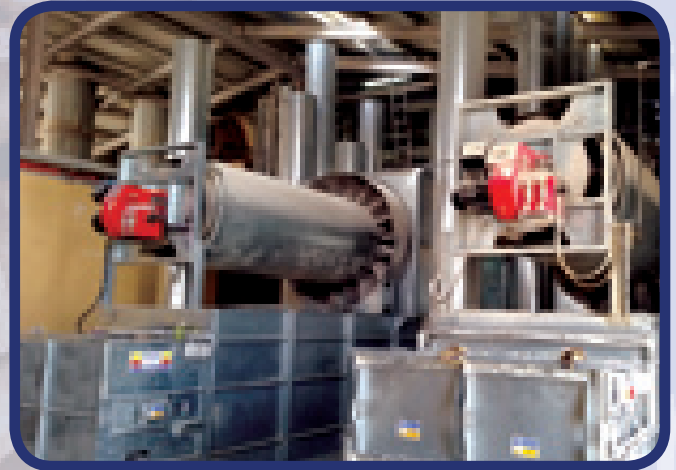




The UK's most experienced manufacturer of materials handling & drying equipment.

BELT DRIER



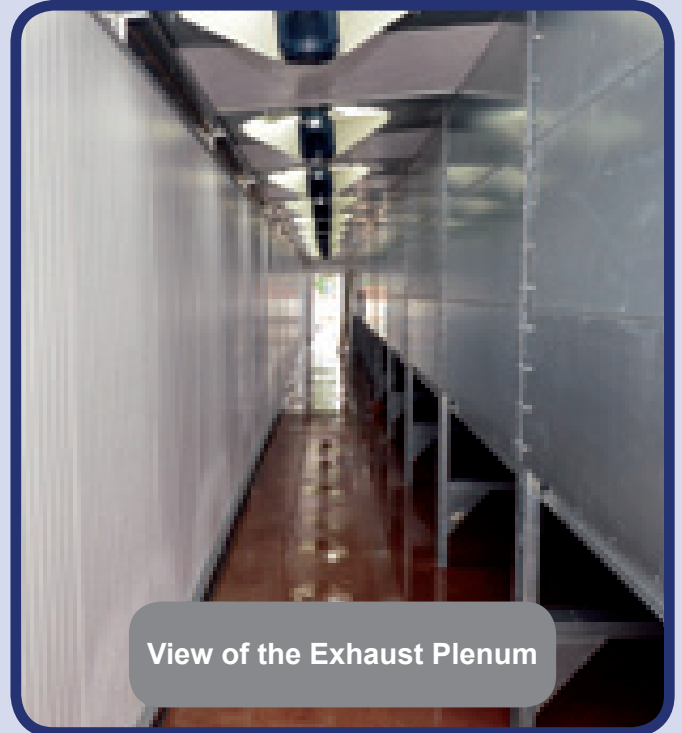
BELTDRIER

Contents

General Design	4
Heat Source Options	6
Belt Information	6
PLC Control Panel	8
<i>Remote Desktop Operation</i>	9
<i>Control Panel App</i>	9
Principle of Operation	10
Options	12
<i>Infeed Options</i>	12
<i>Belt Cleaning</i>	12
<i>Hot Air Recirculation</i>	13
<i>Fire Detection & Suppression</i>	13
<i>Stacked Driers</i>	13
Insulated Enclosure	15
Example Driers	16
<i>Wood Examples</i>	16
<i>Grass Examples</i>	17
<i>Waste Examples</i>	18

Key Points

- Fine mesh drying belt.
- All galvanized construction - stainless steel as an option.
- Multiple heat sources available including biomass, steam, oil, kerosene or gas.
- PLC touch screen panel with internet connectivity.
- Levelling device.
- Modular construction.
- Rotary brush to clean belt.
- Various widths up to 3m available.
- Designed and manufactured in house.
- Optional cooling section.



BELTDRIER

PERRY BIOMASS ENGINEERING

The Perry Belt Drier is ideally suited to drying almost any nonflowing product. Popular applications have included biomass, anaerobic digestate, grass & seeds.

The Perry Belt Drier is ideally suited for these materials:

Wood chip	Beans and soya beans	Extruded pet foods
Wood shavings	Shredded recycled matter	Finely ground wet chips
Wood pellets	Sewerage sludge &	Grass
Other feed pellets	Digestate	Grass seed
Saw dust	Flaked maize	Orange peel
Biomass straw	Nuts	Pulp granulates
Miscanthus and bagasse	Fruit and fruit slices	Solid shredded waste
Herbs	Compost	Granular & shredded plastic
Combinable crops	Cotton rejects	Poultry manure

Traditionally, drying these types of materials has been achieved by rotary drum driers. However this method has many disadvantages, including:

- High risk of fire due to the average operating temperature of 426°C (800°F).
- Balling up of products.
- Potentially volatile emissions which may require additional permits.
- Not suited for heat recovery due to their higher operating temperature.

The Perry belt drier overcomes all of the issues listed above along with being more economically efficient due to the lower operating temperature and providing the opportunity to recover waste heat.

Drying for biomass:

It's highly likely that biomass materials need to have their water content reduced before use to:

- Ensure the optimal heating efficiency of the material, including a greater flame temperature.
- Prevent incomplete combustion of the fuel leading to tar and creosote emissions.
- Prevent corrosion of the flue by water recondensing.
- Improve the efficiency of the transport and storage of the material.

General Design

- **Modular** galvanised steel construction available in 1.5m, 2.2m and 3m widths. The drier can be increased in length in 1m increments from 8.5m to 65m (including drive and tail). The overall height of the drier is dependent on the heat source chosen.



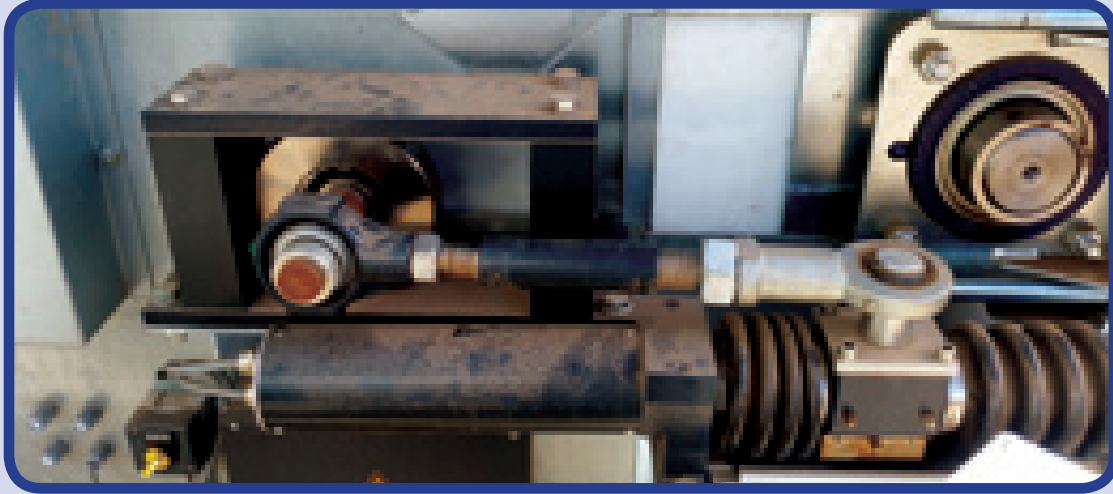
- There is a **rotary brush** to clean the belt as standard - for usual biomass and granular products this is satisfactory. Every piece of the belt is cleaned once per revolution automatically.



