

Oiler System Description

Please see below for a functional description for our high accuracy hygienic oil delivery system.

Oil Spray Principle

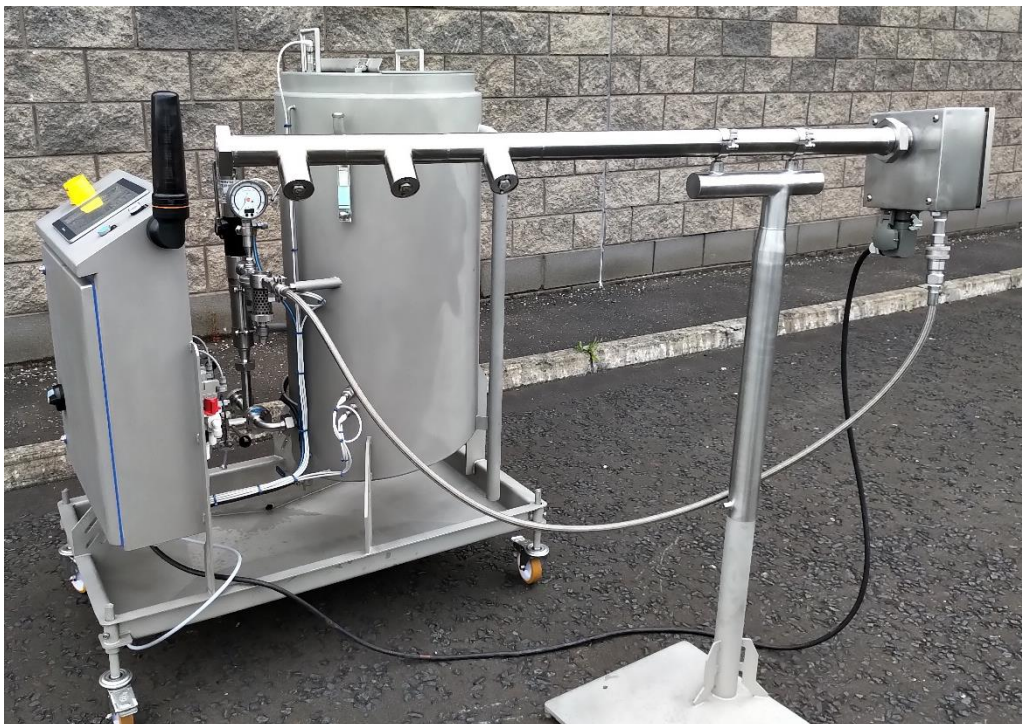
There are various applications where it is necessary to apply liquid oil or fat to a snack product before it is seasoned. These include but are not limited to:

- Low fat (usually baked rather than fried) products where the quantity of oil being applied is relatively low.
- Controlled fat products (e.g. health products or children's food) that require the quantity of oil being applied to be strictly controlled.
- Products that have a surface that powder does not readily stick to, (e.g. extruded products/popcorn/tortillas) adhesion can be greatly improved with a light coating of oil.
- When oil needs to be added to flavour the product or where exotic oils are being used that do not react well to heat.

Traditionally the oil is pumped to an air atomised nozzle and sprayed into the drum to coat the product evenly but there are three issues with using compressed air to atomise the oil:

1. The oil is atomised into a mist rather than into droplets. This mist can be seen coming out the end of the drum and is a waste of product and causes oil to settle on surfaces in the factory environment.
2. It is difficult to modulate and control the flow of oil.
3. The air supply to the nozzle must be filtered and cleaned before it is sprayed directly onto the product.

Our system differs by instead using Spray Systems nozzles which each contain a small electrical actuator to open and close a valve built into the nozzle at a very high frequency. Because the oil supply line to the nozzle is pressurised this creates a controlled spray pattern with the droplets evenly spread across the spray profile. The spray pattern remains practically unchanged across the flow range. The nozzle tips can be interchanged to achieve different spray patterns if required.



Operating Procedure



The system is controlled by a PLC (Siemens) and 10" full colour HMI, with the ability to integrate with upstream and downstream equipment. When running manually the operator will input the Kg/Hr of oil required from the system and when running automatically the output will be a function of the measured unflavoured product entering the drum (controlled by an analogue input signal).

Each recipe will have the ability to program the system with the ratio of oil/powder that is required. All of these parameters can be controlled on the screen manually or by communications with an external system through ethernet.



Oil is added to the tank by the operator (auto fill is available). The tank is double skinned with a heated water jacket in the outer skin which heats the oil to allow for a better spray pattern. The heater has an over temp thermostat to prevent boil off with the oil temperature being controlled by a probe in the oil portion of the tank with the setpoint and actual temperature being displayed on the HMI.

The top of the tank has an IFM ultrasonic sensor to give an indication on the HMI of the quantity of oil left in the tank.



The oil is drawn from the tank (or a bypass is available if pumping from an external container is required) by a fully stainless pneumatic piston pump, pressure is regulated and displayed on an IFM electronic pressure gauge. The oil flows through a stainless cleanable 100 micron filter with drain valve.

From here the flow is measured by a turbine flow meter the passes to the nozzles and drum via a braided hose complete with heavy duty quick release couplings. The PLC monitors the 'actual' oil flow and automatically increases or decreases the frequency of nozzles pulses to achieve the correct flow.

Specifications

- 100 litre oil water heated and temperature-controlled storage tank
- Actual oil level and low-level indication with ultrasonic sensor
- Pneumatically driven oil pump and adjustable oil pressure regulator (2-6 Bar)
- 100 micron cleanable gauze strainer
- Electronic pressure gauge
- Fully welded and banded stainless steel frame on heavy duty castors
- All components stainless where practically possible
- Standard with 3no AutoJet electronic spray nozzles (air free)
- Oil flow from 3-60 litres/hr and up to 120 litres/hr with additional nozzles
- Spraying arm fix to machine frame but remote mounting available
- No compressed air is used to atomise the oil, just pump pressure meaning no oil mist
- Flow adjustable from control HMI or automatically via an analogue signal (0-10v or 4-20mA)
- All functions adjustable from the integrated Siemens PLC with 10" HMI
- Remote dial-in possible
- Closed loop oil flow control, actual flow will adjust to match setpoint
- Auto start/stop interlocks, alarms etc with warning beacon
- Will dispense all 'liquid' oils, water, saline solutions, sugar solutions, etc.
- All units are factory set up with site installs and training available if required