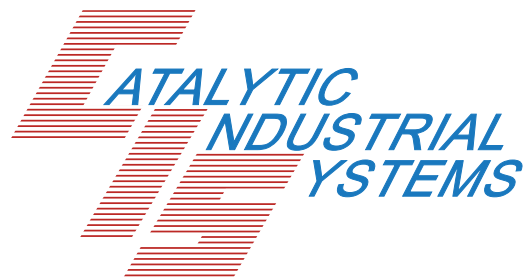




**THE BRUEST®
CATALYTIC HEATERS**

Safe, Efficient, Flameless



www.catalyticirovens.com

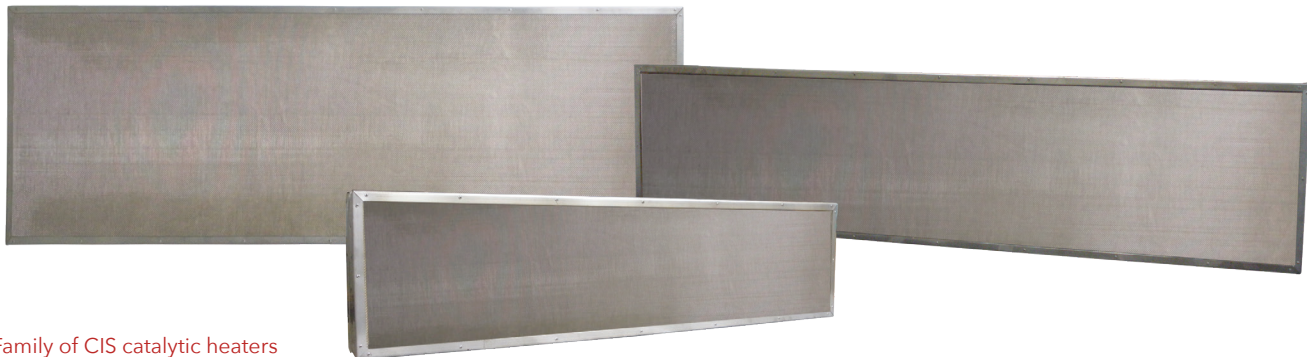


Catalytic Industrial Systems' (CIS) gas catalytic heaters are safe, efficient, and easy to use. The heaters are offered in multiple sizes, BTU ratings, and configurations to meet varying application requirements. CIS catalytic heaters are available standalone or can be preconfigured into zones with control systems to simplify installation and operation tasks. CIS catalytic heaters provide safe and efficient heating alternative.

■ TECHNOLOGY OVERVIEW

Catalytic heaters differ from conventional heating with the introduction of the catalyst. Normal ignition temperature of natural gas in air is approximately 1260°F. In the presence of a catalyst, the reaction occurs with sufficient velocity to begin a chain reaction at 225°F. As long as natural gas and oxygen is supplied, the catalytic reaction will continue without flame with similar amount of heat as if the gas has been burned. The heater will emit infrared energy with the heater face temperature between 800°F and 900°F.

CIS catalytic heaters emits heat in the form of FAR infrared energy, which can be more readily absorbed by most materials. The intensity of the heat energy varies with the square of the distance and travels any distance without loss as long as it does not contact matter which absorbs it. The flameless heat produced at a reduced temperature makes CIS' Catalytic Heaters well suited for many paint and powder coat curing and drying applications.



Family of CIS catalytic heaters

■ OPERATIONAL CONCEPT

CIS catalytic heaters requires both electricity and gas to operate. Electric power is required to preheat the heater. During startup, the enclosed electric heating element (ITEM E) is turned on for about 15 to 20 minutes. Once the catalyst has been warmed up, gas can be introduced via the safety valve (not labeled) to begin the catalytic heating process. Gas enters the heater via the dispersion tube assembly (ITEM B) and is dispersed by the dispersion screen (ITEM C). The gas diffuses through the insulation (ITEM D) to come in contact with the catalyst (ITEM G) to initiate the catalytic reaction. Infrared energy is emitted out along with CO² and water vapor. The thermocouple is used to control the safety valve or the gas solenoid valve. If the catalyst falls below safe operating temperature, the thermocouple will shut off the gas valve to prevent gas from being emitted.

