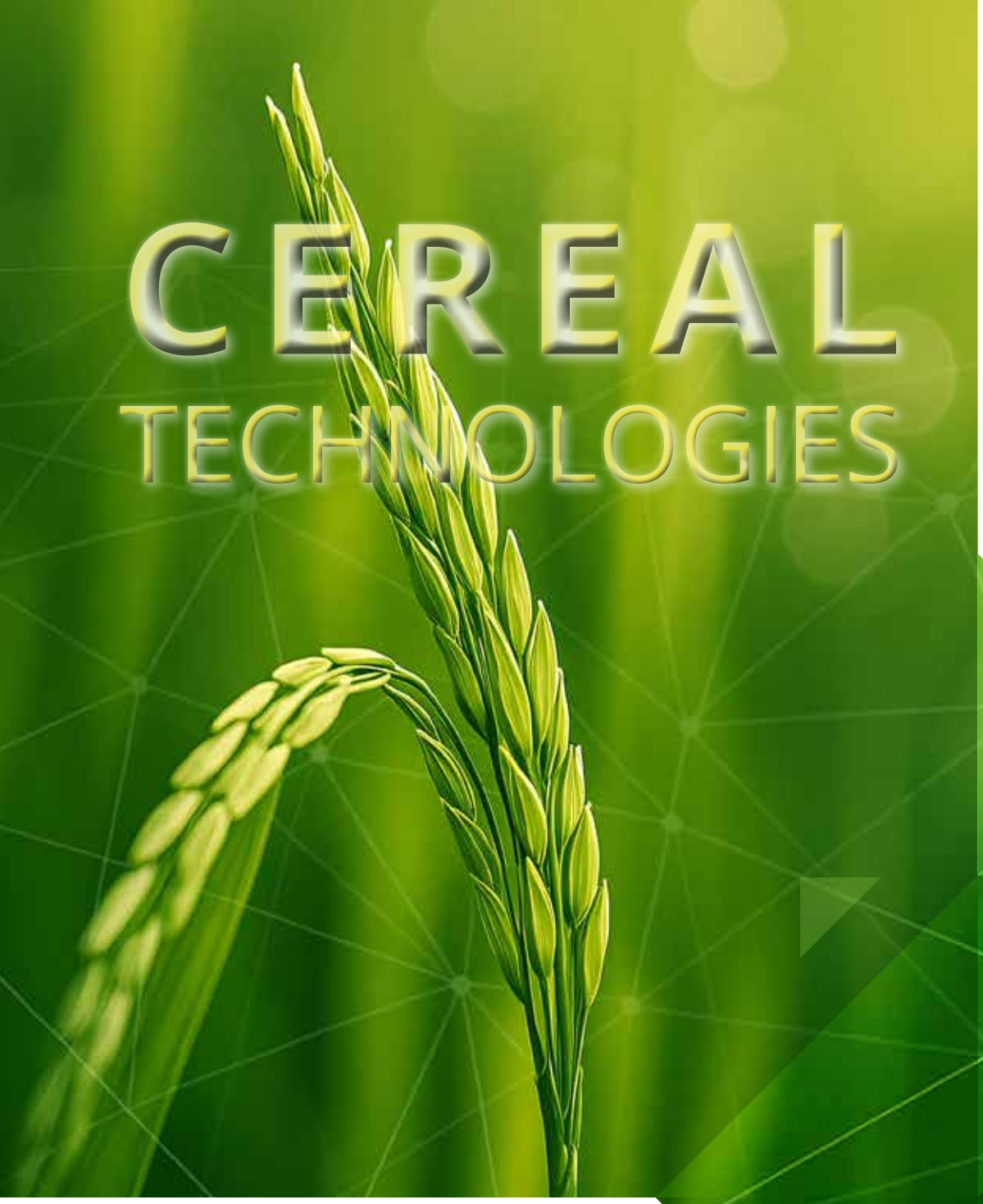


CEREAL TECHNOLOGIES

Tecflam

burners and thermal machines

TecnecoForni
ecology and energy recovery

CEREALS: OUR WORLD

Tecflam Srl stands out in the cereal industry as a leading supplier of highly specialized thermal machines. Our range of products, designed to meet specific plant requirements, guarantees excellent performance and maximum energy efficiency. In these pages, you'll discover the various solutions we offer, each tailor-made to optimize your production processes.

