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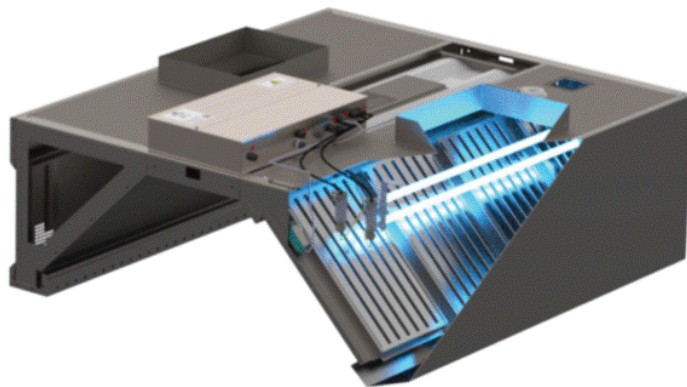
New OGR-UV Technology for

Self-Cleaning Hoods



OGR-UV TECHNOLOGY

Enables Functioning and
Affordable Self-Cleaning Kitchen
Hoods



OGR

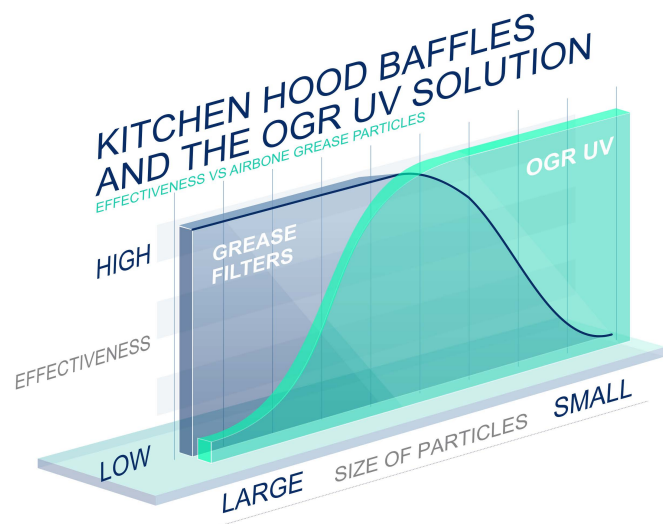
In 2019 and after many years of research, BioZone Scientific, a global leader in UV technologies, developed and patented a new UV kitchen hood system with an aim to overcome the shortcomings of earlier UV systems (US Patent # 10337749).

This new system, OGR, is specifically designed for kitchen hood operating environments with superior performance at the operating temperatures and conditions found in kitchen exhaust systems. OGR's patented technology is a more economical method of UV treatment in kitchen hoods, which provides value to a much larger segment of the kitchen hood market. If UV systems were thought to be too expensive for projects in the past, OGR is now a viable solution that should be considered.

The smaller particle grease vapor and effluents that are not collected by the grease filter are efficiently converted by OGR into non-combustible compounds that will not collect in the ductwork. OGR and the grease filters work jointly, effectively treating both larger and small particles, to keep the duct system, exhaust fan and any downstream air pollution control device clean.

BENEFITS OF OGR UV KITCHEN HOOD SYSTEM

- Reduces hood and duct cleaning requirements drastically
- Provides fire protection by preventing accumulation of combustible compounds in hoods and ducts
- Eliminates unwanted odors of the kitchen exhaust air
- Versatile design. Can be used in any hood
- No waste water produced
- No chemicals used