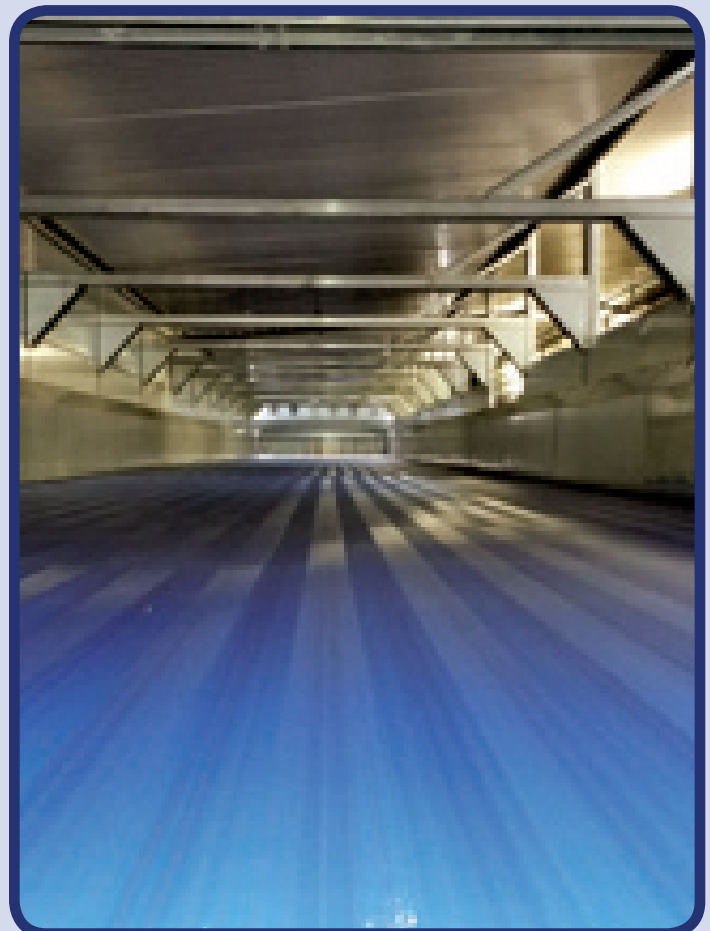
- **Automatic control** as standard is by measuring air temperature on the same principle as the grain drier. The way this works is to measure the air temperature above and below the belt at the inlet and outlet of the drier. When the temperature below the belt drops at the inlet this indicates damper chip entering the drier; the PLC will then slow the belt down to compensate. If the temperature below the belt at the outlet end increases this will indicate that the chip is getting over dried so the PLC will speed the belt back up a little. An extra cost alternative is a system using microwave moisture sensors to measure the moisture and control the speed from these readings. With the moisture sensors moisture is measured, but the PLC program makes the adjustments in the same way.

General Design

- The Perry Belt Drier has an **automatic belt tracking** device which works using a sensor at the side of the belt, which senses if the belt travels to one side. If the sensor is touched an electric actuator changes the angle of the tracking roller which sends the belt across to the opposite side.



- The Perry belt drier **does not have chains or slats**, keeping it very clean. In driers with slats and chains, products such as grass or herbs will leave residue. This will decompose and the bacterial count inside the drier will increase. In the Perry belt drier there is less chance of damage as materials cannot get stuck in the slats and chains. As product is fed onto the belt and is stationary during the drying process the Perry belt drier is very delicate; no damage is caused from it being dragged through the drier over a metal bed by chains and slats.
- Slow moving, and very few moving parts, so rates of wear are very slow and **cheap to maintain**.
- Because there is **no louvre system** or mesh material that the product is being moved over there are no air gaps to become clogged by small residue so the drier performance stays consistent and there is no perforations to clean in the drier body.
- Sealing for product leakage and air leakage is done using a soft **rubber side skirt**. This is adjustable as it wears to help maintain an efficient seal. The side skirt is a slow wearing part.



Heat Source Options

Heat Exchangers

- Heat exchangers are commonly used for applications where a biomass heat source is available such as woodchip boilers to produce hot water, or if there is a steam heat source available.
- The drier can be tailored to accept existing heat exchangers if required.

Oil or Gas Fired Burners

- If a separate heat source is required a direct fired furnace with diesel, kerosene, LPG or natural gas burner can be used. Alternatively a heat exchanger with the same burner can be used for indirect heating if required.

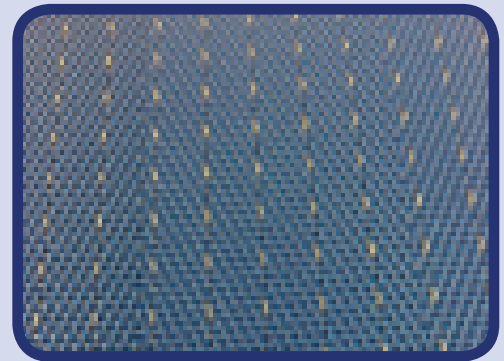


Belt Information

Fitted with a universal belt, the Perry belt drier is suitable for all granular products, woodchip, shavings, sawdust, paper pulp, grass, herbs, vegetable slices, SRF, RDF, silica granules, sand, clay pellets and grain. The belt is tightly woven so very few product fines will pass through.

Polymer Woven Belt (Standard)

- An anti-static synthetic / bronze weave mesh which is well suited to low temperature driers. Temperatures of up to 130°C.
- Best suited for smaller / finer products, or products which have a wide range of particle sizes such as woodchip.
- The woven in bronze wires permanently prevent electro-static charging of the belt.
- The mesh has a high level of air permeability.
- Two Separate tracking rollers and two rotary cleaning brushes (one at the drive end and one at the tail end).





