage:	Factory wired for 100, 115/120, 220, 230 & 240VAC single phase 50/60HZ	Cabinet Dimensions:	4 3/4" X 7 1/2" X 17" (12.1 cm X 19cm X 43.2cm)
Input Power:	Max. 50 watts, 2amp 3wire circuit.	Shipping Weight:	14 lbs. (6.4 Kg) (approx.)

CAUTION: The CU-650 Power Generator housing is not weatherproof or waterproof. On air-handler units exposed to the weather, the Power Generator should be mounted in a weatherproof or waterproof enclosure. Note: Mounting the generator in the airstream of the air-handling unit, upstream of the coils is acceptable.

CAUTION: DO NOT mount the generator in an air-steam at saturation.



# CosaTron® Purifies the Air Inside your Casino and Lowers your Energy Costs



## KEY HIGHLIGHTS

### Application

Hotel and casino facilities

### The Challenge

Create the right first impression on customers with the quality of your indoor air

### The Solution

A system that removes particulate matter from the air circulating in the facility, seamlessly integrates into your existing air handling system and allows you to reduce your HVAC energy costs

### Benefits Sidebar

- Improved air quality generates increased patronage
- Customers and employees don't pick up facility smells
- Purified air allows for reduced outside draw, reducing OPEX
- Easy integration into existing ventilation reduces CAPEX

### Make Air Quality a Competitive Advantage

In the casino business, success is typically measured by the square footage of floor space. Every gaming table, slot machine, restaurant, hotel room and show venue must maximize revenue and contribute to keeping customers on site. But cubic feet of air space can have just as much impact on the bottom line. In fact, for good or bad, the quality of your air may be the very first thing people notice when they enter. When customers feel comfortable on your property because they sense fresher air, they stay longer, they play longer, and they tell their friends.

### The Casino Air Quality Challenge

Few indoor environments have as many pollutant sources as casinos. Tobacco smoke being the most noticeable is also one of the most difficult to reduce or eliminate. But there are also kitchen odors, dust mites, formaldehyde from building materials, bio-aerosols from moisture sources, chemicals from cleaning products, germs and more.

Combine this pollutant-rich environment with modern building techniques that strive to save energy by keeping outside air out – also keep inside air in. Without an effective way to remove pollutants, air systems just move them around.

And while it's generally accepted that low humidity provides a preferable environment, it also enhances people's sense of smell making them more sensitive to pollutants.

Creating non-smoking areas in casinos does almost nothing to improve the micro-particle pollutants found throughout the facility. In a joint study of the impact of second-hand smoke in casinos, Stanford and Tufts University researchers observed, "Those patrons who seek refuge in nonsmoking areas attached to the smoking casinos—such as restaurants, where children are found—find scant protection. Unless these areas are completely sealed off from the casino, with closed doors and a separate ventilation system, the researchers found that secondhand smoke seeps in, resulting in pollution levels seven times as high as outdoors."

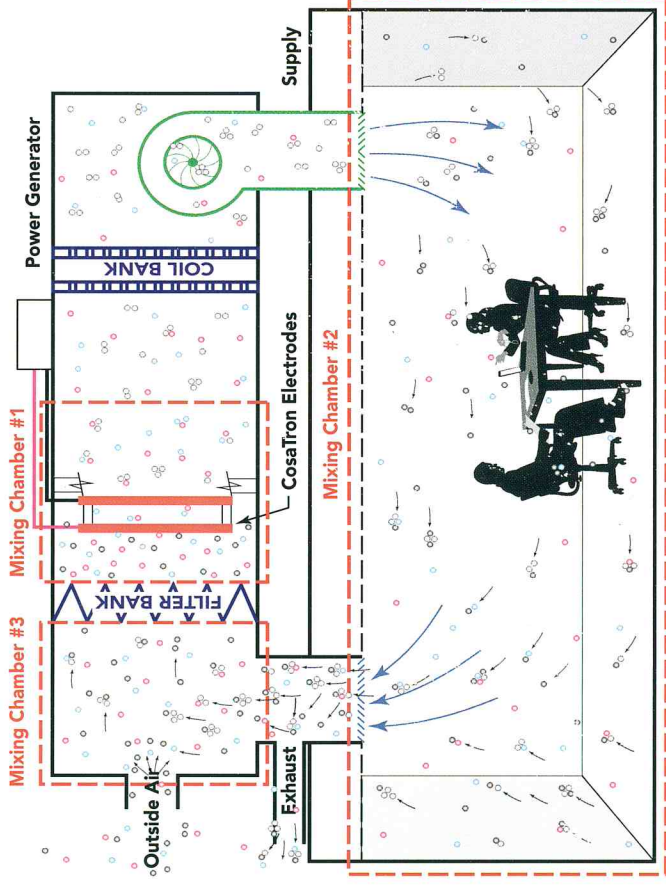
### The Optimum Solution

Casinos are in the hospitality business—not the hospital business. They're supposed to be fun, friendly, inviting and open environments that welcome guests. It's not possible or desirable to create a gambling "clean room" where every airborne molecule is scrutinized and controlled. While a complete ban on smoking on a property would certainly improve air quality,



# “CosaTron Gives Us a Competitive Advantage.”

Greektown Hotel & Casino



The CosaTron process of air purification integrates seamlessly into your existing HVAC system

establishments that try this approach haven't seen the positive impact on the bottom line. The best approach would be to satisfy all the guests if possible. By effectively removing pollutants from the air at a rate that keeps ahead of the sources, air quality can be even better than outside. Purifying the air rather than replacing it allows tight buildings to work better, save energy, and reduce heating and cooling costs. And of course, air purification should integrate into existing ventilation systems in both old buildings and new ones without high costs or retrofits.