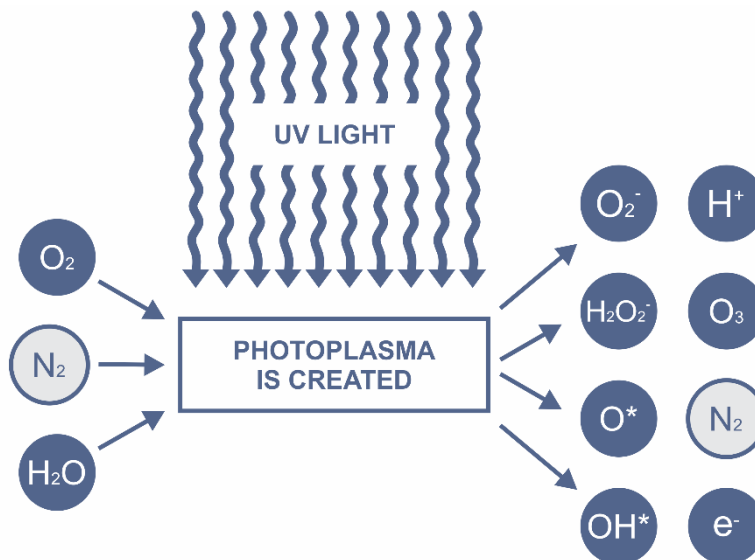
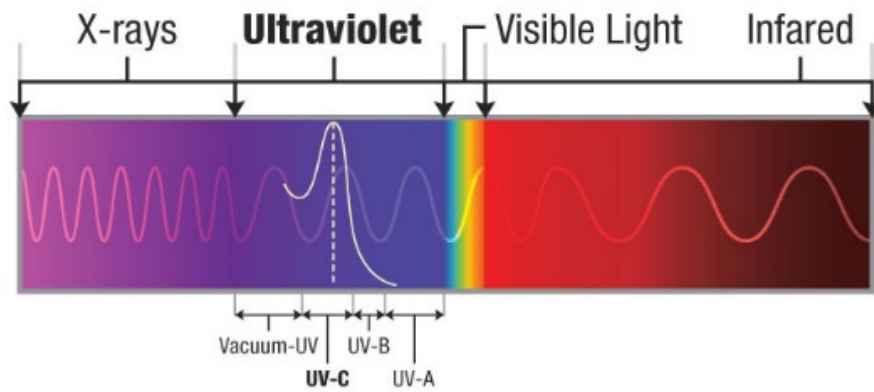
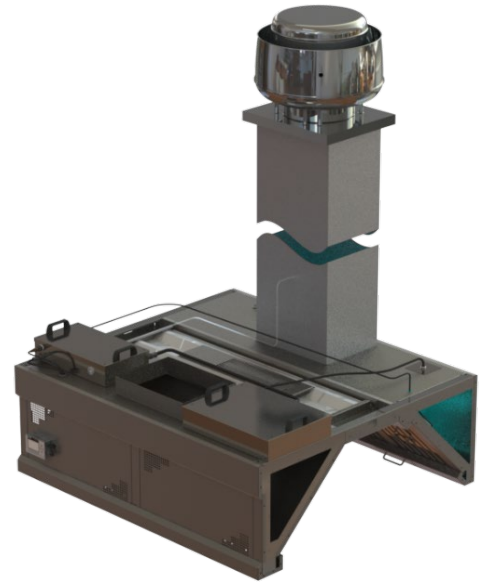
Never clean your kitchen hood again!

