

>> The secret behind Prestyl's  
far infrared heating systems.



Introducing a smarter, healthier,  
more efficient heating.



**PRESTYL**

## The secret behind Prestyl's far infrared heating systems.

With more than sixteen years of development and OEM deployment, it is safe to say that Prestyl's thin-film technology with a life expectancy of possibly 50 years or more is among the world's most dependable products available.

The core of our heating technology is a unique proprietary alloy that features heating characteristics not found in any competitor's product. This alloy is deposited on a base layer of Mylar and is "printed" on a custom printing press at a rate of 2 miles (3.2 km) per hour. The printed film is etched in a process similar to that used in the manufacturing of printed circuit boards and after the etching, washing and drying process the film is laminated with a second layer of Mylar and sealed. Depending on the use an adhesive layer and/or buffer layer is added and the sections are cut and contacts are added. The film is now ready to be placed in the Aluminum housings.

The housings are constructed from pure, 100% recyclable, high-quality Aluminum rolls. The unique (proprietary) design prevents warping and allows the far-infrared heating-panel fronts to be "floating" while providing the best far-infrared transfer possible. The panels contain no heating coils or moving parts; the only mechanical device is a code required thermal cutout. Since it is unlikely it will ever be activated, the usable life of this device is expected to be in the dozens of years.

Prestyl's panels come in white and black as (standard).


Architectural colors (special order and possible additional charges). For its printed image panels, Prestyl works with a highly experienced printing firm that uses UV cured high-temperature durable inks so the images are expected to last many years without fading or discoloring.

Standard US/Canadian panels are 120 Volts and 240 Volts.


For commercial installations the panels are available in both 208, and 277 Volts (Special order; typical lead time 4-6 weeks.)

EU panels are 230/240 Volts and panels for Japan are 100 and 200 Volts



 Prestyl  
Far-infrared heater



 Prestyl  
Far-infrared heater

## Advantages and Applications of Prestyl's Far -Infrared film

The unique thin-film technology was developed for some of the world's best-known companies in a variety of OEM products worldwide. This film is extremely efficient and reliable, typically saving as much as 15 to 50% or more over traditional heating methods. Prestyl developed aesthetically pleasing "plug & play" radiant artworks using this thin film technology and today the panels are manufactured in the State of Washington.

When the weather gets really cold, Prestyl shines. Prestyl's unique Aluminum Hybrid film is designed to start-up regardless how cold it is; during extremely low temperatures all carbon based competitor's products will fail to start-up (most do not work until the ambient temperature is above 5 degrees Fahrenheit (-15 degrees Celsius)).

### Prestyl technology can be found in...

- Homes, Buildings, Industrial complexes and places of worship from the ancient to the most modern creations
- The world's fastest passenger trains
- The world's largest passenger vessel
- Boats, both small and large
- Recreational Vehicles
- Modern automobiles (defrosting, deicing and heating)
- Battery-powered and Hybrid Vehicles (battery conditioning for higher efficiency)
- Agricultural applications
- Other OEM (Original Equipment Manufacturer) applications. Products produced include Winter Construction Solutions, heated clothing, heated horse blankets, roll-up heated awnings, towel heaters, mirror heaters, etc. (UL on several of these products is expected Q4, 2013)

### Reliability

Unlike traditional heating products which can be accessed and serviced easily, ILO/Prestyl's products are designed to be installed in tight, often inaccessible places. One such application is the heating of passenger rail cars. The heating film can be applied between the floor's layers or incorporated in the walls or ceiling/roof. In Europe, a rail car may see a 4-8 year life cycle, but after this, it may be sold to third-world countries where these have an expected service life of 30-50 years.

Other applications are behind the plasterboard in ceilings of homes, schools and offices. Although the product is guaranteed for a few years, the life expectancy is many decades. Nearly all products ever produced are still in service.



## The Electromagnetic Light Spectrum Identified

**Ultraviolet light** has a high frequency and thus a short wavelength that possesses a large amount of energy. This energy is great for solar collectors and plants, but it can cause our skin to burn or even develop cancer after prolonged exposure.

**Visible light** has a lower frequency containing less energy; it allows us to see.

**Infrared light** has the lowest frequency of all and therefore also the lowest energy level. Infrared is absorbed, stored and “re-transmitted”. Every object emits Infrared energy; when an object has a higher temperature than its surroundings, the Infrared light it emits will warm-up nearby objects. This is also called “indirect” heating.

