

Second Wind
Ultraviolet Germicidal
Commercial
Air Purification

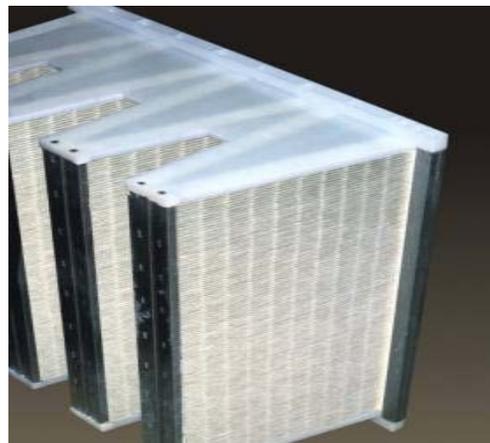
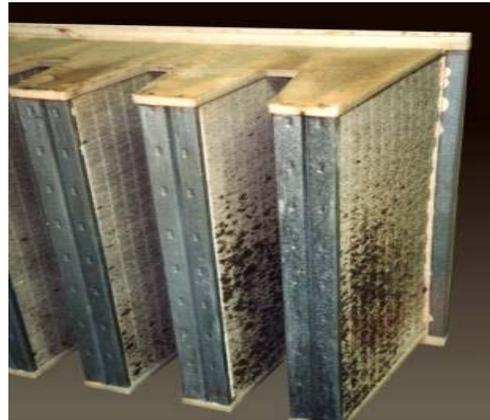


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Current Indoor Air Quality (IAQ) Problems

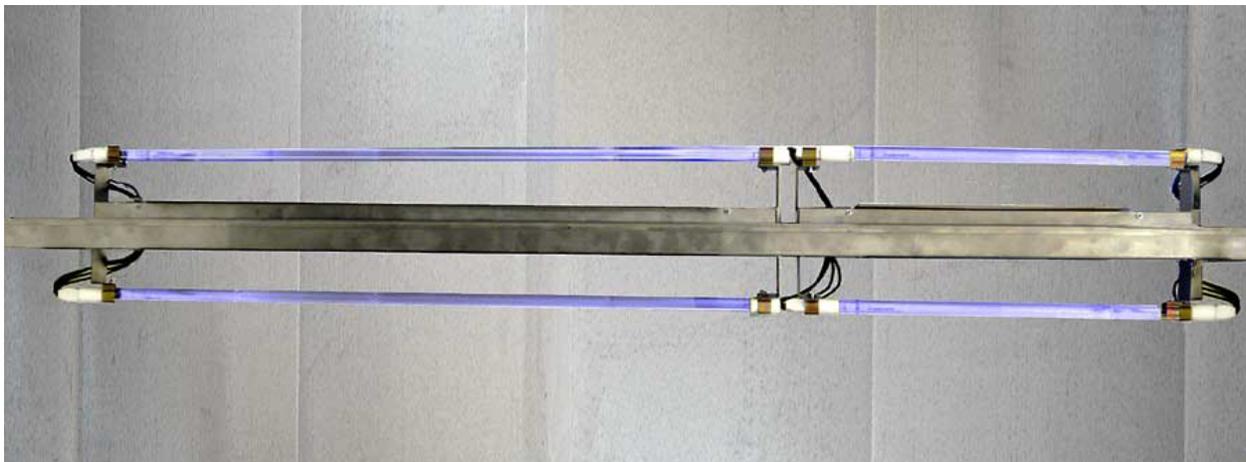
Sick Building Syndrome (SBS) Building Related Illness (BRI) Multiple Chemical Sensitivity (MCS)

SBS is a catch-all term that refers to a series of complaints for which there is no obvious cause and where medical tests reveal no particular abnormalities. The symptoms display when individuals are in the building but disappear when they leave. Complaints may include irritation of the eyes, nose and throat; headache; stuffy nose; lethargy, and skin irritation. Without a quick resolution, increased absenteeism, reduced work efficiency, and deteriorating employee morale are likely outcomes of SBS.