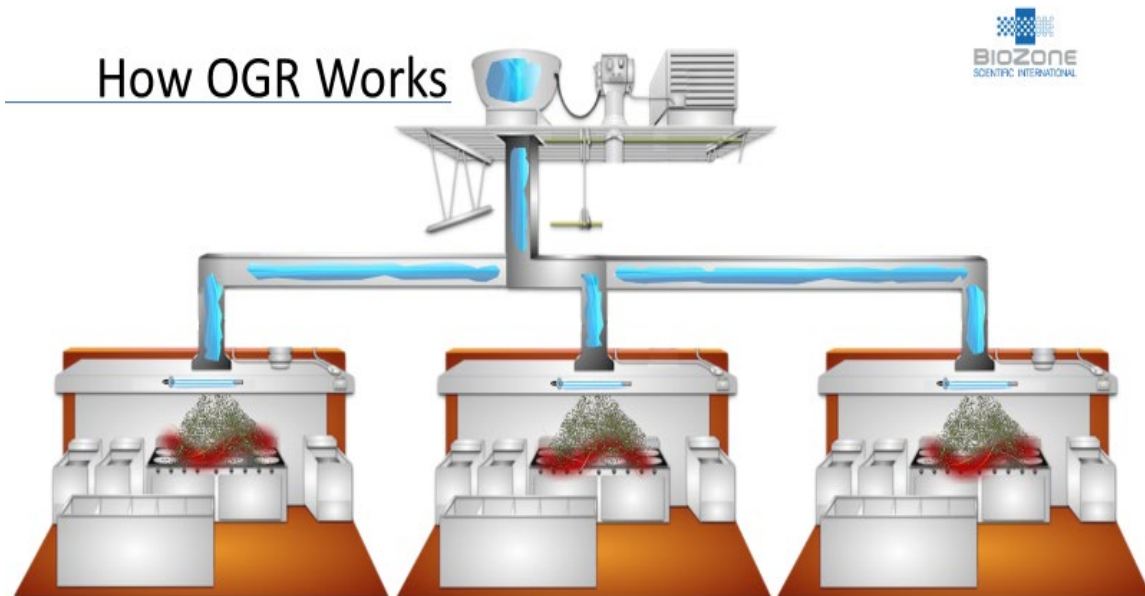
HOW OGR WORKS

OGR utilizes patented technology that combines the powerful effects of both UV light and photoplasma to create a photochemical reaction that converts grease and odors into carbon dioxide, water vapor and microscopic non-grease compounds.

None of the resultant compounds support fire or collect in the ductwork.

UV light is an US FDA-approved method for sterilization and disinfection in food processes. Photoplasma is a well-known and widely published method of oxidation that can be used to efficiently convert unsafe or undesirable compounds like grease and odors into safer and more manageable substances.





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OGR keeps hoods and the entire exhaust air system clean of grease and oil. In many cases, no other exhaust air treatment is needed.

Summary of OGR benefits

Eliminates unwanted odors of the kitchen exhaust air

Reduces need for other exhaust air treatment (ECU, PCU, EP, Water Wash, etc.)

Reduces hood and duct cleaning requirements drastically

Provides fire protection by preventing accumulation of combustible compounds in hoods and ducts

Versatile design - can be used in any hood

Easy and fast factory and field installations

Easy and fast lamp changes

Utilizes fewer lamps than previous UV systems

Less maintenance than on previous UV systems

No chemicals used

No waste water produced

Problems with Early UV Kitchen Hood Systems

Lamps lacked sufficient power to be effective

Lamps required weekly cleaning to function properly, which users were not performing

Systems were expensive and priced out of all but the high-end market

Maintenance of the system and lamp replacement were arduous

Systems lacked appropriate and effective safety controls

Technical failures caused prolonged equipment downtime

UV systems frequently value-engineered out of projects

Problems eroded the potential value proposition that the early systems promised

Manufacturers of competing technologies to UV kitchen hood systems, including filtration and pollution control systems, seized upon the early stalled efforts to vilify the application.

One manufacturer of popular pollution control systems, perhaps in fear of the potential competition, went as far as to sponsor a private engineering report assessing the limitations of early UV systems.

This report, despite radical changes and advances in UV technologies since the date of publication, is still cited on the company's website to this day. None of the limitations of UV systems mentioned in the report are applicable to the OGR system.