Item	Description
A	HEATER PAN
B	DISPERSION TUBE ASSEMBLY
C	DISPERSION SCREEN
D	1" INSULATION
E	ELECTRIC HEATER ELEMENT
F	0.25" INSULATION
G	CATALYST
H	STAINLESS STEEL FACE SCREEN

NOT LABELED: Safety Valve, Thermocouple, Explosion Proof Junction Box

HEATER SPECIFICATION

Heater Size	BTUH	CU FT/HR		Height		Width		Depth		Weight Lbs
		NG	LP	IN	MM	IN	MM	IN	MM	
12X36	18000	18.0	7.2	12.12	307.8	36.12	917.4	6.5	165.1	23
12X48	24000	24.0	9.6	12.12	307.8	48.12	1222.2	6.5	165.1	38
12X60	30000	30.0	12.0	12.12	307.8	60.12	1527.0	6.5	165.1	42
12X72	36000	36.0	14.4	12.10	307.3	77.25	1962.2	6.5	165.1	46
18X36	28000	28.0	11.2	18.12	460.2	36.12	917.4	6.5	165.1	40
18X48	37000	37.0	14.8	18.12	460.2	48.12	1222.2	6.5	165.1	50
18X60	45000	45.0	18.3	18.12	460.2	60.12	1527.0	6.5	165.1	55
24X48	50000	50.0	20.0	24.12	612.6	48.12	1222.2	6.5	165.1	62
24X60	60000	60.0	24.4	24.12	612.6	60.12	1527.0	6.5	165.1	68
24X72	72000	72.0	28.8	24.12	612.6	77.25	1962.2	6.5	165.1	89

Table 1: CIS catalytic heater dimensions; other sizes, and BTU output options available

HEATER STARTUP POWER OPTIONS

Heater Model	Voltage (AC)/Amperage per Heater						
	120	208	240	380	415	480	575
12X36	3.13	3.60	3.12	N/A	N/A	1.56	N/A
12X48	8.33	4.80	4.16	2.38	2.60	2.08	1.73
12X60	10.41	6.00	5.20	2.96	3.01	2.60	2.17
12X72	12.50	7.21	6.25	3.55	3.85	3.12	2.60
18X36	10.00	5.76	5.00	N/A	N/A	2.50	N/A
18X48	12.50	7.20	6.24	3.56	3.85	3.32	2.60
18X60	15.82	9.12	7.90	4.47	4.93	3.94	3.30
24X48	16.66	9.60	8.32	4.76	5.20	4.16	3.46
24X60	20.82	12.00	10.40	5.92	6.02	5.20	4.34
24X72	25.00	14.42	12.50	7.10	7.78	6.24	5.20

Table 2: CIS catalytic heater power requirements



■ FEATURES AND BENEFITS

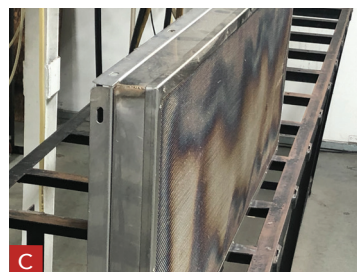
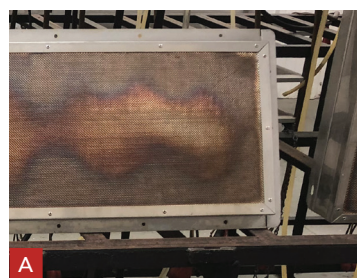
CIS gas catalytic heaters offer unique features when compared to other heating technologies. Unlike traditional gas heaters, CIS gas catalytic heaters burns the gas at significantly lower temperature to provide uniformed, controlled results every time. The radiant energy emitted by the CIS heaters is a long wave length infrared energy, which is more readily absorbed by most materials than the shorter wave energy used by many competitive systems, thus assuring lower operating cost and faster cures. Multiple heater sizes allows configurations to process virtually any shape or size of products to be cured. Additional features highlighted below.

Feature	Benefit
Lower operating temperature	More even heat distribution
Flameless	Able to be used with hazardous material/gases
Multi-zone operation	Maximum control over heat distribution
Automated control	Reduces setup time, able to store recipes for variable operation
Only emits CO ² and water vapor	Cleaner burning, less environmental impact
Multiple safety rating	Safety - Factory Mutual and Canadian Standards Associations approved for hazardous areas
Direct heating of coating substance	Increased capacity
Highest catalytic heater BTU output	Reduced energy usage Space saving
Lower operating cost	Reduce utility cost by as much as 80%

■ MOUNTING OPTIONS

CIS catalytic heaters are available with two mounting options. Ring Mount allows the heaters to be mounted flush to the structure or the wall. Industrial mount allows the heaters to be mounted on a rack or standoff.

