COMBIPRO

Combination Dryer

Introduction

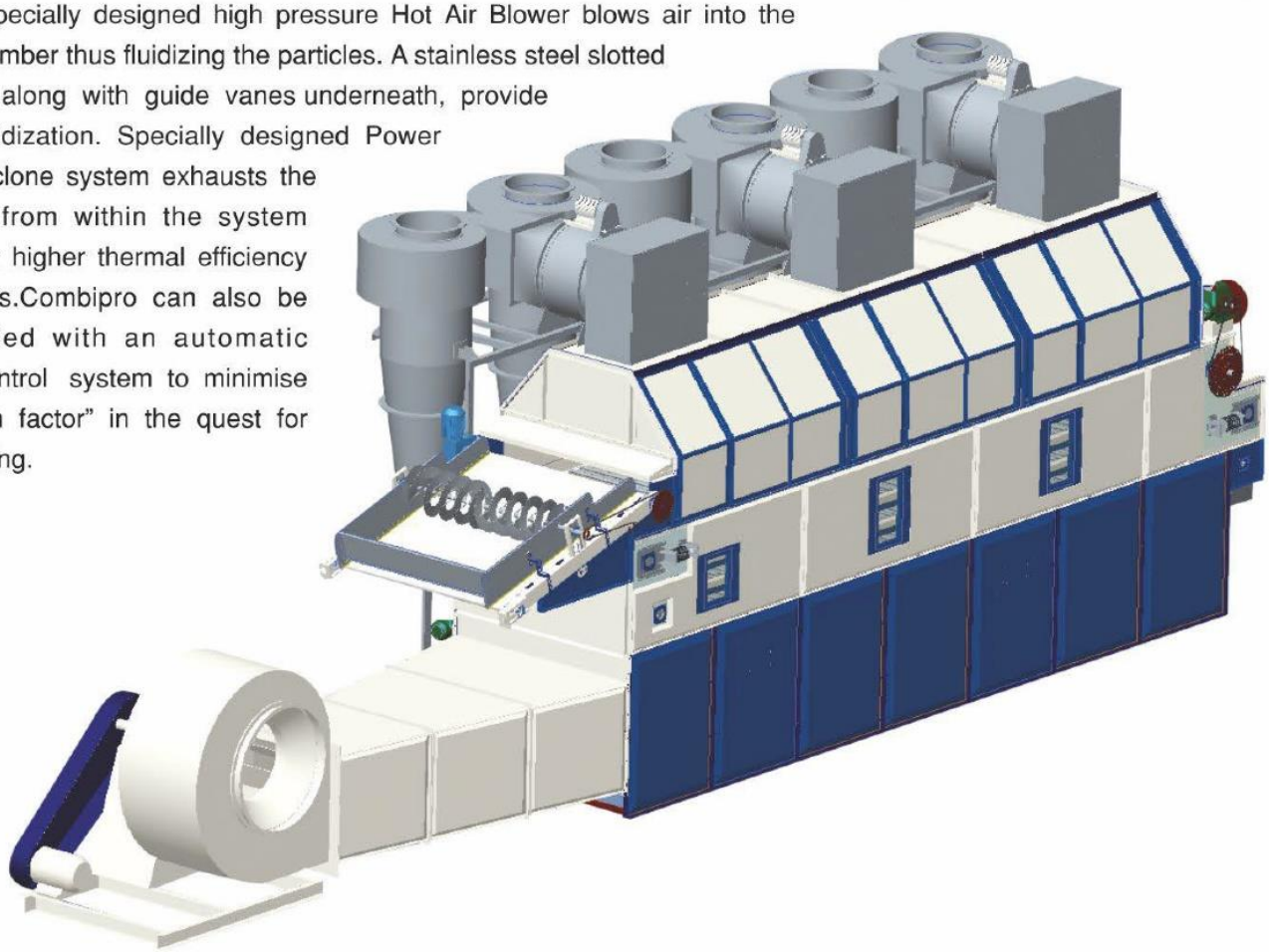
Gem Allied Industries Private Limited is an ISO 9001:2008 certified company engaged in the manufacture and supply of Food Processing Machineries worldwide.