## CosaTron—Fundamentally Different

The CosaTron air purification system is perfectly suited to solve the air quality issues plaguing casinos. Approximately 98% of air contamination consists of sub-micron-sized particles that are too small for filters and too small to be circulated by ventilation systems. The

natural process is for these particles to combine with one another and become large enough to be moved by ventilation and eventually fall or be filtered out of the air. Unfortunately, nature can't keep pace with an environment like a casino floor. This is where CosaTron comes in. CosaTron greatly accelerates the natural process of coagulation through the use of high-frequency and high-voltage electrical fields. Particles exposed to CosaTron become high-performance air sweepers, collecting other particles as they pass through the room. The air in the building is left cleaner—in many cases, cleaner than the air outside.

## Customer and Employee Comfort

Because of CosaTron's natural approach of accelerated coagulation, your customers and employees not only breathe cleaner air, but their clothing stays cleaner too. Unlike other electrical field approaches that ionize

## CUSTOMER SUCCESS STORY



Greektown Casino in Detroit, Michigan underwent a significant upgrade in 2009, adding a 400-room hotel tower and expanding their casino gaming floor space. During the process of evaluating potential air purification systems, Jerry Van Couwenberghe, assistant engineering manager at Greektown visited other local smoking-permitted casinos using the CosaTron system. “I spent a couple of hours at the card table,” explained Jerry. “The first thing I noticed when I left was that I didn't smell of smoke. I knew then there must be something special about the CosaTron approach to air purification.”

Once the installation of the CosaTron system was complete, Greektown was able to draw only 20% outside air, an improvement in air quality that would have normally required close to 50% to achieve similar results. When measured by an independent testing company, the air quality within the casino demonstrated outstanding results.

particles such that they adhere to surfaces and clients, CosaTron relies on filtration and mass to remove pollutants from the space. Improving the work environment for employees can reduce fatigue and improve customer relations. When customers are more comfortable, they can become more loyal patrons, returning again and again, and becoming positive recommenders

## Cleaner Air & Lower Costs

When you can rely on the purity of your air, you don't need to pump in as much outside air and this means that you don't need to heat or cool as much outside air. When it was built, the Bellagio was the most expensive casino ever constructed and they included a ventilation system that relied on 100% outside air—at an enormous cost. With CosaTron, air can be purified without introducing large volumes of outside air, reducing outside air drawn by 50% or more.



www.cosatron.com

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info@cosatron.com

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Advanced Technology for Indoor Air Quality

Case Study: Suncruiser Pontoon & Deckboats

## Factory Workers Breathe Easier Thanks to CosaTron



### Application: Industrial & Manufacturing

#### Key Highlights

**Problem:** Industrial compounds, adhesive, and excessive ozone

**Solution:** CosaTron Series 1000 Units

**Results:** Entire 90,000 Sq. ft. facility cleared of smoke and haze in less than two hours

A reduction in the cost of filters

Suncruiser: Pontoon and Deck boats, Lebanon Missouri, a division of Lowes boats, manufactures Adventure. Adventure in the form of pontoons and deck boats. Quality in what they manufacture, and how they do it, comes first with Suncruiser Pontoons. Their boats are all first class. They offer a variety of color schemes, lengths, layouts, and accessories. Accessories you would not expect on a pontoon boat - propane barbecue grill, wet bar, pull out cooler, mounted trash receptacle, and a privacy enclosure for changing clothes. You can even add a toilet or shower to this enclosure. Definitely first class – and then some. Lowe Boats became the first full-line aluminum boat company to receive the International Organization of Standardization (ISO) 9001:2000 Certification for its approach to process improvement, product quality and customer satisfaction.

Kevin Hamby, Vice President, of Manufacturing and Engineering at Suncruiser, had a concern about the possibility of excessive ozone generation from all the welding activities at Suncruisers. Suncruisers had been in operation for approximately one year before they contacted Doug Hamilton, Air Quality, Inc., South Bend, to discuss their concerns. Suncruisers' 150 employees manufacture 250 pontoons per month. They were experiencing a problem with eye burning and irritation, not only on the floor, but on the mezzanine level where the leather coverings for the seats and panels are fabricated. Doug Hamilton visited their facility and made





a recommendation to install a CosaTron Series 1000 system which installs within new or existing air handling units. The electrodes are sized to fit the return air plenum between the filters and the heating and/or cooling coils. The power generator is located nearby, on the outside of the return air plenum.