Heat Exchangers

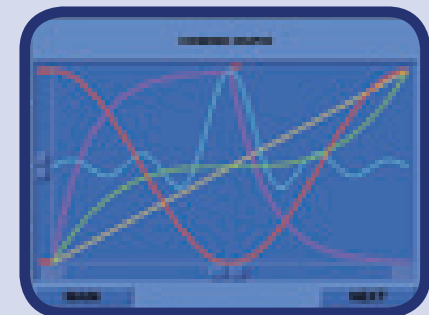
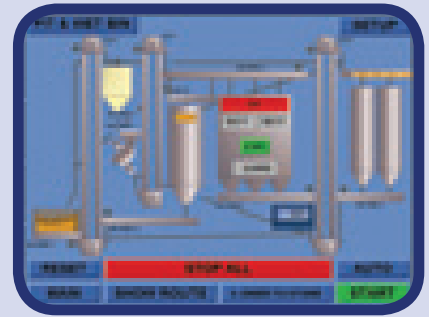


Kerosene Burners

PLC Control Panel

Overview

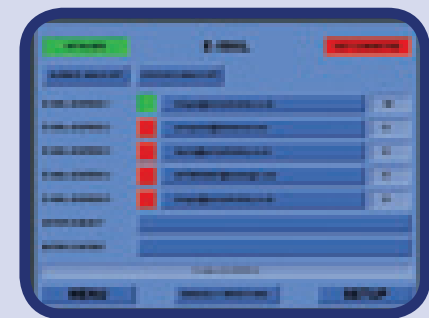
- 12" touch screen.
- Simple operation.
- Plain language status alerts.
- Designed and programmed in house.
- Data logging of all readouts and alarms and drier status.
- Moisture contents can be entered during the day.
- Export all recorded drier conditions and moisture contents to a spreadsheet and automatically create daily record sheets.
- Fuel use calculator included for diesel applications.



Internet Connectivity

Connect the Perry PLC panel to the internet to:

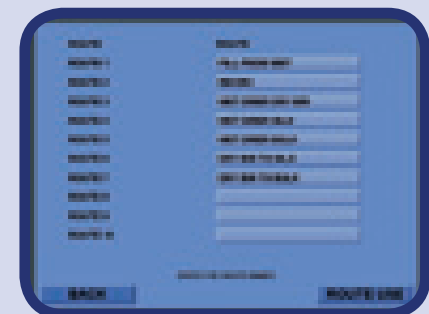
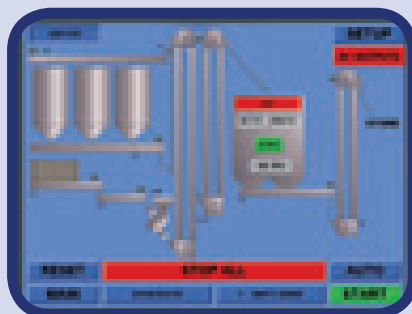
- Allow status reports to be sent to selected mobile numbers and email addresses.
- Have the ability to control or monitor the drier remotely from any internet connected PC or tablet.
- Download all drier history and data logged records.
- Allow UK engineers to access the panel for diagnostics or adjustments.



Requires internet connection and modem for all features.

Diagnostics

The drier history is recorded - input and output screens display current panel conditions to aid fault diagnostics.

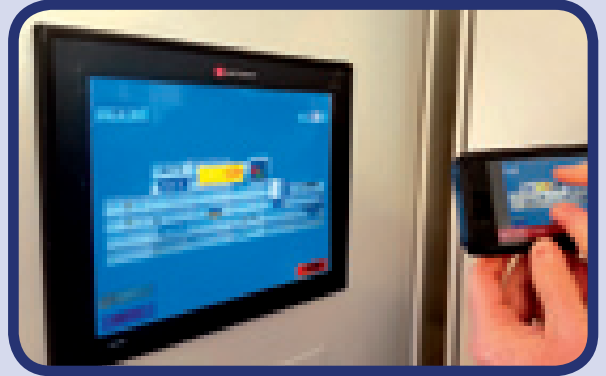


Control Panel App

Full control of your drier from anywhere with a WiFi or 3G/4G connection!

Free app available from both Apple App Store and Google Play Store.

- Control the Perry PLC drier or plant panel from your phone.
- Two settings - either view or control the panel.
- Full zoom compatibility making the buttons and screen easier to read.
- Static IP and passwords mean the connection is secure.
- Multiple applications can be installed on different devices.
- Multiple panels can be installed on each application.



The app allows users more flexibility when operating their driers; you can now operate the panel or check the status of your Perry equipment from wherever you happen to be.

Remote Desktop Operation

Sit at your computer while keeping a close eye on your drier!

- Use the connection exactly the same way as the panel; the screen shows an exact mimic of your panel. Everything that can be done on the panel can be done in the remote connection.
- Static IP and password on the panel can be done in the remote support.
- Application can be installed on more than one device.
- Multiple panels can be connected to the application.



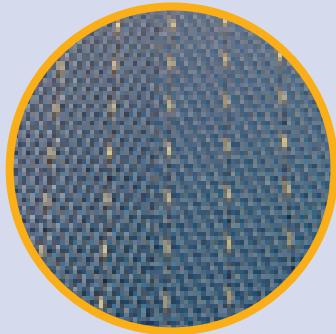
*Panel must be connected to the internet with a static IP address and port forwarding facility, no app currently available for Windows devices.

