MIXING & PROCESS COMPONENTS

PIERRE GUERIN TECHNOLOGIES

TOGETHER BRING LIFE TO YOUR PROJECTS

PIERRE GUERIN "*Innovative Solutions in Mixing & Transfer*"

Standardized or customized systems, PIERRE GUERIN has the ideal solution to meet your needs in mixing & transfer...

With more than 60 years of experience **in the design, manufacturing and installation of process equipment and turn-key units**, PIERRE GUERIN has acquired an extensive know-how of technologies and unit operations in the Food & Beverage and Life Sciences Industries.

Among these, **mixing** has particular importance as it often determines the quality of the final product.
To meet these requirements, **PIERRE GUERIN offers an extended range of agitators which suits any type of mixing operation**.
Our specialists in agitation (design and field engineers) will provide you with the required expertise to achieve your processing objectives and improve productivity.

At the heart of the range of PIERRE GUERIN components, the POLYMEL blenders are dedicated to the dissolution of powder into liquid which enhance the process performance and the working conditions of the operators.

Another key unit operation is the transfer of raw materials and end products. **In this area, PIERRE GUERIN offers a complete range of sanitary centrifugal and positive displacement pumps.**

All these components are designed to comply with the highest requirements of sanitary and hygienic design, according to the EHEDG FDA.

Summary

Agitation & Mixing...

Process Components...

Agitation & Mixing...

For more than 20 years, PIERRE GUERIN has been designing and manufacturing a comprehensive range of agitators, either integrated within our vessels or sold as components.

In 1993, PIERRE GUERIN reinforced its know-how through the acquisition of the MORITZ Company, a world reference in the field of mixing. The take-over of the BIOLAFITTE Company in 1998 also brought additional experience in this field to PIERRE GUERIN, especially for fermentation and cell cultivation applications.

With a wide range of propellers: three blade impellers, helicoids, turbines, PIERRE GUERIN offers is able to propose a solution for any agitation application usually met in the Food & Beverage and Life Sciences industries;

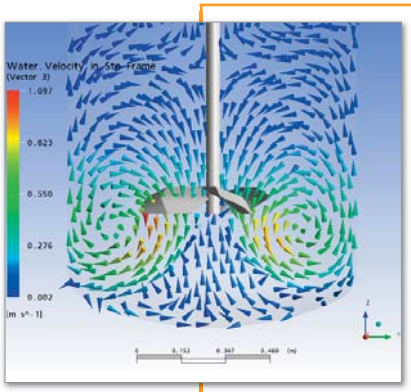
- homogeneous holding
- dilution
- homogenization
- dissolution
- dispersion
- emulsion
- thermal transfer

With PIERRE GUERIN, you take benefit of the expertise and experience of a specialized and dedicated engineering team whose principle aim is to choose and size the best mixing solution at each stage of your process.

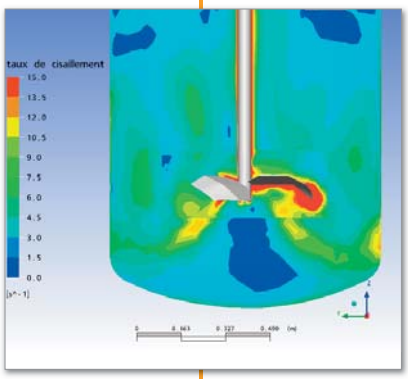
In addition to the capability for designing and manufacturing, we can also take the responsibility for the installation of the agitation systems through to vessel manufacturing and a complimentary range of service contracts.

OUR SERVICES

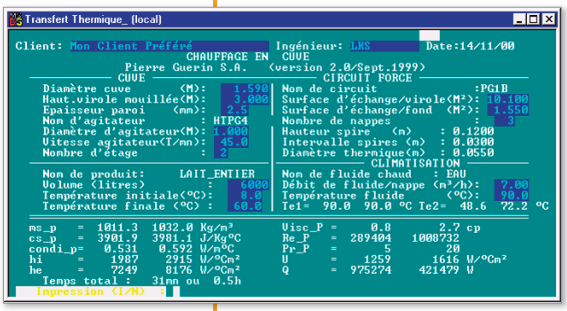
Agitation & Mixing



Hydrodynamic pattern



Shear measurement in various parts of the vessel



As a major supplier of equipment and turn-key units to the Food & Beverage and Life Sciences industries, PIERRE GUERIN has been designing, manufacturing and installing agitator and mixing systems for over 20 years.

PIERRE GUERIN competencies in Agitation & Mixing

PIERRE GUERIN combines its technological expertise in vessel and agitation design to the knowledge of your processes and products.

This combination of knowledge allows us to determine the best solution to meet your mixing needs and to design it following best practise engineering.

The perfect characterization of our propeller range is the key for selecting the correct mixing device ideally suited and appropriately sized to your application.

Taking into account the process operating conditions and physical performance to be achieved, the optimal mixing solution will yield the following benefits:

- minimizing of product losses
- reduction of mixing time and improvement of quality
- efficiency down to the minimum working volumes
- minimise impacts of shear effect or aeration
- sanitary design

To achieve these objectives, our design office will handle:

- hydrodynamic calculations to ensure the selection of the appropriate propeller (single or twin movement) and correct sizing (propeller dimensions, rotation speed, installed power)
- the calculation of mechanical constraints to provide repeatability and robust continuous operation
- the choice of shaft seal design ('V' ring gasket, single mechanical seal, double mechanical seal with either liquid or gas lubrication, magnetic coupling..) to suit operating conditions and environmental constraints
- thermal transfer calculations to comply with your expected performances

Our Field Service team comprises of experienced technicians dedicated to the installation and the maintenance of the agitators. Our Process Engineers are also available to support you during the first production runs in order to optimize your process recipes and validate the performance of the equipment.

Our Services

Assistance, Support, Audit, Site Intervention

Ask PIERRE GUERIN for an audit of your process vessels

Your agitators might be obsolete, there are some concerns at site?

- current performance is no longer appropriate to your evolved processes
- maintenance cost have increased, spare parts have become hard to source
- you meet non compliance issues with current safety regulations...

PIERRE GUERIN provide you with

- **60 years of experience in the Food & Beverage and Life Sciences processes**
- a dedicated team of mechanical engineers for equipment audit at site and selection of the best solution to meet your needs through the supply of a new agitator, or the upgrade of the existing one
- an extended range of propellers and sealing design
- experienced field service engineers for the installation, refurbishment, inspection, maintenance and commissioning

and testing tools in our laboratory or at your site

Viscosimeter

- which allow the selection of the optimal practical solution:
  - through trials performed at lab or pilot scale and scaling-up utilizing simulation principles of geometry, video, dynamic, chemical and thermal types
  - through trials at scale 1:1 (depending on vessels available in our laboratory)

These tools are also available for the optimization of your processes or small scale productions which can be used for qualitative validation of new-products.