**Far-infrared** is the most efficient and healthiest way to heat people and objects.

Like with the sun, Prestyl’s thin-film technology heats surfaces which in turn will heat floors, walls and the objects contained within a space. Prestyl only produces safe and known healthy “invisible light” at wavelengths in the 7,500 to 10,000 nm (7.5 to 10 micrometer); this region of the spectrum is also called “Far-or Therapeutic infrared”.

In contrast, other infrared appliances, such as infrared heat lamps can reach temperatures up to 4,000 °F (2,200 °C); these operate in the visible part of the infrared spectrum and will actually cause eye and skin or eye damage during prolonged exposure. Remember, Prestyl operates only in the very safe and therapeutic “Far-infrared”.

Prestyl’s proprietary thin-film technology produces ultra-low temperatures in the 200 °F (95 °C) range; about the temperature of a cup filled with coffee. Besides the immediate effect of warming the people in the space, Prestyl’s far-infrared operates at a part of the spectrum that allows it to travel through the air virtually unimpeded to heat floors and other surfaces. The primary advantage is heat saturation, so when doors or windows are opened the warmth does not escape, but stays in the floor and objects. Within seconds to minutes of closing the door or window the space is warm again. Unlike with traditional heating, there are no transportation or “duct losses”; no conversion losses and no air-flow losses; all stored energy can be used.



Prestyl Far-infrared heater



## What Is Infrared?

Before we can explain “Infrared” we must first understand that there are three basic means of transferring “heat energy”; Conduction, Convection and Infrared radiant.

### Conduction

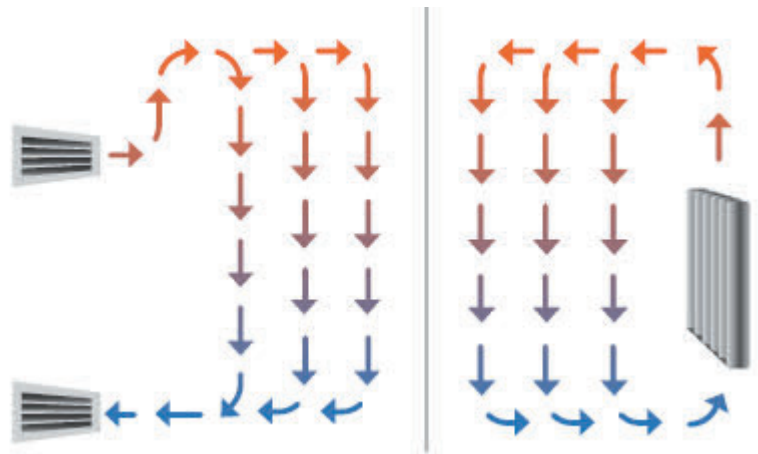


With conduction, heat energy flows from the hottest to the coolest object until the temperatures are equal.

With conduction, “matter” or material is used as the transport medium. For instance the cooking pan: The bottom of the pan is heated by a gas flame, or electric element, and the heat is then conducted to the inside of the pan. The heat will always travel from the hottest area (the bottom of the pan) to the coldest area (in this case the food in the pan) until both are equal in temperature.

### Convection

With convection the air is used as the medium for heat transport. This particular way of heating is widely used in residential and commercial applications worldwide. This can be a hot air/forced air system, such as used throughout North America, or a water/steam-based system whereby a radiator heats the air - - warm air that rises to the ceiling and cold air pulled through the return ducting or radiator’s base, where it is heated again and creates an airflow which heats the entire space. Although convection has been used for generations, it is a poor and inefficient way of heating a space; the hot air rises and especially in tall buildings as much as 50-70% of the heat can be wasted (the hot air rises to the open space above while the lower regions can be cold).



Hot air systems and “radiators” heat the air. Hot air rises and cooler air returns to the floor to be heated again this process is called “convection”.

For humans, the upper body warms up, but with many systems the feet stay cold.

Circulating air moves dust, fungi and pollen; the hot air escapes when doors or windows are opened



## How does Prestyl's Infrared work?

### Infrared Radiant

Infrared Heating (IR) requires no medium to transport warmth. When the invisible (infrared) light collides with (or is absorbed by) surfaces, including the human body, warmth is generated. This is also known as "direct" heating or the same sort of heating we experience through the sun.

