



# INDUSTRIAL SAFETY OVENS



**Pre-engineered chambers  
for handling hazardous materials.**

- ✓ Designed to satisfy the most challenging applications.
- ✓ Our engineered-to-order skills can accommodate your unique requirements.



**TPS**  
Thermal Product Solutions

Blue M is a brand of Thermal Product Solutions, LLC.

»Blue M    »Gruenberg    »Lindberg/MPH    »Lunaire  
»Redline Chambers    »Tenney    »Wisconsin Oven

[www.bluem.com](http://www.bluem.com)

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## OVEN SAFETY

The ovens in this brochure meet the highest performance standards and cover a broad range of application requirements.

### Hazardous Oven Applications

Any chamber application is considered hazardous where the heated workload can combine with the atmosphere around it to produce a flammable or explosive mixture such as when working with paints, coatings, lacquers, solvents, epoxies, resins and similar materials. There are two basic classifications of hazardous atmospheres that affect chamber selection.

- Class I involves atmospheres containing flammable gases or vapors
- Class II pertains to atmospheres containing combustible or conductive dusts

Atmospheres containing solvents normally used in finishing or coating processes are commonly classified specifically as Class I, Group D.

This classification means that an area may have enough flammable Group D solvent vapors present to produce an ignitable mixture with the surrounding environment.

Any electrical device or wiring in such an area must be totally enclosed in a suitable enclosure. It must be strong enough to withstand an explosion ignited internally by an electrical spark and cannot disintegrate or allow a flame to reach the external atmosphere. In addition, no exposed surface of the enclosure can exceed the T-Code temperature as described by NFPA 70 or the National Electric Code.

The current standard covering chamber safety features is found in the National Fire Codes prepared by the National Fire Protection Association (NFPA). This includes:

- Bulletin 70, National Electric Code
- Bulletin 86, Class A Ovens and Furnaces

### NFPA Fire Codes

These are advisory documents that have been adopted in whole or in part by various city and state governmental codes, insurance agencies (such as I.R.I. – Industrial Risk Insurance and F.M. – Factory Mutual) and by OSHA.

### Compliance procedure

An oven buyer must define the hazardous material and determine the volatile load that must be processed.

The chamber manufacturer must define the specific unit offered for the application and its safety features, wiring diagram and exhaust rates.

The chambers mentioned in this brochure are designed for specific kinds of hazardous work. If you have any questions regarding ovens for a hazardous application, please let us know.

You will find that Blue M has the ovens, resources and technological expertise to meet your requirements.

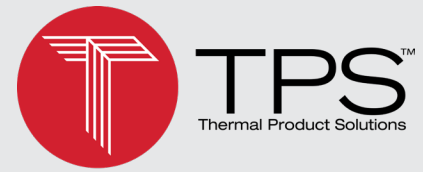
### Applications

- Aging
- Annealing
- ASTM Testing
- Curing
- Drying
- Photo Resist
- Stress Relief
- Solvents, Coatings, and Paint Curing





# OVENS

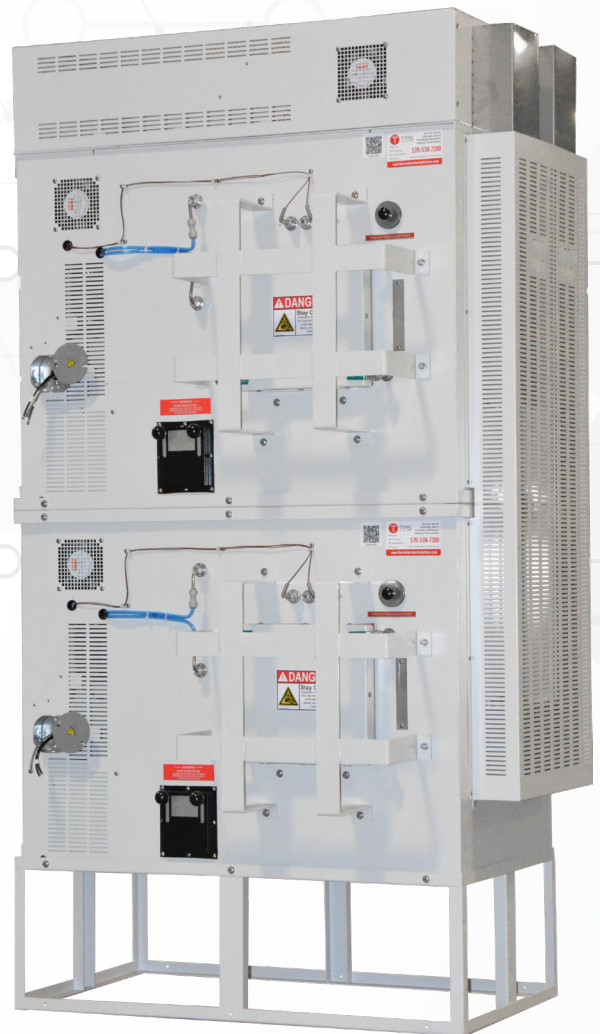


## NFPA Bulletin 86 Blue M Standard Chamber Safety Features

- **Chamber.** Interior chamber seams are heli-arc welded vapor tight to prevent fume infiltration into the insulated walls. Without proper sealing, fumes will condense on insulation and could ignite.
- **Purge timer and door switch.** These devices are provided to prevent the element heat up and allow the exhaust blowers to run for a preset time after every door opening. This clears excessive fumes from the chamber before energizing a possible ignition source, e.g., the heating elements or an electrical fault that may create an arc inside the chamber.