The address for the delivery of your raw materials or products for lab trials or rheological measurements:

PIERRE GUERIN SAS - 6, Rue Denis Papin - 79000 Niort

For lab trials the raw materials must be supplied in quantities allowing for the production of two batches of 2/3 l end-product.

For pilot scale trials the raw materials must be supplied in quantities allowing for the production of two batches of 100 l end-product.

These raw materials must be supplied complete with SOP's, operating modes and recipes.

For rheological measurements, a quantity of 200 ml per product type is a convenient quantity.

Testing vessel

Where are we active

Our primary area of activity is Europe ...

but we also operate worldwide…

TURBOLAB 2500 Series

The state of the art in laboratory agitators

High Power and Speed, User-friendliness:
"to match your specific mixing needs at laboratory"

TURBOLAB 2500

The **TURBOLAB 2500** is the essential or represents the state of the art bench agitator for the development and the formulation of product samples at laboratory scale. The available range of impellers covers all commonly found mixing operations in the food and pharmaceutical process: heat transfer, suspension holding, homogenization, dissolving, dispersion, and emulsifying. These impellers are also available at industrial scale that allows for a predictable extrapolation.

The **TURBOLAB 2500** is also suitable to viscous products due to its unique available power and speed.

General Overview

The TURBOLAB 2500 includes a quick lock coupling device combined to an electrical lifting device for easy use and changing of impellers.

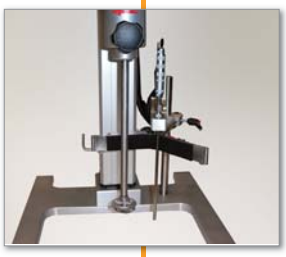
Technical Features

1

- waterproof motor IP55, class FF
  - installed power: 0.55 kW
  - variable speed from 100 up to 4.500 rpm
- electrical lifting device - maximum height: 300 mm
- control cabinet comprising of:(1)
  - emergency stop
  - led for power ON and mixing authorization
  - LCD Display of the agitation speed and temperature
  - ON/OFF agitation switch and speed controller
  - lifting device controller with safety contacts
- special frame profile ensuring perfect stability of the mixing device with dimensions suitable for the use of heating plate (2)
- beaker fixation device with locking system and safety contact allowing agitator start (3)
- temperature sensor (4)
- electrical Connections :
  - power supply: 230 V ± 15 Single phase: 50/60 Hz
  - cable, length 3 meters with 16 A connector
- weight: 40 Kg
- dimensions:
  - width: 450
  - depth: 450
  - height: 800
- noise level: 80dBA
- maximum dimensions allowed for the beaker:
  - volume ranging from 200 ml to 25 liters
  - maximum diameter: 340 mm
  - maximum height: 300 mm
- compliant to EEC directive 98/37/CE

2

3



4

Model HTPG4 Ø 100 propeller

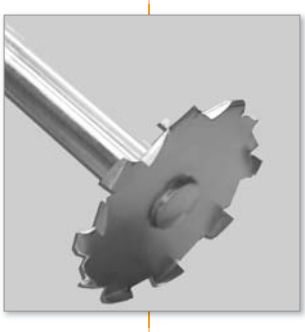
Features

- three blades Impeller
- axial flow
- low turbulence action
- low shearing action

Applications

- homogenization of miscible liquids
- suspension of solids
- easy dissolving
- heat transfers

Model Disc Turbine Ø 80



Features

- high radial flow
- high shearing action
- high turbulence action

Applications

- dissolving
- dispersion
- pasting
- preparation of gels

Model L40 & L60 Turbines

Features

- open disk turbine with stator ring
- radial flow
- high turbulence action
- high shearing action

Applications

- processing of products with high concentration of solids
- cleaving
- dissolving
- chemical reaction

Model TR60 Turbine

Features

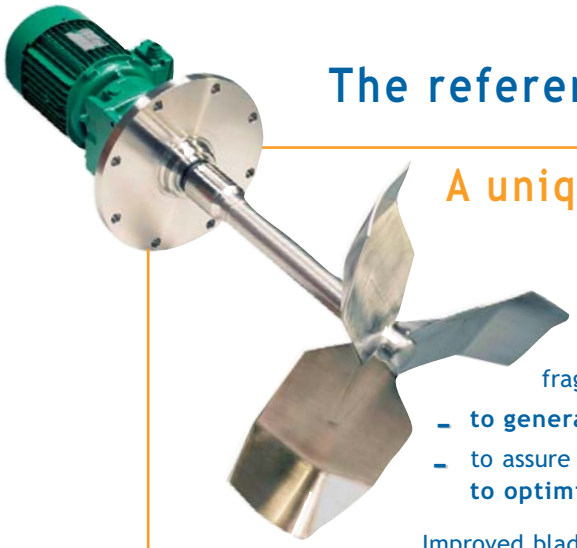
- closed radial turbine with disks and toothed ring
- high shearing action

Fonctions

- emulsifying of liquids
- dispersion of solids into liquids

HTPG4® agitators

The reference for the mixing of fragile products



A unique design: "the axial flow propeller "by excellence"

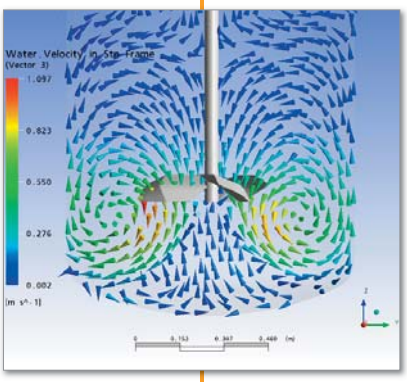
The design of the patented propeller **HTPG4®** originated from work focusing on two hydrodynamics mixing characteristics, essential when applied to any fragile fluid based products:

- **to generate a minimum shearing effect**
- to assure a maximum efficiency between circulation rates/power consumption, **in order to optimize production periods and to minimize electrical consumption.**

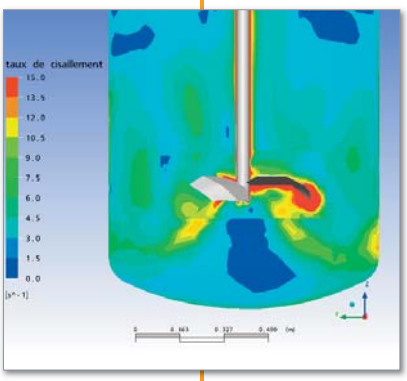
Improved blade designs and measurement of hydrodynamic impact with various sophisticated studies, in addition to numerical simulation, torquemeter and coloured tracer, generated the generation of PIERRE GUERIN Triple Impeller: **HTPG4®** (patented design).