Principle of Operation

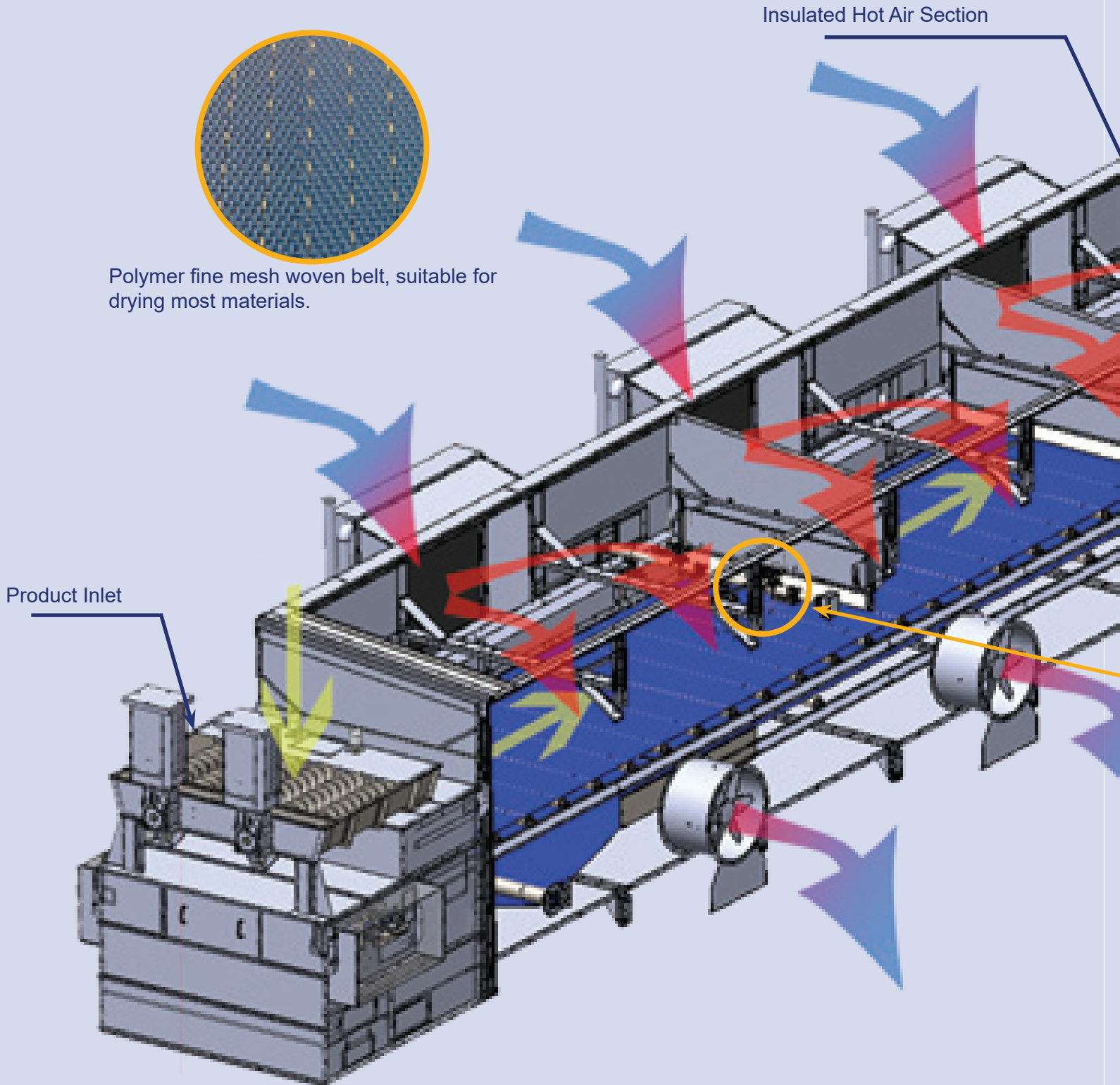
Cold air is drawn through the heat exchangers where it is heated to the required temperature.

The warm air is then drawn down through the product bed & belt and dispersed through the fans.

If you would like to discuss how the Perry Belt Drier could be the solution you are looking for please contact us on +44 (0)1404 890300.

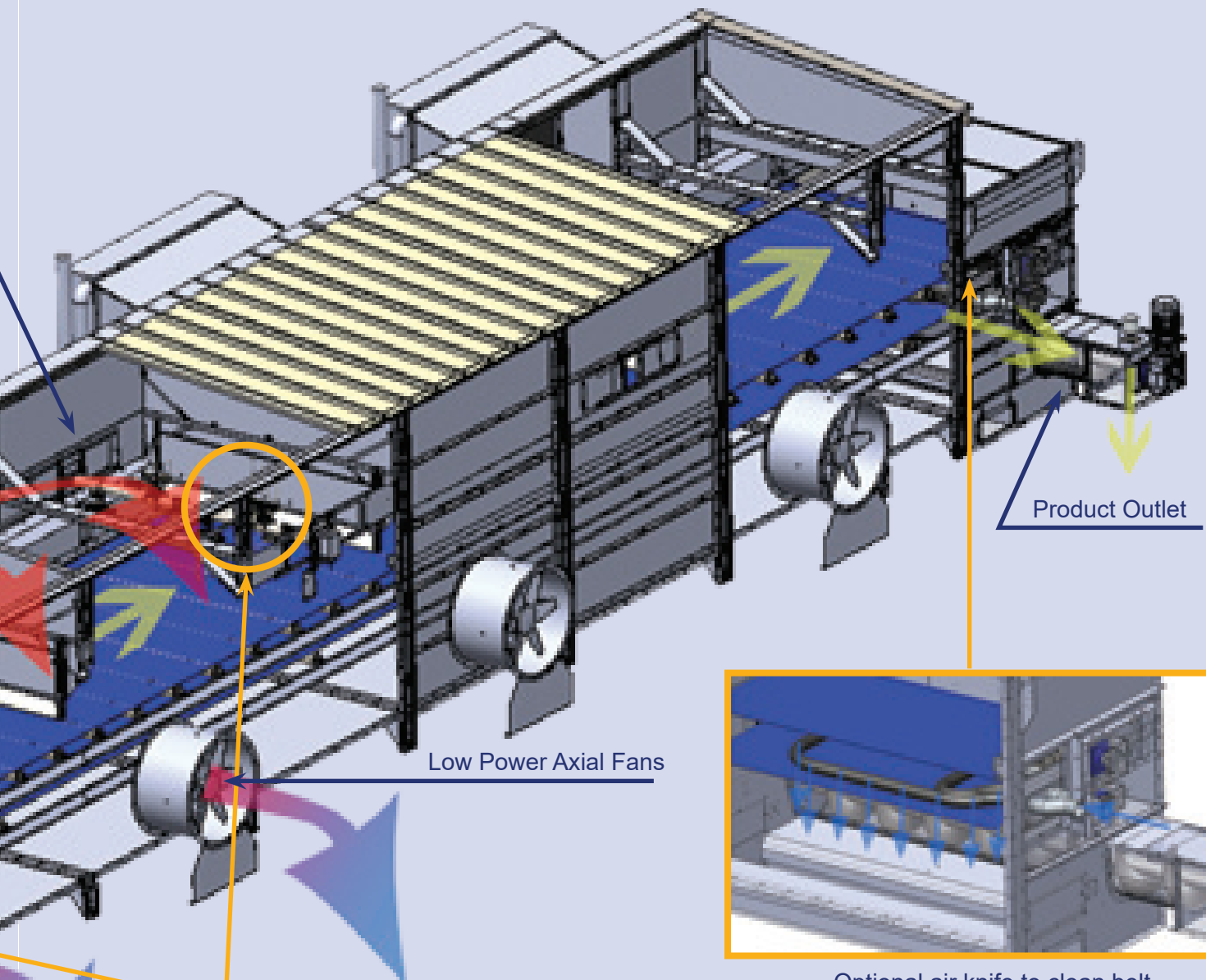


Polymer fine mesh woven belt, suitable for drying most materials.