The system operates automatically any time the chamber door is opened or a power failure occurs.
- **Blowout relief panel.** The panel provides one square foot area per 15 cubic feet of chamber liner volume. The panel will blow out and relieve the internal chamber pressure if a low-level explosion occurs, minimizing possible damage.
- **Over-Temperature protection (OTP).** Preventing uncontrolled temperature rise is imperative. This protection device is independent of the primary control circuit and includes its own contactor to disconnect the main chamber power line.
- **Forced exhaust system.** This system maintains negative pressure inside the chamber improving the exhaust of hazardous vapors. The designed exhaust flow rate is calculated to dilute flammable vapors to a concentration well below the flammable limit. Dampers at the chamber intake and forced exhaust are factory-set to meet individual chamber exhaust requirements. An airflow switch de-energizes the heaters in the event of airflow loss.
- **Direct-drive blower systems.** Direct drive systems eliminate potential failures of belt driven systems.
- **Fire extinguishing port.** Sprinkler head, CO2 or foam systems that respond to over-temperature protection control, their own direct-flame or smoke-sensing devices are at times specified by regulatory agencies for hazardous applications.
- **Airflow interlock protection devices.** These devices shut down heating power unless blower systems are operating properly. They ensure three important aspects of operations. First is that the dilution air is thoroughly mixed with the chamber air. Secondly, that enough airflow passes over the heaters to prevent burnout. Lastly, they make certain of proper airflow during the initial purge cycle.

Two interlocks are required. An electrical interlock to disconnect the heating element circuit if the motor overload protection device disconnects the blower motor and a differential pressure switch that responds directly to airflow loss.





## FRICION-AIRE®

### Here's how it works...

The Friction-Aire oven provides a controlled environment with 100% straight-line proportional temperature performance without heating elements or electrical controls. It uses a unique high velocity airflow system to move air through a prescribed pattern to generate heat. This concept offers a number of advantages.

### Class I, Group D, Div I and II

Friction-Aire chambers can be used for a number of hazardous work applications due to the unique operating concept of providing controlled heat without heating elements. This characteristic helps solve the problem of operational safety when operating in a Class I, Group D processing environment by removing an ignition source.

Three models of the Friction-Aire family are listed by Underwriter's Laboratories. These chambers are the first—and only—electric ovens to have ever been so listed.

Friction-Aire ovens are a sound solution to the Class I, Group D processing applications. If you would like more information or need help in choosing the right chamber for your specific application requirement, please let us know. We would like to be of service.

### Greater Cost-Effective Performance

There are potential energy savings over conventional ovens. The operational concept and simplistic design features also reduce maintenance cost as well.

### Temperature Uniformity

There is no central heat source in the system. Heat is generated within the air as it moves using a blower to develop turbulence and friction. As a result, there are no hot spots or points within the chamber that exceed the indicated air temperature. Temperature stratification problems are eliminated by Friction-Aire.

### Built-in over-temperature protection

Friction-Aire ovens incorporate a unique and intrinsically safe, non-electrical overtemperature protection system. It is powered by its own secondary bellows.

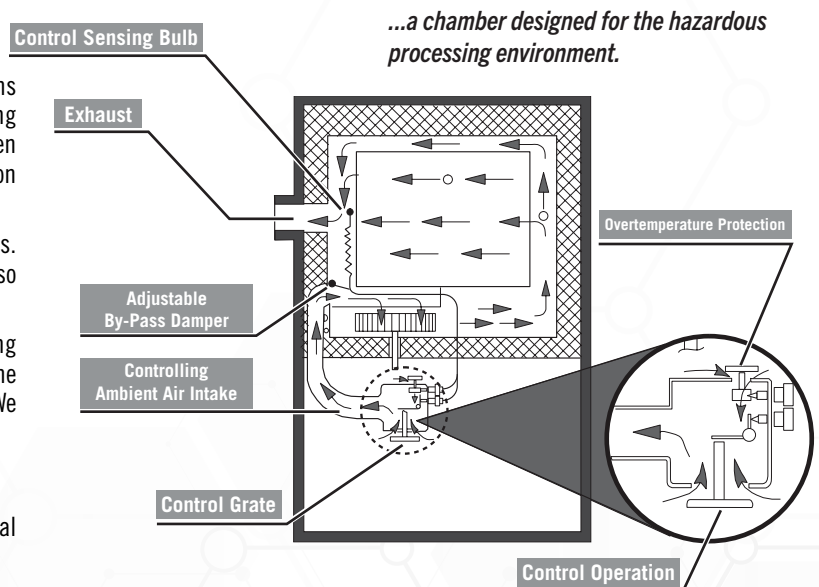
The bellows responds to its own sensing bulb. A spring-loaded vent with an inlet area greater than the control vent area is latch-closed by a reset lever on the control panel.

If the main control fails, the OTP safety-sensing bellows trips the vent latching mechanism to lock the vent in the fully open position. The resulting increase in exhaust capacity immediately drops the chamber temperature. The vent must be re-closed manually by pressing the reset lever. The oven is then ready to continue operation.

### Fast Cool-Down Rates

High-velocity air generated by the blower system is fully controllable within the work chamber and reduced to a practical rate during the work cycle.

Fast cool-down is an inherent capability of the system. Typically, an empty oven temperature will drop from +150°C to +50°C in thirty minutes.



### Natural Interlock of Blower & Heat

This characteristic means that if the motor/blower system—the only source of heat—fails, the chamber temperature will automatically drop. No dangerous temperature runaway conditions exist in this system.

If air circulation stops, there are no uncontrolled heating elements to increase oven temperature above the set point of the control.