OGR compared to first-generation UV Kitchen Hood Systems

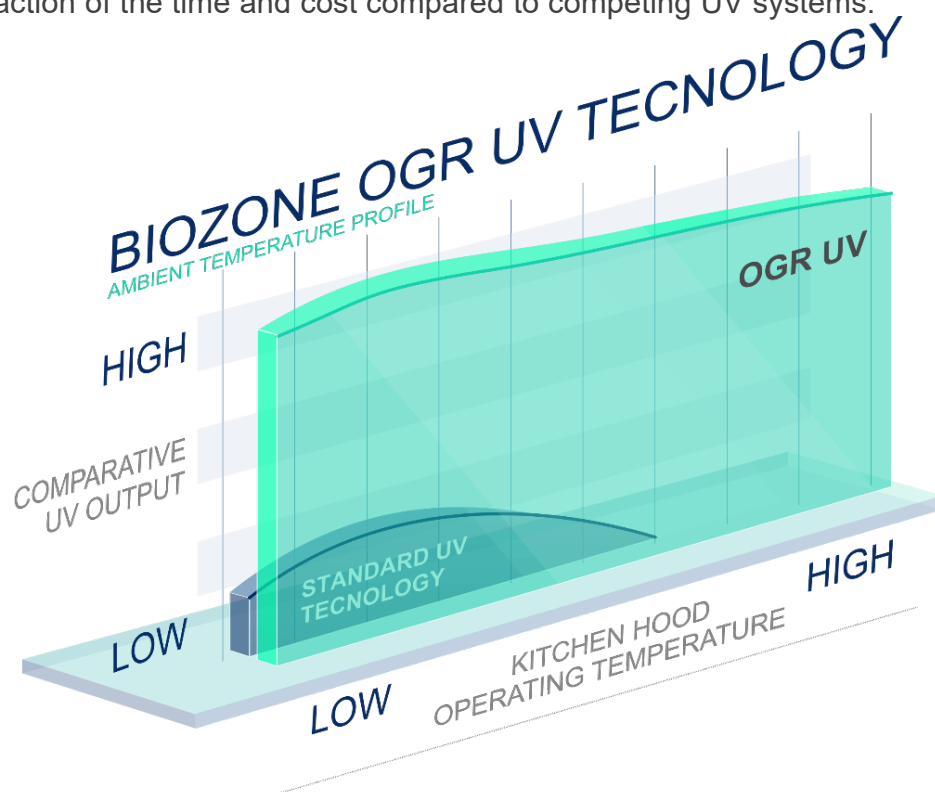
First-generation UV kitchen hood systems were first developed in the late 1990s and are still available on the market by some kitchen hood manufacturers. These systems utilize dated UV lamp technology from the 1970s that is optimized for use in water treatment environments.

The realities of kitchen hood exhaust environments, which include high temperatures and fast-moving air, are a challenging combination for the UV lamps used in competing UV kitchen hood systems.

These kitchen hood environments will cripple conventional UV lamp output down to ~10% of the lamp's output at ambient conditions. In 2019 BioZone Scientific developed a state-of-the-art UV lamp technology optimized to operate in the demanding environments of kitchen hoods (US Patent # 10337749).

OGR UV lamp can replace several UV lamps from competitive UV systems, depending on specific circumstances. Because competing systems utilize such low power and inefficient UV lamps, they require in some cases dozens of lamps and expensive and elaborate mounting structures to house their lamps. Such mounting structure add no value and no benefit to the customer, but do add significant cost to the UV kitchen hood system and its cleaning and maintenance.

OGR utilizes such powerful and efficient UV lamps, elaborate and expensive mounting systems are not required. The installation of OGR, due to the simplification of the system, takes a fraction of the time and cost compared to competing UV systems.



OGR compared to corona discharge ozone generators

Corona discharge systems, also known as ozone generators, are advertised to treat kitchen exhaust by reducing grease and odors in the exhaust air.

The corona discharge process is a high-voltage system that creates an electrical discharge in the air between two metallic conducting plates, converting some of the oxygen in the air (O₂) into ozone (O₃).

Corona discharge ozone generators are traditionally installed in a side duct that is installed above the kitchen hood and tied into the existing exhaust ducting. Through a venturi effect, the ozone produced by the corona system is then fed into the exhaust ducting. There are several key shortcomings and disadvantages to this arrangement, including the fact that the kitchen hood is not treated, and by installing the corona system further downstream, there is much less dwell time for the ozone to react with grease and odors in the exhaust.

By installing OGR inside of the kitchen hood, the kitchen hood is kept clean and free of accumulated grease. In addition, the OGR system maximizes dwell time between photoplasma and the grease and odor compounds carried throughout the exhaust ducting. The combined UV light and photoplasma used in OGR has been shown in peer review journal articles to be more than 100 times more effective than ozone alone.