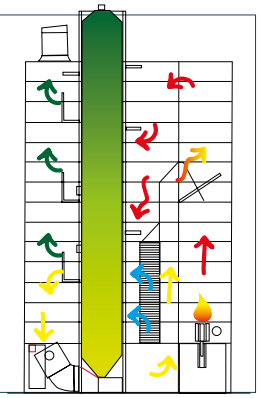
TABLE OF CONTENTS

Classification by Hot Air Production Method

One possible classification can be the way by which hot air is produced. There are two distinct categories:

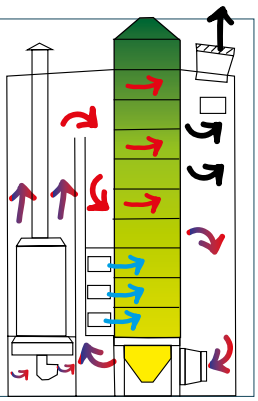
DIRECT

The combustion fumes are diluted with the air used in the drying process.



INDIRECT

The combustion fumes are emitted into the atmosphere, while the process air is heated indirectly via heat exchangers.



Choosing the correct heating system:

The correct heating system makes an important contribution in meeting the technical requirements of the drying process (drying quality and uniformity, ability to dry all products, automation and humidity control, energy savings, low emissions of dust and combustion products, low noise levels).

The European Community directives themselves classify the only accepted direct-fire method is the one using gas burners, particularly the in duct type.

Many diesel burners in direct-fired dryers are in operation, but sooner or later they will need to be replaced as European countries accept this fuel only in indirect system.

We can propose the following heat producing methods:

DIRECT
- with in duct gas burners in the air stream
- with liquid fuel burners + combustion chamber (HGG)
- biomass-fired

INDIRECT
- with air/fumes heat exchangers (HAG)

ELECTRIC AND HYBRID (direct + electric, indirect + electric)

DIRECT SYSTEMS

IN DUCT BURNERS

This is certainly the most widespread and established method today.

General characteristics

Fuel

Fired only by gaseous fuels (Natural Gas, LPG, biogas, and even a combination of these), they are inserted directly into the dryer's air duct without the need for combustion chambers.

Construction

They are modular in construction; the burner shape is adapted to the process air duct, promoting uniform heat distribution. Solutions can also be designed with burners in parallel to create dual, triple, or other configurations, thereby gradually increasing the thermal output.

Operation

They have a high maximum-to-minimum heat output ratio (1:20); this allows for drying in summer and winter without any intervention. Almost all the burners we manufacture are modulating, so as to fully exploit their technical features and achieve a drying temperature accurate to within ±1°C of the setpoint; it is possible to combine them with a temperature controller installed in the burner electrical panel. Other operating modes (two-stage or on-off) also exist, with lower performance levels and are no longer commonly used.

Bypass

Tecflam's in duct burners can be equipped with a standard bypass device, which instantly switches the burner to low flame when the dryer discharges

the grain (when the dust dampers typically activate to limit airflow), then instantly returns to its normal operating working level. The dryer manufacturer is responsible for determining when the bypass function should be activated.

Process Air Detection

Process air must be present when the burner is ignited; the burner may be equipped with an air monitoring device; otherwise, this is the responsibility of the dryer manufacturer. If process air is lost during normal burner operation, the burner must be shut down immediately.

Customized configurations

Some dryers use a single burner, while others use two (one for external air and one for recirculation). In this case, the recirculation air burner has special configurations regarding the gas valve train, fans, and electrical control panel. We design different versions based on specific customer requests.

Combustion air fan

There are two basic classes of in duct burners: those without a combustion air fan (less commonly used) and those with a dedicated fan (much more common). In the first case, the burner is sensitive to any variations in the process air, while in the second case, it is less so.

Gas valve train

Sized according to the type of gas, available pressure, and required thermal power. Generally, there is a main line, an ignition pilot line, and a bypass function.

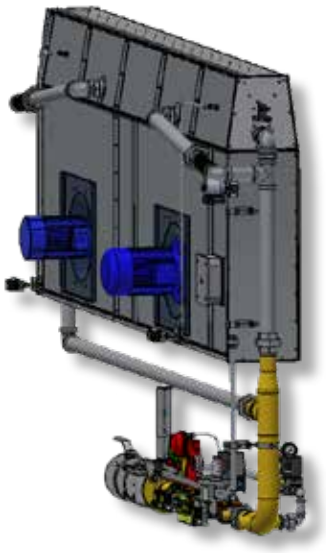
Electrical Panel

All our installations include a burner control panel with electrical junction boxes (for the gas valve train and burner body); connections between the boxes and the electrical panel are made with multi-core cables and quick-release plugs. We create custom made setups based on each customer's specific needs, for signal exchange with a PLC. With remote support available upon request.

STANDARDS: Our burners are manufactured in accordance with the UNI EN ISO 13577-2 industrial thermal application standard, the electromagnetic compatibility directive 2014/30/EU and the machinery directive 2006/42/EC.