The primary advantage of Infrared-energy over any other means of heating is that the Infrared warmth can be stored in objects. A good example is the sun. After it has been shining on a brick wall, this wall still generates warmth even after the sun has gone down (in summer this may be for many hours).

It should be noted that besides infrared, the sun's rays contain light in various wavelengths, or "bands"; some are designed to help the plants and trees, others are used to generate photovoltaic solar energy, and infrared is used to heat the earth's surface and objects.

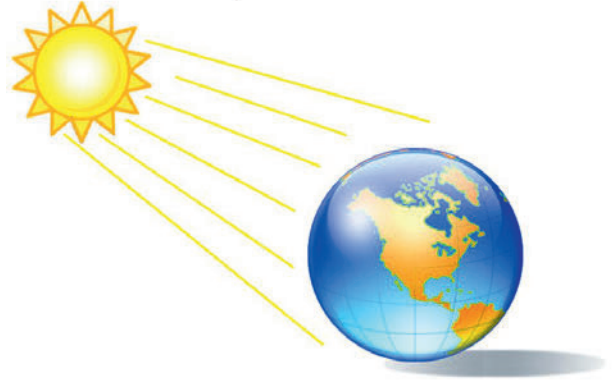
As depicted in the illustration above, Prestyl's infrared energy is best compared to the warmth of the sun. The vast amount of energy emitted by the sun is transported to the surface via electromagnetic beams that are divided into different wavelengths. The unit for this subdivision is nanometer. (1 nm= 1 millionth of a millimeter or 0.001 micrometer).

Each wavelength transports a certain amount of energy. The higher the frequency of these waves, the shorter the wavelength and the shorter the wavelength the more energy it can carry, in other words: the higher the frequency, the shorter the wavelength, and the higher the energy level.

The sun's rays are partly absorbed by the atmosphere and only a small portion reaches earth.

Rays that do reach the earth's surface contain a number of wavelengths representing both visible and invisible light; ranging from Ultraviolet light (UV) - - then traveling through the visible light -- to the Infrared (IR) portion of the spectrum.

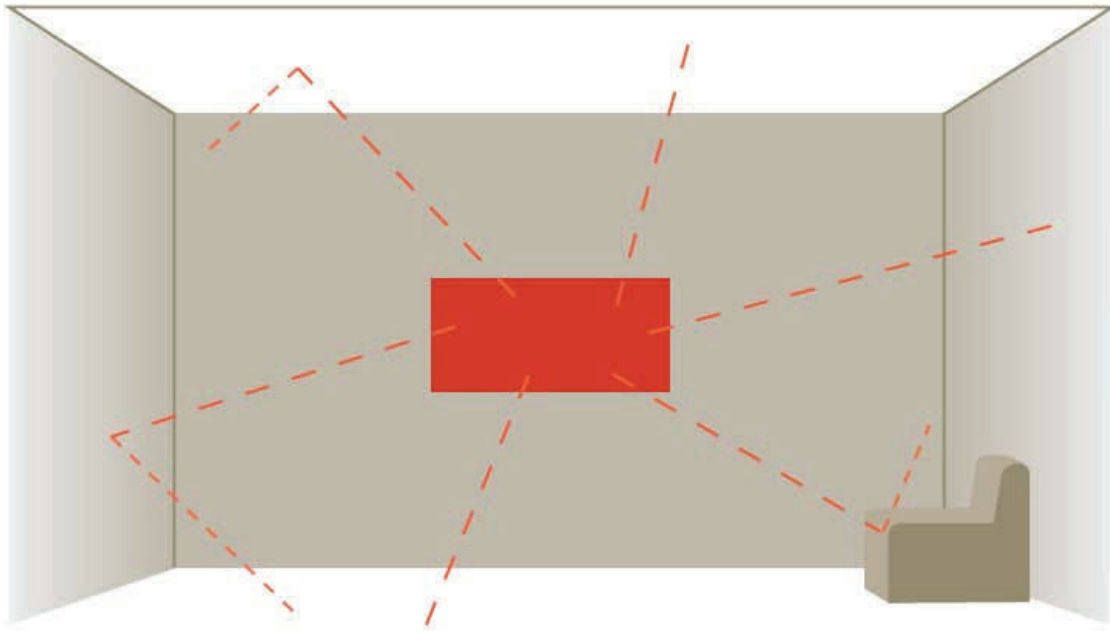
The sun is the Earth's only source of natural heat; it is 94 million miles or 150 million km away from the earth.