CosaTron is a unique system of Indoor air quality control. The benefit of CosaTron In this type of installation is that CosaTron does not ionize the air and does not produce ozone. In fact, CosaTron controls the ozone produced in the space - in this case, from the heavy welding activity. During welding, both gases (including ozone, oxides of nitrogen, phosgene, carbon monoxide and carbon dioxide) and particulates can be generated.

Suncruisers has 15 MIG and TIG welders plus two automatic welders. One seam welder is twenty feet long. Suncruisers facility has 18' ceilings, 40,000 cfm and ten air changes per hour with high supply and low return. There is a twelve foot high plastic curtain which is used to cordon off the welding area from the main heating system. As part of their energy savings and payback program, they recycle the air rather than exhaust it.

CosaTron's patented process uses solid state electronic components to control the electrical forces of odorous gases, aerosols and other fine particles suspended

in the conditioned air, causing them to adhere to one another. These CosaTron treated particles enter the conditioned space and sweep up the particles produced in the manufacturing area. They then adsorb and absorb the various gases in the room and continue to grow even larger. These larger particles have sufficient cross sectional area to be seen by the air currents and can now be carried by the air currents to the returns. The airstream then passes through the filters. The larger particles, and those absorbed and adsorbed gases, are trapped in the filters. Suncruisers had the CosaTron system designed based on handling the welding area of their facility only. However, according to Kevin Hamby, on the very first day that the CosaTron system was turned on, the entire plant (90,000 sq. ft.) was cleared of the heavy haze and smoke in less than two hours.

The air actually became so clean that, for further operational savings, they reduced the efficiency of their final filters from 85% to 65%. These final filters are changed two to three times a year. The polyester pre-filters are blown out every two weeks and changed monthly. Over 30,000 CosaTron units have been installed in a variety of applications around the world over the past 50 years - wherever there is a concern for the air where you live, work, play and breathe, CosaTron has the solution.



## Taking The Odor Out Of Medical Examinations



### Application: Odor Control

### Key Highlights

**Problem:** Control odors from cadavers

**Solution:** CosaTron Series 1000

**Results:** An odor-free and healthier medical examiners facility

A new Medical Examiner's Facility was built in Fort Myers, Florida in 1987, that was designed to handle three rapidly growing counties - Lee, Glades and Hendry. It has since grown from two autopsy areas to one of the finest Medical Examiner's facilities in the State of Florida.

The initial facility design called for installation of a filtration enhancement device called CosaTron to help control the obnoxious odors normally associated with a Medical Examiner's facility.

CosaTron was specifically requested by Dr. Wallace M. Graves, Jr., the then District Medical Examiner, for this new facility. Dr. Graves was familiar with the effectiveness of the CosaTron system through his association with Dr. Joseph Davis at the Dade County Medical Examiner's facility. However, because of County budgetary constraints, CosaTron was eliminated from the specifications for all but the "special" autopsy area.

Because of their location near the Gulf of Mexico, the Lee County Medical Examiner's facility has to perform a lot of special autopsies. This was the area of greatest concern. This special autopsy area was located near the back of the building and was designed for the numerous "floaters" and "decomps" handled every year. The accompanying odor can be extremely pungent. If not properly contained and controlled, these odors can permeate walls, clothing, hair, skin, etc.

The CosaTron excitation process reduces and controls invisible contamination which is found in 98% of filtered air. It is these contaminants - smaller than one micron in size - that cause odor perception and can also



result in bacteria and fungus growth. As anticipated by Dr. Graves, CosaTron proved very effective at controlling odors during these special autopsies. However, the problem of gurney's being moved into the facility, down the hallways, in and out of refrigeration, and in and out of the special autopsy room presented a problem in areas not utilizing CosaTron treated air.

In 1990 the Lee County Medical Examiner's facility was expanded to keep up with the growth of the counties it serves. The additions included a lab, walk-in refrigerated storage areas, conference and meeting rooms, plus office space for the doctors, technicians and administrative staff. Along with the growth came additional concerns.

One important concern was indoor air quality and its affect on employee comfort and well being. One staff member vacated her office in the rear of the building and moved to the front office whenever a special autopsy was performed. Additionally, other staff members complained to Dr. Graves about the poor indoor air quality in the building. Some employees experienced upper respiratory ailments which would be relieved when they were no longer in the building.

Dr. Graves had an additional concern about the potential problems associated with handling bodies which may have been exposed to AIDS, Hepatitis or other viruses. Because of these concerns, Dr. Graves contacted the State about his employee's welfare and the possibility of sick building syndrome. He was able to convince the State to authorize installation of CosaTron in the remainder of the Lee County facility.

CosaTron is not a filter. It does not ionize the air or create ozone. CosaTron is an air filtration enhancement device scientifically tested and proven capable of controlling the odors and other contaminants typically found in hospitals, medical examiner's facilities and funeral homes. Problems specific to this type of environment include deposition and residual odors. The patented CosaTron process uses solid state electronic components to control

the behavior of odorous gases, aerosols and fine particles suspended in the conditioned space. CosaTron causes these particles to collide and stick together to form larger particles through a natural process called coagulation. Once large enough, the particles are easily carried back to the returns where they are either exhausted or captured by the filters and removed. Independent tests published in scientific journals indicate that CosaTron accelerates the natural process of collision and coagulation thereby enhancing the effectiveness of the filters.