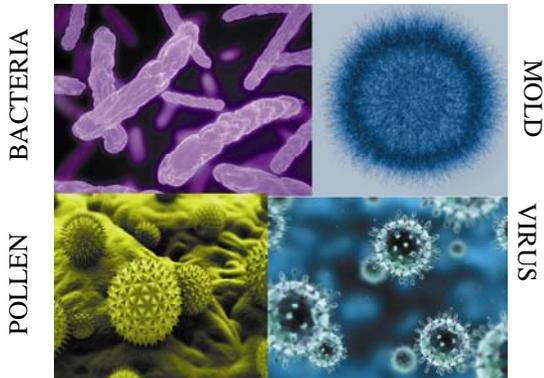
BRI refers to a defined illness with a known causative agent resulting from exposure to building air. While the causative agent can be chemical (e.g. formaldehyde), it is often biological. Typical sources of biological contaminants are humidification systems, cooling towers, drain pans and filters, or water damaged material. Symptoms may be specific or mimic symptoms associated with the flu. Serious lung and respiratory conditions can occur.

MCS is a person that has sensitivity to particular agents at levels that do not have an observable affect on the general population. Persons having MCS apparently have difficulty being in most buildings. Building managers may encounter occupants who have been diagnosed with MCS. Pollutants travel through the building from areas of high pressure to areas of lower pressure. Some of these pathways are planned and deliberate, for example building ventilation systems (HVAC Systems). Just as an HVAC system can introduce a contaminate to an occupied space, it can also remove it. The factors most important to understanding indoor pollution are a) indoor sources of pollution, b) outdoor sources of pollution, c) ventilation parameters, airflow patterns and pressure relationships, e) air filtration systems, f) Ultraviolet Germicidal Irradiation Systems, and g) Gas Phase (VOC) Removal Systems.

Second Wind Air Purifiers have years of experience designing the best Ultraviolet Germicidal Irradiation and Gas Phase Removal Systems on the market. Second Wind systems offer the highest intensity ultraviolet irradiation, while also reducing gas phase contamination through the introduction of Photo-Catalytic Oxidation (PCO).



Ultraviolet Light



The ultraviolet (UV) component of sunlight is the main reason microbes die in outdoor air. The use of ultraviolet germicidal light for sterilization of micro-organisms has been studied since the 1930's. Microbes are vulnerable to the effects of light at the wavelengths at or near 253.7 nm. At that wavelength ultraviolet light has the right amount of energy to break bonds or genetically damage microorganisms. Ultraviolet systems have much more concentrated levels of ultraviolet energy than are found in sunlight.

"The 99.9% removal rate criterion often requested by clients seems to have no analytical justification. In the case of Anthrax, for example, a removal rate of about 60% would seem to be adequate to prevent most, if not all, fatal infections in any recirculating constant volume system with at least 15% outside air."

***Engineered Systems Magazine, 9/30/2002
W.J.Kowalski***

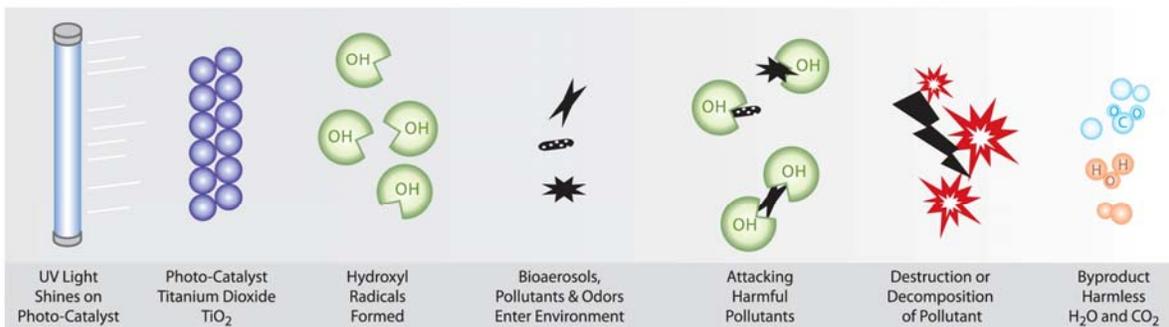
Properly designed UV system installations have proven highly effective in hospitals, schools, etc.