VD SERIES

These are the most common burners; they are installed inside tower dryers (vertical dryers); they have combustion air fans integrated into the lower part of the burner. The gas valve train is generally located under the burner body. For high heat outputs, versions with multiple combustion bodies can be made: DUAL, TRIPLE, etc.

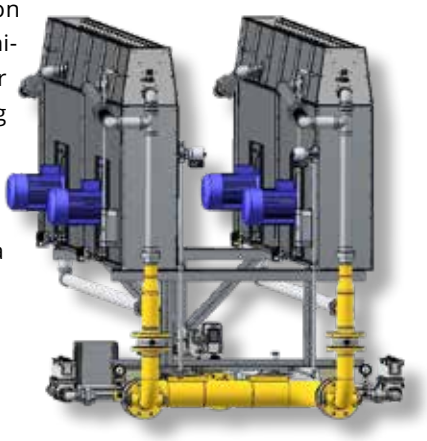


Burner model	Length for each burner mm	Power		Fans	
		kcal/h	kW	pcs	Power (kW)
VD 60	600	700.000	814	1	1.1
VD 75	750	875.000	1.017	1	1.1
VD 90	900	1.000.000	1.163	1	1.5
VD 120	1200	1.400.000	1.628	1	2.2
VD 150	1500	1.750.000	2.035	1	3
VD 180	1800	2.100.000	2.442	1	3
VD 210	2100	2.450.000	2.849	1	3
VD 240	2400	2.800.000	3.256	2	2.2 + 2.2
VD 270	2700	3.150.000	3.663	2	3 + 1.5
VD 300	3000	3.400.000	3.953	2	3 + 2.2
VD 360	3600	4.200.000	4.884	2	3 + 3
VD 420	4200	4.900.000	5.698	3	3 + 3 + 1.1
VD 450	4500	5.250.000	6.105	3	3 + 3 + 1.5
VD 480	4800	5.600.000	6.512	3	3 + 3 + 2.2
VD 540	5400	6.300.000	7.326	3	3 + 3 + 3
VD 600	6000	7.000.000	8.140	4	3 + 3 + 2.2 + 2.2

They can be built with different layouts, some examples of which are:

VD DUAL SERIES

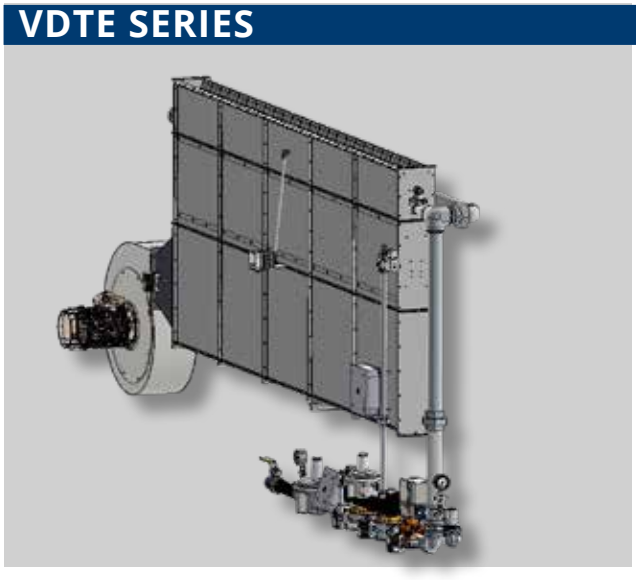
This variant of the VD Series integrates two combustion bodies, allowing for a significant increase in power output while maintaining a compact footprint. This configuration optimizes system efficiency, ensuring high performance in a compact space.



Burner model	Length for each burner mm	Power		Fans	
		kcal/h	kW	pcs	Power (kW)
VD 120 __ DUAL	1200	2.800.000	3256	2	2.2 + 2.2
VD 150 __ DUAL	1500	3.500.000	4070	2	3 + 3
VD 180 __ DUAL	1800	4.200.000	4884	2	3 + 3
VD 210 __ DUAL	2100	4.900.000	5698	2	3 + 3
VD 240 __ DUAL	2400	5.600.000	6512	4	2.2 + 2.2 + 2.2 + 2.2
VD 270 __ DUAL	2700	6.300.000	7326	4	3 + 3 + 1.5 + 1.5
VD 300 __ DUAL	3000	6.800.000	7907	4	3 + 3 + 2.2 + 2.2
VD 360 __ DUAL	3600	8.400.000	9750	4	3 + 3 + 3 + 3
VD 420 __ DUAL	4200	9.800.000	11395	6	3 + 3 + 3 + 3 + 1.1 + 1.1
VD 450 __ DUAL	4500	10.500.000	12209	6	3 + 3 + 3 + 3 + 1.5 + 1.5
VD 480 __ DUAL	4800	11.200.000	13023	6	3 + 3 +3 + 3 + 2.2 + 2.2
VD 540 __ DUAL	5400	12.600.000	14651	6	3 + 3 + 3 + 3 + 3 + 3
VD 600 __ DUAL	6000	14.000.000	16279	8	3 + 3 + 3 + 3 + 2.2 + 2.2 + 2.2 + 2.2

They can be built with different layouts, some examples of which are:

VDTE SERIES



They are equivalent to the VD series but adapted for smaller power outputs (to ensure a longer burner); they are primarily used where drying temperatures are lower and in smaller dryers.
They are also available in a dual version.

