Read This!

- ✓ Cut Outdoor Air in Half
- ✓ Reduce AC Equipment 25%
- ✓ Meet Codes
- ✓ Easy to Spec
- ✓ Maximize IAQ

AN ENGINEER'S GUIDE TO THE *IAQ PROCEDURE*

The International Mechanical Code has caught up to ASHRAE Standard 62.1 allowing for the reduction of outdoor air intake, so the *IAQ Procedure* now flies. Therefore AC systems get smaller, installation costs are reduced and ongoing energy usage is slashed.

Plasma Air's products, designed to improve indoor air quality, provide a proven approach that saves first costs and ongoing energy costs. We'll provide you with all the necessary documentation including IAQ calculations and associated specifications. So the question isn't whether to use us – it's when!

Positive Air Quality *Negative Energy Costs*

- Schools
- Churches
- Gymnasiums
- Arenas
- Auditoriums
- Convention Centers
- Casinos
- Daycare Centers
- Nursing Homes
- Office Buildings
- Retail Stores
- Big Box Stores
- Health Clubs
- Military Barracks
- Correctional Facilities
- Banks
- Student Centers
- Sports Facilities
- Medical Clinics

and more . . .

PLASMA AIR
INTERNATIONAL

SAVE COSTS

• Reduce AC equipment 25% to 30%
• Ongoing energy savings

When you can reduce outdoor air intake, sizable reductions in both heating and cooling equipment result. As you can see in the chart for a typical 100,000 square foot project, the construction **cost savings far outweigh the cost of the Plasma Air system** so there is no ROI analysis to perform. In addition, you realize corresponding savings in installation costs, electrical service, roof penetrations, ductwork, structural support, etc. And by reducing the need to finance several hundred thousand dollars, the building's owner will save thousands of dollars in interest costs each year.

Because you are conditioning a reduced amount of outdoor air all year long, you achieve **significant ongoing energy savings** as well. With utility costs continuing to rise, cutting energy usage by 30% or more on air conditioning means building owners realize measurable annual savings. Plus a greener building! And as the engineer, you are the hero.

So whether you are designing your system with roof top units that condition the outdoor air directly, water source heat pumps with dedicated outdoor air systems, or even a chilled water system with central air handling units, savings are seen across

IAQ Procedure Cost Analysis
100,000 Sq Ft New Construction

$350,000	Savings in AC & Heating Equipment[1]
-$50,000	Plasma Air Installed Cost
$300,000	First Cost, Day One Savings
$30,000	Annual Energy Savings
-$8,000	Annual Tube Replacement/Maintenance
$ 22,000	Annual Ongoing Savings[2]

1 Estimated cost savings include equipment, ductwork, roof penetrations, electrical service, structural support, etc., as appropriate.

2 Not including maintenance savings or financing savings from reduced interest expense based on $300,000 first cost savings.

the board. Imagine the cost savings of reducing a dedicated outdoor air unit from, let's say, 40,000 CFM to 20,000 CFM!

And savings are not just on new construction. They also apply when AC equipment is replaced on existing buildings. Plasma Air products can also be easily retrofitted into existing AC equipment. You won't realize first cost savings, but the ongoing energy savings offsets the cost of Plasma Air equipment in just a few years.

MEET CODES

• Use ASHRAE's *IAQ Procedure*
• Meet requirements of the IMC

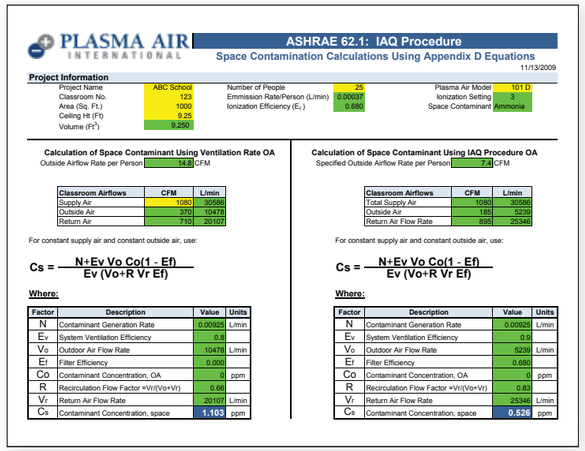
For some thirty years in Standard 62.1, ASHRAE has promoted the *IAQ Procedure* which supports the reduction of outdoor air intake requirements. In 2006, the International Mechanical Code finally caught up with ASHRAE. Employing Plasma Air's bipolar ionization system results in air contaminant levels that are "equal to or lower than" those achieved using the prescriptive Ventilation Rate Method, thereby meeting code. As a result, engineers find they can **cut outdoor air by 50%** or, in many cases, by 66%!