Flow efficiencies of HTPG4 blades are unique...

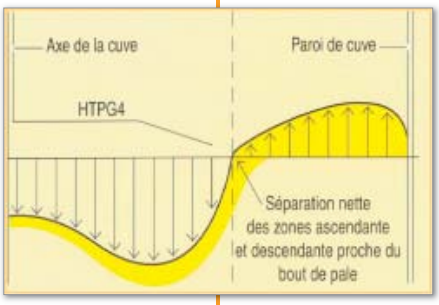
- the design assures a minimum shearing in order to maintain compatibility with **fragile product structures** (fat matter, proteins, cells cultures, etc...)
- the design induces an oriented flux, avoiding radial leaks and generating two distinct upward and downward flows. **HTPG4®** generates an optimal circulation rate optimizing productivity and time efficiency
- the flow resistance is very low, minimising power consumption and energy costs associated with the installation.



Speed distribution in tank



Measurement of shearing rates in the different tank zone



Laser measurement of speed configuration

Comparison of efficiency between HTPG4® and traditional large blade impellers

Number of anti-rotation blades	Improvement of HTPG4® compared to a traditional large blade impeller		
	Power	Mixing time	Shearing
2	0	-21	-21
0	-13	-62	-67

Mixing applications

HTPG4® allows for the following mixing operations:

- homogeneous blending of liquid product
- mixing and re-suspension of solids/liquids
- dissolving of readily soluble powder easily in liquids
- heat transfer improvements

Examples of applications

- cell culture
- bacterial fermentation
- milk maturation and standardisation
- milk fermentation, curd breaking
- crystallisation
- fruit juices and flavoured water preparation
- sugar syrup preparation
- homogeneous preparation of ready cooked meals components
- processed eggs preparation
- blending oils
- brine preparation
- wines assembling & tartaric precipitation

Why choose the PIERRE GUERIN solution?

- because it is one of **the most efficient commercially available impellers**
- because of **our understanding of process and products**
- because of **the well defined flow properties of HTPG4® for all tank designs**

Control and knowledge of agitation principles in your field of application combined with the **HTPG4®** efficiency brings **the solution to your mixing requirements.**

Standard - HTPG4® agitators - Top head mounting

PIERRE GUERIN production methods allow the manufacturing of **HTPG4®** configurations with diameters of up to 2.4 meters and shaft lengths of up to 12 metres.

With 1, 2, 3 or even 4 impeller stages, we are able to make hydrodynamic calculations that will ensure you selected to the most appropriate dimensioning to your needs.

HTPG4® top mounted agitators are suitable for vessel capacities up to **120 m³.**

Our agitation engineering office carries our mechanical strain calculations (torque and flexion), is able to recommend the ideal location and system assembly thus assuring equipment longevity.

Various mechanical mounting solutions are proposed depending on the running conditions, with flange or screwed couplings, seal with simple or double gaskets, with double thermo-elastic gaskets, or with single or double mechanical seal.

Standard - HTPG4® agitators - Tank wall and bottom mounting

Technical characteristics

- IP55 gearbox motor, 400 or 230/400 volts three-phase supply voltage, 50 Hz
- three-blade welded impellers from Ø 200 to Ø 1 000 mm
- all finishes available on request
- tank fixation by stainless steel flange with a leakage detection slot
- sealing by mechanical seal lubricated by the product

Selection guide for homogenous storage

H	T	P	G	4															-		

Code montage :
F : Fond
V : Virole

Code finition :
1 : Soudures polies
2 : Soudures brutes, décapées, passivées

Code support :
PS : Sans support
SI : Pour cuve isolée
SNI : Pour cuve non isolée

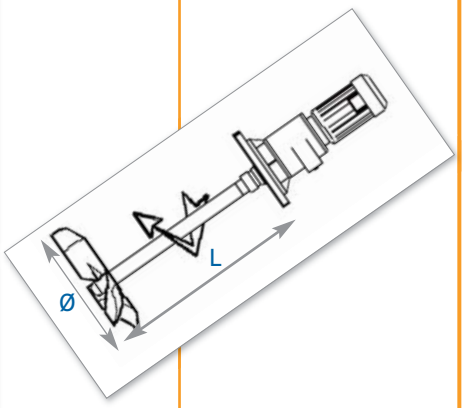
Code étanchéité :
BO : Garniture Carbone / Carbure
BU : Garniture Carbure / Carbure

Code motorisation :
1V : 1 vitesse
2V : 2 vitesses
VF : Variation de fréquence
VI : Variation de fréquence intégrée

Code moteur antidéflagrant :
NAD : Moteur non antidéflagrant
ADF : Moteur antidéflagrant

Pour Cuve *	Code Hélice (mm)	Puissance (kw)	Vitesse (mm)
8 000 l à 20 000 l	200	0.37	393
21 000 l à 35 000 l	300	0.55	302
36 000 l à 50 000 l	400	0.75	226
51 000 l à 75 000 l	500	0.9	176
76 000 l à 102 000 l	600	1.1	141
103 000 l à 125 000 l	700	1.8	125
126 000 l à 150 000 l	800	2.2	103
151 000 l à 200 000 l	900	3	92
201 000 l à 250 000 l	1000	4	82

** Détermination à valider en fonction de l'application*



HTPG4	L
Ø 200	200
Ø 300	300
Ø 400	400
Ø 500	500
Ø 600	600
Ø 700	700
Ø 800	800
Ø 900	900
Ø 1000	1000

POLYMIX agitators, the economical solution for homogeneous holding of low viscosity products

Simplicity and **reliability** are the two main characteristics of the POLYMIX mixer. The agitator is fitted with **2 up to 8 stages of twin-blades impeller**s, depending on vessel geometry and volume.
The POLYMIX mixer is suitable for **homogeneous holding of low viscosity products** and **thermal transfer operations.**

Main Benefits

- suitable for fragile products due to minimum shear constraint
- optimum circulation rate / power consumption ratios
- design and sizing avoiding air incorporation
- easy mounting on existing tank using bottom shaft guides that thus avoids reinforing or changing the cover

Technical Features

Standard propellers ranging from Ø 400 up to Ø 600

- welded twin-blades impellers
- all product contact parts made from in stainless steel EN 1.4404 (316L) or 1.4307 (304L)
- finishes: welds are ground, polished to Ra ≤ 0.8 µm
- sealing by leak preventing cup
- IP 55 Geared motor
- voltage: 400 or 230/400 V, three-phased, 50 Hz
- vertical assembly with bottom shaft guide (in most cases)

Applications

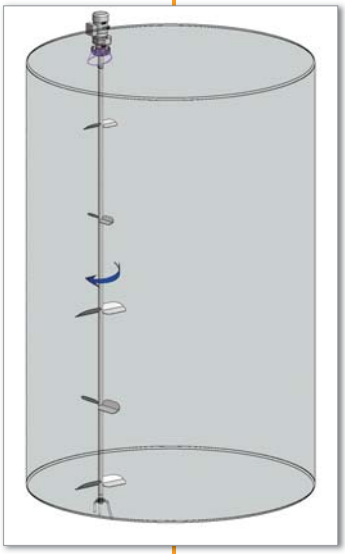
- homogeneous holding of low viscosity (< 50 cps) products (liquids and liquids / solids)
- suitable for thermal transfer operations

Examples of process applications:

Storage of milk, cream, oil, eggs...