Second Wind ultraviolet germicidal lamps are 253.7 nm of light, optimal for air and surface disinfection. All microorganisms are susceptible to ultraviolet germicidal light at different rate constants.

Photo-Catalytic Oxidation (PCO)

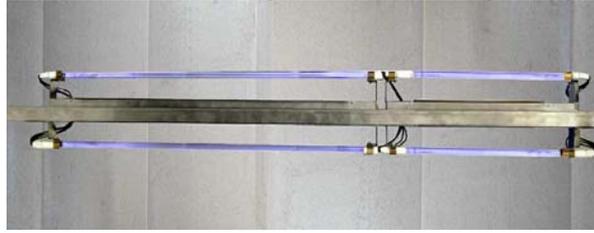
The Process

Second Wind Air Purifiers employ a patented Photo-Catalytic Oxidation (PCO) Process to remove mold, bacteria, viruses, odors and off gases in your home. When the High Intensity Ultraviolet light shines on the Photo-Catalyst a reaction takes place producing Hydroxyl Radicals. Hydroxyl Radicals are second in Oxidation Power only to Fluorine. The Hydroxyl Radicals attack the Bioaerosols and Volatile Organic Compounds by changing their molecular configuration. The bacteria, allergens and other pollutants are often rendered unable to reproduce or are destroyed by the PCO process, leaving behind harmless by-products like H₂O and CO₂.



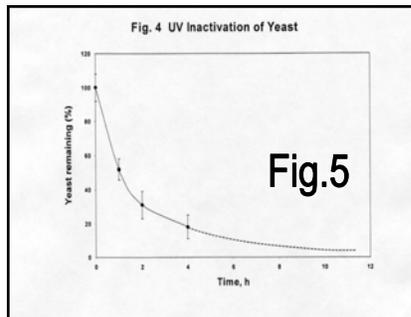
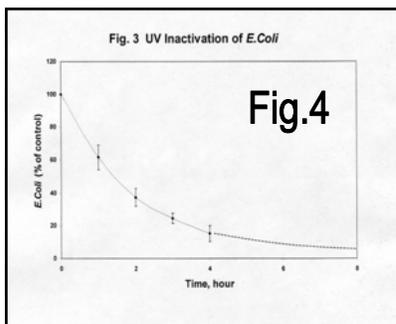
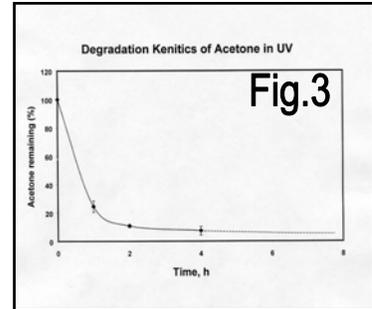
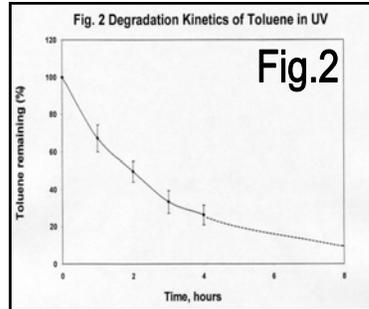
The volatile organic compounds are oxidized by a reaction that takes place during this process due to the fact that the OH radicals need to attach themselves to something, and the contaminate is absorbed at the catalyst surface. PCO will also decomposes many of the absorbed bioaerosols.

Photo-catalytic Oxidation (PCO)



Second Wind commercial air purifiers have the only commercially available systems that incorporates ultraviolet germicidal light and Photo-catalytic oxidation (PCO).

Second Wind has done multiple tests using PCO technology and currently implements PCO in the residential line of air purifiers. Fig. 2 and Fig. 3 show the results of PCO on volatile organic compounds (Acetone and Toluene).