In buildings such as schools, churches, gymnasiums, office buildings, arenas, daycare centers, etc., the predominant pollutant load is from the occupants. Typical emitted pollutants are reduced through a gas phase disassociation process lessening the requirement to dilute these pollutants through outdoor air

IMC Ventilation Rate Exception

Exception: Where the registered design professional demonstrates that an engineered ventilation system design will prevent the maximum concentration of contaminants from exceeding that obtainable by the rate of outdoor air ventilation determined in accordance with Section 403.3, the minimum required rate of outdoor air shall be reduced in accordance with such engineered system design.

2006 International Mechanical Code



PLASMA AIR INTERNATIONAL — ASHRAE 62.1: IAQ Procedure
Space Contamination Calculations Using Appendix D Equations
11/13/2009

Project Information

Project Name	ABC School	Number of People	25	Plasma Air Model	101 D
Classroom No.	123	Emmission Rate/Person (L/min)	0.00037	Ionization Setting	3
Area (Sq. Ft.)	1000	Ionization Efficiency (E_f)	0.680	Space Contaminant	Ammonia
Ceiling Ht (Ft)	9.25				
Volume (Ft^3)	9,250				

Calculation of Space Contaminant Using Ventilation Rate OA
Outside Airflow Rate per Person: 14.8 CFM

Classroom Airflows	CFM	L/min
Supply Air	1080	30586
Outside Air	370	10478
Return Air	710	20107

For constant supply air and constant outside air, use:

$$Cs = \frac{N + Ev\ Vo\ Co(1 - Ef)}{Ev\ (Vo + R\ Vr\ Ef)}$$

Where:

Factor	Description	Value	Units
N	Contaminant Generation Rate	0.00925	L/min
Ev	System Ventilation Efficiency	0.8	
Vo	Outdoor Air Flow Rate	10478	L/min
Ef	Filter Efficiency	0.000	
Co	Contaminant Concentration, OA	0	ppm
R	Recirculation Flow Factor =Vr/(Vo+Vr)	0.68	
Vr	Return Air Flow Rate	20107	L/min
Cs	Contaminant Concentration, space	1.103	ppm

Calculation of Space Contaminant Using IAQ Procedure OA
Specified Outside Airflow Rate per Person: 7.4 CFM

Classroom Airflows	CFM	L/min
Total Supply Air	1080	30586
Outside Air	185	5239
Return Air Flow Rate	895	25346

For constant supply air and constant outside air, use:

$$Cs = \frac{N + Ev\ Vo\ Co(1 - Ef)}{Ev\ (Vo + R\ Vr\ Ef)}$$

Where:

Factor	Description	Value	Units
N	Contaminant Generation Rate	0.00925	L/min
Ev	System Ventilation Efficiency	0.9	
Vo	Outdoor Air Flow Rate	5239	L/min
Ef	Filter Efficiency	0.680	
Co	Contaminant Concentration, OA	0	ppm
R	Recirculation Flow Factor =Vr/(Vo+Vr)	0.83	
Vr	Return Air Flow Rate	25346	L/min
Cs	Contaminant Concentration, space	0.526	ppm

intake. Plasma Air's proprietary software performs the calculations that reliably demonstrate this improved air quality and we regularly provide them to engineers around the country.

So give us some basic information and we'll provide you with the required calculations as the example above shows. It's that simple. And we will prepare it free of charge with no obligation. We've even had our software calculations third-party verified on actual installations. So, we talk the talk AND walk the walk.

EASY APPLICATION

• Specs provided
• IAQ calculations done

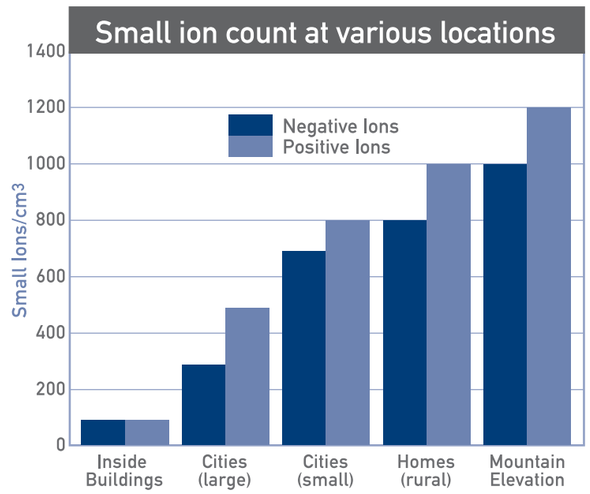
Plasma Air was founded by engineers so we understand the day-to-day challenges you face. You have assumed the responsibility of knowing what codes allow when designing cost-competitive and energy-efficient buildings.