Options

- sealing by double ring or other
- variable Frequency Drive



Liner Height	Qantity of twin-blades impeller	Motor Power	Speed
1500	2 impellers Ø 600	0.37 kW	70 t/mn
2000	2 impellers Ø 600		
3000	2 impellers Ø 600 + 1 impellers Ø 400		
4000	2 impellers Ø 600 + 2 impellerss Ø 400	0.75 kW	
5000	2 impellers Ø 600 + 3 impellers Ø 400		
6000	2 impellers Ø 600 + 4 impellers Ø 400		
7000	2 impellers Ø 600 + 5 impellers Ø 400	0.75 kW	
8000	2 impellers Ø 600 + 6 impellers Ø 400		

EOLE4, an innovative agitator for your viscous and fragile products

"the gentle mixing" from PIERRE GUERIN"

The homogenisation of some viscous products requires **an important flow rate**.
For this type of application, a traditional agitation system, utilizing a pumping impeller at high rotation speed, generates **shear forces** which can **damage** the product structure.

In such case EOLE4 is the solution you are looking for...

Made with several stages of the PIERRE GUERIN **patented HTPG4 impeller** and with **opposing mounted blades**, Eole4 brings **a drastic reduction of the undesired shear effects**.

The HTPG4 impellers ensure the **axial** pumping of the product from **the top to the bottom in the centre of the vessel** whereas the blades ensure **the pumping in the reverse direction and along the vessel wall**.

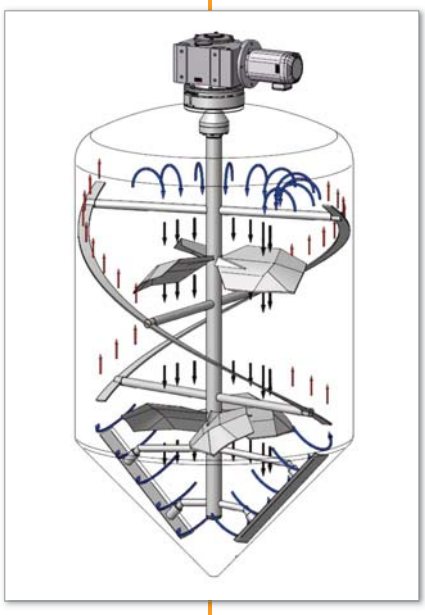
The complementary action of two types of propellers allows **for decreasing significantly the rotation speed** compared to a traditional agitator, thus preserving the product integrity while ensuring an optimal mixing in the vessel as a whole.

A number of baffles, **fitted at the bottom part of the shaft provides additional benefits by improving**:

- thermal transfer
- recirculation of the product
- homogeneous holding when emptying the vessel

EOLE4 also exists **in coaxial version** for **two independent movements** with adjustable speed per propeller. That simplifies optimization of the mixing performance.

Should the recipe require dispersion or emulsion operations, the vessel could be equipped with an additional bottom mounted agitator fitted with a high speed turbine.



Main benefits

- due to minimum shear effects, Eole4 **preserves product integrity**
- the low speed **limits the vortex** and risk of air incorporation, and thus **the oxidation of the product**
- because of the high recirculation flow rate, Eole4 **optimizes the mixing time**
- the hydrodynamics of the HTPG4 impellers ensures a maximum ratio: circulation flow rate / consumed power (**meaning less electrical consumption**)
- the efficiency of the mixing **limits the product loss** (for example during the cutting of coagulum)

Applications

EOLE4 can be used for the typical following operations:

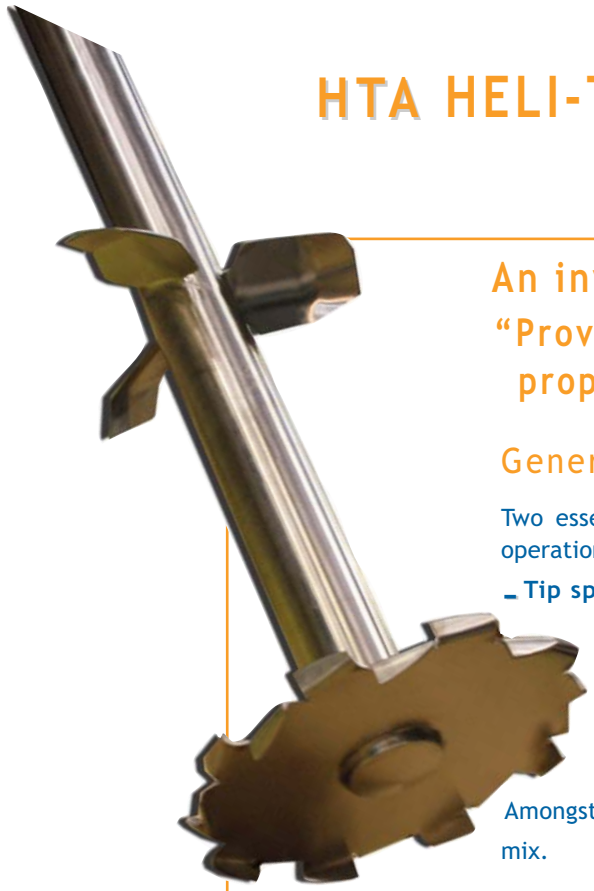
- homogeneous holding of fragile liquids, pastry products
- coagulum cutting

While improving thermal transfer and renewal of the wall layer limit

Examples of applications

- cell culture
- coagulum cutting of mixed yogurts
- chocolate mixing
- food preparation
- milk desserts
- fourrages, nappages
- preparation of fruit jams

HTA HELI-TURBO Agitators, a unique combination for your dispersion operations



An inventive design:

"Provided by the unique combination of the PIERRE GUERIN propeller and the SC Saw disc turbine"

Generalities about dispersion operations

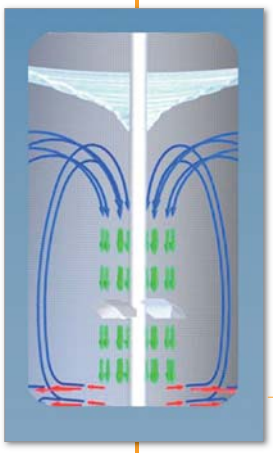
Two essential and complementary hydrodynamic parameters ate to be considered for the operations of dispersions:

- **Tip speed** that directly relates to the shearing rate imposed on the powder to be dispersed by the impeller. This speed varies between 7 and 20 m/s depending on the application...
- **Circulation rate** that determines agitator capability to increase the number of particle passes through the disperser.

