

PHROPINES EQUIPMENT RANGE



PHROCRYST Crystal Stabilising

A final reaction/resting tube fitted immediately prior to an extrusion packaging machine. These units are fitted with screens and Constant Pressure Buffer Unit to provide a controlled crystallisation of fats prior to extrusion packaging.



PHROTREAT Pre-Crystallisation Heat Treatment

Heat treatment is necessary for all edible fat emulsions to ensure removal of fat crystals formed during blending. Moreover, precise control is also necessary over the entry temperature to the crystalliser. Three heat transfer sections are included: heating, cooling and regeneration. Hot water is used for heating and tempered water for cooling. A holding section for in-line pasteurisation is added immediately following the heating section.



PHROMELT Reheating of Crystallised Fat

A multi-tube heat exchanger to provide remelting of emulsions that have been recycled during start-up, shut-down and packaging line interruption. This heat exchanger is capable of rapid reaction to a 100% variation in emulsion throughput. Continuous closed circuit remelting eliminates contamination risk and is free of operator involvement.



PHROFILL Carton/Bucket Filling

An accurate semi-automatic filling machine requiring only manual positioning of containers for automated filling on a "pre-fill" and "final fill" basis. This technique of filling eliminates product recycle during normal operation. An operator is necessary to keep the filling machine supplied with containers and to direct the filled packages. Filling is via twin robust pneumatically operated divert valves. Weight control is effected by a Mettler-Toledo Lynx system using a bench load cell under the "final fill" station.



PHROCAL Hot Water Generation

Packaged steam hot water units have been developed to provide for the necessary low volume, rapid response and precise temperature control requirements of continuous margarine and spread processing. The unit specified will satisfy the maximum heating demands, plus margins to cover start-up and line losses, of the two heating circuits necessary to cover both high and low temperature operations.



PHROCOOL Refrigeration

Packaged refrigeration plants have been developed to provide for the very exacting demands of high volume scraped surface heat exchange evaporation. The refrigeration package will match the maximum evaporative capacity of the PHROCESSOR PK, plus margins to cover start-up and line losses. An independent forced draught evaporative condenser is offered as standard.

PHROTATOR MODEL PK

A Scraped Surface Heat Exchanger of high pressure design - 160 barg, the Model PK was developed to meet an increasing demand for flexibility over a wide viscosity range. The result is an ideal heat exchanger

for crystallisation of margarine, shortening, spreads and pastry fats. Innovation by our design engineers combined with the development resources of the PHROPINES Group has resulted in a high quality

specification at a competitive price. The result is much greater flexibility than ever before and the opportunity to present a single processing unit capable of the ultimate in flexibility and control - the PHROCESSOR.

INTERNAL SLEEVE BEARINGS

Food compatibility, high wear resistance and maximum dimensional stability over a wide range of process applications create the need for a self lubricating "filled ptfе" contact surface bonded within a corrosion resistant stainless steel housing. When cooling products containing a high level of abrasive elements it is necessary to pressure flush with compatible media using an external injection unit.

SCRAPER BLADES

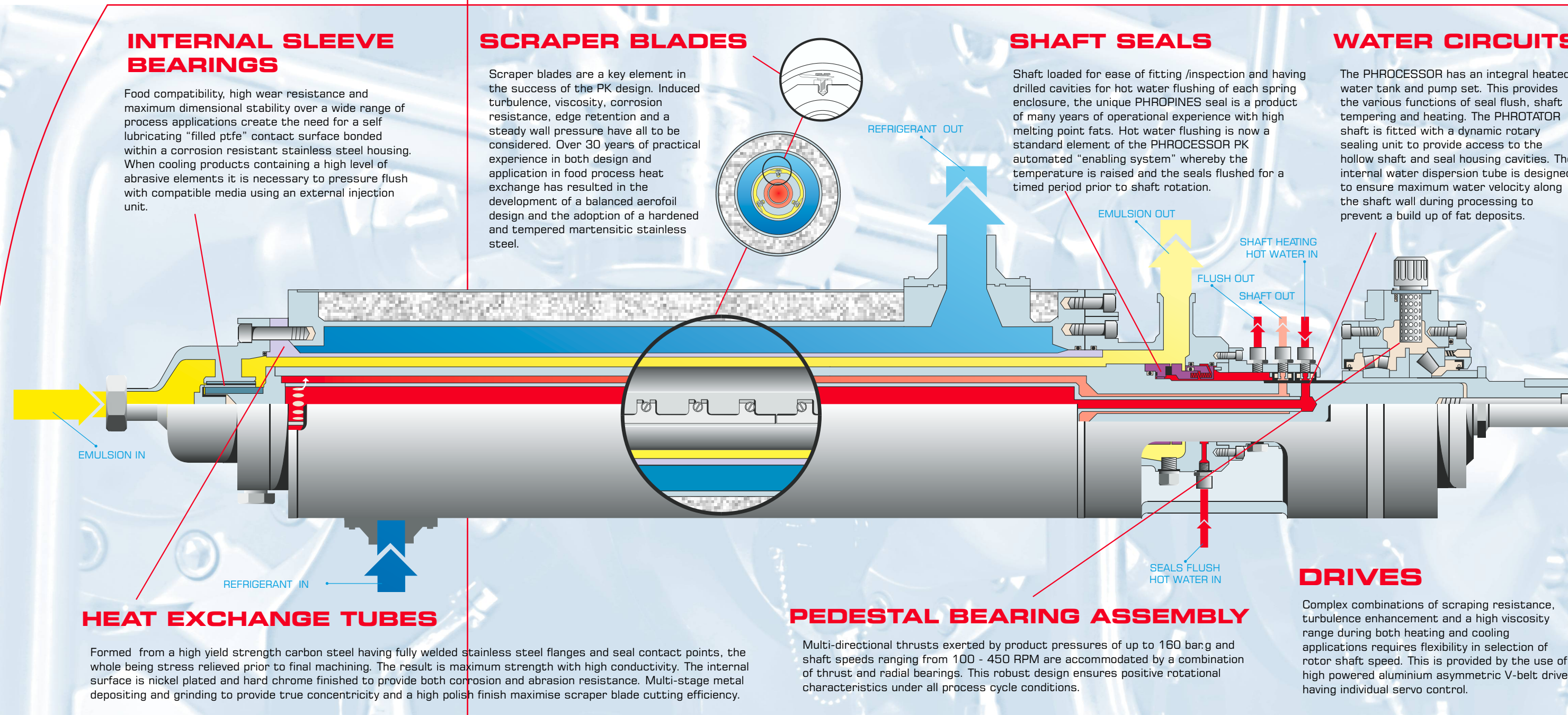
Scraper blades are a key element in the success of the PK design. Induced turbulence, viscosity, corrosion resistance, edge retention and a steady wall pressure have all to be considered. Over 30 years of practical experience in both design and application in food process heat exchange has resulted in the development of a balanced aerofoil design and the adoption of a hardened and tempered martensitic stainless steel.