The need for a timed purge cycle is eliminated to avoid igniting the air/solvent mixture at start-up. When product is initially placed in the oven, a high concentration of volatiles is present due to rapid evaporation from the product. If a conventional heating element design is used, this concentration must be diluted by a timed purge cycle prior to energizing the heaters. Since Friction-Aire ovens do not have resistive heating elements, this need is eliminated.

### Over-Temperature Protection (OTP)

This non-electrical system is powered by its own secondary bellows and responds to its own sensing element. A spring-loaded vent with an inlet area greater than the control vent area is latch-closed by a reset lever on control panel.

If the main control fails, a properly set OTP safety trips the vent latching mechanism to lock the vent in the fully open position. The resulting increase in exhaust capacity immediately drops chamber temperature. The vent must be re-closed by manually pressing the reset lever. Oven operation continues at safe temperature.



# OVENS



## HS Series Models

Precision electric batch ovens without heating elements or electrical controls.



Scan for additional specifications and options



### Control Operation

A temperature-sensitive bellows regulates fresh ambient air to the blower system. Temperature is set by the control dial. As the temperature rises with blower operation, the bellows expand to open and position the control gate. More air enters the system causing sharp temperature curve-off and stabilization.

An adjustable by-pass damper vane establishes control inlet pressure. When horizontal, the damper restricts path of blower only through control. Since this reduces CFM and velocity, heating is minimized for control at lower temperatures. When the damper is vertical, the system recirculates for maximum heat.

While a large air volume must be moved to generate heat, much of it passes through the by-pass chamber surrounding the work chamber. The small percentage passing through the inner chamber is practical for most applications.

Solid or Gravity side walls are available for applications involving the drying of lightweight powders and other sensitive airborne product loads.

### UL Listed Ovens

The three standard HS models (1002, 1202 and 3802) have been listed by Underwriter's Laboratories for operation in Class I, Group D hazardous locations. They are ideally suited for the testing and processing of hazardous materials, paints, solvents and lacquers. There are no heating elements in the chamber and no inherent hot spots to create potential danger. Tests show that load temperature follows closely behind chamber temperature. If the application calls for the processing of hazardous materials over extended periods, the load temperature and chamber temperature will be practically equal at all times. When chamber and load reach complete equilibrium, they will remain so indefinitely until the temperature is deliberately changed. Even if spillage of flammables inside the chamber occurs, danger is minimized since any surface the liquid encounters is only as hot as the process air.

### Non-UL Listed Ovens

The HS-362 model offers all of the operational advantages of the standard models in a size that meets higher volume processing requirements. Its design resembles the typical batch oven configuration and provides a work chamber volume of 36 cubic feet. It delivers controlled batching temperatures in a range from 25°C above ambient to +150°C (302°F). The HS-362 ovens have been specially engineered to meet the stringent design requirements of Class I, Group D service. They incorporate a relief panel and safety cage centered in the back wall, plus Class I, Group D motors and starters with approved M.I. cable and fittings. An electric, non-indicating backup OTP in a Class I, Group D enclosure is furnished as standard on this unit. A Class I, Group D door switch that shuts off the blower when the door is opened is also included as standard.



### FRICION-AIRE® HS SERIES GENERAL SPECIFICATIONS

UL Listing	UL Listed Models			Non-UL Listed Models			
Model	HS-1002†	HS-1202	HS-3802	HS-362	HS-1004†	HS-1204	HS-3804
Cubic Feet (Liters)	1.3 (36.3)	5.2 (147.3)	13.7 (388)	36.0 (1019.5)	1.3 (36.8)	5.2 (147.3)	13.7 (388)
Work Space Inches (mm) (W x D x H)	14 x 17 x 12 (36 x 43 x 30)	25 x 20 x 20 (63 x 51 x 51)	38 x 25 x 25 (96 x 63 x 63)	37 x 37 x 48 (94 x 94 x 122)	14 x 17 x 12 (36 x 43 x 30)	25 x 20 x 20 (63 x 51 x 51)	38 x 25 x 25 (96 x 63 x 63)
Temperature Range:	+20°C above ambient to +150°C (302°F)			+20°C above ambient to +260°C (500°F)			

†Bench Model



# CLASS A OVENS

**World class chamber engineering that meets NFPA Bulletin 86 requirements.**

Blue M Class A ovens are mechanical convection, electric heated chambers that include safety features recommended in NFPA Bulletin 86 as standard. The design of the chamber concedes that the element temperature may be well above the auto-ignition point of some flammable materials. However, this is mitigated by maintaining a non-explosive mixture through the use of higher than normal exhaust rates. Increased element KW compensates for this exhaust factor or increase in makeup/intake air.

In addition to meeting NFPA recommendations, this oven design has exceptional exhaust capabilities for handling solvents. A negative pressure is maintained in the work chamber that ensures that all hazardous vapors will be expelled through the exhaust duct and not through the oven, blower shaft seal or any other apertures. These ovens are complete systems. No additions are required to meet the recommendations of NFPA Bulletin 86 for processing hazardous workloads.