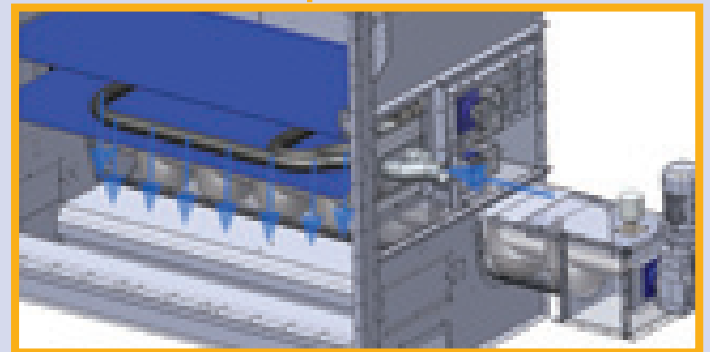
Wood Chip - Wood Shavings - Sawdust - Straw - Paper Pulp - Grass - Digestate

BELT DRIER

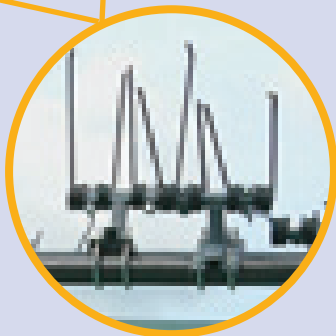


Low Power Axial Fans

Product Outlet



Optional air knife to clean belt.



Optional product agitators to aid even drying.



The UK's most experienced manufacturer of materials drying & handling equipment.

+44 (0)1404 890300 - sales@perryengineering.com

Shredded Recycled Matter - Solid Shredded Waste - Granular & Shredded Plastic - Flaked Maize



To find out more about the Perry Belt Drier please call +44 (0)1404 890300 or email sales@perryengineering.com. Alternatively you can visit www.perrybiomassengineering.com.

Options

Infeed Options

- **Screw feeder** - a feeding hopper that can be used as a buffer hopper to help feed the product evenly over the belt. This feeding hopper will have a number of screw feeders dependant on the width of drier chosen. The hopper can be fed via dump loading, elevators, conveyors or screw conveyors.
- **Belt feeder** - this can be used singularly or in a row of multiple feeders. The belt feeder ensures a level product bed going into the drier & acts as a buffer hopper.
- **2m buffer hopper** - a 2m tall buffer hopper can be added to screw feeders to ensure the drier is fed at a steady and consistent rate, and help ensure there is always product for the drier.
- **Gravity feed** - for existing infeed & levelling systems already in place, Perry offer a basic gravity feed hopper.



Belt Cleaning

As standard all of Perry belt driers are fitted with a rotary brush to clean the belt. Additional belt cleaning options include:

- **Air knife** - this can blow small particles such as dust or fines out of the belt, ensuring consistent airflow throughout the product bed.
- **Water jet** - a high pressure water jet cleaning system is available for more sticky products.

Both methods work after the drive drum to clean the belt before returning to the inlet.

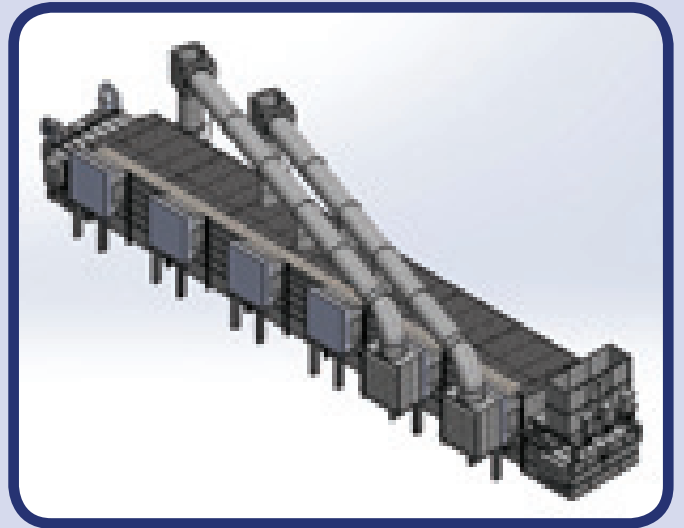
The PLC Control Panel can constantly monitor the air pressure below and above the belt. When the pressures rise the cleaning option can be turned on automatically for a set number of rotations of the belt.



Options

Hot Air Recirculation

- On average, adding hot air recirculation to a drier will **save** about one third of the thermal energy required.
- It **reduces the overall running costs** of the drier.
- It reduces the amount of air that is exhausted through the fans. This is particularly helpful for applications where an **odour abatement system** is being used.



Fire Detection & Suppression

Perry have two fire detection and suppression systems available for the more **volatile** materials, or plants that are more fire conscious.

- **British Standards Certified System** - The system is designed and installed to NFPA 750 - 2015 and consideration of the BS8489 – 1:2016.
- In-house designed pump for fire quenching system. This is not certified to British standards, but it is a **more cost effective** solution. It can be fitted with an automatic spray bar option or a manual drenching option.

Presenting fire detection & suppression systems to insurance companies is likely to **reduce insurance premiums**.

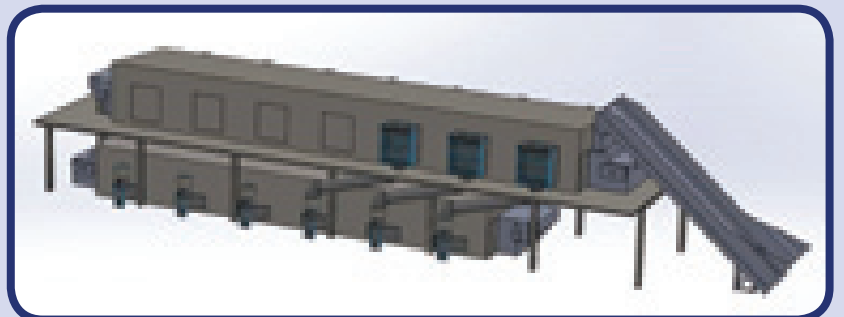
Stacked Driers

For projects where space is an issue, Perry offer a stacked drier option. This allows two driers to work as one long drier to increase throughput.

The stacked driers are offered with the top drier being supported on a mezzanine floor, which allows for full access to the top drier.

Perry supply all steel-work & flooring.

All Perry Belt Drier options are available with stacked driers.