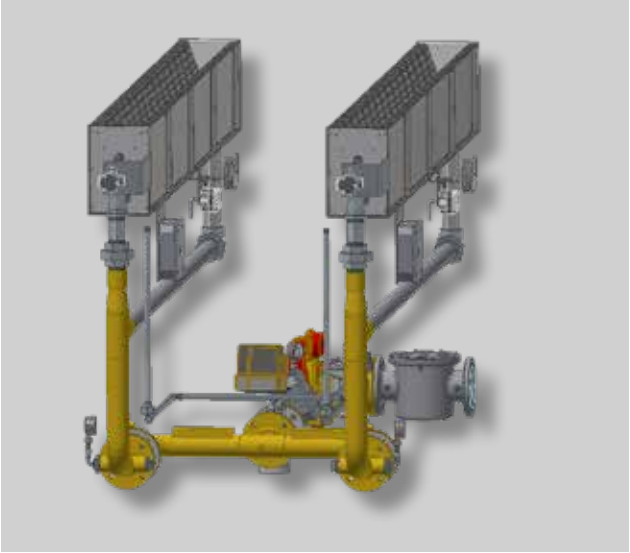
Burner model	Power		Fans	
	kcal/h	kW	pcs	Power (kW)
VDTE 50	250.000	291	1	0.55
VDTE 100	500.000	581	1	0.75
VDTE 150	750.000	872	1	1.1
VDTE 200	1.000.000	1.163	1	1.5
VDTE 250	1.250.000	1.453	1	2.2
VDTE 300	1.500.000	1.744	1	3

VDS – VDSA SERIES

This model uses a fraction of the process air as combustion air. Precisely for this reason, it is more sensitive to variations in the process air. Calibration is therefore slightly more delicate and requires particular attention. Furthermore, the air must be clean and have a normal oxygen content. Compared to the version equipped with fans, it has a greater pressure drop (Δp) across the burner.

Thermal power: from 800 kW to 16 000 kW

VDS DUAL SERIES



This model also allows two burners to be coupled to increase power while taking up less space and ensuring even heat distribution.

Thermal power: from 800 kW to 10 000 kW

VDC SERIES

In duct burners with a linear body, supplied complete with its own section of duct for easy system integration. This burner type is used in small, horizontal, and even mobile dryers.
The duct can be made of galvanized, painted, or stainless steel, depending on specific application requirements.
The combustion body is also available in
"X" and "H" configurations, ideal solutions for high-power applications and to optimize overall plant space.
These burners can also be supplied with a bypass function. These burners, with a circular duct, are known as VDCR.

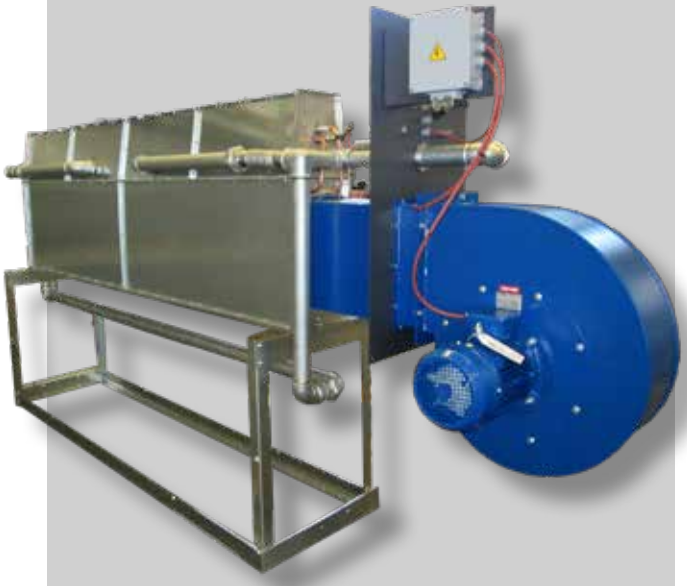
Thermal power: from 50 kW to 6 000 kW

VDCS SERIES

This type of burner, unlike the VDC, does not have combustion air fans, but uses a portion of the process air as combustion air. These burners, with a circular cross-section duct, are called VDCRS.