## ► Features

- Fully welded and sealed inner chamber made of corrosion resistant, stainless steel type 304
- All-welded, heavy-duty exterior with heavy gauge, reinforced, cold rolled steel. Baked on white, powder coated, enamel finish for long-lasting corrosion protection
- Fiberglass insulation to ensure safe cabinet skin temperature
- Exclusive Blue M Eterna heating elements – the most reliable available, with heavy gauge, high temperature, nickel chromium wire and low watt density for longer service life
- Automatic, initial timed purge air cycle
- Exhaust blower system that maintains safe air ventilation rate through the oven with a constant exchange of fresh ambient air with process air
- Door switch that disables the heat and circulation blower upon door opening. The switch also initiates the purge cycle
- Independent, overtemperature protection (high limit controller) included
- Pressure relief (blowout) panel installed in the chamber rear wall is guarded and retained by a steel safety retaining cage
- Emergency shutdown pushbutton
- Circuit breaker provided for ground fault protection as standard
- Safety warning placard is installed on the front of the oven
- Adjustable shelf levels





# OVENS



## DCSA 146 and Batch Series Models

### 11 Sizes to choose from...

Blue M ovens have earned a long-standing reputation for exceptional performance, long service life and ease of operation over a broad range of applications.

The design approach of the Class A batch system is to prevent the atmosphere within the chamber from exceeding 25% of lower flammable limit, LFL, of the solvents being processed.

In order to assure safe operations, maximum solvent amounts, exhaust flow, solvent type and operational temperature must be carefully controlled. Regular maintenance is essential.



Scan for additional Batch Series  
Oven specifications and options



Scan for additional 146 Series  
Oven specifications and options

#### BATCH SERIES CLASS A GENERAL SPECIFICATIONS

Model	166	246	326	366	606	966
Cubic Feet (Liters)	16.0	24.0	32.0	36.0	60.0	96.0
Work Space Inches (mm) (W x D x H)	24 x 24 x 48 (610 x 610 x 1219)	36 x 24 x 48 (914 x 610 x 1219)	48 x 24 x 48 (1219 x 610 x 1219)	36 x 36 x 48 (914 x 914 x 1219)	36 x 48 x 60 (914 x 1219 x 1524)	48 x 48 x 72 (1219 x 1219 x 1829)
Temperature Range:	15°C above ambient to 316°C (600°F)					

#### 146 SERIES CLASS A GENERAL SPECIFICATIONS

Model	206 <sup>†</sup>	256 <sup>†</sup>	296	336	1406
Cubic Feet (Liters)	4.2 (119)	5.8 (164)	9.0 (255)	11.0 (312)	24.0 (680)
Work Space Inches (mm) (W x D x H)	20 x 18 x 20 (508 x 457 x 508)	25 x 20 x 20 (635 x 508 x 508)	25 x 25 x 25 (635 x 635 x 635)	25 x 20 x 38 (635 x 508 x 965)	48 x 24 x 36 (1219 x 610 x 914)
Temperature Range:	15°C above ambient to 350°C (662°F)				

<sup>†</sup>Bench Model



## LOW OXYGEN CLASS A

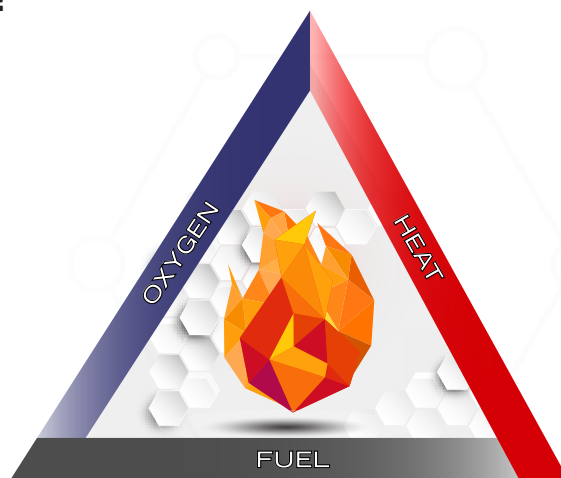
### Which safety oven is right for your process?

Standard “Class A” ovens are designed in compliance with NFPA 86. These ovens address the **FUEL** side of the triangle. Mechanical ventilation is used to dilute flammable vapors to a point where they are too lean to ignite. The process starts with a timed purge, ensuring that a minimum of four volumes of fresh air are flushed through the system before the heat source is enabled. The dilution air flow rate is calculated to prevent the vapor concentration from exceeding 25% of the LFL. If the system includes a solvent monitor, then operation at up to 50% of the LFL is permitted. Explosion venting is required on Class A ovens. The advantages of Class A ovens include the simplicity of the design, low initial cost and low maintenance. However, with high solvent loads, there will be a large make-up air flow requirement. This can result in high operating costs, due the need for constant heating of cold intake air.

“Low Oxygen Class A” ovens are also designed in compliance with NFPA 86, but they address the **OXYGEN** side of the fire triangle. These ovens use an inert atmosphere to deprive the process of atmospheric oxygen that would be necessary for combustion. An oxygen analyzer is used to supervise an initial purge cycle. Inert gas is used to drive the oxygen concentration down to a level where the mixture is no longer flammable. This level is known as the Limiting Oxidant Concentration (LOC). The analyzer verifies that the oxygen concentration is at least 3% below the LOC before allowing the heaters to be energized. The oxygen concentration is maintained at this level for the duration of the cycle. If for any reason the control system cannot hold the oxygen concentration below the LOC, then the heat is de-energized and the cycle is aborted.

Advantages of a “Low Oxygen Class A” oven include the high degree of safety, the ability to process an unlimited quantity of solvent and the low process gas flow rate. The low flow rate makes solvent recovery an attractive option for these ovens. Another advantage is that explosion relief is not required on Low Oxygen ovens. Disadvantages include the higher initial equipment cost and the ongoing cost of inert gas.

Many processes involve the heating of volatile, flammable solvents,



**THE FIRE TRIANGLE**

and these require some type of safety oven to mitigate the risk of a fire or explosion. These ovens fall roughly into three categories, depending on which side of the “fire triangle” they address - fuel, oxygen or heat (ignition source).