Amongst others factors, this circulation rate is linked to the viscosity of the product mix.

In actual industrial processes, **two main classes** of impeller devices: the turbines and the propellers, cover the majority of mixing operations. Turbines provide radial flux and shearing actions while propellers generate axial flux and pumping actions.

The turbines, in particular the disc type, are the typical impellers used for dispersion operations but this configuration only provides a limited circulation flow while consuming high power.



The HTA range is unique in the market...

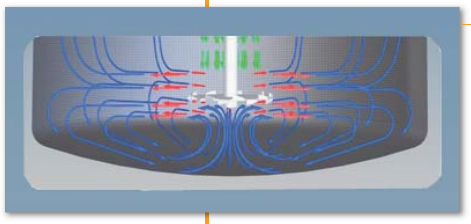
With the Heli-Turbo Agitator PIERRE GUERIN has differentiated itself taking the dual action approach of **the highly effective pumping action of its patented HTPG4™ impeller** with the SC saw disc turbine to achieve exceptional dispersion results.

Characteristics and advantages of this desing

Pumping effect

HTPG4 impeller generates a vortex assuring **an optimum feeding** of powder to the SC saw disc turbine dynamic region.

It is possible to control the extent of the vortex using a frequency inverter.

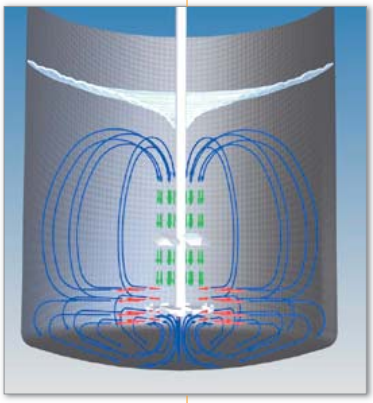


Dispersion effect (tank bottom)

HTPG4 propeller also enables fast powder wetting thus increasing dispersion rates through the saw disc turbine. Under these hydrodynamics conditions, the SC saw disc turbine works at its optimum cutting efficiency, either in a turbulent or laminar flow.

Combined flow dynamics

The dual function design has the advantage of maintaining homogeneous product but with relatively low rotation speed thus avoiding possible breakage of three-dimensional mix structures.



Users benefits

- HTA agitator efficiently blends powder into liquid without generation of lumps thus reducing losses of raw materials
- the high powder wetting rate gives an assurance of fast dispersion meaning optimum productivity
- power input required for dispersion is minimized.

Main technical features

- gearbox motor with IP55 protection, voltage 400 or 230/400 three phase, 50 Hz
- HTPG4 propellers Ø 60 to 300 mm / saw disc turbines Ø 80 to 400mm
- wide choice of material finishing according to User requirements
- tank mounting via a stainless steel flange provided with leakage detector device
- sealing: lip seal or lubricated mechanical seal

Applications

- dispersions of products such as Xanthan gum, Guar gum, Carob, Pectin, Carrageenans, Starch
- applications: milk desserts, mustard, puree, tomato sauces...

Dispersion of texturizing agent in a raspberry puree

Turbo-Agitator "P", the versatile agitator for your mixing operations

The perfect balance between shearing and pumping effects...

The **turbo-agitators "P"** generates two complementary hydrodynamic effects: pumping and shearing.

This range of agitators is thus perfectly adapted to homogenizing operations, dispersion of powders, emulsions of pastry products and liquids..

Technical Features

- standard rotation speed: 750 - 1500 rpm
- viscosity up to 15 000 cpo depending on the mixing operation to be achieved and products to be mixed
- mounting: by flangee
- finishing:
  - food application: Ra 0.8 µ
  - cosmetic and pharmaceutical applications: Ra 0.6 or 0.4 µ with electro-polishing on request
- propeller: double turbine with radial flow.

How it works

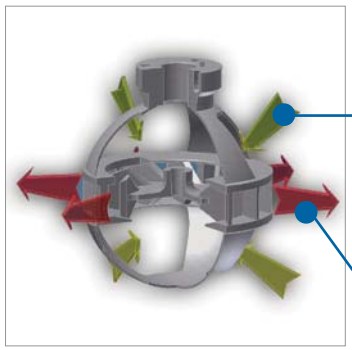
The agitator is made of a double turbine (rotor / stator type) fitted with a crenellated crown which generates a radial flow. The shearing effect is achieved through the circulation of the liquid into the rotor / stator air-gap. .

The spherical design of the turbine with 2 wide-opening carters also allows the rotor for an optimal pumping of the total product volume.

P3A turbine

Rotor from above

Stator from below



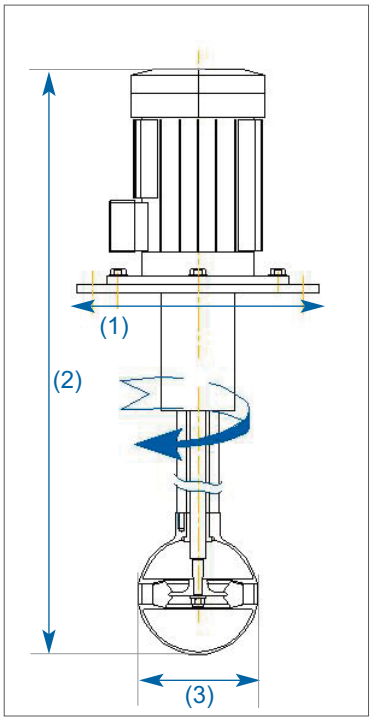
Axial flow generating a pimping effect

Radial flow generating a shearing effect

Applications

The turbo-agitators P allow for the following mixing operations:

- mixing of liquid
- mixing of pastry products
- homogenization
- dispersions of powders into liquids for volumes ranging from 40 to 10 000 litre
- emulsions
- thermal transfer