Thermal power: from 50 kW to 6 000 kW

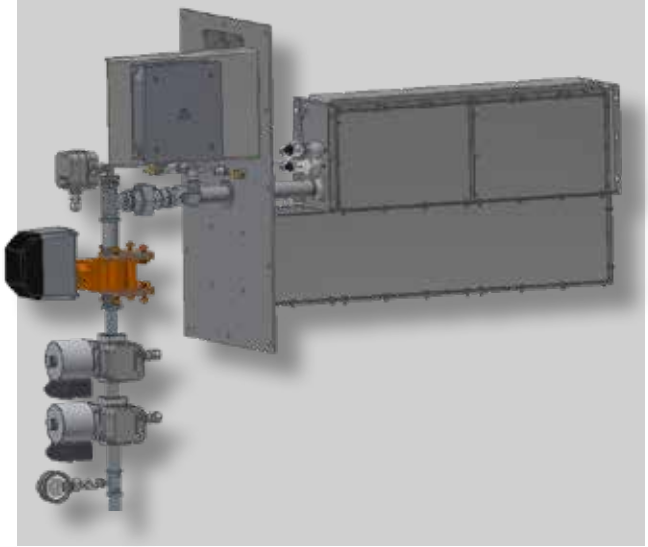
VDP SERIES



They are equivalent to the VD models, but with the distinctive feature of being mounted on a mounting plate and having the instrumentation (including the fan) outside the process duct through which the air to be heated passes.
The combustion body can be linear or H-shaped; the latter allows for increased thermal output with the same duct cross-section.

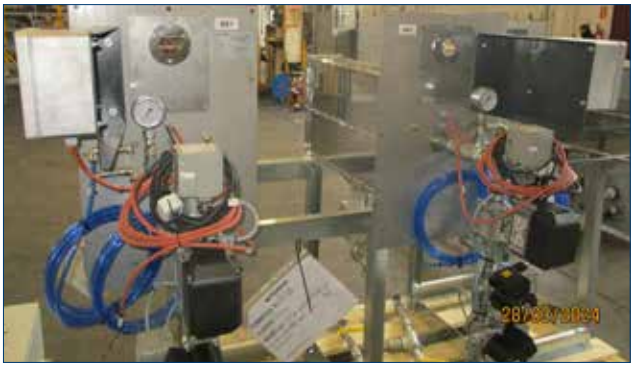
Thermal power: from 70 kW to 4 000 kW

VDPS SERIES



Burners with mounting plate; unlike the previous ones, they are not equipped with combustion air fans, but use a portion of the process air as combustion air.

Thermal power: from 70 kW to 700 kW



VDG Series

These are effectively hot gas generators, typically used in seed drying applications in horizontal or basket dryers, operating at low temperatures. They can also be used to treat products contained in silos using controlled air. The process fan draws in a mixture of ambient air and fumes from the burner located on the intake. Thanks to their compact design, they can be installed even in small spaces. The burners alone can also be supplied without process air fans.

Thermal power: from 70 kW to 700 kW

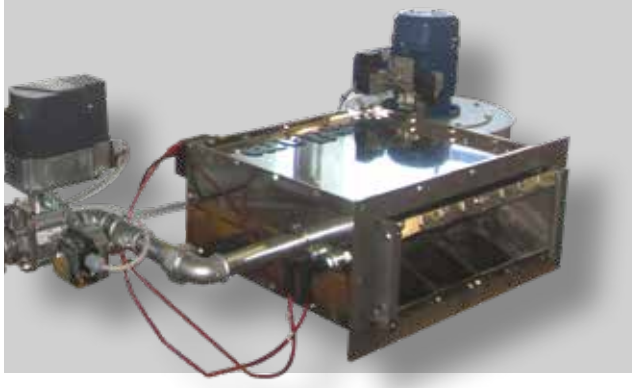
Application with VDM burner and process air duct

VDM/VDMR SERIES

These are generally used in systems where there is hot air recirculation, to increase the existing air temperature (when lower thermal power is needed).