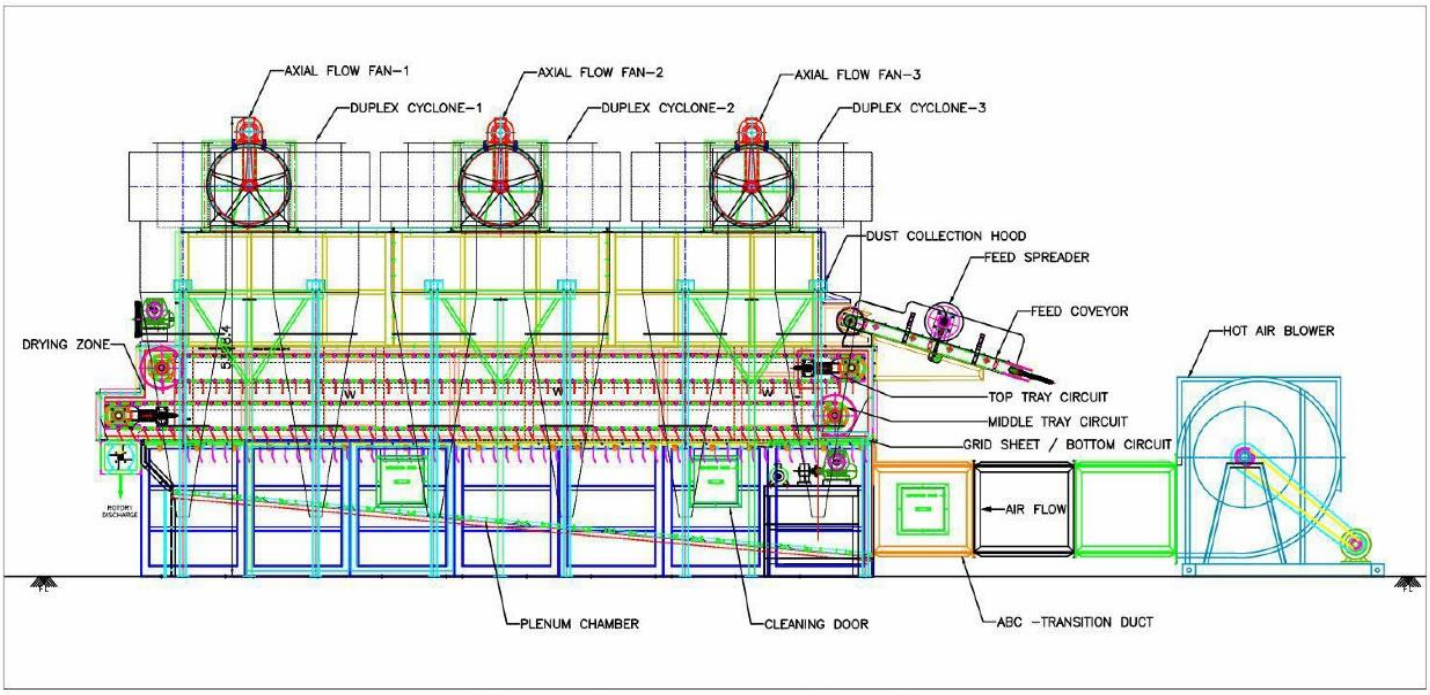
The expertise of GEM lies in the cutting, blending, drying and sorting of food products and is a recognized Export House by the Government of India. We have over 100 satisfied clients worldwide with installations in India and overseas such as Australia, Japan, Vietnam, China, Indonesia, Philippines, Thailand, Malaysia, Sri Lanka, Bangladesh, Russia, Iran, South Africa, Mozambique, Ivory Coast, Kenya, Rwanda, Malawi, Burundi, Cameroon, Tanzania, Mexico, etc,.