Even at this distance, the earth still receives the equivalent of 127.3 Watts of infrared heat energy per square foot, or 1.37 kW per m<sup>2</sup>



## Prestyl's Far-Infrared at work



Heat-energy is stored in both the floor and in the wall/objects in the room; the floor and objects release the stored heat-energy over time. Air flowing past the walls and warm objects is used by the room-thermostat to control the “room temperature”. Because the air is heated indirectly, the actual comfort (room) temperature will be lower than with conventional technologies; the difference between floor and ceiling in a properly designed system will only be 1 or 2 degrees - no more hot head & cold feet.

Since Prestyl is able to store the heat energy at night (and other times when the rates are lower) and release this energy during the day, this can be used to save even more on energy bills.

Most power grids are pushed to the limit when the workday starts, but have excess energy during the night so switching to Prestyl's far-infrared heating allows the consumer or commercial client to use electricity during the inexpensive “night tariff” and not use any heating energy for heating until later in the day. Hence, switching to Prestyl's far-infrared heating will help balance energy provider's electrical load which has an immediate positive environmental impact (fewer harmful emissions through the reduction of peak demand).



## Industrial heating: Prestyl's Factory heated by Prestyl's Far-Infrared

At Prestyl we do not simply sell a product; we first try it ourselves and make sure it works. Since we moved into our Spokane Washington manufacturing facility and warehouse, the building has been heated exclusively by Prestyl's Fra-infrared (IR) heating panels; there is no other heat in the building.

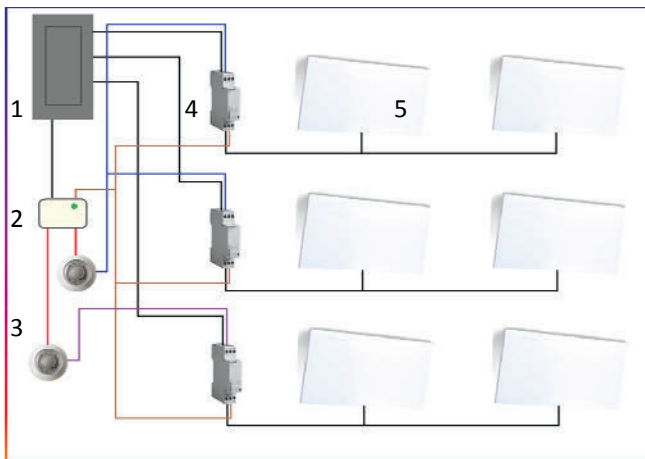
Prestyl's building is in a moderately cold area; though normally temperatures do not get this low, the record low temperature was -25 degrees Fahrenheit or -31.5 Celsius (1968). The building features very high ceilings that would normally require excessive amounts of convection heat and the floor would still be cold; by suspending the panels on chains we are able to keep the floor and work space temperatures comfortable (even when the shipping doors are open). The temperatures at roof-level are only a few degrees above the floor temperature (this is impossible with convection heating) and thus we save a lot of energy.



In Prestyl's factory, the system is configured with three zones; it is controlled by three standard low-voltage thermostats that control a set of hybrid relays, which in turn control the panels.

Zone 1 controls the office, Zone 2 the main manufacturing area, and Zone 3 the warehouse.

In buildings with large spaces, "zoning" can be used to balance the space and compensate for north/south exposures. In Summer for balancing air-conditioning systems



The following are the key components that make up a Prestyl system (see diagram on the left)

1. Breaker box
2. Power supply (required if DC controlled hybrid relays are used)
3. Thermostats (one per Comfort Zone)
4. Hybrid relays (recommended for longevity)
5. Prestyl's heating panels





## Prestyl's Far-Infrared PRUD, under desk series

Summer or Winter (balance AC systems or provide supplemental heat); Prestyl's thin-film far-infrared technology is now available with an attached mounting flange for easy installation for under desks, counters, work benches, cubicle walls, etc. This makes it ideal for task specific heat, bringing the heat right to where you need it. There is even a low-power version measuring 1' x 3' (300 x 900mm) for under church pews or stadium-bench heating.



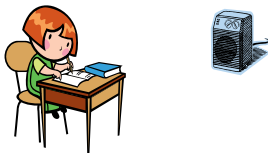
To the employee the benefits of Prestyl's far-infrared are comfort, no more noise, no more "hot head - cold feet syndrome".