Fully Enclosed



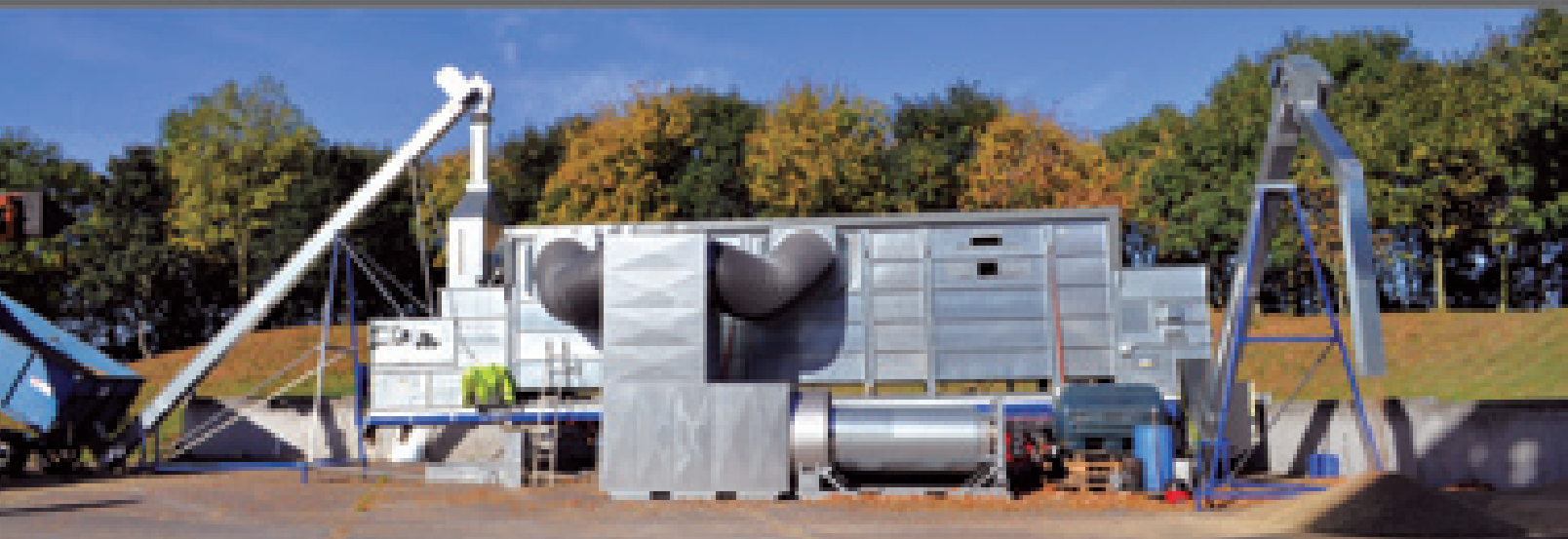
Fully Enclosed
Fan Side



Fully Enclosed
HEX Side



No Enclosure
Inside

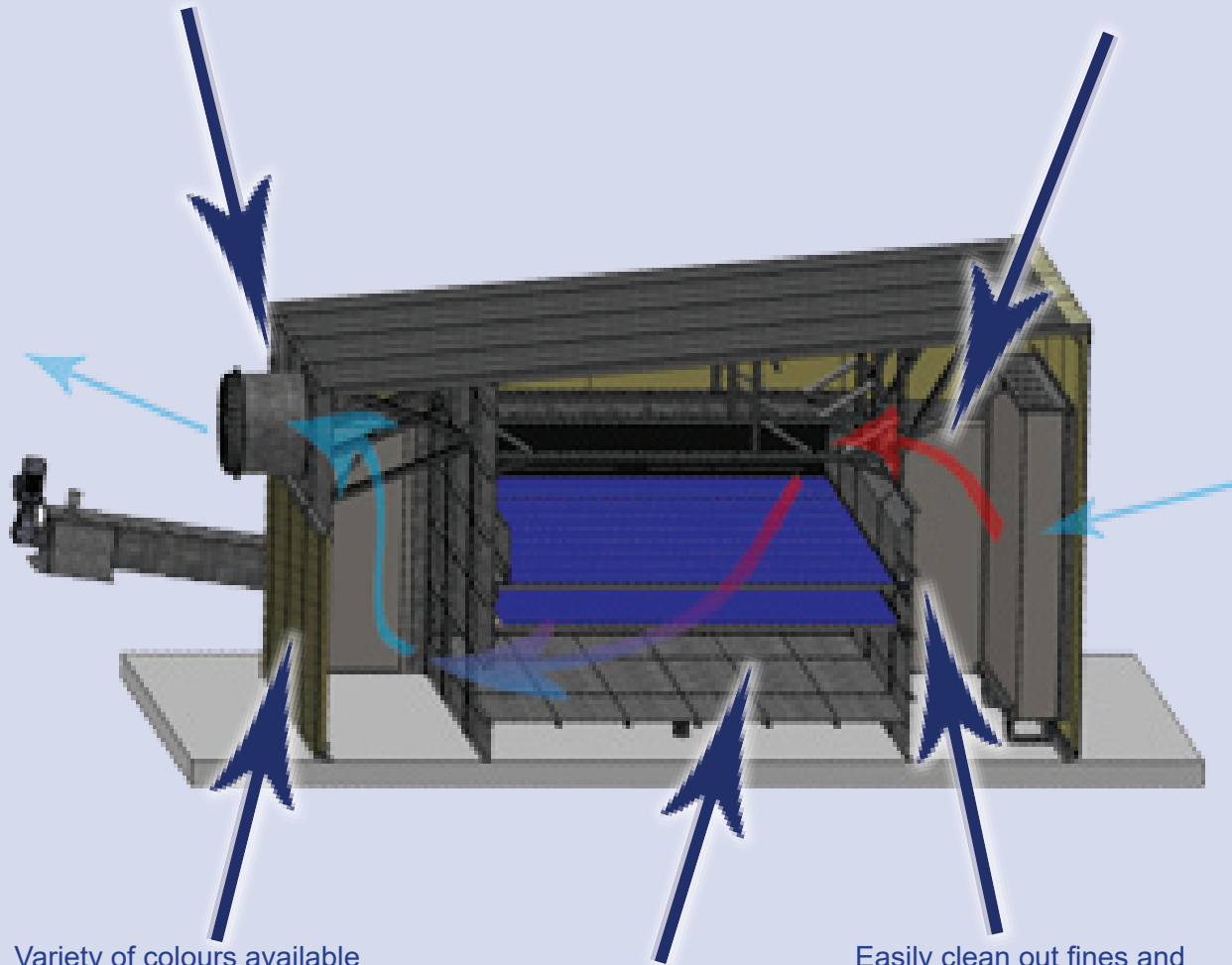


No Enclosure

Insulated Enclosure

Modular design allows for simple future extensions.