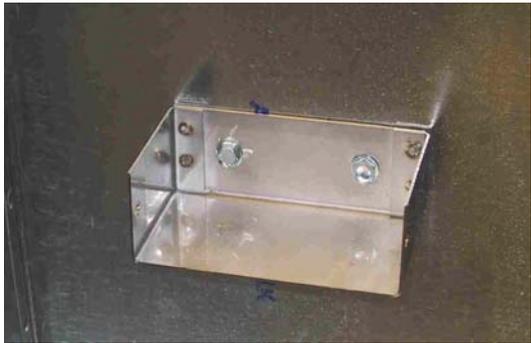


Second Wind has done multiple tests using PCO technology and currently implements PCO in the residential line of air purifiers. Fig. 4 and Fig. 5 show the results of PCO on bioaerosols (E.Coli and Yeast).

“Photocatalysts for the destruction of indoor air pollutants, including VOC’s and gaseous inorganic pollutants such as nitrous oxides, carbon monoxide, and hydrogen cyanide...(Heller,1996). “Reports of tests show the technology capable of rapidly destroying toxic components of tobacco smoke such as formaldehyde, acrolein and benzene.”

Taken from the American Lung Association webpage January 24, 2001

PROGRESSIVE INSTALLATION PICTURES



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2



3



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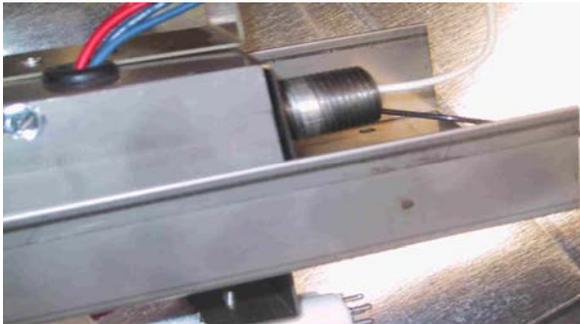
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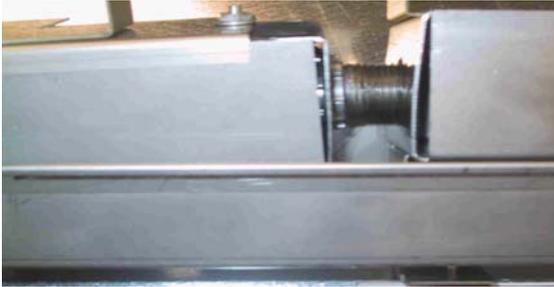


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8

PROGRESSIVE INSTALLATION PICTURES



9



1 0



1 1



1 2

Commercial Sizing For 5000 Series

The Second Wind 5000 series is the perfect choice for small and large commercial applications.

For ducts that are less than 36 inches in height, the single lamp unit can be mounted directly in the duct system against one side of the duct. (Fig. 1)

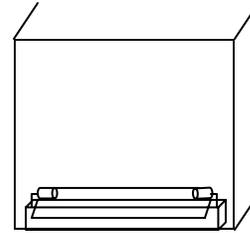


Fig.1

If the duct is more than 36 inches wide multiple units will need to be linked together to span the width of the duct. (Fig.2)

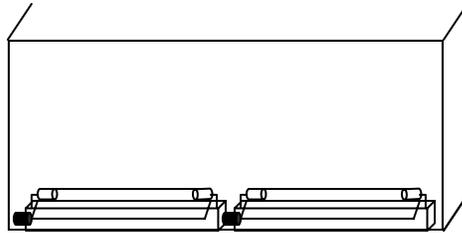


Fig.2

If the duct is greater than 36 inches in height, the double lamp models should be used, mounted on a 5000T track. Tracks come in 6 foot lengths and can be cut to size for smaller ducts or coupled together for larger ducts. The 5000 series is designed for both surface and air disinfection. (Fig.3)