In addition to producing ozone, corona discharge systems are also known to produce nitrogen oxide compounds (NO_x), which create toxic and corrosive nitric acid (HNO₃) in the presence of water vapor.

Brief History of the use of Ultraviolet Light in Kitchen Hoods

Ultraviolet (henceforth “UV”) light has been used in commercial kitchen hoods to remove grease and odors since the late 1990s. Early UV kitchen hood systems borrowed from technology and knowhow that had been pioneered in water disinfection systems, which had been common for decades and was in widespread use by that point.

The primary intended use for UV in commercial kitchen hoods is for the reduction of grease and odor particles in the exhaust effluent, including in the hood plenum and the exhaust ducting. In this application, UV lamps are mounted inside of the hood, behind the baffles and near the duct collar. Grease vapor and effluents that are not collected by the baffle filter pass over the UV lamps.

For the grease that would normally collect in the hood, ductwork and exhaust fan, a photochemical reaction converts this grease to carbon dioxide, water vapor and microscopic non-grease compounds. None of the compounds support fire or collect in the ductwork. The lack of grease collection is a major benefit because it helps keep the duct system, exhaust fan and any downstream air pollution control device clean.

This process drastically reduces any steam cleaning requirements and costs, and offers additional fire protection by preventing the accumulation of combustible compounds throughout the exhaust system. Furthermore, UV kitchen hood systems offer an economical and efficient remediation for unwanted kitchen odors.

First-generations UV hoods were not without their problems. Early models depended too heavily on components and equipment that was not optimized for the challenging operating conditions of commercial kitchen exhaust systems, mainly the high temperatures and high air velocity. As a result, these early UV systems suffered from a host of problems, including early component failure, complicated installation, extensive system downtime, blocked airflow, and others. In addition, the performance of the UV hood systems often fell short of the intended target due to inadequate design and limitations of the existing technology of the time.

Frequently Asked Questions

How effective is OGR in removing grease and odors?

Independent third-party studies have demonstrated that OGR can remove over 95% of grease and odors from kitchen hood exhaust systems. This process drastically reduces any steam cleaning requirements and costs, and offers additional fire protection by preventing the accumulation of combustible compounds throughout the exhaust system.

How does OGR work?

OGR utilizes patented technology that combines the powerful effects of both UV light and photoplasma to create a photochemical reaction that converts over 95% of the grease and odors into carbon dioxide, water vapor and microscopic non-grease compounds. None of the resultant compounds support fire or collect in the ductwork. UV light is an FDA-approved method for sterilization and disinfection in food processes. Photoplasma is a well known and widely published method of oxidation that can be used to efficiently convert unsafe or undesirable compounds like grease and odors into safer and more manageable substances.

How is OGR different than traditional UV systems for kitchen hoods?

Competing UV technologies utilize dated UV lamp technology from the 1970s that is optimized for use in water treatment environments. The realities of kitchen hood exhaust environments, which include high temperatures and fast-moving air, are a disastrous combination for the UV lamps used in competing UV kitchen hood systems. The kitchen hood environments will diminish conventional UV lamp output down to ~10% of the lamp's output at ambient conditions. In 2019 BioZone Scientific developed a state-of-the-art UV lamp technology optimized to operate in the demanding environments of kitchen hoods (US Patent # 10337749). OGR UV lamp can replace several UV lamps from competitive UV systems.

How does OGR compare to corona discharge ozone generator systems for kitchen hoods?

Corona discharge ozone generators are traditionally installed in a side duct that is installed above the kitchen hood and tied into the existing exhaust ducting. Through a venturi effect, the ozone produced by the corona system is then fed into the exhaust ducting. There are several key shortcomings and disadvantages to this arrangement, including the fact that the kitchen hood is not treated, and by installing the corona system further downstream, there is much less dwell time for the ozone to react with grease and odors in the exhaust. By installing OGR inside of the kitchen hood, the kitchen hood is kept clean and free of accumulated grease. In addition, the OGR system maximizes dwell time between photoplasma and the grease and odor compounds carried throughout the exhaust ducting. The combined UV light and photoplasma used in OGR has been shown in peer review journal articles to be more than 100 times more effective than ozone alone.