- A. Heater shown with Ring Mount
- B. Ring Mount Heater example
- C. Heater shown with Industrial mount option
- D. Industrial mount installation example



■ APPLICATIONS



Mobile Dry Racks (MDR)

Designed to offer maximum flexibility and mobility. The heaters can operate with a variety of power supplies ranging from 120VAC to 480VAC. The racks can be ready to operate in as little as 30 minutes. Fuel choices include natural gas or propane with multiple fitting options.

The support structure of the Mobile Dryer Racks offers adjustability in height, depth of reach, and angle to accommodate a variety of shapes and sizes of parts.

The MDR can be operated in any open area or be moved inside a paint booth after the paint process has been completed.



Heaters on Racks

CIS Heaters on Racks are designed and built to meet specific application demands. Suitable for retrofit or custom enclosures for applications such as preheating, drying, powder gelling, boosting, and curing.

The racks are assembled at the factory with all electrical and gas plumbing terminated at a common point at each rack. This will reduce the onsite work for a quicker startup.

The racks are controlled with a PLC and HMI with Ethernet interface capabilities. The control system can be configured to operate the racks in either vertical or horizontal zones to ensure the most efficient heat coverage and distribution.



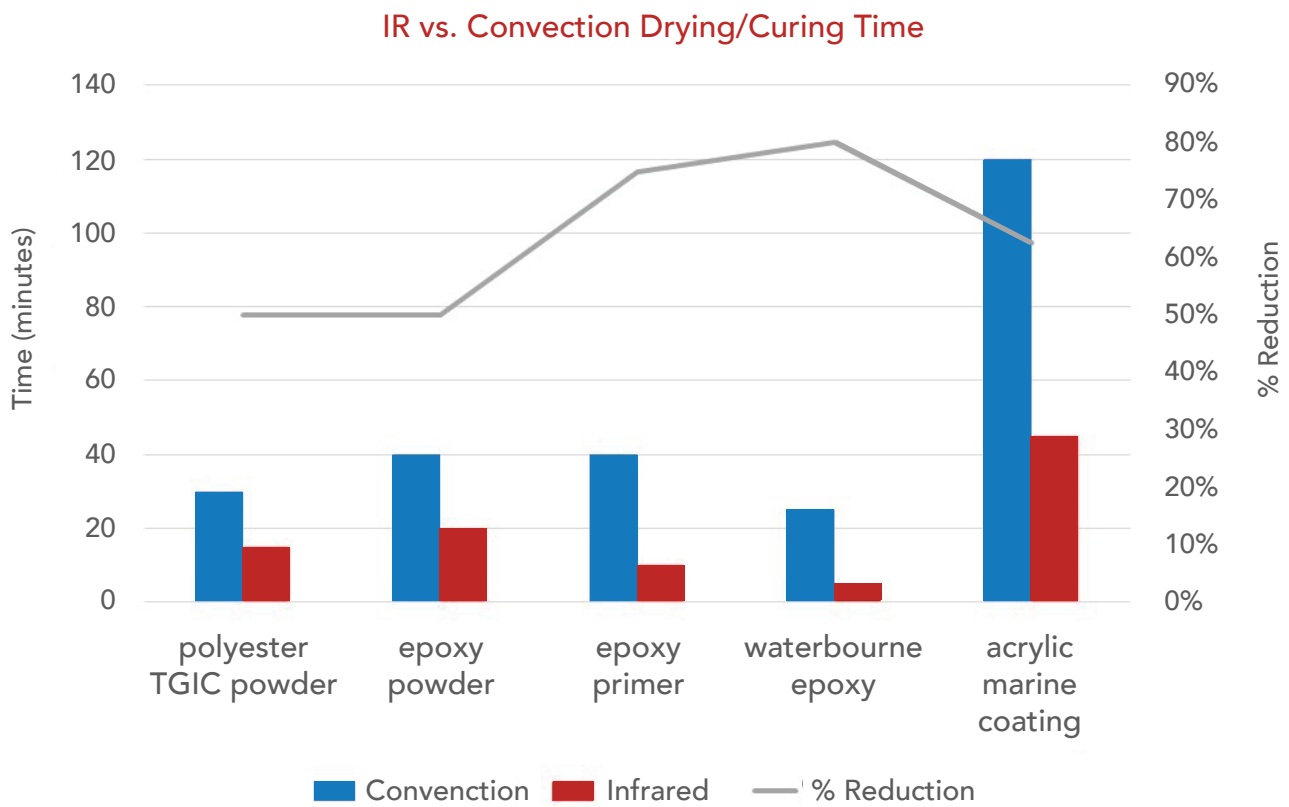
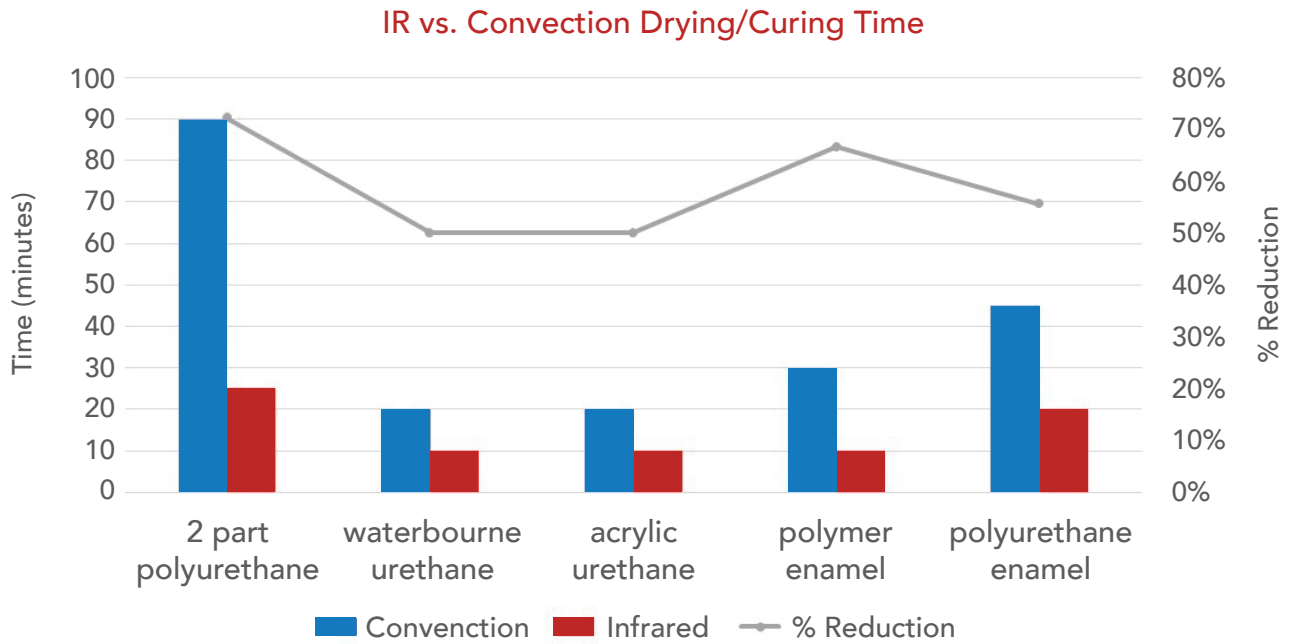
Complete Oven

To further reduce onsite installation and startup time, CIS offers complete catalytic infrared ovens. The ovens include not only the heaters (usually assembled on racks) but also a control system with remotely mountable control panel, any ventilation system, and integration of conveyance systems.

The ovens are designed through collaboration with the user's engineering resources and factor in space and line speed constraints. The ovens are then preassembled at the factory before shipping to be installed onsite.

CIS offers complementary factory testing with motorized overhead conveyor. A paint booth with capabilities to paint liquid and powder coating allows the process to be proven.

CIS Gas Catalytic Heater Performance Versus Convection



CIS gas catalytic IR ovens outperforms convection systems by at least 50% for powder and most urethane coatings. The time saving can be as much as 80% for epoxy and polyurethane.