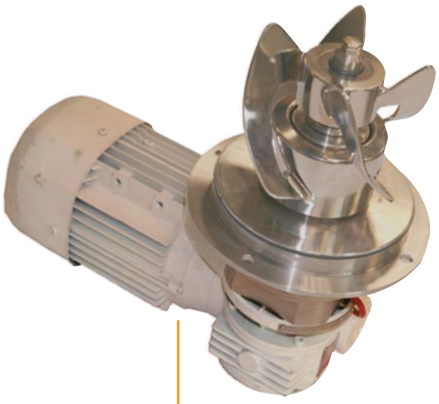
Examples of applications

- mixing and homogeneous holding of sugar syrups
- emulsion egg and butter for pancake batter
- emulsion for vinaigrettee
- dispersion and emulsions shampoos and personal care products

Technical Features

	DESIGNATION OF THE EQUIPMENT					
	P1	**P2**	**P3**	**P4H**	**P50**	**P5H**
Ø Nominal flange (1)	125	150	200	250	300	300
Ø Ext mm	250	285	340	395	445	445
Ø Hole mm	210	240	295	350	400	400
Number of holes Ø mm	4 x 18	4 x 22	4 x 22	6 x 22	6 x 22	6 x 22
Length mm (2)	860	1 270	1 456	1 736	1 800	1 800
Ø Sphere mm (3)	115	150	200	235	260	260
Motor Power kW	0.55	1.1	4	5.5	7.5	11/15
Speed rpm	1 500	1 500	1 500	1 500	1 500	1 500
Weight kg	19	26	44	120	160	180
Water flow rate l/mn	1 200	2 400	4 500	7 000	8 000	11 000

PG-MAG®, magnetic agitators for mixing under aseptic conditions



Relating our know-how of sanitized process to our background expertise in agitation via the MORITZ division, PIERRE GUERIN provides the **PG-MAG™** range, a new generation of bottom mounted shaft agitators with magnetic coupling, for your process applications.

This system is particularly adapted to pharmaceutical and food industries formulation and storage tanks, and for applications requiring strict asepsis, and efficient agitation with cleaning in place.

Main Benefits

- the **PG-MAG™** agitation system ensures perfect sealing (absence of mechanical seal and lubrication systems) and elimination of contamination risk
- design and construction of this equipment meets quality requirements of CGMP and EHEGD: cleaning and sanitation in place capability, self draining, no dead zone, surface finish Ra ≤ 0.8 µm with with electro polished mixing head (option: Ra ≤ 0.4 µm with electro polished, bell), material traceability for all contact parts
- the design of the mixing provides a maximal flow rate for low operating speeds, that will achieve homogenous mixing with minimal shear effects
- the range is composed of only 3 models for volumes from 20 liters to 20 000 liters requiring stocking of a minimal number of spare parts
- systems are delivered with complete documentation, supporting validation requirements

Technical Features

Tank volume (l)	20-200	200-2 000	2 000-20 000
Power (kW)	0.37	0.55	3.0
Speed (rpm)	80-496	80-496	80-496

Information suitable for liquids having approximatively viscosity and density such water

Material

- stainless steel EN 1.4404 - 316L for all contact parts
  option : *EN 1.4435*
- bearing ring in silicon carbide
  option : *Peek*
- magnet in Samarium Cobalt
- gasket in EPDM - Other on request
- material certificate 3.1

Finishing

- finishing of all wetted parts: Ra ≤ 0.8 µm
  option : *Ra ≤ 0.4 µm electropolished*

Other Available Options

- bell assembly on removable flange'
- bell housing exteension for insulated tank bottoms
- speed sensor
- motor with integrated frequency inverter
- control Box
- magnetic retaining device for sterilization in autoclave
- dismounting tool (**PG-MAG-1B & 10B**)

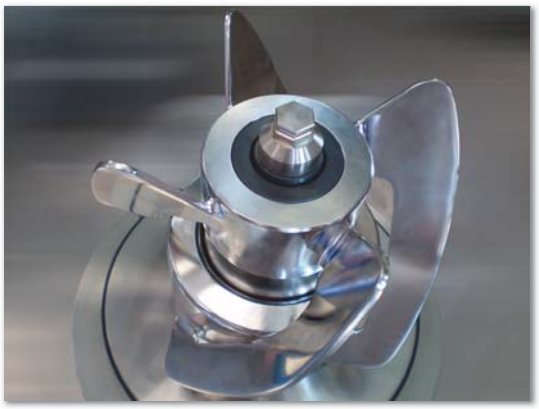
Magnetic Driving Agitator PG-MAG™

Selection Guide

Note your selection here

Code	Tank Nominal Volume (l) (*indicatve*)	
PG-MAG-1B	20-200	
PG-MAG-10B	200-2 000	
PG-MAG-50B	2 000-20 000	
Code	**Material**	
04	1.4404	
35	1.4435	
Code	**Roughness**	
S8	Ra ≤ 0.8 µm	
S4	Ra ≤ 0.4 µm	
Code	**Assembling**	
AS	Bell housing weld pad	
BD	Bell housing on removable flange	

- Example of agitator coding: **PG-MAG-50B-04-S4-AS/04-02**
- Example of accessories coding: **PG-MAG-50B/A01/A03**