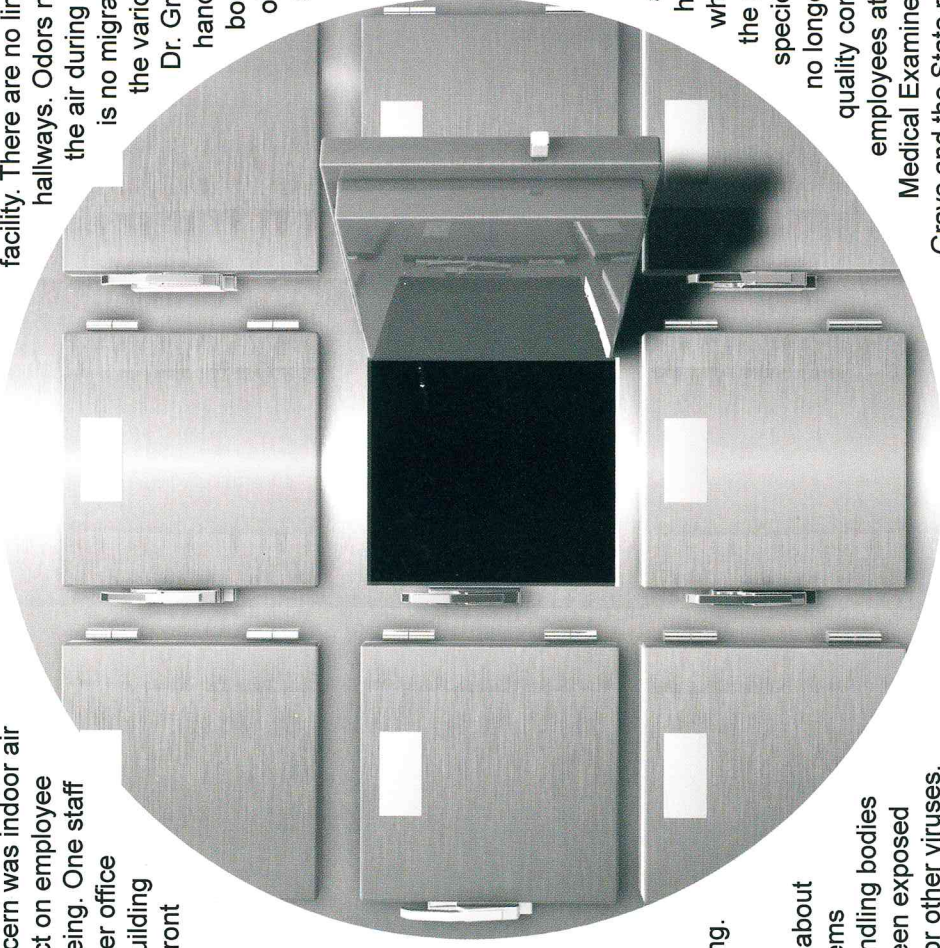
Since the installation of CosaTron, there has been a definite improvement in the indoor air quality of the facility. There are no lingering odors in the hallways. Odors no longer hang in the air during autopsies. There is no migration of odor from the various storage areas. Dr. Grave and his staff handled close to 600 bodies in 1993 - 385 of which required full scale autopsies.

An important part of their job is their involvement with organ procurement agencies who recover organs and issues for transplantation. In addition, they also routinely handle bones which are found in the area to determine species. There are no longer indoor air quality complaints from the employees at the Lee County Medical Examiner's facility. Dr.

Grave and the State responded to their concerns and needs by providing a facility in which obnoxious odors are controlled and removed not covered up and masked.

Dr. Graves feels that CosaTron was a valuable addition to the Lee County Medical Examiner's facility. He would highly recommend that CosaTron be considered when building a new medical examiner's facility or remodeling an existing one.

CosaTron has been used in installations around the world to provide a cleaner, healthier environment wherever people are concerned about indoor air quality - which is wherever people live, work, play and breathe.







Advanced Technology for Indoor Air Quality

Case Study: Delta Airlines

## Delta Airlines Checks In CosaTron at DFW



### Application: Odor Control

### Key Highlights

**Problem:** Odor control in the terminal at DFW

**Solution:** 12 CosaTron Series 1000 units

**Results:** Elimination of odor throughout the terminal

An annual energy savings in excess of \$170,000

Controlling the offensive odor generated around airport terminals can be a major problem. This is particularly true of odor associated with support facilities such as restaurants, snack bars, security screening (where people must now remove their shoes), waiting lounges, etc. Delta Air Lines has solved this disturbing problem in several of their terminal and operations facilities, specifically in the giant Dallas/Fort Worth (DFW) complex. Delta's solution to this problem was the installation of CosaTron series 1000 units, a unique solid-state air purification system that operates in conjunction with high-efficiency filters to save energy, control offensive odors, and reduce over-all cleaning and maintenance costs.

DFW, the sprawling airport complex situated on 17,207 acres some 17 miles from downtown Dallas/Fort Worth, is the culmination of a dream dating back to 1927. Originally opened in 1974, today, DFW is the fourth largest airport in the world in terms of operations and eighth largest in terms of passengers.