The triangle illustrates the three elements necessary for combustion. Safety ovens eliminate one or more of the elements in order to inhibit the combustion reaction.



Scan for additional Oven  
specifications and options



# OVENS



## NFPA 86 Low Oxygen Class A

### Oven Design

#### ► Features

- Inert Gas Purge System creates and maintains a low oxygen level in the work chamber
- Two oxygen analyzers (MSA Ultima-X series) are supplied, one used to supervise the inert gas purge cycle and one will be a redundant analyzer per NFPA 86 code
- Allen Bradley TLS-GD2 Guard Locking Switch is a positive-mode, tongue-operated interlock switch
- Solvent Condensing System
- Purged Holding Tank
- A Compressed Air System (CDA) restores a breathable atmosphere prior to unlocking the oven doors
- Pressure Relief Valves
- Gas Control Panel
- Low N2 and CDA Pressure Switch with Alarm
- Photohelic Pressure Switch
- Airflow Switches
- Emergency Shutdown Switch





## CSP-400 SERIES

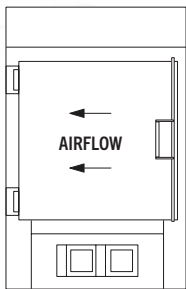
The **ONLY** Blue M oven with vertical airflow boasting the same features as the Class A and Batch oven, but in stackable configurations...

The Blue M CSP-400 Series of Class A safety ovens provides a compact, cost-effective tool that meets NFPA Bulletin 86 requirements for handling solvents and expelling hazardous vapors. The CSP-400 Series is ideal for flash curing paint samples, drying solvents, varnish or adhesives. It is also useful in laboratories that require a variety of product loads.

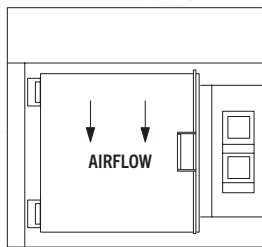
The Blue M CSP-400 Series employs the Watlow PM control system, a single-loop temperature controller featuring a bright LED display that shows set point temperature and process temperature simultaneously. Indicator LED's on the controller face log alarms and control output status during oven operation. All control functions are accessed using three large keys on the controller face, guided by prompts from the control display.

The controller monitors oven air temperature using a sheathed, J-type thermocouple, located in the oven work space. Controller software interlock prevents accidental data loss or configuration changes.

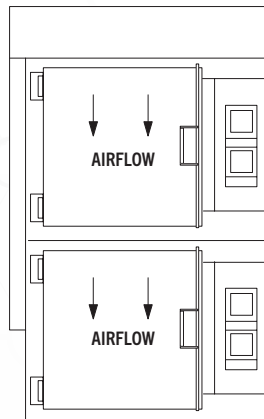
### Oven Configurations



Horizontal



Vertical



Stacked



Scan for additional CSP-400  
Oven specifications and options



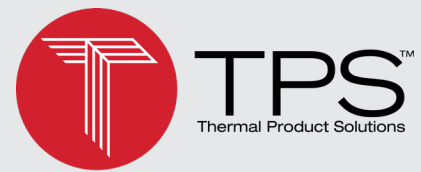
### CSP-400 SERIES GENERAL SPECIFICATIONS

Model	Single Oven Configuration (Horizontal Airflow)	Single Oven Configuration (Vertical Airflow)	Stacked Oven Configuration (Vertical Airflow)
Cubic Feet (Liters)	3.0 (85)	3.0 (85)	6.0 (170) total
# of Work Spaces	One (1)	One (1)	Two (2)
Work Space Inches (mm) (W x D x H)	18.9 x 15 x 18 (480 x 381 x 457.2)	18 x 15 x 18.9 (457.2 x 381 x 480)	18 x 15 x 18.9 (457.2 x 381 x 480)
Temperature Range	+10°C above ambient to +343°C (+650°F)		

Note: factory settings are indicated on the front door of each unit. Any change must be made by a qualified safety engineer.



# OVENS

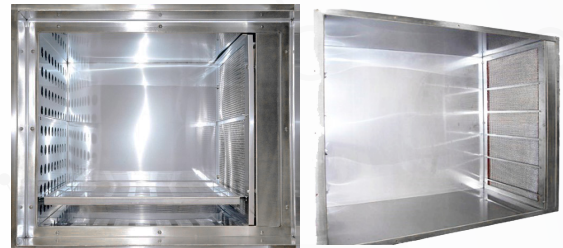


## Blue M Oven Options and Accessories

Contact your Blue M rep for additional options...

### ► Available Oven Options

- Nickel-plated wire rod or stainless steel slotted shelves
- Special truck channel or flat uninsulated floor for customer designed racks
- Stainless steel, roll-in rack
- Stainless steel, roll-in rack shelves
- 24-hour, 7-day digital process timer
- Temperature recorders (paper or paperless)
- Reverse door hinge
- Floor stands (bench models only)
- Swivel casters with leveling feet
- Inert Gas Reserve
- Programmable controller, Ethernet and USB communications
- Data logging and trending
- Nine-point thermocouple monitoring system
- Variable frequency drive on circulation blower
- Exclusive, adjustable, semi-pierced duct walls for tuning of air flow
- Lead-in ports (various locations available)
- Electro-mechanical or pneumatic door lock
- Light tower assembly with audible alarm
- Maintenance lock-out system
- Main power fused disconnect switch
- Redundant over-temperature protection (high limit controller)
- UL508A labeled control panel
- Alternative exterior finishes
- CE Mark
- If inert purge is required, please contact the factory for a quote on LOC (Limited Oxygen Concentration) Class A Ovens








# GRUENBERG CYCLONE SERIES™

U.S. Patent No: 11,543,136

## When your process needs a Class II solution...

The Gruenberg Cyclone Series™ Safety Oven utilizes a pair of non-sparking blowers to provide a patented ignition-free heating method. One blower circulates the airflow in the oven while a second blower generates heat using “fan friction”. This heat source is by nature ignition free and it can be independently modulated without affecting the circulation air flow rate. The Cyclone Series™ is ideal for applications involving a wide range of hazardous materials, including flammable solvents and dusts that may be encountered in drying, curing and finishing applications. It is also designed with the capability to be used with programmable ramp and soak controllers.