To the employer the benefits are huge energy and operating cost savings. Below is a study done in St. John's Newfoundland; it is based on \$0.12 Canadian per Kilowatt (about the same as it would be in the USA based on current exchange rates)



### Space heaters and their shortcomings

- ◆ Like base-board heaters, a typical space heater works on the principle of convection (hot air)
- ◆ Space heaters are typically 1500 to 2500 Watts
- ◆ Space heaters are generally noisy and disruptive
- ◆ Space heaters can cause massive imbalance issues in "green buildings"; space heaters used by many can collectively burn more energy than the entire building's climate control system
- ◆ The operating cost of a 1500 Watt space heater operating 9 hours a day on a 60% duty-cycle equals 178 kW and at \$0.12 per kW this is \$21.38 a month
- ◆ For a 2500 Watt unit this is 297 kW or \$35.64 per month
- ◆ An office with 20 people using space heaters burns an extra \$428—\$713 a month on top of their normal heating bill



**Expensive to operate - wasted convection heat (hot air) -feet stay cold - noisy**

### Prestyl's solution

- ◆ Prestyl's under-desk solution works on the same principle as the sun; it heats objects, the floor and people
- ◆ Compared to space heaters there is no unnecessary heating of air that just rises to the ceiling; legs and feet are warm at a fraction of the cost
- ◆ Taking the worst possible scenario, a Prestyl under-desk unit running 9 hours at full power costs \$6.53/month (54 kW)
- ◆ With a thermostat (est. 60% duty cycle) this is \$3.90/month
- ◆ **An office with 20 people using space heaters would save between \$350 and \$635 per month** (even more if the PWM intensity controller is used)
- ◆ No more breaker popping; no more computers crashing
- ◆ Soothing and even warmth equals improved productivity



**Substantial energy savings -no more wasted convection air -feet stay warm - no noise - comfort of the sun (Summer or Winter)**



## Prestyl in Hospitals, Assisted living, Sports facilities and Yoga Studios

Together with its European hospital-industry partner Lavero, Prestyl has developed a number health industry specific products. Prestyl has become the heater of choice for many hospitals/operating rooms, institutions and yoga studios. The reason? -- **Indoor Air-quality!** Prestyl uses hypoallergenic wool-based insulation in a sealed housing; our competitors use dangerous fiberglass and in many cases this is left exposed (no rear cover).

Fiberglass particles are easily moved through the air by ventilation systems or when doors or windows are opened; these are so small that most air-filters cannot extract these.

Today, there are no safety standards or guidelines on insulation so most manufacturers are driven by cost which can compromise health safety.



Prestyl's Medical Far-infrared heating products and control systems are available from Lavero Medical BVBA

Contact Prestyl USA for details



Operating room under construction,



Prestyl's hospital series heaters installed



Lavero Operating Room Controller (designed and built by Prestyl USA),



Operating room control panel



Image of a Canadian Yoga studio  
Prestyl's 1100 Watt 42' x 42'' panels suspended from the ceiling

Prestyl heating panels have been installed into many yoga studios with excellent results.

We offer a variety of sizes and voltages to accommodate any design. Your system can be easily expanded and re configured to grow with your business. The panels are approved for wall mounting at any desired height for localized heat to overcome any cold spots...

***Prestyl's heating panels do not contain dangerous fiberglass.***

The panels are lightweight, easy to install, maintenance free, and extremely energy efficient when controlled by our new Hot Yoga controller (commercially available Q3, 2013). With this controller, the system can be programmed from low level pre-warming, to multiple step up/down intensity cycles, to accommodate your class schedules and hours of operation.

The panels can be customized with the images of your choice as well as be custom color matched to integrate into your interior design.



## >> Technical Outline

**Prestyl's panels** may be installed in commercial, residential and instructional environments; installation may be as simple as plugging the panel into a wall outlet (with or without Line-Voltage thermostat or Prestyl's proprietary "comfort Control" intensity controller). US, Canadian, and Japanese panels are available in a variety of voltages and power levels; EU panels are 230/240 Volts at different power levels.