The massive Delta terminal at DFW at its peak handled over 300 flights per day until Delta closed it as a hub in 2007. As in all of the terminal facilities at DFW, Delta utilizes twelve separate air-handling systems to control their interior environment. Their individual capacities range from 38,000 cfm to 48,000 cfm depending upon the area served. Each air-handling system at DFW utilizes 100HP fan motors, roll pre-filters and 80% NBS efficient in-line sock filters. The main supply air system is distributed to individual spaces through





induction-type damper boxes in the ceilings, thus providing zone control throughout the terminal facility. Chilled water is supplied from a remotely located central chiller plant. Each system averages 7 – 7½ air changes/hour.

In the Delta terminal, each of the 12 air-handling systems is equipped with CosaTron, consisting of two CosaTron Power Generators and a 120" x 120z" electrode assembly located inside the air plenum. Easy access is provided for cleaning and maintenance via the air handler's access door. An auto cut-off switch deactivates the CosaTron when the access door is open. The total power consumption per generator is approximately 50 Watts, operating from 110 Volt, single phase, 60-cycle current.

The CosaTron system at Delta's DFW facility replaced an activated charcoal system that was installed as original equipment when the terminal complex was first constructed. After only 12 months of operation, DFW was notified by the manufacturer of the carbon system that reactivation was necessary. This prompted Delta's maintenance and engineering personnel to evaluate the CosaTron systems that had been operational in their Atlanta training and operations centers since 1973.

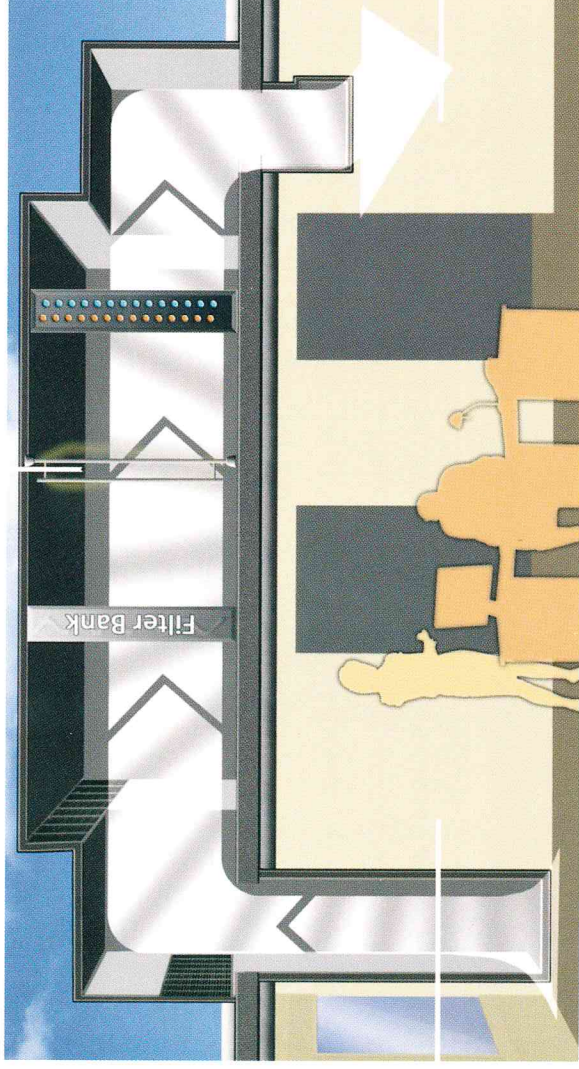
In an effort to evaluate the effectiveness of the CosaTron system at DFW, Delta engineers established a test procedure that could easily be monitored by their maintenance and engineering personnel. Selected ceiling tiles in the passenger and restaurant areas, installed during initial construction, were replaced with new, clean tiles. For a fair evaluation, the coils and fans in each air-handling

system were thoroughly cleaned prior to commencing the test. After the 12-month evaluation period was complete, officials of Delta and CosaTron, inspected the DFW terminal, reviewed operating reports and talked with Delta's on-site maintenance personnel. As a result of this careful evaluation, Delta accepted the CosaTron system without further qualification. A Delta executive wrote a letter detailing, in part, "...odor control has been outstanding; our mechanical equipment has remained clean and deposition of fine particles on the building surfaces is greatly reduced." Today, more than twenty years after the initial installation, the selected test tiles still stand out from those that were part of the original installation.

Other significant benefits were realized too, according to Delta's maintenance personnel at the DFW facility. It was reported that the use of chilled water was reduced from 1,150 gallons per minute to 350. A savings of \$10,000 during the first full month of operation was reported, plus an additional \$3,000 reduction in energy use. Delta reports a savings in excess of \$170,000 in the first full 12 months of CosaTron operation, not including the savings generated by the reduction in staining, soiling and other damaging effects of fine particle deposition.

CosaTron is helping many airport facilities achieve a new standard in clean air technology. Controlling offensive odors and dust are only some of the benefits. Others include significant energy savings by reducing the need to heat or cool outside make-up air by as much as 95%, a reduction in germs and viruses, reducing day-to-day cleaning and maintenance costs ... and more.