VDM

Thermal power: from 70 kW to 700 kW



VDMR

Thermal power: from 90 kW to 1 400 kW

VD – SPECIAL VERSIONS

We can design heating units consisting of multiple burners to meet specific plant construction requirements. Some examples:

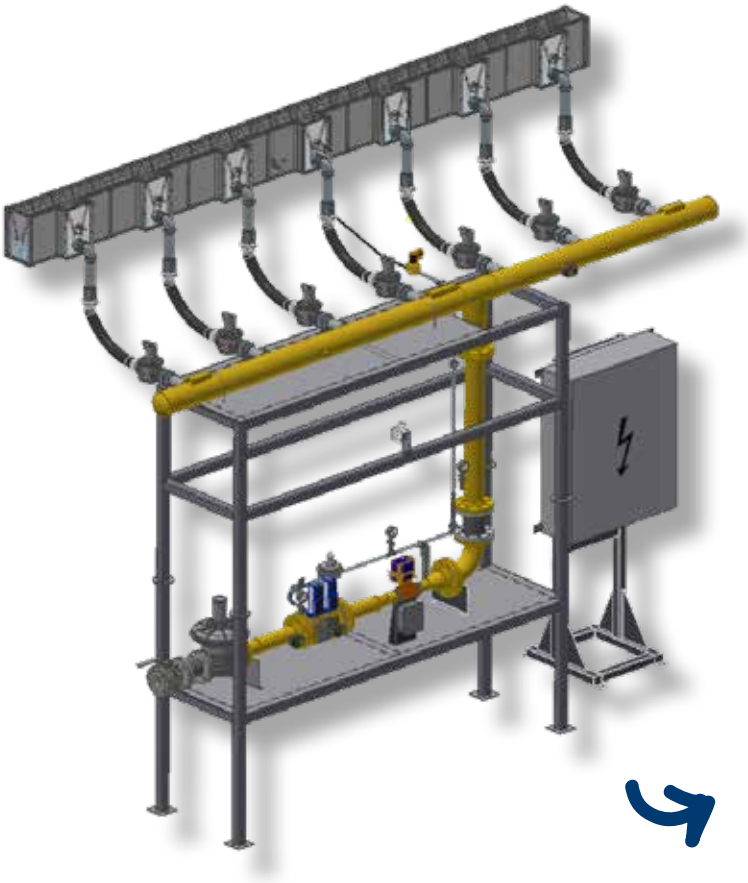
• Group of three independent linear burners with three gas valve trains installed on a skid and a single control panel.

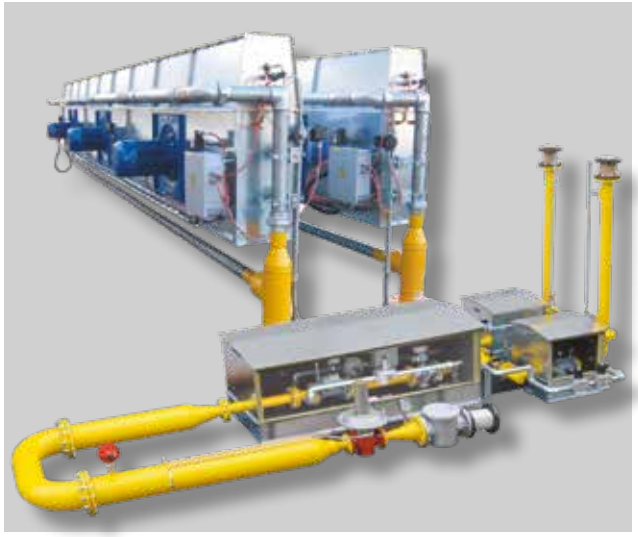

• One linear burner consisting of four combustion bodies, a single gas valve train installed on a skid, and a single control panel.



• Group of three independent TRIPLE linear burners with three gas valve trains with a single inlet manifold and a single control panel.


- One linear burner divided into seven independent sections with corresponding ignition and flame detection points, a single gas valve train installed on a skid and a control panel. This particular configuration was created for the need to increase the modulation range (1:50) in seed drying applications.





... BT

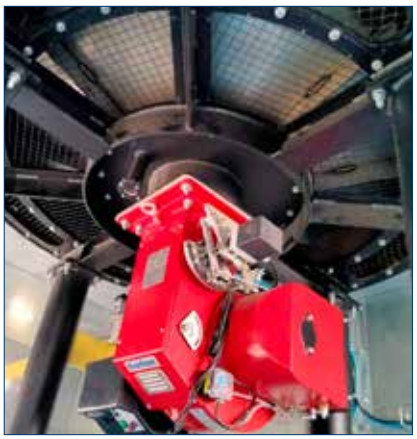
The burners can be equipped with a system that guarantees operation in cold environments, with temperatures as low as -20 °C.

Special electric motors are available. The electrical junction boxes, control panel, and gas valve train box are heated complete with thermostats and insulated to ensure optimal operating conditions for the components.

HGG Hot Gas Generator
with combustion chamber

In traditional applications, the combustion chamber is predominantly vertical, but can also be horizontal. Tecflam or mono-block burners from various brands are used.





They can be installed inside or outside the dryer. Depending on plant specifications, they can be made entirely of stainless steel or a combination of stainless steel and carbon steel. The burners can be powered by various types of fuel: gas, diesel, fuel oil, biogas, etc. Our burners are custom-made to meet each customer's specific needs, with single fuel or multi-fuel versions (e.g., gas + diesel).