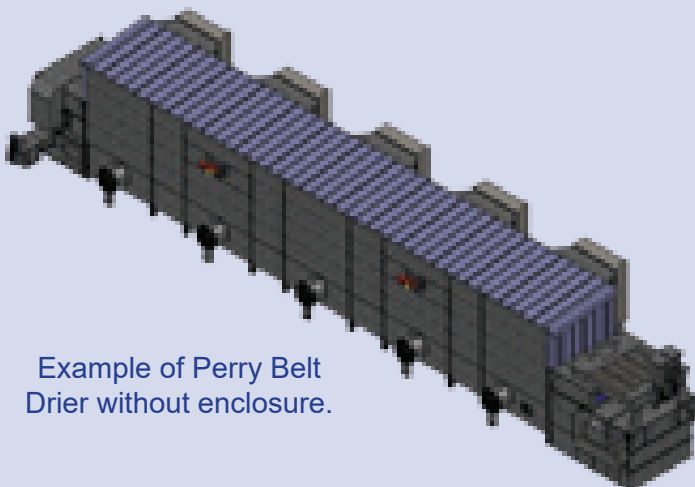
Hot air is directed over the divisions and down through the product bed.



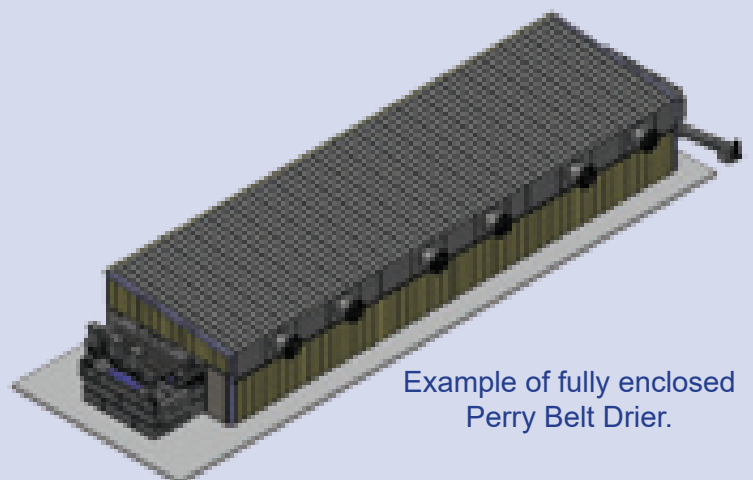
Variety of colours available to ensure your belt drier is aesthetically in-keeping with the rest of your plant.

Easy access for cleaning and maintenance, no need to remove side panels.

Easily clean out fines and dust that may have built up under the drying bed.



Example of Perry Belt Drier without enclosure.



Example of fully enclosed Perry Belt Drier.

Wood Examples

G30 to G50 Woodchip

Example throughputs are based on 100°C hot air temperature, 45% initial moisture content, 10% target moisture content.

Thermal Energy Required is based on a standard drier without hot air recirculation. Typical thermal energy savings are at least one third of the energy required when hot air recirculation is installed.



Drier Model	Belt Width	Overall length	Wet Input	Dry Output	Thermal Energy
BD1510	1.5m	15m	1.7tph	1.0tph	1000kW
BD1520	1.5m	25m	3.5tph	2.1tph	2100kW
BD2225	2.2m	30m	5.8tph	3.5tph	3500kW
BD3040	3.0m	45m	13.9tph	8.5tph	8500kW
BD3050	3.0m	55m	17.4tph	10.6tph	10,500kW

Wood Shavings

Example throughputs are based on 100°C hot air temperature, 45% initial moisture content, 10% target moisture content.

Thermal Energy Required is based on a standard drier without hot air recirculation. Typical thermal energy savings are at least one third of the energy required when hot air recirculation is installed.



Drier Model	Belt Width	Overall length	Wet Input	Dry Output	Thermal Energy
BD1510	1.5m	15m	0.9tph	0.5tph	750kW
BD1520	1.5m	25m	1.8tph	1.1tph	1500kW
BD2225	2.2m	30m	2.9tph	1.8tph	2500kW
BD3040	3.0m	45m	7.1tph	4.3tph	5600kW
BD3050	3.0m	55m	8.9tph	5.4tph	7000kW

Grass Examples

Fresh Cut Grass/Lucerne

Example throughputs are based on 100°C hot air temperature, 85% initial moisture content, 12% target moisture content.

Thermal Energy Required is based on a standard drier without hot air recirculation. Typical thermal energy savings are at least one third of the energy required when hot air recirculation is installed.



Drier Model	Belt Width	Overall length	Wet Input	Dry Output	Thermal Energy
BD1510	1.5m	15m	0.5tph	0.1tph	850kW
BD1520	1.5m	25m	1.1tph	0.2tph	1700kW
BD2225	2.2m	30m	1.9tph	0.3tph	2800kW
BD3040	3.0m	45m	4.5tph	0.7tph	6700kW
BD3050	3.0m	55m	5.6tph	0.9tph	8450kW

Wilted Grass/Lucerne

Example throughputs are based on 100°C hot air temperature, 65% initial moisture content, 10% target moisture content.

Thermal Energy Required is based on a standard drier without hot air recirculation. Typical thermal energy savings are at least one third of the energy required when hot air recirculation is installed.



Drier Model	Belt Width	Overall length	Wet Input	Dry Output	Thermal Energy
BD1510	1.5m	15m	0.7tph	0.5tph	850kW
BD1520	1.5m	25m	1.5tph	0.6tph	1700kW
BD2225	2.2m	30m	2.5tph	1.0tph	2800kW
BD3040	3.0m	45m	6.1tph	2.3tph	6700kW
BD3050	3.0m	55m	7.6tph	2.9tph	8450kW

Waste Examples

SRF (Solid Recovered Fuel)

Example throughputs are based on 100°C hot air temperature, 35% initial moisture content, 12% target moisture content.

Thermal Energy Required is based on a standard drier without hot air recirculation. Typical thermal energy savings are at least one third of the energy required when hot air recirculation is installed.



Drier Model	Belt Width	Overall length	Wet Input	Dry Output	Thermal Energy
BD1510	1.5m	15m	1.4tph	1.1tph	800kW
BD1520	1.5m	25m	2.9tph	2.1tph	1600kW
BD2225	2.2m	30m	4.8tph	3.6tph	2600kW
BD3040	3.0m	45m	11.6tph	8.6tph	6200kW
BD3050	3.0m	55m	14.5tph	10.7tph	7700kW

RDF (Refuse-derived fuel)

Example throughputs are based on 100°C hot air temperature, 50% initial moisture content, 15% target moisture content.

Thermal Energy Required is based on a standard drier without hot air recirculation. Typical thermal energy savings are at least one third of energy required when hot air recirculation is installed.



Drier Model	Belt Width	Overall length	Wet Input	Dry Output	Thermal Energy
BD1510	1.5m	15m	0.7tph	0.4tph	750kW
BD1520	1.5m	25m	1.5tph	0.8tph	1500kW
BD2225	2.2m	30m	2.5tph	1.5tph	2600kW
BD3040	3.0m	45m	5.9tph	3.5tph	6200kW
BD3050	3.0m	55m	7.4tph	4.3tph	7700kW

Perry of Oakley since 1947

Perry of Oakley was founded in 1947 by Tom Perry, a farmer's son, who offered a mobile repair and manufacturing service to local farmers and businesses in the Oakley, Basingstoke area of Hampshire.