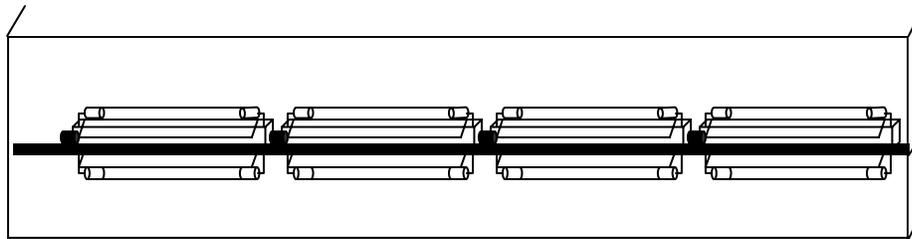
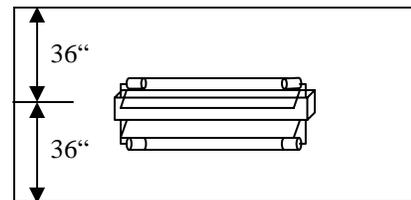
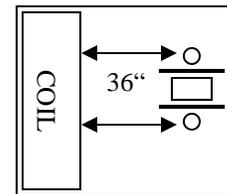
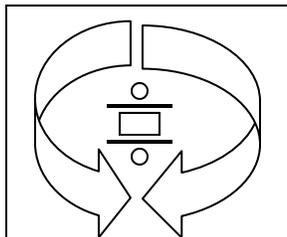


Fig.3

The effective coverage area for mold and fungus surface disinfection is 9 square feet, with the units being installed within 3 feet of the surface being disinfected. (Fig.4)



The Second Wind 5000DL series units have a 360 degree coverage radiation arc. (Fig.5)