How much does OGR cost?

Your local BioZone Scientific selling partner can recommend the OGR system appropriate for your project based on the exhaust air volume and dimensions of your kitchen hood. A detailed quote complete with drawings and specifications will be prepared by your local BioZone Scientific selling partner.

Who can install OGR?

OGR should be installed by a licensed and experienced mechanical contractor familiar with kitchen hood equipment. OGR may also be available as a factory installed option from the kitchen hood manufacturer.

Do kitchen hood manufacturers sell OGR?

Yes! Many manufacturers of kitchen hoods offer UV systems, including OGR, from BioZone Scientific. Some kitchen hood manufacturers offer a private labeled version of OGR supplied by BioZone scientific, marketed and sold under the trade name of the hood manufacturer.

Is OGR compatible with water wash systems?

OGR is compatible with water wash systems. However, water wash systems are typically not required when OGR is installed on a kitchen hood, as the function of both systems would be redundant. OGR can typically be installed at a fraction of the cost of a water wash system, and OGR is certainly better for the environment because it consumes no water and requires a fraction of the electrical consumption of a water wash system.

Is OGR compatible with pollution control systems?

OGR is compatible with pollution control systems, in fact many kitchen hood manufactures that offer OGR will highly recommend the OGR system to be paired with a pollution control system. By removing over 95% of grease and odors from the exhaust system, OGR can substantially extend the life of the media and activated carbon filtration systems.

In some cases, OGR can even replace entire pollution control system, or enables use of much lighter and economical filtering system.

Does OGR remove smoke from exhaust air?

OGR does not remove smoke from exhaust air. OGR is designed to remove grease and odor from the exhaust air and can be paired with a pollution control system to offer a complete solution to remove grease, odor, and smoke from the exhaust air.

What materials is OGR made out of?

Inside of the kitchen hood, the OGR system is comprised of hood-safe and food-safe materials including 304 stainless steel, ceramic, glass, Teflon, and high temperature silicon and plastics.

Can the OGR system be integrated with our BMS/BAS?

BMS/BAS integration is an available feature of the OGR system. Please contact your local BioZone Scientific selling partner for more information about BMS/BAS integration capability and requirements.

How much electricity does the OGR system consume and what type of electrical connection is needed?

The typical OGR system will consume between 2-6A and should be supplied with 240V AC 60Hz single phase input power. Note that 208V AC power is not acceptable for the OGR system.

How do I know what type of OGR system I need for my kitchen hood?

Your local BioZone Scientific selling partner can recommend the OGR system appropriate for your project, based on the exhaust air volume and dimensions of your kitchen hood.

Is the OGR system safe?

OGR is designed with a number of standard safety systems installed. The standard safety systems include:

- integration with the kitchen hood fan so that OGR is enabled to treat the exhaust air whenever the fan is operating
- integration with the pressure switch so that OGR is deenergized whenever there is blocked or impeded exhaust air in the ducting
- safety switches for the baffle filters and other access panels so that the OGR system is deenergized whenever the UV lamps would be revealed. Exposed UV light can irritate skin, and this safety system prevents accidental exposure.

What maintenance is required for the OGR system?

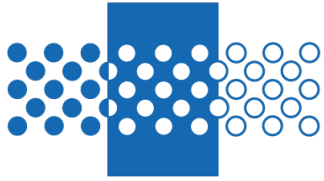
OGR neither requires nor consumes any water or hazardous chemicals. OGR requires an annual replacement of UV lamps.

Where can OGR UV Lamps be discarded?

UV lamps should be discarded via the appropriate waste stream designated by the local municipality. Visit www.lamprecycle.org for more information.

Can the OGR system work with our existing kitchen hood controls?

The OGR system can be integrated into the existing kitchen hood controls. The standard integration would be to tie the OGR system into the kitchen hood fan contactor.



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