Hazardous Material	Class	Div	Groups
 Gases or Vapors	Class I	Div I	A Acetylene B Butadiene, Ethylene oxide, Hydrogen, Propylene oxide
		Div II	C Acetaldehyde, Cyclopropane, Diethyl Ether, Dimethyl Hydrazine D Acetone, Ammonia, Benzene, Butane, Gasoline, Methane, Propane, Alcohols
 Combustible Dusts	Class II	Div I	E Combustible metal dusts (aluminum, magnesium, and their commercial alloys)
		Div II	F Combustible carbonaceous dusts (carbon black, charcoal, coal & coke) G Combustible dusts not in Groups E or F (flour, grain, wood, plastic & chemicals)
 Ignitable Fibers	Class III	Div I	No Equivalent
		Div II	No Equivalent

## Intrinsically Safe Interior for total protection and compliance.

The **intrinsically safe** design for the **interior** of the chamber complies with the National Electrical Code (NEC), ANSI/NFPA 70 requirements for Hazardous (Classified) Locations. An “Intrinsically Safe” (INS) system is one in which all possible sources of ignition have been eliminated. Possible ignition sources include electrical sparks, mechanically generated sparks and hot surfaces (such as electric heating elements). Typically, these systems are used in hazardous locations where flammable gases or vapors may be present.

The definition of “Intrinsic Safety” used in the relevant IEC apparatus standard IEC 60079-11 is a “type of protection based on the restriction of electrical energy within apparatus and of interconnecting wiring exposed to the potentially explosive atmosphere to a level below that which can cause ignition by either sparking or heating effects.”



# OVENS



## Standard Features

### ► Features

- Independent blower creates heat using “fan friction” - no interior oven surface is hotter than the process air
- Ideal for processes involving hazardous Class I & II materials, including a wide range of flammable organic and inorganic solvents encountered in drying, curing, bonding, encapsulating and finishing applications
- Simple, economical design that endures years of use
- Modulated rotational speed for heating blower adjusts heat input without affecting the air circulation rate
- Unlike Class A ovens, the maximum quantity of solvent per batch is **not limited**

### ► Benefits

- Ignition-free heat source mitigates risk of atmospheric explosions and ignitions when working with Class 1, Group C & D, and Class II, Group E, F & G materials
- Modular- Available for use on a wide range of oven styles and sizes
- Flexible - Compatible with ramp and soak controllers to generate complex temperature profiles

### ► INS System Design Requirements:

- The interior of the oven is designed to eliminate ignition sources
- Each instrument that penetrates into the oven chamber, including the control thermocouple, passes through an intrinsic barrier
- When a barrier is installed, the incidence of abnormal spark-causing conditions such as electrical equipment failure, wiring faults, overvoltage application to the circuit, or the grounding, shorting, open-circuiting of any lead(s) in the presence of a hazardous mixture, are not sufficient energy to cause ignition
- Fans and blowers are designed with spark-resistant construction
- The surface temperature of all components inside the oven is limited to 80% of the auto-ignition temperature of any material being processed
- The oven liner is sealed airtight by the continuous welding of all seams, and all penetrations through the wall of the oven are sealed to prevent the exchange of dust and/or vapors
- Access doors employ spark resistant latches



### ► Installation Options

- New equipment
- Field retrofits possible, contact the factory for more information
- Available within other TPS Brands, contact the factory for more information



Scan for additional Cyclone Series™  
Oven specifications and options



## CONTROL SYSTEMS PACKAGES



Scan for additional F4T specifications and options

The Watlow F4T Temperature Controller with INTUITION™ temperature process controller combines the flexibility of a modular I/O controller with best-in-class ease of use.

### ► Watlow F4T Controller Features

- 4.3-inch, color touch panel with high-resolution, graphical user-interface
- 1 to 4 control loops with TRU-TUNE+ adaptive control algorithm for superior controllability
- 40 ramp and soak profiles with real-time clock and battery backup.
- Ethernet Modbus® TCP connectivity
- High-speed USB 2.0 host port
- Modular design, which offers numerous types of field pluggable modules for maximum flexibility and easiest compatibility
- Optional Data Logging capability
- Optional Graphical Trend Chart
- TPS provides panel mounted USB and Ethernet ports located on the front control panel of the equipment
- Temperature stability: Typical  $\pm 0.1^{\circ}\text{F}/^{\circ}\text{F}$  ( $\pm 0.1^{\circ}\text{C}/^{\circ}\text{C}$ ) rise in ambient max



Scan for additional PM Plus specifications and options

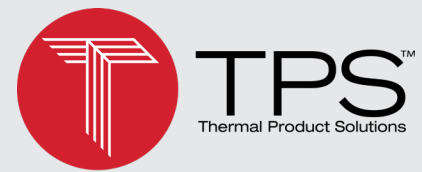
Watlow's PM PLUS™, the enhanced EZ-ZONE® PM, is now more intuitive and features an enhanced interface for easier programming and readability with a SMOOTH-TOUCH™ keypad creating an industry leading user experience.