**Health-conscious and environmentally friendly** Prestyl's housings and core film materials are constructed of 100% recyclable Aluminum. The unique proprietary design creates a lightweight, durable product while providing the best electrical to far-infrared energy transfer conceivable. Prestyl uses a hypoallergenic wool-based insulator, not dangerous fiberglass

**Installed As a system** - A system typically contains a number of Prestyl heating panels, thermostats and relays/contactors to control the panels. Prestyl has developed a number of proprietary "comfort control systems" that are scheduled to be introduced Q3, 2013. Photo/image panels may be wall-mounted; others may be mounted in a dropped system ceiling, mounted on the ceiling with supplied mounting brackets or, if higher than 14 feet (4.2 meters), suspended from chains. Alternately, where the latter is not practical, the panels may be installed as "perimeter heating" (mounted along the walls at 45-50 degree angles).

### Technology:

The core of our heating technology is a unique proprietary thin-film element built to ISO 9001 standards. The film features heating characteristics not found in any competitor's product. It is extremely efficient and reliable, typically providing savings of 15% to up to 50% over traditional heating methods (savings percentages are based on many factors such as the age of a building, old heating system, etc.). The panels contain no carbon film, no heating coils and no moving parts and are expected to have a usable life of dozens of years. Prestyl's artwork panels are printed and UV cured to be enjoyed for many years.

The typical installed wattage 4 to 6 Watts per square foot, or 41-60 Watts per square meter (depending on building conditions, mounting-height and glass present).

## >> Specs US and Canada (DC/50/60 Hz) >> EU/World & Japan (DC/50/60 Hz)

<i>Size</i>	<i>Power</i>	<i>120V</i>	<i>208V</i>	<i>240V</i>	<i>277V</i>	<i>Size</i>	<i>Power</i>	<i>100V</i>	<i>200V</i>	<i>230/240V</i>
12" x 36"	125W	N/A	N/A	0.7A	N/A	300 x 900 mm	125W	N/A	N/A	0.7A
20" x 20"	275W	2.5A	1.5A	1.3A	N/A	500 x 500 mm	275W	2.8A	1.6A	1.3A
24" x 24"	400W	4.5A	2.6A	2.3A	2.0A	600 x 600 mm	400W	5.0A	2.7A	2.3A
24" x 48"	750W	8.4A	4.8A	4.2A	3.7A	1200 x 600 mm	750W	9.0A	4.9A	4.2A
42" x 42"	1100W	12.4A	7.1A	6.2A	5.4A	1050x1050 mm	1100W	13.3A	7.2A	6.2A

**Note:** All current draws are shown at worst case (high voltage tolerance) conditions at 32 degrees Fahrenheit (0 degrees Celsius). The panels are self-regulating; the current goes down as the panels heat up

**All panels feature a 5 year limited Warranty.**



## >> Approvals and certifications

Prestyl's products have been tested and have surpassed some of the world's most stringent performance and safety standards.



International Electrotechnical Commission



Worldwide System for Conformity Testing and Certification of Electrotechnical Equipment and Components (IECEE)



Prestyl has both an Intertek ETL "C" and ETL "US" listing; the product was tested by Intertek to meet Canadian and US safety standards and that the units surpass the requirements of both CSA (Canadian) and UL (Underwriters Laboratories) standards; these conform to UL Standard 1278 and are certified to CSA Standard C22.2 No. 46



GS (Gefrüßte Sicherheit; translated "Proven Safety") is perhaps the most coveted German approval obtainable. Prestyl's products have passed the requirements and versions specifically designed for GS dominated markets are readily available.



KEMA (originally Netherlands only) is also a widely accepted approval in many countries. Prestyl meets or exceeds all of KEMA's requirements.



NF (Norme française) Prestyl's film originates in France and the company is one of the few companies worldwide that meet or exceed the NF standards.



CE (French for «Conformité Européenne») indicates that our product conforms to the norms of the European Economic Area; since 1993 it has been a mandatory conformity mark for products placed on the market in the European Economic Area (EEA).



CB (CB Certificate) - Besides the country-specific approvals, Prestyl holds a worldwide recognized CB Certificate; a CB Certificate means that Prestyl's units have passed the requirements and standards of the "International Electrotechnical Commission" and the "Worldwide System for Conformity Testing and Certification of Electrotechnical Equipment and Components" (IECEE). The CB certificate may be used in lieu of local approvals or can simply be converted to local approvals in countries that require their own approvals.

**CB Certificate Number:** IEC60335-2-30-G

**Report number:** 2147445.50A

**Class I**



**PRESTYL**