



features

- *Stainless steel pressure vessel*
- *Comprehensive control panel and instructions*
- *Liquid ring vacuum pump*
- *Steam ejector*
- *Condenser*
- *Electrical heating of the oil*
- *Internal cooling coil*
- *Extraction pump*
- *Polishing filter*
- *Vacuum to 1 Torr*
- *Temperatures to 250°C*
- *Internal steam sparge*

benefits

- *Only 25 litres of oil to be processed*
- *Safe and easy to use*
- *Economical*

Miniature-scale research & development technology



The Armfield Deodorising Unit is a floor-standing batch processing vessel suitable for steam stripping of fatty acids from edible oils.

Description

The deodorising process vessel has a batch size of 25 litres and is mounted in a floor-standing stainless steel framework which also houses the high vacuum equipment, control console, discharge pump and polishing filter.

A 3.0kW electrical heating element is incorporated in the vessel to heat the oil to temperatures of up to 250°C. The vessel also contains a special steam distribution tube which allows the thorough steam/oil mixing required.

Operating temperature is selected on an electronic temperature controller and is recorded on a continuous chart recorder both of which are housed in the control console.

An immersed cooling water coil provides a means of reducing the oil temperature on completion of the process.

A multi-stage vacuum system incorporates a steam ejector, condenser and liquid ring vacuum pump to achieve vacuum levels less than 5mm Hg (ABS), 6.5 mbar in the process vessel. Accurate indication of the vessel pressure is achieved using an electronic pressure transmitter which indicates the vacuum level down to 1 Torr on a digital display in the control panel.

Fatty acids and other compounds carried over with the steam are condensed in a spray type condenser and they pass to drain with the sealing water of the liquid ring vacuum pump.

On completion of the deodorising process, the oil is pumped out of the vessel through a 'polishing' filter which removes any remaining particles in the finished oil.

The deodoriser vessel is designed in accordance with the BS 5500 code for pressure vessels.

All materials in contact with process fluid are of stainless steel.

Modes of Operation

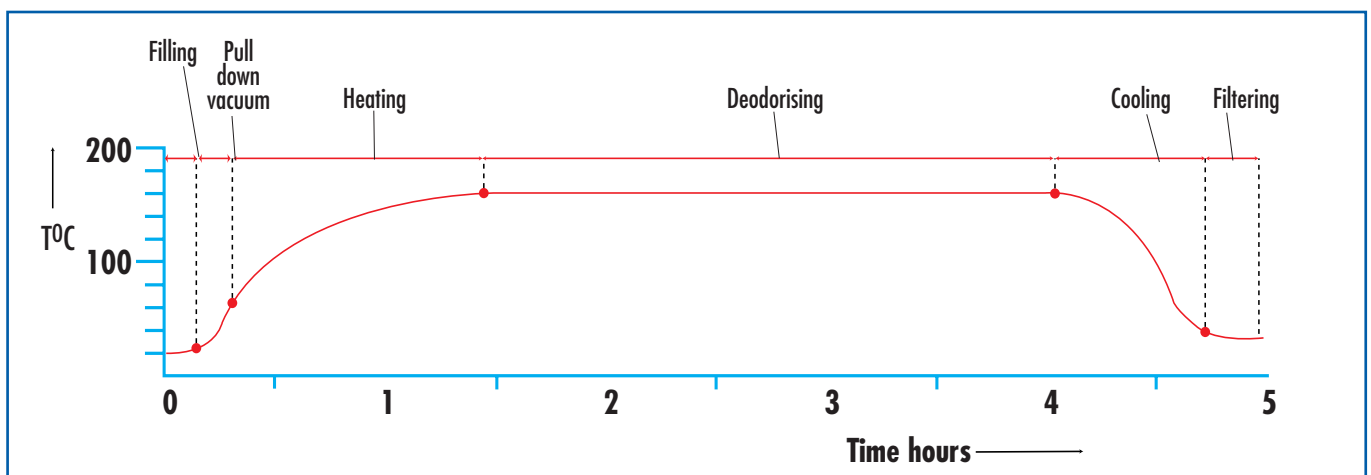
Removal of free fatty acid, ketone and acetaldehyde traces in edible oils is an important stage in the refining procedure as it is these compounds which impart an unpleasant odour to the oils. The method used for this removal is vacuum steam distillation under very high temperature and vacuum conditions. The Armfield Deodoriser achieves this using a unique steam mixing/contactor and multi-stage vacuum system.