## #1 IN AIR PURITY

### The Benefits of CosaTron Protected Buildings

- Control odors, dust, germs and other indoor contaminants.
- Reduce energy costs for HVAC.
- Lower capital costs for HVAC equipment.
- Lower cleaning and maintenance costs.
- Comply or exceed indoor air quality standards.

### The Market Leader in Purifying Indoor Air Quality for Over 50 years

For over 50 years CosaTron<sup>®</sup> has been dramatically improving the quality of indoor air. Our patented technology accelerates the natural coagulation of airborne particulate matter in increase the effectiveness of your filters. Independent laboratory examination and air quality analysis has unequivocally proven that CosaTron tackles all airborne quality issues with unparalleled effectiveness. From all manner of odors and industrial corrosive environments, to pollen, smoke and viruses, only CosaTron will cost effectively demonstrate significant air quality improvement and reduce your energy costs. With over 30,000 systems installed worldwide, CosaTron is the recognized market leader in indoor air quality improvement for any application.

### Why Choose CosaTron?

#### Cleaner Indoor Environments

- Helps meet or exceed building standards and codes.
- Reduce airborne bacteria and viruses for a healthier building.
- Improved indoor air quality helps increase productivity and decrease absenteeism.

#### Reduced Costs

- Keeps buildings, equipment, furniture, walls, etc. cleaner.
- Reduces HVAC operating costs.
- Savings in initial HVAC design cost.

### CosaTron Removes

- |                           |                                 |
|---------------------------|---------------------------------|
| • Germs                   | • Medical supplies              |
| • Bacteria                | • Bioeffluents                  |
| • Pollen                  | • Pesticides                    |
| • Airborne dust           | • Cooking odors                 |
| • Carbon monoxide exhaust | • Ozone                         |
| • Cigarette smoke         | • Industrial process byproducts |
| • Vacuum cleaner residue  | • Formaldehyde                  |
| • Cleaner supplies        | • Bathroom odors                |
|                           | • Viruses                       |





Advanced Technology for Indoor Air Quality

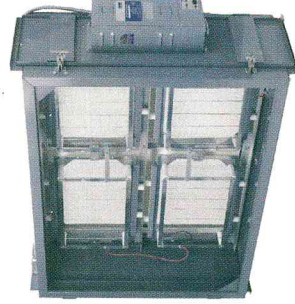
## Air Matters – And Air Quality Matters to CosaTron

### Odor is No Joke! CosaTron Delivers Industrial Strength Odor Control

Bad smells within a building can make services less attractive to customers or make a working environment uncomfortable for employees. From food service centers in shopping malls, airport concourses and event centers, to animal odor at zoos, farms, and shelters, CosaTron will eliminate bad odors throughout the building or in isolated spaces. Removing odors from the air is far from the only benefit of installing CosaTron, in many cases outside air contributions in the air handler means you condition less air and can reduce your energy bill substantially.

### Custom Systems – Series 1000

Custom designed for easy installation within new or existing air-handling plenums. The electrodes are sized to fit within a support framing package, between the filter and the cooling coils. The UL-Listed power generator can be conveniently located in, on, or near the outside of the plenum. A choice of custom plenum designs and options are also available with electrodes and generator. Fully integrated and tested systems delivered from the factory.



### Standard Modular Plenum Units – Series 2000

Available in standard plenum sizes, these UL-Listed packaged versions of the custom CosaTron products are designed to adapt to standard air-handling units up to 40 tons during initial construction and retrofit. Series 2000 systems install easily within the existing air-handling unit, fan terminal unit, small cabinet fan, or the ductwork. Perfect for typical installations such as clean rooms, conference and meeting rooms, lounges, cafeterias, medical labs, offices, and waiting rooms. Available in plenum sizes of 16", 20", 24", 36", or 48" high and up to 96" wide.



### Partial Customer List

- Kiel Center Arena
- Lake of the Torches Casino
- Miami International Airport
- Mid-Tennessee Mental Health Facility
- Nashville Arena
- New Orleans International Airport
- Orlando Science Center
- Opryland Convention Center
- Philip Morris
- RSA Union Building

### Meet or Exceed Regulations for Air Purity

Operating an industrial plant can generate significant airborne particulate and gaseous matter. Particulate from materials handling, machinery, lubricants, glues, paints and shipping materials can all contribute to reduced indoor air quality. CosaTron can be used in conjunction with your air handlers throughout the facility or in isolated areas such as machine and paint shops or mill areas. You must comply with government health and safety regulations, CosaTron will ensure your air quality does exactly that. In addition, in most applications your outside air contribution can be reduced which will dramatically affect your energy consumption and in some states, qualify you for energy reduction grants.

### Fan-Powered Units – Series 3000

Self-contained, fan-powered products for supplemental air-cleaning. Designed for temporary or permanent use almost anywhere that existing air handlers and balancing cannot manage. Ideal for confined spaces such as board rooms, higher-roller suites and other hard to treat localized air quality issues. Series 3000 systems control the build-up of dust, gases, smoke, and offensive odors generated by activity in an area or infiltration from other areas.