The GEM COMBI-PRO DRYER offers a unique blend of drying through conduction, convection and fluidization.

Construction

The GEM Combipro Dryer consists of a six- feet wide chamber, with insulated double walled constructed plenum chamber. The particles travel on a six feet wide perforated trays on the first two circuits before entering the fluidized bed zone. A duly insulated specially designed high pressure Hot Air Blower blows air into the plenum chamber thus fluidizing the particles. A stainless steel slotted grid sheet along with guide vanes underneath, provide uniform fluidization. Specially designed Power efficient cyclone system exhausts the humid air from within the system allowing for higher thermal efficiency and outputs.Combipro can also be incorporated with an automatic process control system to minimise the "human factor" in the quest for uniform drying.





General Arrangement Drawing

Hot Air Blower

The Hot Air Blowers is manufactured from heavy gauge steel with heavy duty pedestals. The Hot Air Blower is fitted with heat slingers and duly insulated to prevent heat loss. The Impellers of the blowers are statically and dynamically balanced as per relevant IS standards. The impellers are driven by TEFC Motors with IP 55 Protection and Class F Insulation with suitable safety guards. The robust construction of the blowers alongwith its aerodynamically tested impellers ensure a soundless and vibration free performance enhancing the life of the bearings, shafts and impellers while providing adequate quantity of air at suitable pressure with almost negligible maintenance.

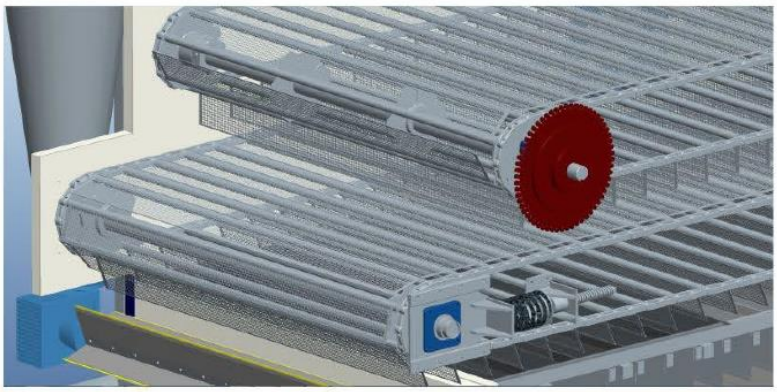
Suitable dampers are fitted at the inlet to control the volume of air to be permitted inside the drying chamber. The Hot air Blower is connected to the Plenum Chamber with a duly insulated connecting duct.

Plenum Chamber

The Plenum Chamber is constructed from heavy gauge steel duly insulated to prevent heat loss. The discharge door is also insulated to prevent any heat loss through conduction. The aero-dynamic design of the plenum chamber allows the desired volume and pressure of air for effective fluidization of the particles throughout the length of the plenum chamber. Stainless Steel 304 perforated plates with staggered oblong holes are fixed on top of the plenum chamber.

Multiple guide vanes are provided to achieve precise control of air flow. Cleaning and Inspection windows are provided to facilitate inspection and maintenance of the plenum chamber.

Drying Chamber



The Drying Chamber consists of double-walled, mineral-wool insulated panels where the tray system is mounted and is driven through chains and hardened sprockets. Thetop circuit trays carry the particles from the feed conveyor and discharge them onto the second circuit for further drying. The particles from the second circuit are further discharged onto a perforated stainless steel grid sheet where the particles are duly fluidized and further dried. This allows for maximum efficiency while occupying minimum floow space. The trays are made of stainless steel and are duly perforated to ensure that the particles do not fall through while allowing for suitable drying of the product. The speed of the chains can be varied with the help of Variable Frequency Drives allowing for suitable and varied drying times as per the requirements of each product.

Large windows to facilitate inspection and monitoring have been provided with heat-resistant glass in each panel. Simple hinge mechanism provided for easy opening of the windows.