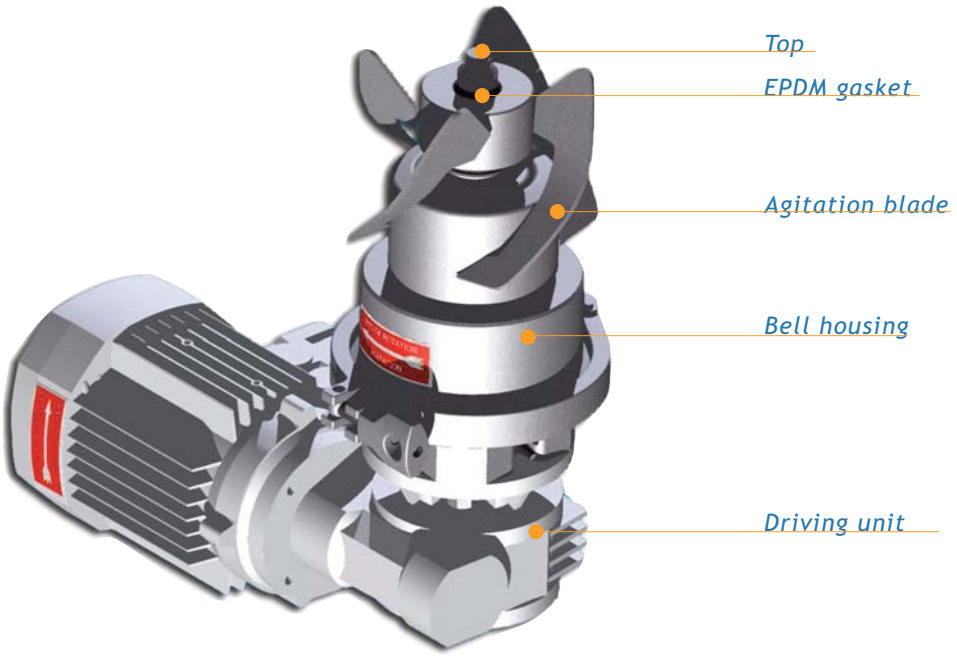


Note your selection here

Available Options		
01	Speed sensor	
02	Motor with integrated frequency inverter	
03	Bell housing extension	
04	PEEK material bearing ring in lieu of Silicon	
05	Electro polishing of all wetted parts Ra≤0.4 µm	
Available Accessories		
A01	Magnetic retaining device for sterilization by steam autoclaving (*PG-MAG-1B & 10B only*)	
A02	Dismounting tool (*PG-MAG-1B & 10B only*)	
A03	Leak proof bell housing control tool (*recommended if AS assembling*)	
A04	Supply of bell vessel weld flange (*if BD assembling*)	

3D View - Weight and Dimensions

Weight (kg)	10	15	60
Dimensions (mm) L x H x P	288 x 276 x 156	327 x 335 x 185	586 x 463 x 268



PIERRE GUERIN TECHNOLOGIES

- AGITATION & MIXING -
SELECTION GUIDE

Folio : **1/2**
To be filled in by P.G. SA
Application n°
Date of the demand

This questionnaire lists the major information needed by our technical services to determine the most adequate mixing solution to fit your application.

Be sure it will be very confidential

(Please fill in one questionnaire per equipment)

1 - General Information -

Your ref.		Date	
Company		Person in charge	
Phone		Phone	
Fax		Fax	
E-mail		E-mail	

2 - Mixing objectives -

2.1 - Mixing operations to be achieved

Type of mixing	Mixing operation	
☐ Liquid - Solid	☐ Dissolution	☐ Homogenous storage
☐ Liquid - Gas	☐ Dilution	☐ Dispersion
☐ Liquid - Liquid	☐ Suspension	☐ Emulsion
☐ Non-miscible	☐ Heat exchange	☐ Oxygen transfer
☐ Miscible		

2.2 - Physical characteristics of the final product

Nature..... Quantity..... Viscosity ..... mPa.s (Cp) at ..... °C

Specific gravity..... Temperature .....

3 - Rheological behavior of the final product -

Newtonian yes ☐ no ☐ Pseudo-plastic yes ☐ no ☐

Rheopecte yes ☐ no ☐ Thixotropic yes ☐ no ☐

3.1 - Characteristics of liquid ingredients *(please indicate units)*

	Liquid 1	Liquid 2	Liquid 3	Liquid 4	Liquid 5
Nature					
Density					
Viscosity					
Volume					
Temperature					
Percentage					
Specific Heat					
Conductivity					

3.2 - Characteristics of solids ingredients *(please indicate units)*

	Solid 1	Solid 2	Solid 3	Solid 4	Solid 5
Nature					
Apparent Density					
Solid Size					
Concentration					
Percentage					

3.3 - Characteristics of gas ingredients (*please indicate units*)

Nature ..... Pressure .....
Flow..... Percentage .....

4 - Operating mode and recipe -

PleasePlease provide hereafter any useful information related to your operating procedures and recipes (mixing time, initial volume, way of introduction of ingredients and flow rates rate, etc...)

.....
.....
.....

5 - Main vessel features -(*Where possible, please attach the drawing of the vessel*)

Location: Inside..... Outside.....
Design: Horizontal..... Vertical.....
Cover type: Flat..... Dished Conical..... Bottom type.....
Frame type: Skirt..... Legs..... Concrete..... Brackets..... Load Cells.....
Inslated tank: yes ☐ no ☐ Insulation thickness.....
Minimum working volume: Minimum working volume:
Internal Ø:..... External Ø:..... Liner height:..... Outlet height:.....
Maximum operating pressure:..... Maximum operating vacuum:.....
Maximum operating temperature:.....
Is the vessel fitted with baffles? yes☐ no ☐ Quantity:..... Width:.....

6 - Material and finish of the product contact parts -

Material:..... Finition:.....

7- Conditions of use and others requirements

7.1 - Agitator location

Top mounting..... Wall mouting..... Bottom mouting .....

7.2 - Flange dimensions

Internal Ø:..... External Ø:.....

7.3 -Type of seal

V'Ring Gasket Single Mechanical Seal.....
Double mechanical seal with steam lubrication.....
Double mechanical seal with liquid lubrication.....
Magnetic coupling.....

7.4 - Others

Should the mixer have to work during draining yes ☐ no ☐
Maximum overall height available.....
Variable speed required: yes ☐ no ☐
Available voltage: 220V - 380 V Other:.....

Additional requirement:

.....
.....
.....

POLYMEL

Blending systems

This equipment is ideal for any process that requires the incorporation of large quantities of powder into liquids.

Due to their versatile performance, the POLYMEL product family provides a solution for a wide range of mixing operations including dissolution, homogeneous holding and pre-dispersion

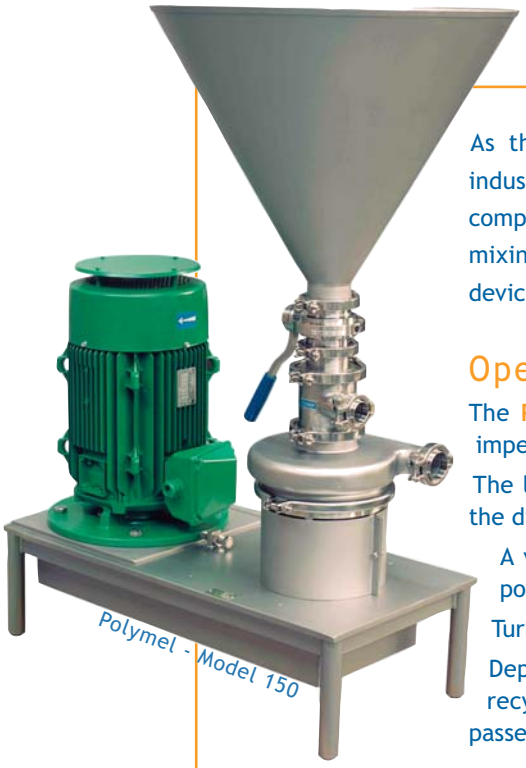
Simple to use, ergonomic and cleanable-in-place, they can easily be incorporated into a production process line.