### ComputerPac

This special, field-proven product is designed specifically for new or existing down-flow air-conditioning units to control submicron contaminants in data processing facilities. The unique Cosatron technology also helps to reduce the impact of space charge that would normally be experienced in data sites.

### Not All Air Purification Systems Are Made Equally

Other air purification techniques such as ionization or ozone injection are both ineffective and can be harmful for building occupants. Ionizing the air in the building simply turns your customers or employees in to walking air filters. And according to the government injecting any level of ozone in a confined space can be harmful. Unlike other air purification systems, CosaTron's unique patented technology increases the efficiency of your existing filters. Isolating and simplifying the routine maintenance of your HVAC system.

- SeaWorld
- Stanford University
- St. Luke's Medical Center Office Tower
- Toyota Manufacturing Facility
- Tsing Sha Tsui Cultural Centre
- U.S. Tobacco
- United States Post Office
- Vanderbilt University Medical Center
- V.A. Medical Centers
- Walmart Distribution Centers

6304 Benjamin Road, Suite 502, Tampa, FL 33634-5128 • Phone (813) 886-1717

• Fax (813) 884-2745 • Email [info@cosatron.com](mailto:info@cosatron.com) • [www.cosatron.com](http://www.cosatron.com)





Advanced Technology for Indoor Air Quality

Case Study: 15th Street Fisheries  
& Dockside Café

## Landmark Restaurant Declares an Odor Free Restaurant the “Catch of the Day”



### Application: Odor Control

### Key Highlights

**Problem:** Kitchen and bathroom odors migrating into the dining space

**Solution:** CosaTron Series 1000 and Series 2000

**Results:** Elimination of unwanted odors throughout the restaurant and a reduction in dust and contaminants on surfaces.

For nearly 30 years, giving customers the free gifts they cherish most - recognition, recommendation and reassurance - has made the 15th Street Fisheries & Dockside Café one of the most popular restaurants in South Florida. Fifteenth Street Fisheries has been honored as a winner of the Ivy Awards of Distinction for food service excellence (the restaurant industry's Oscar) and by American Express in their reader's poll which named 16 restaurants nationwide which provide “uncommonly good service.” Recognition - remembering customer's names and preferences. Recommendation - servers describe and recommend items to their customers. Reassurance - check the tables and see if anything else is needed - don't just ask. This is a formula for success that includes both customers and employees and has resulted in annual sales of over \$7million for the restaurant.

Michael Hurst, past president of the National Restaurant Association, practices what he teaches as Manager and owner of the 15th Street Fisheries. He teaches his successful brand of restaurant management at the Florida International University (Miami) and is a consultant at restaurants around the country. As Hurst puts it, “Hospitality is a happening. Bring in the people.” His philosophy includes managing the restaurant from the front door, not the rear entrance. Greeting customers by name - serving hot foods



hot - serving cold foods ice cold - warming customer expectations with the smell of hot bread as they enter the restaurant - serving them samples as soon as they are seated - using word-of-mouth advertising - sharing restaurant secrets about new recipes and new dishes - all started people talking and inviting their friends.

15th Street Fisheries & Dockside Café employs over 100 staff. They start at entry-level positions and work their way up through on-the-job and classroom training. Turnover of personnel is minimal and usually occurs due to upward mobility. A career ladder helps entry level employees move up to cooks, waiters and waitresses. Students are encouraged to stay in school. This concern for the benefit of the employees is expressed in an additional way, a healthy work environment. The kitchen opens directly into the dining area enabling diners to watch the staff in action. This design allows cooking odors to migrate into the dining area and the management of the restaurant wanted to minimize the odor and deposition of grease and cooking residue throughout the restaurant. The answer was CosaTron, a unique system of air pollution control added to the air handling systems at 15th Street Fisheries. CosaTron is not a filter. It does not ionize air or produce ozone. Combined with proper room air change rates and the recommended filter, CosaTron solves the problems associated with restaurants and lounges.

The patented CosaTron process reduces and controls the ultrafine invisible contaminants that account for 98% of what is found in normally filtered air. It is these contaminants - smaller than one micron in size - that cause the build-up of residual odors due to deposition throughout the building. CosaTron also controls the migration of bacteria and fungal odors, typically from the bathrooms, that may occur in this type of environment. John Kirkpatrick of Air Conditioning Associates, working with the local CosaTron representative, included the custom CosaTron Series 1000 and Series 2000 in the design of the air handling system for the 15th Street Fisheries.

Opened in April 1979, the restaurant has 175 seats as well as 85 seats in the popular bar. 75 seats were added to an upstairs dining room where only dinner is served. 50 seats were added to the downstairs café where sandwiches, appetizers and seafood are served daily from 11:30 a.m. to closing. These additions included additional custom CosaTron Series 1000 units as well as the Series 2000 Modular Plenum Units. The CosaTron Series 1000 is custom designed for easy installation within new or



existing air handling plenums. The electrodes are sized to fit within a support framing package, typically between the filter and the cooling coils. The Series 2000 Modular Plenum Units are self-contained packaged versions of the custom system and are designed to adapt to standard air handling units up to 40 tons.