Deodorising:

The oil is heated under vacuum using direct steam to provide the agitation for good heat transfer. When the desired temperature and pressure are achieved, the direct steam injection is adjusted to impart a high degree of turbulence to the oil which ensures good physical contact of the steam with the oil. The impurities are carried over in the vapour and condensed in the vacuum condenser, the resulting condensate blending with the liquid ring vacuum pump sealant to be discharged to drain.

Polishing:

After deodorisation, the oil refining process is complete and the oil can be consumed or used in the manufacture of other products. It must therefore be free of any trace of contaminants and, to achieve this, it is pumped through a fine 'polishing' filter which removes particles down to 6.0 micron giving a bright oil as product.



Typical printout of process temperature recorder

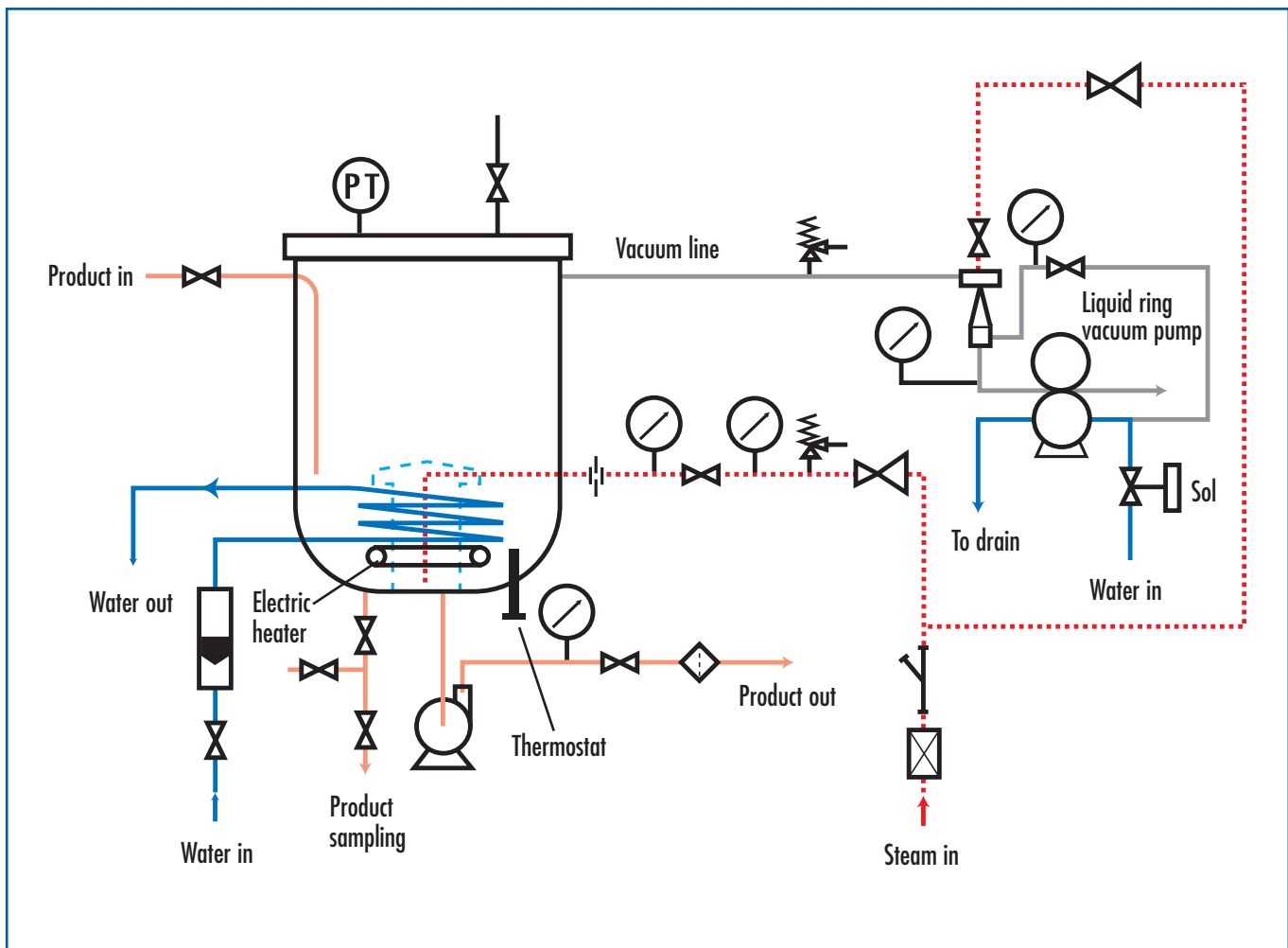
Performance:

Independent deodorisation tests carried out by:
Manchester Metropolitan University, Department of Food and
Consumer Technology, using refined and bleached rapeseed oil
gave the following analytical results:-

	Refined bleached oil	Deodorised oil
Free fatty acid	0.1%	0.04%
Soap in oil	nil	nil
Colour	20 Yellow 0.5 Red	10 Yellow 0.4 Red

CAPABILITIES

- operation of small scale version of the industrial process
- determination of optimum process conditions for different oil types
- effect of variation of process temperature
- effect of variation of process pressure
- effect of variation of quantity of direct steam added
- effect of variation of overall process time.



FT68 Schematic diagram



An ISO 9001 Company



Miniature-scale R & D technology

Head Office:

Armfield Limited
Bridge House, West Street,
Ringwood, Hampshire.
BH24 1DY England

Telephone: +44 1425 478781
Fax: +44 1425 470916
E-mail: sales@armfield.co.uk

U.S. Office:

Armfield Inc.
436 West Commodore Blvd (#2)
Jackson, NJ 08527
Telephone: (732) 928 3332
Fax: (732) 928 3542
E-mail: info@armfieldinc.com

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Specifications

Deodoriser vessel:

Overall volume: 60.0 litres
Working volume: 25.0 litres
Product temperature maximum: 250°C
Working pressure: less than 5.0mm Hg (ABS), 6.5mbar

Heating element: 3.0kW
Cooling coil area: 0.1m²
Direct steam flow rate: 0.0-1.0 kg/hr

Vacuum system:

Ejector steam: 4.1 bar, 4kg/hr
Vacuum pump:
Type: liquid ring
Number of stages: two
Motor power: 2.0kW
Sealant: water
Sealant flow rate: 10.0lpm

Pressure leaf filter:

Material: stainless steel
Filter volume: 3.8 litres
Filter cake capacity: 1.0 litre
Filtering area: 0.09m²
Filter screen: 110 mesh (0.3mm wire)
Maximum pressure: 3.0 bar

Polishing filter:

Type: replaceable cartridge
Filter element size: 6.0 micron

Requirements

Electricity supply: Three Phase (see ordering codes)
Water supply: For cooling
20.0 lpm @ 3.0 bar min/5.0 bar max pressure @15°C
Steam supply: 4.0 bar minimum; 10kg/hr

Ordering Codes

FT68-C: 415V/3ph/50Hz, (11kW)
FT68-D: 208V/3ph/60Hz, (7kW)
FT68-E: 380V/3ph/50Hz, (11kW)
FT68-F: 220V/3ph/60Hz, (7kW)

Shipping specification

Volume: 2.5m³
Gross weight: 500kg

Overall dimensions

Height: 1.58m
Width: 1.28m
Depth: 0.68m

The Armfield range includes HTST/UHT/aseptic systems, carbonator/filler/cappers, spray dryers/chillers, multifunction batch processors, ice cream freezers, margarine crystallisers, extractors, edible oils processors and more. For further information about our products and services, or to book a trial at one of our trials facilities, please contact us.