SHAFT SEALS

Shaft loaded for ease of fitting /inspection and having drilled cavities for hot water flushing of each spring enclosure, the unique PHROPINES seal is a product of many years of operational experience with high melting point fats. Hot water flushing is now a standard element of the PHROCESSOR PK automated "enabling system" whereby the temperature is raised and the seals flushed for a timed period prior to shaft rotation.

WATER CIRCUITS

The PHROCESSOR has an integral heated water tank and pump set. This provides the various functions of seal flush, shaft tempering and heating. The PHROTATOR shaft is fitted with a dynamic rotary sealing unit to provide access to the hollow shaft and seal housing cavities. The internal water dispersion tube is designed to ensure maximum water velocity along the shaft wall during processing to prevent a build up of fat deposits.



HEAT EXCHANGE TUBES

Formed from a high yield strength carbon steel having fully welded stainless steel flanges and seal contact points, the whole being stress relieved prior to final machining. The result is maximum strength with high conductivity. The internal surface is nickel plated and hard chrome finished to provide both corrosion and abrasion resistance. Multi-stage metal depositing and grinding to provide true concentricity and a high polish finish maximise scraper blade cutting efficiency.

PEDESTAL BEARING ASSEMBLY

Multi-directional thrusts exerted by product pressures of up to 160 barg and shaft speeds ranging from 100 - 450 RPM are accommodated by a combination of thrust and radial bearings. This robust design ensures positive rotational characteristics under all process cycle conditions.

DRIVES

Complex combinations of scraping resistance, turbulence enhancement and a high viscosity range during both heating and cooling applications requires flexibility in selection of rotor shaft speed. This is provided by the use of high powered aluminium asymmetric V-belt drives having individual servo control.

PHROCESSOR PK - Capacity Chart

- Notes:
- (a) The following chart is our standard plant range based upon two and three stages of super cooling. Three stages are necessary to achieve the best processing conditions for Low Fat Spreads and Pastry Fats. Additional stages of cooling can be used to increase the capacity.
 - (b) To this standard range can be added further variations to both increase and decrease the processing capacity.
 - (c) Laboratory scale PHROLAB designs are also available. These operate in the capacity range 50-150 kg/hr.
 - (d) All plants may operate continuously though we recommend a process cleansing operation at least once/day and that a few hours be set aside each week for elementary maintenance and good house-keeping operations.

PHROCESSOR Model:	PK542	PK543	PK782	PK792	PK783
Tub margarine:	1,580	2,380	2,810	3,370	4,210
Cake margarine:	2,240	3,370	3,900	4,680	5,850
Pastry Margarine:		1,520			2,700
Spreads 70% fat:	1,400	2,110	2,490	2,990	3,740
Spreads 60% fat:		1,850			3,280
Spreads 40% fat:		1,320			2,340
Shortening:	2,350	3,520	4,160	4,990	6,250
Shortening + 15% gas:	2,090	3,140	3,710	4,450	5,570
Frying Fat:	2,690	4,030	4,770	5,720	7,150
Butter recombination:	1,580	2,380	2,810	3,370	4,210
Butter-oil:	2,690	4,030	4,770	5,720	7,150
Butter-oil + 15% gas:	2,370	3,560	4,200	5,040	6,300