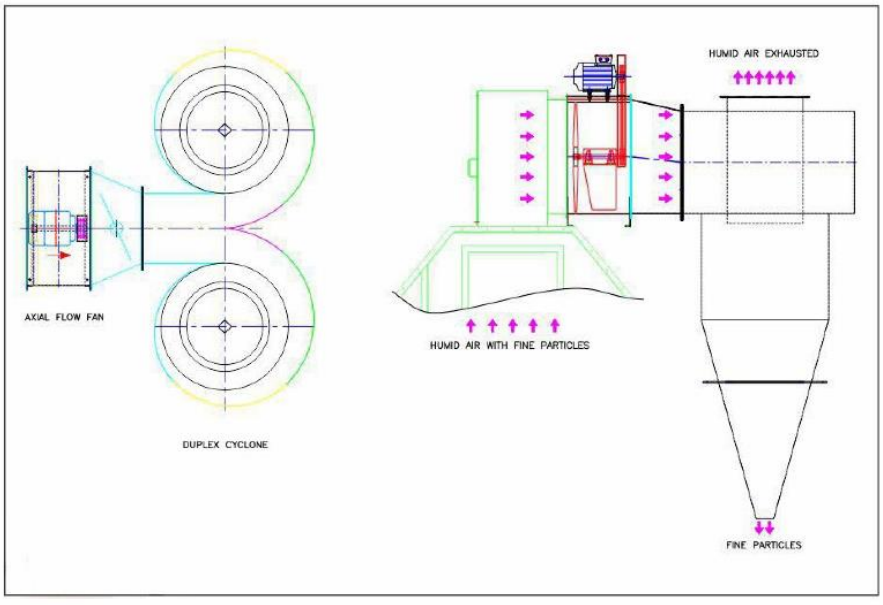
The Combipro allows for gradual moisture removal without causing any physical/chemical damage to the product during the process of drying.

Ideal Fluidised Bed

The dryer is so designed that the particles are uniformly fluidized along the length of the plenum chamber with the combination of air and pressure passing through the grid plates. The return trays of the second circuit carry the particles forward in a fluidized condition ensuring a controlled drying rate and a lesser requirement of air flow. This results in lower fuel consumption and higher efficiency.

Humid Air Exhaust System And Cyclones

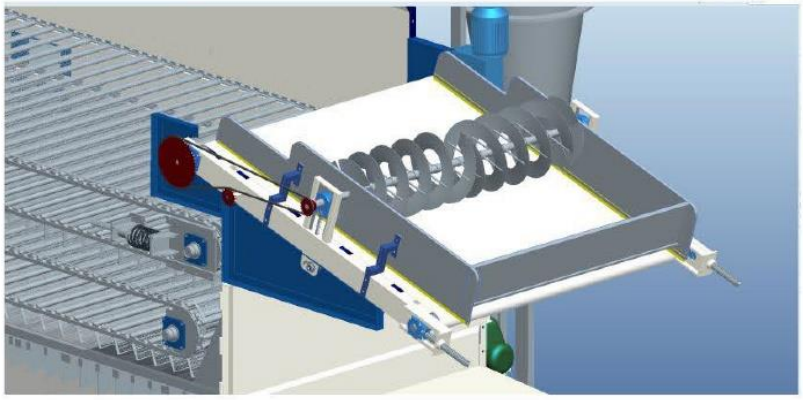
The specially designed Axial Flow Fans exhaust humid air along with the very fine particles from the drying chamber. The humid air is further exhausted out of the drying area with the help of chimneys while the very fine particles are collected in the cyclones thereby increasing overall output and minimizing wastage.Each fan is provided with dampers to set the air balance.



Centralized Control Panel

A Centralized Control Panel fitted with digital temperature indicators displaying the temperatures at different zones are integrated as part of the system. MCCB/MCB connections are fitted to safeguard the motors. Hooting arrangement alerts the operator in case a motor gets tripped. Centralized Volt meter and Ammeter displays are provided. Individual indicator lamps for different feeders help the operator to observe various parameters. Variable Frequency Drives for the tray circuits are fitted onto the panel allowing the user to adjust the speed of the tray and chains thereby increasing/decreasing the output as per the desired discharge moisture.