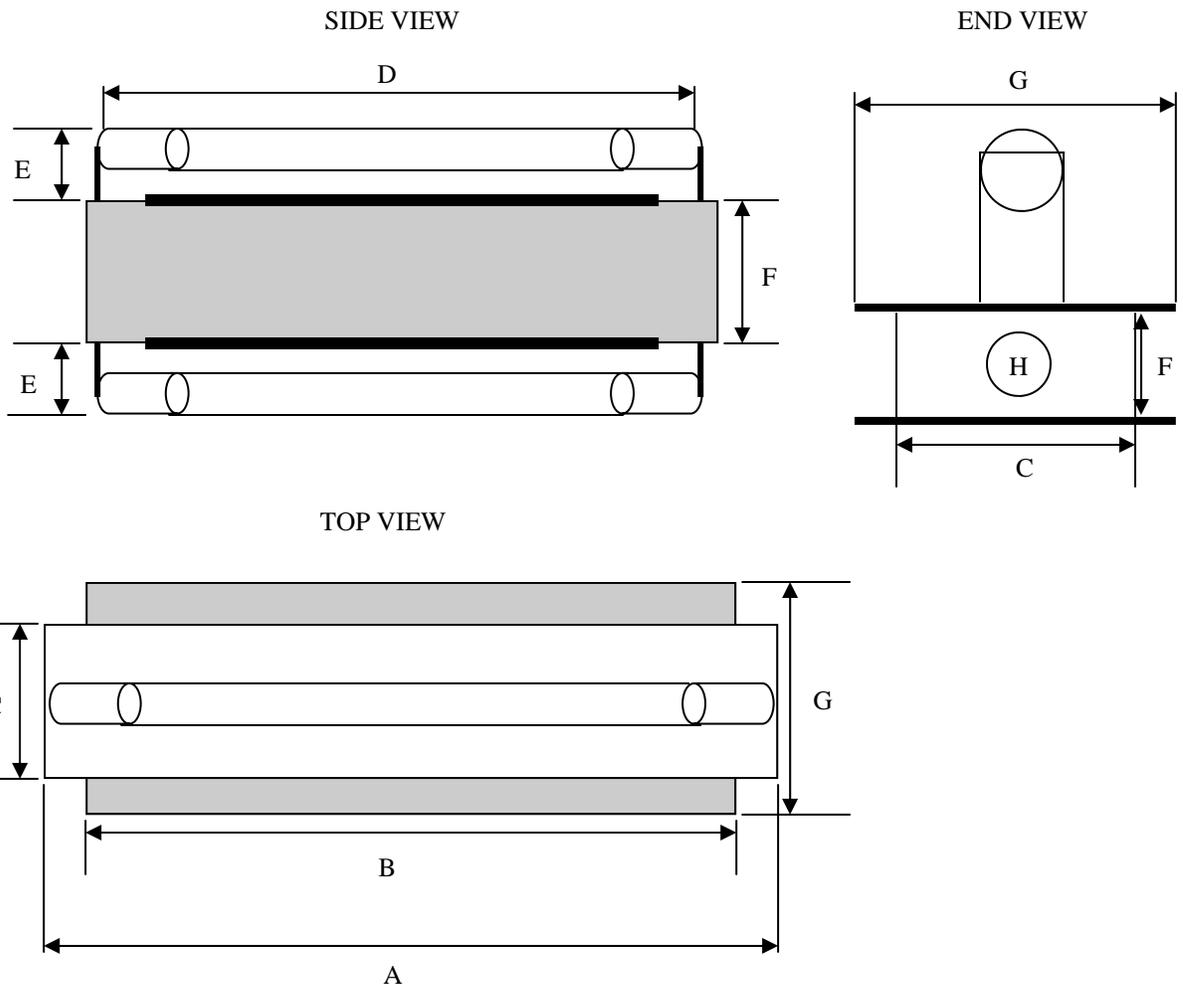


Commercial Measurements For 5000 Series

The Second Wind 5000 series is the perfect choice for small and large commercial applications.

The following are the dimensions IN INCHES of the various units:

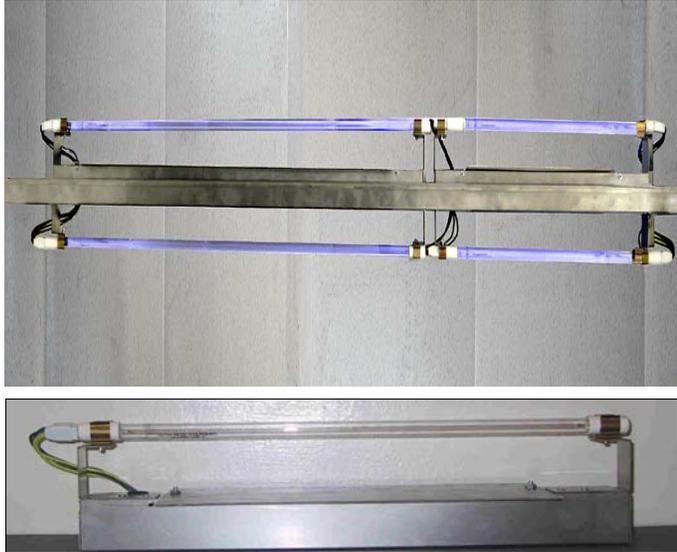
Model	A	B	C	D	E	F	G	H
5009SL	12.1	6.2	2.6	9.6	2.9	2	5.5	0.5
5009DL	12.1	6.2	2.6	9.6	2.9	2	5.5	0.5
5018SL	17	11.9	2.6	18.6	2.9	2	5.5	0.5
5018DL	17	11.9	2.6	18.6	2.9	2	5.5	0.5
5036SL	32.1	27	2.6	34.7	2.9	2	5.5	0.5
5036DL	32.1	27	2.6	34.7	2.9	2	5.5	0.5
5000T	74							



Second Wind Air Purifier Commercial Series

- Models:**
5009SL
5009DL
5018SL
5018DL
5036SL
5036DL

**Ultraviolet Germicidal Photo-catalytic Air Purifiers
 for Commercial Heating Ventilation
 and Air Conditioning Systems**



The Second Wind Commercial Series is the perfect choice for small or large commercial/Industrial applications . Second Wind uses Germicidal Ultraviolet light and a Patented Photo-Catalytic process to disinfect mold, bacteria, infectious disease, and decrease volatile organic compounds in the air stream. Second Wind Commercial air purifiers are designed for surface and air disinfection.