### ► Watlow PM Plus Controller

- Integrated functions and high amperage power control output lower ownership costs
- Current monitoring detects heater current flow and provides alarm indication of a failed output device or heater load
- Features a wide range of serial communications capabilities
- Dual-channel controller provides two PID controllers in one space-saving package
- Configuration communications with software saves time and improves reliability of controller setup
- The EZ-ZONE PM Express controller features a simplified menu that eliminates complexity often experienced with more advanced controllers and unnecessary features
- Temperature stability:  $\pm 0.1^{\circ}\text{F}/^{\circ}\text{F}$  ( $\pm 0.1^{\circ}\text{C}/^{\circ}\text{C}$ ) rise in ambient max



# OVENS

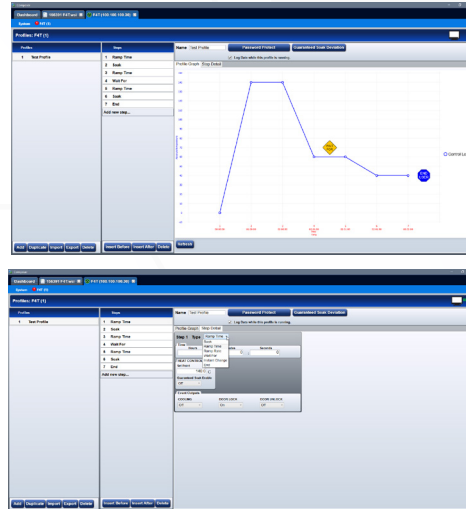
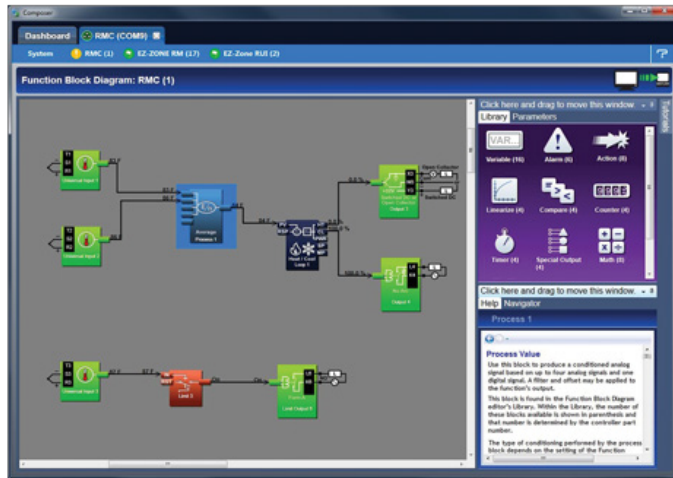


## COMPOSER® Software

COMPOSER® is Watlow's new, easy-to-use software for configuring and customizing controllers. Use it to optimize Watlow's F4T, D4T, EZ-ZONE® RM and EZ-ZONE PM products for specific applications. Task-specific views simplify all aspects of commissioning new controllers including managing the inputs and outputs from pluggable flex modules, setting up functions such as control loops and alarms and creating and editing profiles.



Scan here for additional Watlow Composer specifications, software and demos, and training and education information.

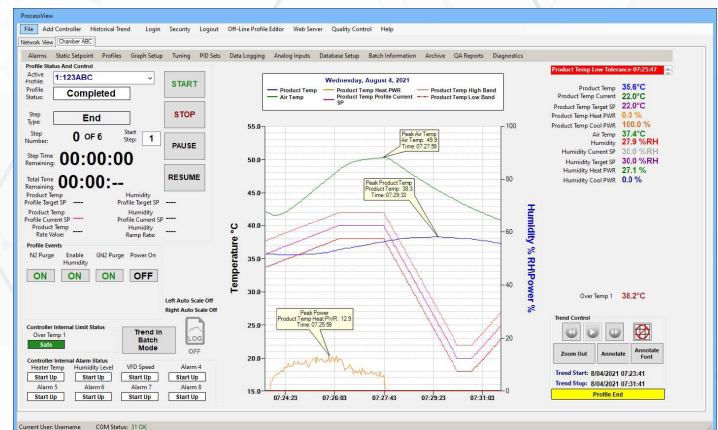


- ✓ Function block diagram with live data and error indication
- ✓ Depicts the configuration visually making it easy to understand and explain to others
- ✓ Multi-language support
- ✓ Provides backup of settings to restore if settings are changed or controller is replaced
- ✓ Lets users adjust window sizes and positions to work efficiently

## ProcessView Software

ProcessView Data Acquisition Software for Watlow's F4T, Legacy F4, and EZ-Zone® PM Controller Networks. The Software is dedicated to adding value just with Watlow F4T, Legacy F4, and EZ-Zone PM Controllers, which means there is no programming required and it outperforms other more expensive software packages on the market.

It is designed to work with Windows 7/10/11 operating systems allowing the use of newer PC technology. It supports up to 50 Watlow F4T's, Legacy F4 and or EZ-Zone PM Controllers embedded in Environmental Chambers, Furnaces or Ovens on a local network. Enabling the software's security features provides compliance to 21 CFR Part 11 industries such as Pharmaceutical, Medical and Clinical markets. ProcessView is a great replacement for legacy Watview® Software.



### Dedicated Overview Screen:

Each Controller/Chamber on the network shows real-time trend, process data, event output status and current Profile status. Profiles can be started, stopped, paused or resumed from this screen. Profile Events can be manually turned on or off if enabled.

### Software Alarm Screen:

Each input sensor (temperature, humidity, etc.) can have a Software Alarm associated with it independent of the alarms hard coded in the controller. Both visual and audible notifications can be enabled in the software.