Working from home he converted an Austin 12 car into a mobile workshop; the back seat was replaced by a bench and welder. He travelled all over the country, sleeping in a tent if away from home, repairing farm machinery, (tubing traction engine boilers, welding combines & binders) in the field.

In 1949 Tom Perry designed and built our very first belt and bucket elevator with a capacity of 5tph. 1949 also saw the introduction of our first grain cleaners. These early cleaners were equipped with mechanical sieves and aspiration to lift off dust and light rubbish.

During the early 1950s many new farm mechanisation aids were designed by Tom Perry and manufactured in Oakley. These included tractor mounted buck rakes, trailers, dust reduction systems for

combine harvesters and jog trough grain conveyors driven by petrol engines or electric motors. These conveyors had capacities of up to 5tph, as capacity requirements increased the first chain and flight conveyors were developed. These conveyors were the fore runners of the conveyors that Perry's currently design and manufacture with capacities up to 650tph.

In 1952, the first factory was built in Oakley - it measured 60 foot x 40 foot.

In 1955, our first continuous flow grain drier was manufactured also with a capacity of 5tph.

The business steadily developed based on its reputation of delivering reliable, well-engineered conveyors and bucket elevators during the early 1950s. Export sales of Perry's

own design grain driers developed as well as adding dust extraction equipment and weighing hoppers to the range. The conveyor range was expanded to include curved & inclined conveyors and flow & return types.

In 1974, a brand new purpose built manufacturing facility was built in Oakley, Basingstoke.

During the next 16 years the business continued to grow.

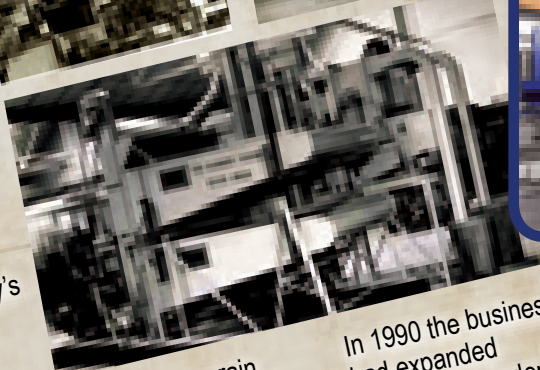
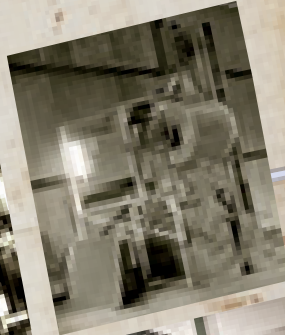
In 1990 the business had expanded sufficiently - under the direction of Tom's son, Nigel Perry - to require larger premises and a relocation move to Honiton, in Devon, was made.

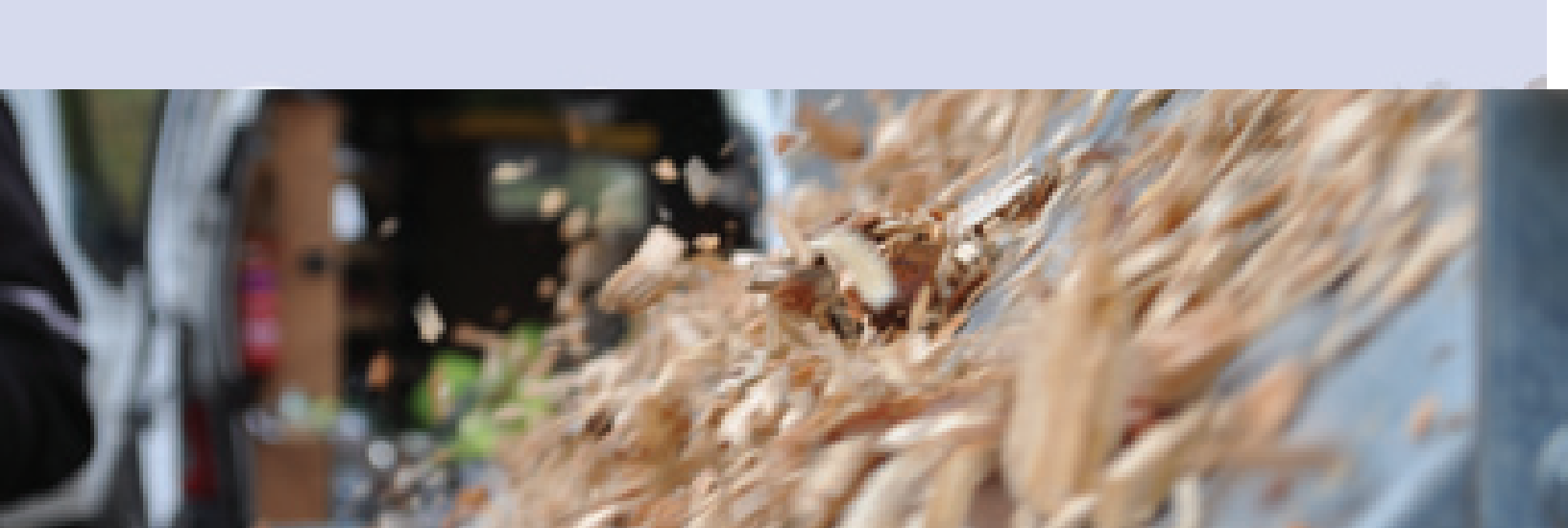
The following year Nigel's son, David, joined the business - having achieved a First Class Honours degree in engineering.

Since October 2007 when David Perry took over as managing director, Perry's have continued to expand and plan for the future. Investing in the very latest CAD CAM technology, including three dimensional design facilities and the latest fully automated punching and forming machinery.

All Perry of Oakley Ltd. products are designed and manufactured in the purpose built facility in the West Country using a depth of knowledge acquired during more than of business.

We have a large engineering and design department and have a very active research and development program. We provide expert technical support for our machinery worldwide and we stock one of the most comprehensive spare parts inventories in the trade.





SHAPA's 2017 & 2021 'Exporter of the Year' award winners & DIT Export Champions.

Perry of Oakley Ltd.

Dunkeswell Airfield,
Dunkeswell,
Honiton,
Devon,
EX14 4LF

Phone

Sales: +44 (0)1404 890 300

Support: +44 (0)1404 890 305

Web

E-mail: sales@perrybiomassengineering.co.uk

Web: www.perrybiomassengineering.co.uk