■ Application Examples

A Tulsa pneumatic cylinders, controls, and valves manufacturer for the mobile, truck equipment, and automotive markets had been using a batch convection oven to cure powder coat. The oven, which broke down and would have taken significant investment to repair, took 20 minutes to cure. An outside powder coating company took over the process for the company, charging tens of thousands of dollars monthly.

Catalytic Industrial Systems designed and built a gas catalytic IR solution to bring their coating process back in-house while doubling their capacity. Factory testing proved that CIS' IR system reduced the cure time from 20 minutes down to 10 minutes. The solution consisted of two heater rack sections retrofitted into the existing oven enclosure. The new system doubled the production rate in the same foot print.



Retrofitted IR rack system

An international heavy industrial equipment manufacturer's location in South TX manufactures and paints large diesel engines for large mining vehicles reached out to CIS with oven and curing issues. The previous process used a 150 feet long convection oven with two 1.5 million BTUH burners curing in 50-60 minutes.

After testing in the CIS lab with the engines, a time and energy saving solution was developed. CIS demonstrated that the cure could be achieved in only 20 minutes with Gas Catalytic IR using only half the energy. CIS' gas catalytic system was retrofitted into the existing convection oven. The new system improved the process using only 50 feet of space in 1/3 the cure time and consuming half the energy.



Factory lab testing of coating on engine

A wind turbine manufacturer in Colorado had multiple manufacturing issues. The larger blades were being staged to go into the flash tunnel, which took over four hours to cure. This created a bottle neck in the staging area leading to defects in the paint after curing. The paint supplier required a defect free cure to guarantee 20 year life.

CIS worked with the turbine blade manufacturer and the paint supplier to develop a gas catalytic IR solution. With extensive testing both at CIS' factory and onsite, the paint supplier approved a solution to retrofit the flash tunnel with over 100 feet of IR heating. Now the 135 feet plus long turbine blades can move through the tunnel continuously without stopping and cure in 45 minutes. This resulted with more than 75% reduction in the cure time, resolved the bottle necking issues, and met the curing specifications of the paint supplier to get the 20 year paint performance guarantee.



Turbine blade in original oven



Oven with IR Heaters in place

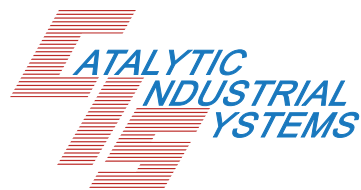
HOW TO ORDER

A	B	C	-	D	E	F	G	H	J
S	12	36	-	1	7	0	5	2	1

Example

12" X 36" horizontal mount heater with tab mount, J-type thermocouple for automation control, 240VAC preheat voltage, Class 1 Division 2 rated by FM with XP junction box, natural gas fuel

A	Installation Orientation	E	Safety Valve Selection	H	Hazardous Location Rating
S	Standard - Horizontal	0	None	0	No certification
V	Vertical	1	Manual Valve w/ Thermocouple	1	Standard location, Certified by FM, with non-XP rated junction box
B	Width of Heater	6	K Thermocouple	2	Class 1 Division 2 Group D, rated by FM, with XP rated junc- tion box
12	12 in	7	J Thermocouple	3	Class 1 Division 1 Group D rated, Certified by CSA
18	18 in	8	Mertik Thermostat control	4	ATEX I
24	24 in	A	K-Type Thermocouple with 96" Lead K-Type	5	ATEX II
XX	Custom Size	B	K-Type Thermocouple with 108" Lead	J	Fuel Gas Type
C	Length of Heater	F	Reserved	1	Natural Gas
36	36 in	0	Reserved	2	LP Gas
48	48 in	G	Preheat Voltage	* Contact factory for options not shown.	
60	60 in	3	120VAC		
72	72 in	4	208VAC		
YY	Custom Size	5	240VAC		
XX	Custom Size	6	480VAC		
D	Mount Type	7	575VAC	* Contact factory for options not shown.	
1	Tab Mount	X	Custom		
2	Industrial Mount (STD)				
3	Ring Mount				
X	Special				



Catalytic Industrial Systems
 Division of Catalytic Industrial Group, Inc.
 713 N. 20th Street, P.O. Box 827
 Independence, KS 67301
 Toll Free: 800-835-0557 | PH: 620-331-0750
 Fax: 620-331-3402
 Email: sales@catalyticirovens.com
www.catalyticirovens.com
 © Copyright 2020, Catalytic Industrial Systems

REV 040720