A time delay mechanism ensures that all drives operate in the correct sequence. The chain condition monitor eliminates jamming of trays by detecting chain slackness, if any.



Feed Conveyor

A full width feed conveyor comprising of a food grade PVC Belt with a spreader is provided to facilitate uniform feed.

Pneumatic Discharge Valve / Rotary Discharge Valve

A Pneumatic Discharge Valve consisting of a blower and pneumatic chamber helps to cool the particles on the discharge side and enables single point collection on either side of the chamber. Alternatively, a Rotary Discharge Valve can be provided which prevents the hot air from within the system from escaping the dryer while allowing for the product to be discharged effectively.

Automation

Combipro ensures consistency of end product in situations where inlet moisture of particles vary frequently. The ACS comprises a Programmable Logic Counter (PLC) coupled with a Variable Frequency Drive. The PLC receives the input of operating temperatures of the Combipro through temperature controllers and automatically adjusts the throughput time through the Variable Frequency Drives. All the drives of the Combipro are coupled to the Variable Frequency Drives.

Low Power And Fuel Consumption

The dryer is highly efficient and utilises limited power and can be used with a variety of fuels such a wood, coal, gas, oil and steam.TheCombipro is suitable for any kind of heater. Solid Fired or Gas Fired Heaters/Boilers with Radiators should be capable of maintaining the required temperature depending on the capacity of the dryer.

Drying Time

The drying time of the particles can be efficiently controlled with the help of Variable Frequency Drives that are fitted onto the control panel. This feature assists in drying multiple products with different residence times with the same equipment.

Three Circuits

The stainless steel grid sheet on the top of the plenum chamber can be replaced with a third circuit (Tray and Chain system) as per the requirement of the customer.