The POLYMEL program comprises of 3 models providing powder incorporation flow rates of up to 9 500 Kg/h.

A wide range of options are available: mounting on mobile frame, hopper for working under pressure, special device for the continuous dosing of powders…

Actually, more than 3 000 Polymels are in use worldwide...

POLYMEL® Blending System for the Food & Beverage, Pharmaceutical & Cosmetic Industrie



Polymel - Model 150

As the French leader of industrial equipment for food, biopharmaceutical and cosmetic industries, PIERRE GUERIN is recognized for its know-how in the manufacture of automated complete equipment lines and for the quality of its products. Among the range of agitation and mixing systems, PIERRE GUERIN offers the **POLYMEL®**, an efficient powder/liquid mixing device.

Operational description

The **POLYMEL** comprises of a mixing chamber incorporating a centrifugal pump casing, an impeller and a horizontally mounted hopper.

The liquid enters tangentially in the diffuser pipe, through the mixing chamber by following the direction of impeller rotation, which causes a rapid acceleration in the speed.

A vortex forms in the impeller's eye causes a pressure drop thus causes a sucking-up of powder from the hopper.

Turbulences created by impeller result in the homogeneity of final product.

Depending on the application, final product is directly transferred (continuous process) or recycled in a buffer vessel (the recycling improves the mixing operation due to successive passes via the **POLYMEL**).

Advantages

- simple and robust system with the guarantee of a rapid and homogeneous mixing
- installation in a fabrication line without any significant modifications
- simple connection using flexible tubing
- compact, reliable (few moving parts) low maintenance cost
- easily dismountable and cleanable-in-place

Polymel - Model 20

User Benefits

- economy of manpower and reduction of product losses
- improvement of User working conditions
- improvement to final product quality: no lumps, greater product homogeneity

Technical Features

- 3 models with a capacity of up to 9500 kg/h sucked powder
- 60° conical hopper, 50 liters capacity (for models 20 & 50)
- diffuser pipe with tangential liquid inlet
- casing design mixing chamber
- open impeller with inverted blades
- turbine driving with pulley and notched belt (model 50 & 150)
- simple Carbon/Silicon Carbide mechanical seal and leak proof static seal
- 230/400V, class F with shaft protection
- clamp or SMS connections
- in accordance with Europeans standards

Material

- all product-contact parts are made of stainless steel 1.4404 (316 L)
- EPDM gaskets

Finish

- internal: Ra ≤ 0.8 µm
- external: satin

Documentation

- manual of instruction and maintenance with CE certificate of conformity

Material Certificates

- EN 10028/7 3.1 material certificates: casing and back plate, impeller, diffuser, and inlet adapter
- FDA certificates for mechanical parts and gaskets
- roughness surface finish certificates of all product-contact parts

Options

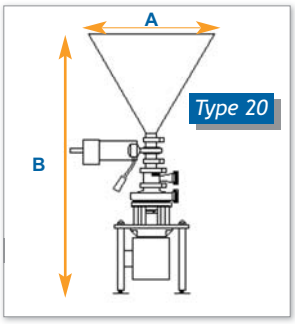
- alternative mechanical seal materials: silicon carbide/silicon carbide for abrasive products (others on request)
- powder inlet fitted with pneumatic butterfly valve
- Viton gaskets
- ATEX version (zone 2 class 2)
- trolley mounted
- skid mounted version with preparation tank and dosing device for liquid and powder

Special design with hooper operating under presure

Trolley mounted version

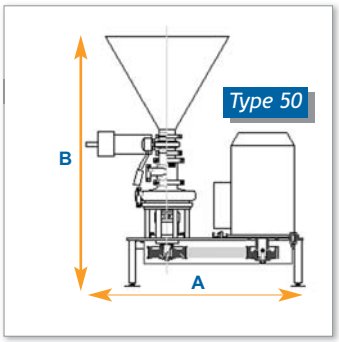
Applications in the Food & Beverage Industries

- reconstitution of milk derived products
- standardization and enrichment of milk
- preparation of infantile and gelified milk
- coating products for pet foods
- dissolution of sugar (solutions up to 67° Brix)
- incorporation of stabilizers
- preparation of batter
- fabrication of brine
- preparation of food sauces
- incorporation of salt into oil
- reconstitution of egg white



Applications in the Pharmaceutical & Cosmetic Industries

- dissolution of active pharmaceutical components
- mixing of base components for personal care products
- dissolution of detergent pellets

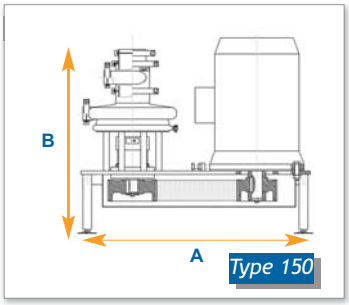


Sizes - Weighs - Flows rates

Model of POLYMEL	A	B	Frame Widht	Net Weight (kg)	MAXIMUM flow rate *(according to apparent density)* (kg/h)	Liquid Flow (l/h)
20	600	1240	355	95	1 350	13 500
50	970	1280	400	190	2 700	27 000
150	860	760	400	250	9 500	34 000

More Information

- availability less than 6 weeks for standard models
- rental equipment available for trials



PIERRE GUERIN TECHNOLOGIES

- POLYMEL -
SELECTION GUIDE

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Your ref.		Date	
Company		Person in charge	
Phone		Phone	
Fax		Fax	
E-mail		E-mail	

2 - Information related to the products -

2.1 - Characteristics of liquid ingredients (*please indicate units*)

	Liquid 1	Liquid 2	Liquid 3	Liquid 4
Nature				
Density				
Viscosity				
Volume				
Temperature				
Percentage per product				
Specific Heat				
Conductivity				

2.2 - Characteristics of solids ingredients (*please indicate units*)

	Solid 1	Solid 2	Solid 3	Solid 4
Nature				
Apparent density				
Solid size				
Concentration				
Quantity				
Flow rate				
Abrasive (*yes / no*)				
Hygroscopic (*yes / no*)				
Percentage per product				

3 - Physical characteristics of the final product -

Nature ..... Quantity ..... Viscosity ..... mPa.s (Cp) at ..... °C
Specific gravity .....

4 - Operating mode and recipe -

Expected mixing time .....
Suction pressure ..... Discharge pressure .....

Please provide hereafter any additional useful information related to your operating procedures and recipes: .....

5 - Complementary information

Specific electrical protection required: yes ☐ no ☐
Specific gasket material compatibility: yes ☐ no ☐
Precise your demand: .....