Features and Benefits

- Available for all commercial applications
- Disinfects mold growth on cooling coils
- Surface and Air Indoor Air Quality Control
- Proven effectiveness through independent test data
- High intensity Ultraviolet Lamps
- Patented Photo-Catalytic Oxidation process to reduce VOC levels
- 304 Stainless steel construction
- TiO2 photo-catalytic surface area



• FDA class II medical device: K980745



- Improved indoor air quality
- Reduces infectious disease
- Reduces mold, airborne allergens, bacteria and germs from indoor air
- PCO Module decreases off-gasses and odors from airstream



- Improved air system efficiency
- Low cost operation
 - low maintenance
 - lifetime PCO module (if equipped)



- Safe and effective
- Chemical-free disinfection
- EPA Registration# 73112

SPECIFICATIONS

Second Wind Commercial units are mounted end to end or in channels to accommodate most HVAC systems. The units install anywhere in the system to disinfect molds, bacteria or reduce VOC contamination. The housing is 304 stainless steel and comes in 3 sizes (9", 18", and 36"). The 304 stainless is 0.08% C, 18% Cr, 2% Mn, 9% Ni, 1% Si, 0.045% P, 0.03% S, balance stainless steel. Second Wind units can be wired in parallel by using the channel and 1/2" electrical knock outs on each end. All units are manufacturer assembled and tested.

The power source is a electronic, Class P, Sound rated A, Type HL, NO PCB's, type 1 outdoor ballast meeting EMI requirements of CFR Title 47 Part 18 consumer. The operating range is from 120 VAC to 277 VAC and the current is 980ma@120vac. The ballast is designed to operate at any airflow and relative humidity.

Second Wind lamps operate at 253.7 nm, ideal for air disinfection, good for use at any velocities, temperatures ranging from 30 - 170 F. Every lamp has an extended lamp life coating which helps maintain intensity levels at 85% even after a year of operation. They are a High Output (HO), T5 (15mm) diameter, lamp yielding 2/3 more output than standard lamps of the same length. Base of the type "L" quartz glass is ceramic, with triple-coiled electrodes made of molybdenum lead in a clamped filament design. Lamp connectors are 4-pin single ended circling sockets. Lamp life shall not be less than 9000 hours.

Submitted device shall be tested under typical HVAC conditions and in accordance with the general provisions of IES Lighting Handbook, 1981 applications Volume. Total output per one inch arc length shall be not less than 10uW/cm2 at 1 meter in air of 45 F and 400 fpm

The titanium strips attached to the units are the catalyst for the production of hydroxyl radicals in the Photocatalytic process. They are made of Titanium grade 2; 0.01% C, 0.005% N, 0.04% Fe, 0.12% O, and balance Titanium. It has a density of 4.5 g/cm cube, specific heat of 520 J/kg K, electrical resistivity 50 micro ohms cm, thermal expansion (10-6K) 9.1 (20-300C), tensile strength 390 N/mm sq, and elongation A3 min 30%.

Dimensions:

9"	5009SL - 12.25"L x 3"W x 5 "H
	5009DL - 12.25"L x 3"W x 8.5"H
18"	5018SL - 17"L x 3"W x 5"H
	5018DL - 17"L x 3"W x 8.5"H
36"	5036SL - 32.5"L x 3"W x 5"H
	5036DL - 32.5"L x 3"W x 8.5"H

Weight

9"	5009SL - 3 lbs.
	5009DL - 4 lbs.
18"	5018SL - 4 lbs.
	5018DL - 5 lbs.
36"	5036SL - 7 lbs.
	5036DL - 9 lbs.
Track	5000T - 4 lbs.

Power Electronic Ballast

120 VAC - 277 VAC

Lamps

	36"	18"	9"
Base Face in. -	33.2	17.2	8.4
Length mm -	842.4	436.0	212.0
Arc Length in.-	28.0	14.2	5.2
mm -	710	360	131
Current mA-	980	980	980
Wattage W-	90	40	25
Voltage @60Hz-	102	86	32
UV Output W-	34	10	5
UV Output @1M			
uW/cm2 -	560	500	360
Lamp life hours-	9000	9000	9000

Wiring

Number 18 teflon coated wire 600V, 105C.

URV Rating

Done at 400 fpm, 6" installation tracks, with TB Bacilli rate constant with 60% reduction. Based on scale like MERV rating Low- High, 1-15.

36"	18"	9"
15	13	12

5000T- 74" Stainless Steel mounting track

5000C- Track Coupling

5000H- Track End Holders

Warranty **3-Years Fixture 1-Year Lamps**

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