As a result of installing the CosaTron air purity solution, there are none of the usual odors associated with restaurants. No fish odors. No grease problems. No smoke problems from deep fat frying or the plunge cooker. Hurst is very pleased with CosaTron and its operation. He feels that CosaTron does in fact "control all odors." For over 50 years, the CosaTron system, for the control of indoor air contamination, has been used in installations around the world - anywhere there is a desire or government regulation for first class indoor air quality. In airports, casinos, convention centers, data centers, industrial manufacturing plants, dog tracks, hospitals, office buildings, and Casinos. From A (airports) to Z (zoos), CosaTron is at work providing clean air where we live, work, play and breathe.





Advanced Technology for Indoor Air Quality

Case Study: Martin Health System

# Healthier, Odor-Free Hospitals Thanks to CosaTron



## **Application: Odor and bacteria control**

### **Key Highlights**

**Problem:** Odor and bacteria control

**Solution:** CosaTron Series 1000

**Results:** An odor-free and healthier medical facility

One of the major concerns in any health care related facility is the control of airborne contaminants such as fine particulates and bacteria that move unseen through the air to cause post-operative infections, inflammation or irritation. Secondary concerns include the control of odors associated with a typical health care facility, such as those medically related, as well as the offensive chemical, bathroom and food preparation odors that can prove uncomfortable to patients and employees alike.

A number of hospitals and related healthcare facilities around the country have eliminated these problems by installing CosaTron®, a unique solid state air purification system which accelerates the natural coagulation of airborne particulate matter and enhances the filtration of the existing air-handling systems. CosaTron controls the behavior of airborne contaminants, as well as offensive odors, saving energy dollars by reducing outside air requirements and cutting overall cleaning and maintenance costs of the conditioned space, and the air-handling equipment. Case in point is Martin Health System based in Stuart, Fla. comprises two hospitals, two MediCenters, a free-standing emergency center, and numerous outpatient centers and clinics. A third hospital, Tradition Medical Center, will be completed in 2014 in west Port St. Lucie.



When Martin Memorial was considering a six-story, 72,578 sq. ft. expansion of their facility to include additional patient rooms, modern Operating Room (OR) suites, an enlarged ICU unit, Radiology, Emergency Room and an employee dining room, Aaron Hertz was called in as the consulting mechanical engineer. Familiar with the problems of any hospital and impressed by the savings in outside air requirements and overall air quality generated by CosaTron, Hertz specified that CosaTron be included in the design criteria of the new addition.

At that time, the State of Florida required 100% outside air for any OR suite or operating facility such as orthopedic areas, but Hertz was granted special permission for a 50% reduction based on the CosaTron inclusion in the design specifications for all 12 air-handling units serving the new addition. In the design, the systems serving the OR suites use 50% outside make-up air with 50% return air, providing a total of 17 air changes per hour. The filters consist of a combination of 55% NBS efficiency pre-filters and 99.9% HEPA type filters on the discharge side of the supply fan. All other air-handling systems serving clinic, ICU and patient room areas use 80% to 85% NBS filters in lieu of the HEPA type (average 80% return air and 20% outside make-up air).

At the time that the new addition went into operation, Hertz states, "I ran my own series of tests with CosaTron "ON" and with CosaTron "OFF," demonstrating that CosaTron did, in fact, reduce energy and operating costs and control the odors associated with this health care-related facility." After years of operation, the differences between the original hospital and the new six-story addition are like night and day," says Jim Briggs, Director of Plant Services, Martin Memorial. "In the old wings, the brown fuzzy contamination around the supply outlets and return air grills is obvious. So is the unmistakable hospital odor. In the new areas we have exceptionally small amounts of dirt collecting on the grid tiles around the supply outlets and return grills, as compared to the areas not treated by CosaTron. In here, it just doesn't smell like a hospital either," adds Briggs. In fact, everyone at Martin Memorial is aware of the difference, from the



administrator to the head housekeeper who claims "that only minimal housekeeping is required in the CosaTron area of the hospital as compared to the requirements in the non-treated areas."

As part of ongoing expansion to meet demand, Martin Memorial decided it was time to finish the fifth floor of the new facility to increase the number of patient rooms and insisted that CosaTron be included in the two air-handling systems serving the floor. Subsequently, CosaTron systems have been added to the two units in the older part of the facility, as well as the emergency operating room, central supply, laboratory, nursery, pharmacy, the recently-completed sixth floor patient room area, nurses and doctors lounges, and visitor waiting room areas.

## ...it just doesn't smell like a hospital

The remaining air-handling units serving the non-treated areas are already scheduled for CosaTron as soon as the necessary funds become available. In addition to saving energy, reducing the day-to-day operating and maintenance costs, and eliminating the typical hospital odors, Martin Memorial's cooling coils, fans, supply ducts and other heat transfer surfaces remain clean, thereby eliminating other sources of bacteria and contamination buildup. And in the laboratory areas equipped with a Xenon Gas Evacuator, they have never had a problem with Xenon gas odor. As Briggs states, "We've had CosaTron for years now and we know that it works!"