Salient Features

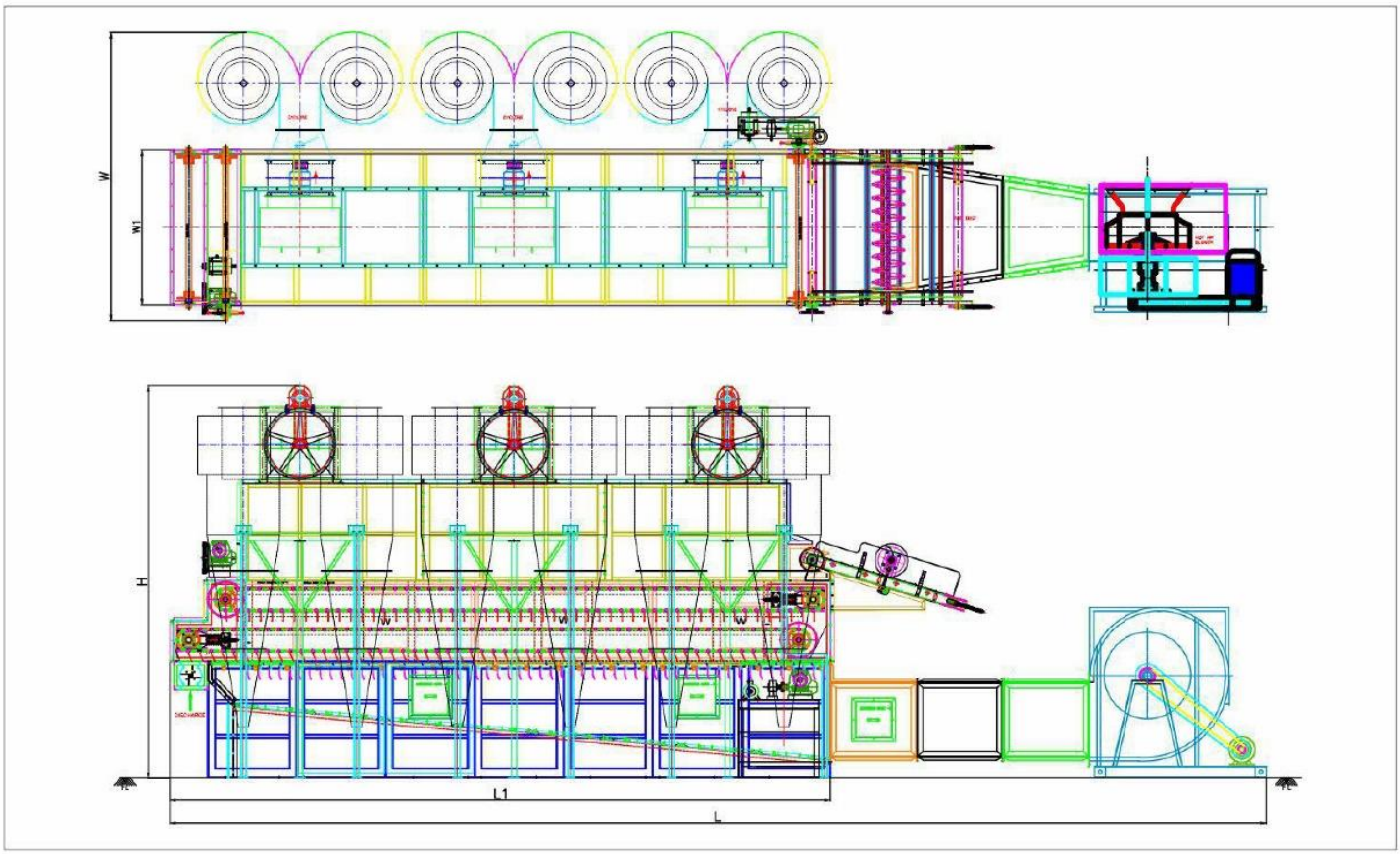
- Modular construction for easy assembly and extension – from 4 modules to 8 modulesPOWER EFFICIENT HOT AIR BLOWER DULY INSULATED WITH DUCT.
- AERODYNAMICAND INSULATED PLENUMCHAMBER for uniform fluidisation.
- Stainless Steel grid plates with Stainless Steel Trays and Chains ensure hygienic standards across all food processing sectors.
- High efficiency Axial Flow Fans for exhausting humid air.
- Capable of Drying small as well as larger particles efficiently MODULAR FRAME FOR EASY INSTALLATION WITHIN 7 DAYS
- Automation through PLC possible *
  UNIFORM FEEDING AND DISCHARGE with the help of Feed Conveyors and Spreaders.

Other Features Of Gem Combipro

- Hygienic Construction – All parts in contact with tea are in stainless steel construction.
- Easy access along the entire length of the dryer.
- Economical with minimal Power Consumption.
- Control Panel with Temperature Indicators.
- Suitable for any heater or fuel.
- Reduced Maintenance.
- Unparalleled after sales service with wide network of technical representatives and service engineers.

Optional Features

- Feed Conveyor
- Variable Frequency Drive
- Automation
- Heaters, Boilers and Radiators
- Cyclones
- Three Circuits



Technical Specifications

	UNIT	4M	5M	6M	7M	8M	10M	12M
Drying Chamber	Sq.ft.	96 (16X6)	120 (20X6)	144 (24X6)	168 (28X6)	192 (32X6)	240 (40X6)	288 (48X6)
Inlet Temperature (DC)	Deg. C	100-120	100-120	100-120	100-120	100-120	100-120	100-120
Inlet Temperature (VCO)	-	60-65	60-65	60-65	60-65	60-65	60-65	60-65
Output Per Hour	Varying depends on the product and input moisture content.							

Power Requirement ;

Drying System (Hot Air Blower)	HP	30	40	50	50	60	75	75
Dust Collection System (Cyclone Fan)	HP	15	15	15	15	20	30	30
Drive, Feed + Discharge	HP	8	8	8	8	8	12	12

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