We make every effort so that Plasma Air products are an easy part of the process. Our ionization units mount on the supply air ductwork or in the air handler itself so no special provisions are required. In addition to providing the IAQ Procedure calculations, we have specifications which can be modified for your application. We also have ionization unit schedules, CAD drawings, and our in-house engineering support when you need it.

HOW IT WORKS

Plasma Air's bipolar ionization system produces both positive and negative oxygen ions. Replicating "mountain air" quality, these ions neutralize airborne pollutants resulting in a cleaner and healthier indoor air environment. The system works by:

- Charging airborne particles oppositely causing particle agglomeration. These larger, heavier particles now get caught by the system filter leading to reduced asthma and allergy irritants. **Test reports show 86% reduction in dust and 91% in mold spores.**
- Reducing airborne mold and bacteria through cell oxidation. Fewer airborne bacteria and virus cells decrease absenteeism and improve worker productivity. **Test reports show 95% reduction in bacteria.**
- Breaking down volatile organic compounds (VOCs) from carpet, paint, cleaning agents, furniture polish, etc., thus reducing headaches and eye irritation. **Test results show 98% reduction in TVOCs.**
- Eliminating odors which provides for improved concentration and avoids productivity distractions.



AN EXTENSIVE LINE OF PRODUCTS FOR ANY PROJECT TYPE

Our products are available in both self-contained stand alone units and in-duct models that are installed either on the supply air ductwork or directly into the air handling unit. So, whether a single classroom or a large airport terminal, our products can be scaled to any size project.

100

Voltage:	120V/230V
Energy Use:	4/5/6 watts
No. of Tubes:	1
Tube Size:	C/D/E
Capacity:	up to 3,000 cfm

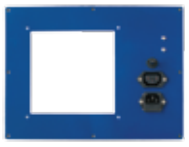
Application: In duct unit for smaller central HVAC systems. Ideal for classrooms, conference rooms, daycare facilities, nursing homes, office buildings, casinos, homes and restaurants.

200

Voltage:	120V/230V
Energy Use:	10/12 watts
No. of Tubes:	2
Tube Size:	D/E
Capacity:	4,000/5,000 cfm

Application: In duct unit for medium central HVAC systems. Ideal for office buildings, schools, hospitals, restaurants, nursing homes, childcare facilities, and casinos.

AFS-MF



Voltage:	120V/230V
Fuse Size:	5 Amp
Mounting:	Ductwork
Field Connection	Corded plug
Switch setting:	Positive

Application: Painted steel mounting frame with integral pressure differential switch. Frame gets mounted to ductwork with sheet metal screws and ionizer gets mounted to frame with machine screws. Power is brought to plate and circuit is closed with jumper cord.

50E

Voltage:	120V/230V
Energy Use:	30 watts
No. of Tubes:	5
Tube Size:	E
Capacity:	8,000 cfm

Application: In duct unit for larger central HVAC systems. Ideal for schools, gymnasiums, arenas, office buildings, nursing homes, daycare facilities, casinos and industrial projects like food processing facilities, manufacturing plants and sewage treatment plants.

50F

Voltage:	120V/230V
Energy Use:	50 watts
No. of Tubes:	5
Tube Size:	F
Capacity:	10,000 cfm

Application: In duct unit for larger central HVAC systems. Ideal for schools, gymnasiums, arenas, office buildings, nursing homes, daycare facilities, casinos and industrial projects like food processing facilities, manufacturing plants and sewage treatment plants.

ION Tower

Voltage:	120V
Energy Use:	15 watts
No. of Tubes:	1
Tube Size:	A
Capacity:	400 sq. ft.

Application: Portable tower with fan and filter. Tower is 16" tall and ideal for small scale applications where a central HVAC system is unavailable such as homes, conference rooms, offices, hospital rooms, nursing homes, and assisted living rooms.

Eco-Scrubber

Voltage:	120V/230V/480V
Energy Use:	per capacity
No. of Tubes:	varies
Tube Size:	varies
Capacity:	per spec

Application: Custom engineered to meet the needs of manufacturing facilities, sewage treatment plants, and other large scale operations that must purify the air prior to exhaust or recirculation.

Residential Commercial Industrial

PLASMA AIR INTERNATIONAL

Positive Air Quality - Negative Energy Costs

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