### Security Screen:

All menus and screens can be password protected with 3 different role levels (Supervisor, Technician and Operator) with unique passwords.

### Audit Trail Viewer:

All audit trail entries can be viewed with the audit trail viewer screen. Each audit trail entry is time stamped and answer the "How", "Why", "Who", "When" for the change. Audit trails are encrypted and can be printed or exported for auditor inspections in a readable CSV format.

### Real-Time Data Log File Viewer Screen:

Displays data as it is being logged to the PC file for peace of mind and to make sure the correct data is being logged. Events are also recorded in the Data Log file along with Batch Information and Min/Max process values for each input. Notes can be added by the operator real-time as the profile or batch is running. Multiple electronic signatures can be added to data log files for tamper-proof security.





## Blue M Warranty

**LIMITED WARRANTY TO ORIGINAL PURCHASERS.** Blue M ("Blue M") warrants to the original purchaser that Blue M owns and will convey clear title to each product that it manufactures and delivers. Additionally, and provided the original purchaser has paid the full purchase price for a product or service, Blue M warrants that from the date it ships and, if applicable, installs a product, or finishes performing a service, the product Blue M manufactured shall conform to written specifications that Blue M approved, and the product shall be free from defects in material and workmanship for twenty-four (24) months, (with the exceptions of the Ultra Temp and LO/GO series, which have a 12 month warranty). Blue M further warrants that any service it performs shall conform to written specifications that Blue M approved and be free from defects in workmanship for twenty-four (24) months (with the exceptions of the Ultra Temp series, which are covered for 12 months. No service warranty for LO/GO series). If a purchaser purchases a TPS Preventive Maintenance & Calibration plan at the end of the warranty period, these limited warranties shall each be extended by twelve (12) months, (with the exceptions of the LO/GO series) subject to the exclusions below. If, within that time period, the original purchaser notifies Blue M in writing of an alleged non-conformity, and Blue M determines, to its reasonable satisfaction, that a product or service is, in fact, non-conforming, then Blue M shall, at its option and expense, repair or replace the non-conforming product or correct the non-conforming service, either at the original purchaser's or Blue M's factory. **Warranty Exclusions.** This limited warranty shall not apply to (i) labor to replace a part in a product located outside of the U.S., (ii) a service Blue M performed outside of the U.S., (iii) any loss or damage resulting from normal wear and tear or alteration, misuse, or abuse, including any loss or damage caused by customer products or processes, (iv) improper installation, operation, maintenance, or repair by the original purchaser or a third party with or without TPS' permission, (v) improper water quality out of range specifications as noted by TPS, (vi) improperly configured customer controllers or customer training issues, (vii) consumable items, including, but not limited to, filters, drive belts, light bulbs, lamps, wear strips/surfaces, gaskets, fuses, conveyor belts, contactors, valves, spark plugs, and other similar items. If on-site warranty work is required for a product located outside of the continental U.S, Blue M will charge the customer on a time and materials basis, plus reasonable expenses for travel, lodging and meals.

**THIS LIMITED WARRANTY IS IN LIEU OF ALL OTHER WARRANTIES, WHETHER EXPRESS, STATUTORY OR IMPLIED, AND STATES BLUE M'S ENTIRE WARRANTY AND THE ORIGINAL PURCHASER'S SOLE AND EXCLUSIVE REMEDY RELATED TO PRODUCTS OR SERVICES BLUE M PROVIDED. BLUE M EXPRESSLY DISCLAIMS ALL OTHER WARRANTIES, INCLUDING, BUT NOT LIMITED TO, ANY WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE, AND ANY WARRANTIES IMPOSED BY COURSE OF DEALING OR USAGE OF TRADE.**

Scan for Additional  
Warranty Information



For full details, exclusions, and other information on our warranty please go to: <https://www.bluem.com/warranty-information>

## International Support

- All models available in 50 & 60 Hertz configurations
- CE, cUL, & UL-508A available
- Authorized reps / servicers in most countries



## MAX PROGRAM

### TPS MAX Program

The TPS MAX Program allows the customer to purchase future service and/or parts without the need to have a purchase order approved and released when parts or service are needed. These funds are available to be used on parts or service in the future, saving you and your company costly down-time. Enrollment also entitles you to the many advantages listed below. Enrollment in the TPS MAX Program requires a minimum purchase of \$5,000.00. Amounts above \$5,000.00 will be accepted. Funds do not expire.

#### 10% Off:

- Service Labor (including: training, installation, preventive maintenance)
- Travel Time
- Calibration Services
- Parts
- Mileage
- Ground Shipping on Parts

## Aftermarket Services

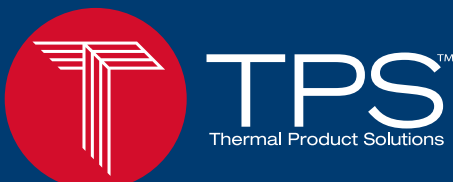
### Optimize. Revitalize. Maximize.

From installation, parts and global support to servicing, testing and yearly maintenance, we are here to ensure your TPS product achieves maximum performance.

GAMP Documentation may include FRS, HDS, SDS, FAT, SAT, and IQ/OQ.

#### Services Include:

- Installation Supervision
- Start-up & Training
- Preventative Maintenance
- Temperature Uniformity
- Instrument Calibration
- GAMP Documentation



Blue M is a brand of Thermal Product Solutions, LLC.

»Blue M »Gruenberg »Lindberg/MPH »Lunaire  
»Redline Chambers »Tenney »Wisconsin Oven

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