Thermal power: from 50 kW to 5.000 kW


Biomass
Hot Air Generators

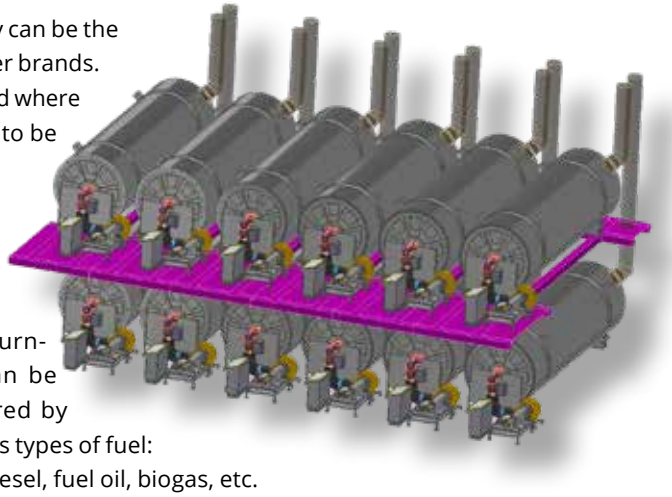
We can manufacture combustion systems that run on biomass fuel.

Photo of a wood chips hot air generator

INDIRECT SYSTEMS

HAG Hot Air Generator
air/fumes heat exchangers

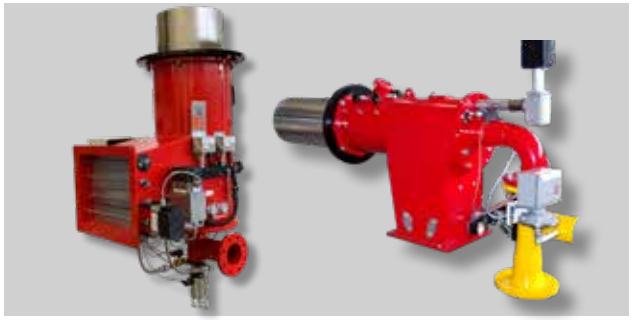
Vertical or horizontal hot air generators equipped with a burner, they can be the Tecflam Dual bloc model or alternatively monobloc models from other brands. They are used when an unconventional, often liquid fuel is available and where combustion fumes cannot be brought into contact with the product to be dried, thereby providing hot, clean air for the process.

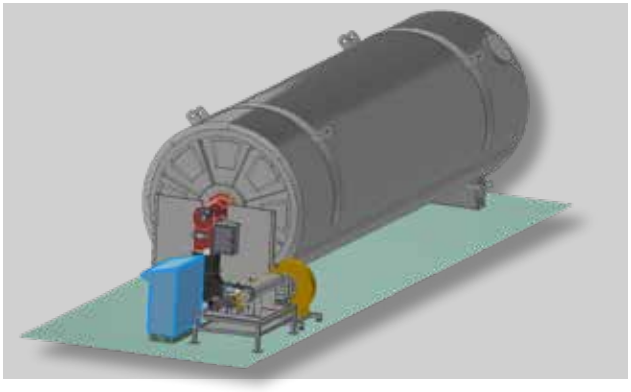


They can be installed inside or outside the dryer.
Depending on plant specifications, they can be made entirely of stainless steel or even a mixture of stainless steel and carbon steel.

The burners can be powered by various types of fuel:
gas, diesel, fuel oil, biogas, etc.
Our burners are custom-made to each customer's specific needs, in single-fuel or multi-fuel versions (e.g., gas + diesel).

Thermal power: from 100 kW to 3 000 kW





ELECTRIC AND HYBRID

E-HAG

Tecflam also manufactures electrical hot air generators, where there is a section of process air duct of which are installed the electrical heater elements and the electrical junction box for the electrical cabling. The scope of supply includes the electrical control panel.
The HAG is designed in such a way as to have a very large turn down ratio of even 0-100%.
Managing the temperature and the electrical elements of the generator can be done with a PLC.
The system can either be under negative or positive pressure, i.e.: the process air can either be aspirated through the heater elements by the process air fan or the air can be pushed through the heater elements from behind.

Power range: 20 kW – 6 000 kW
Range of exit temperature: 50 °C - 500 °C
Electrical power supply: 110 Vac, 230 Vac, 400 Vac, 690 Vac

HYBRID SYSTEM

There is also available a Hybrid version in which the electrical generator can be used in conjunction with our burners or with our direct and/or indirect hot air generators. These solutions are designed according to the client's specific requirements. They are configured in such a way that allow to optimise the electrical energy available, thereby choosing the most suitable type of heating, both for the combustion air as well as for the process air. Two examples of hybrid systems are shown alongside. In the first, the electrical component is installed downstream of an indirect generator with a diesel burner.
In the second, the electrical generator is in series with a natural gas burner.

