ASHRAE 62.1 Outside Air Reduction

CosaTron has long been recognized for our ability to dramatically improve indoor air quality. The effectiveness of our system has been demonstrated through thousands of successful installations, numerous test reports and white papers and especially in actual in-situ evaluations which are the true measuring stick.

These applications have primarily been limited to situations where a specific indoor air quality issue was identified. In all such situations our technology was proven to be the solution.

There is another significant application where our technology can be equally applied successfully and that is the issue of reducing outside air required for any facility. Many of you know the impact of reducing outside air to any degree. The resulting cost savings in energy use can be substantial. One of the traditional methods employed in the HVAC industry to combat indoor air quality issues has been the practice of increasing the amount of outside air in an attempt to dilute or “flush out” contaminates. This practice has largely proved to be somewhat ineffective in truly improving indoor air quality and very costly.

As all CosaTron experienced people know it’s due to the fact that 98% of all indoor particles are too small to be entrained, and therefore moved, by the typical HVAC system. So bringing in additional outside air, and exhausting it, has very little effect in moving the contaminates out of the facility. That’s why CosaTron is so effective.

In determining the amount of outside air that is required for any facility ASHRAE has two methods available for engineers or designers to use in their calculations. One method is the Ventilation Rate Procedure (VRP) and the other is the Indoor Air Quality Procedure (IAQP).

The VRP Method

The VRP is the most common method and requires very little in the way of calculations. There are standards, in the ASHRAE, guidelines that help an engineer determine the OA required and takes into account the parameters of building type, building (or zone) use, the size, the total air volume, the air flow of the system, the maximum occupancy of the facility and the primary activity.

By employing the guidelines and these parameters the engineer determines the amount of OA that is required. It is generally given as outside air cfm required for the zone. The system is sized accordingly, installed and commissioned based on those requirements.

Once this has been put in place the only opportunity available for a facility owner to reduce the outside air the system is operating at is to employ demand ventilation to monitor air quality and adjust the OA accordingly. The system of monitoring is based on the level of CO2 present in the facility. A pre-set limit is determined as the set point of the system. It is generally determined to be the level of CO2 present in the outside conditions plus 700 parts per million (ppm). Most outside conditions register between 300-500 ppm of CO2. Therefore the set point of the demand ventilation system will typically be around 1,000-1,200 ppm of CO2.

As the system is operating there will be a series of CO2 sensors that detect the level of CO2 present in the facility. Whenever the level of CO2 drops below the set point (for CO2) of the system outside air dampers will modulate closed to reduce the amount of outside air coming into the facility and air dampers will modulate further open allowing more return air (recirculation) into the system. The more air is allowed to recirculate the less energy cost is used to treat the outside air.

The IAQP Method

The IAQP method is the other acceptable method allowed by ASHRAE to determine OA. This method assumes that contaminates of concern (COC) will be

reduced by an air purification system which allows for less OA to be used than under the VRP.

This method is more complicated and less understood than the VRP method, but is gaining in use due to the ability to reduce OA and save energy cost. Under this method a new calculation is performed that takes into account contaminate reduction and is supposed to be based on historical data derived from past performance. This second calculation is performed with a substantially reduced level of OA and provided that the level of "calculated" mass contaminates is less than, or equal to, the mass contaminate level derived under the standard VRP method then the engineer can use the amount of OA that was used in the IAQP calculation.

Many bi-polar ionization (BPI) manufacturers have been successful in promoting this method with engineers and achieving reductions in OA. In order to approve this method using the BPI technology the engineer/end user has had to be willing to accept exceptionally high levels of CO2 since CO2 is one of the byproducts of the BPI process. It can almost double the level of CO2 present in the facility.

In addition to accepting much higher levels of CO2 the engineer/end user will also have to accept the fact that ozone is going to be produced by this process as well. All BPI and UV technologies increase the level of CO2 and produce ozone. Contrary to what some manufacturers will promote, there is no exception. It is part of the process.

The CosaTron Advantage

With our technology the level of CO2 will be decreased by 10-20% by normal operation. That means that even if a facility was set up under the VRP method of OA, and demand ventilation is employed, we will benefit the end user because removing 10-20% of the CO2 is going to drive the overall CO2 level below the set point far more often resulting in modulating away for OA. This is the only way an

air purification system can help a facility under the VRP procedure save any money in reduced OA. No other technology can accomplish the same thing.

The bigger impact (cost savings) will be achieved by employing CosaTron under the IAQP method. We can utilize the parameters used under the VRP method to calculate the contaminate mass balance using CosaTron and compare it to the original VRP mass balance contaminate value. It will be significantly lower and will have been performed at a significantly lower OA level which will allow an engineer to use the new OA value.

In virtually all cases where this comparison has been made the resulting OA reduction is between 60-70%. We have a form on the rep only site that you only have to use to provide us with the basic parameters and from that we will perform the contaminate mass balance (CMB) calculation that can be provided to the engineer.

We are able to provide all the benefits of OA reductions that the BPI technologies have been utilizing, but with the following additional benefits;

1) We will truly reduce contaminates. Most reports show that the other technologies have little or no evidence of actually reducing contaminates.
2) We will reduce the level of CO2 so even if an engineer still wants to use the VRP method and employ demand ventilation we will save the owner energy cost.
3) The engineer/end user will NOT have to settle for elevated levels of CO2. Not only does our system not add CO2, but as stated, we actually remove CO2.
4) NO ozone. All BPI and UV processes produce ozone. We have UL testing just performed in the UL lab in Atlanta to show that we not only do not produce ozone, but we actually REMOVE ozone as well.

BPI technologies have to justify elevated levels of CO2. The medical community has performed many studies to demonstrate that even levels as high as 1,000 ppm will have some detrimental effects, especially on children.

Levels, above 2,000 ppm have serious negative effects as shown on the Power Point presentation on Outside Air Reduction. The typical BPI system will result (by their own documentation) of CO2 levels will above 2,700 ppm and higher.

We have created the accompanying Power Point Presentation to assist you in presenting our ability to reduce OA whether using the VRP method or the more substantial IAQP method.

The details of this narrative are shown as talking points in the PPT, as well as, and example of a school building with the savings in OA detailed using CosaTron.

If at any point there are questions regarding the PPT or help needed in presenting this please do not hesitate to contact us.

CosaTron

Because Clean Air Matters

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