OPTIONAL

Fuel flow meter
For precise consumption control and efficient fuel management.

Fuel pressure reduction stations
Optimize operating pressure, ensuring safety and operational continuity.

Modules and interconnections
Facilitate integration with existing systems, reducing installation time and costs.

Special layouts
Tailored solutions to adapt to complex spaces or architectural/plant constraints.

Alternative fuels
Maximum versatility for sustainable and future-ready applications.

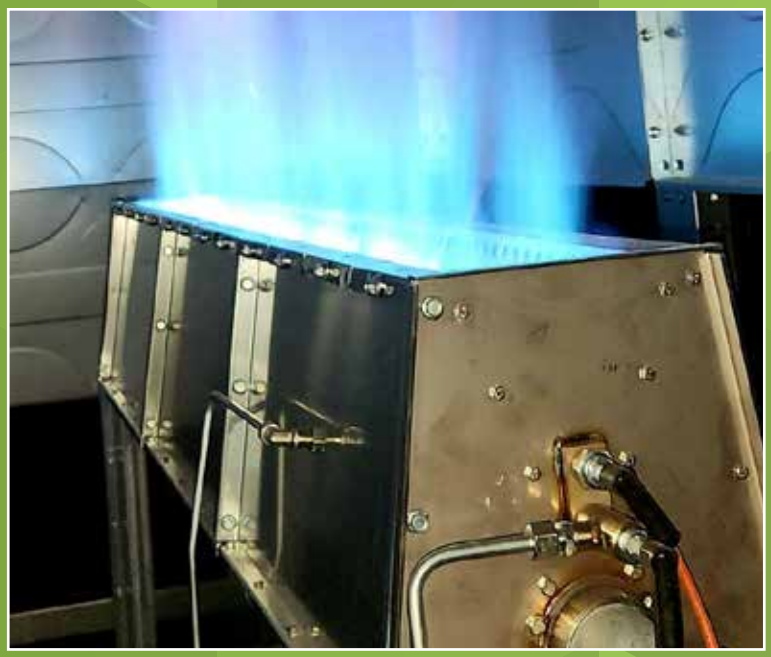
Low pressures
Guaranteed operation even in networks with limited pressure availability.

HMI (Human-Machine Interface)
Intuitive interface for simplified system monitoring and management.

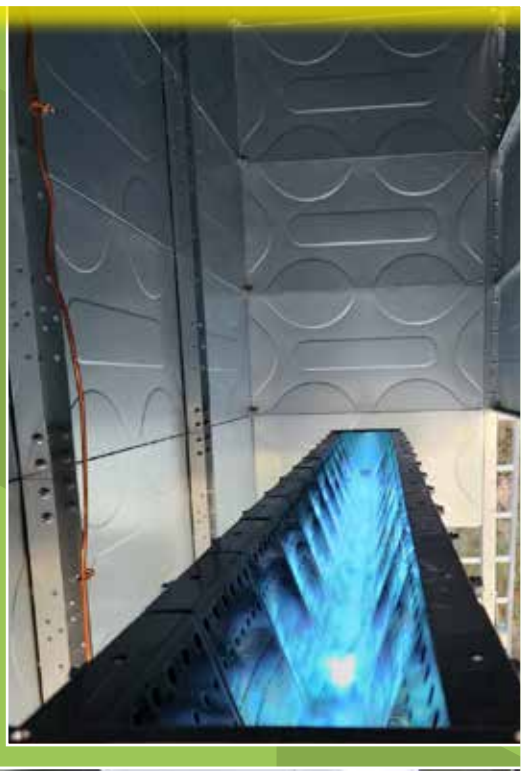
REMOTE ASSISTANCE

Our systems can be equipped with network interconnection systems that allow remote supervision and control.
Some advantages of this solution are:
- personalized management via PLC
- complete package of hardware and software for implementation
- ability to receive faster assistance via remote connection
- simple and intuitive operator-machine interface
- compliance with the latest safety parameters

INDUSTRY 4.0




Tecflam



SISTEMI DIRETTI

Tecflam

Tecflam s.r.l.
via Curiel, 3 (Corte Tegge) - 42025 Cavriago Reggio Emilia, Italy
tel. +39 0522 944207 - fax +39 0522 494091
tecflam@tecflam.it - www.tecflam.it

Company with quality management system according to UNI EN ISO 9001:2015

Company with environmental management system according to UNI EN ISO 14001:2015

TecnecoForni
ecology and energy recovery
brand of Tecflam s.r.l

visit us on