

Material parameters:

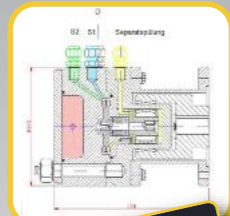
Pump head	Stainless steel 1.4571, Hastelloy 2.4610, PTFE / PFA
Impeller	Stainless steel 1.4571, Hastelloy 2.4610, PTFE; PEEK
Pump shaft / bushings	Stainless steel 1.4571, Hastelloy 2.4610, SiC, WoC, Si3N4
O-rings	FKM (Viton), FFKM (Kalrez) Sigriflex (metal)
* Special materials on request	

motor parameters:

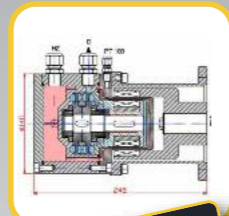
Supply voltage (V)	230 / 400
Power (kW)	0.12 to 18
Protection class	IP 54
Ex version	on request
weight (kg)	4 up to 170

Accessories:

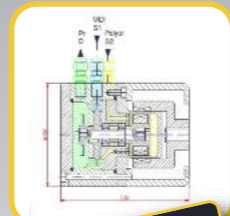
- Filter from 10 microns
- High-pressure houses with PTFE core
- Shut-off valves
- Flow meter
- Dry run monitoring inverter



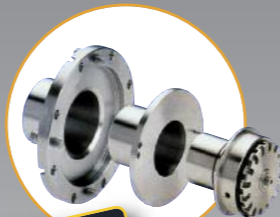
Espira 02 with separately rinse split can



E 02 with double impeller for premix



Espira 02 with residence time chamber



Design with double split can



Gas entry from Ziklon 04 in Espira 02

Fluid entry from Ritmo 05 in Espira 02

Fluid connections:

- Cutting ring fittings
- PFA fittings
- High Pressure Fittings
- Flange connections according to DIN 2501/1
- * Special connections on request

Reaction- and mixing technology in the pump design with hermetic sealed peripheral mixing pumps and - reactors

The alternative to stirred tank reactors, rotor-stator mixers, injectors and static mixers

Espira E 02 Peripheral mixers and - reactors are magnetically coupled, sealless and pulseless peripheral pumps with the entry of several mixing or reaction components in the pumping chamber of the pump. They are designed as a function of their use as micro-reactors and with appropriate scaling-up as a mixing unit and process reactors in demanding chemical and process applications.

Espira E 02 - Peripherals mixer and - reactors are characterized by a chemical-resistant material selection in **stainless steel, Hastelloy, ceramic, tungsten carbide** (cemented carbide) and **PTFE linings** for extreme process conditions.

They can be designed for system **pressures up to 750 bar** and for hot fluids with **temperatures up to 450 ° C**.

In **hermetically sealed construction** by magnetically coupled drive technology the pump make sure hermetic applications (TA-Air) even under high system pressure.

They can be used for nearly all potential **reactants, aggressive and hazardous acids, alkalis and solvents, for liquid / gas mixtures, suspensions and dispersions**.

As multiphase pumps the Espira-pumps can be used for gas accumulations in liquids, for water and sewage treatment, in biofuel plants, bioreactors or also for oil water separation on oil rigs and oil fields.

E02 - Peripheral mixers and - reactors are available for basic research on a **laboratory scale**, a scale-up in the small production scale and for **process applications up to 160 m³ / h**.

All sizes are available for applications in explosion-proof areas with **atex-compliant design**.

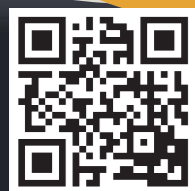
Inverter in IP 55-design for a **process-dependent speed control** can be provided.

Mixing- and reactor technology – exactly matching your needs

- magnetically coupled peripheral pumps
- self-priming peripheral pumps
- PTFE-lined feed pumps
- Small feed pumps in high pressure design
- Inline feed pumps
- Chemical standard pumps in PTFE
- Liquid-gas mixture pumps
- Multiphase pumps
- dispersing pumps
- Peripheral mixer
- Peripheral reactor
- Reaction mixing pumps
- Gas circulation pumps
- Peristaltic Pumps



Espira® 02 mixers and reactors from 11/h – 160 m³/h



Peripheral mixer

Mixing **organic or inorganic solvents**, aggressive and hazardous acids, alkalis, heavy of immiscible liquids, hot with cold fluids or gas / liquid components.

Mixing aggressive and highly sensitive **liquid gases or supercritical gases** under high system pressures possible.

Preparation of emulsions, e.g. Oil / water emulsion with as monodisperse trained phase.

Preparation of disperse systems to assess the phase separation (mixer-settler) in Conti-operation.

Homogenizing, emulsifying, dispersing of liquids not dissolvable in each other or different viscous phases.

Gas enrichment of liquids to multiphase mixtures.

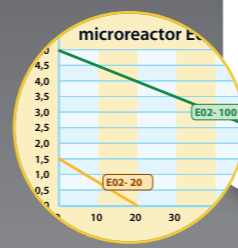
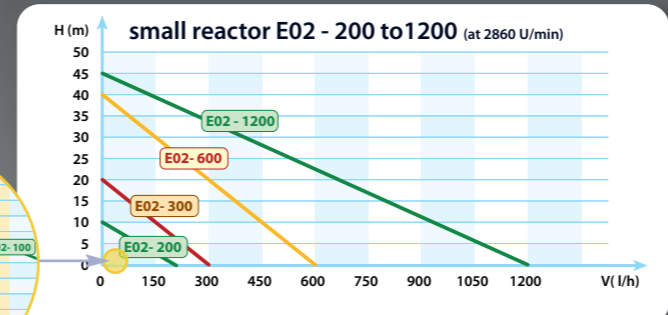
Air, oxygen, ozone enrichment for sewerage- and emulsion treatment.



Version E02-100-5 laboratory



Version E02-100-5 PTFE



Peripheral reactor

Implementation by quickly extending **liquid / liquid or gas / liquid** reactions by the targeted gas entry of the reaction gas into the pumping chamber of the pump.

Implementation **consecutive-competing reactions** with very fast main reaction and fast side reaction, for precipitation reactions and suspension hydrogenations.

Implementation strongly **pH-dependent reactions**, for example, chlorination or neutralization in Conti process.

Reaction with high hazard potential such as **phosgenations**.

Targeted **interruption of polymerization** through the entry of reaction product and water extremely different temperatures.

Adaptation of the mixing / reaction process to high temperature processing conditions with **heated pump heads** to prevent crystallization in the split can area.

Adaptation of the mixing / reaction process to the low-temperature conditions of the process with **coolable pump heads** for avoiding outgassing and removal of exothermic heat of reaction.

Optimization of reactions with **pre-mixer, residence chamber or two reaction chambers** for pre- and main reactions.



Version F02-300-20 TH heatable



Version E02-600-40 high pressure



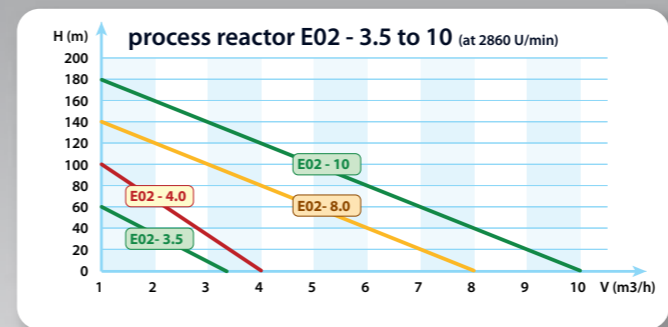
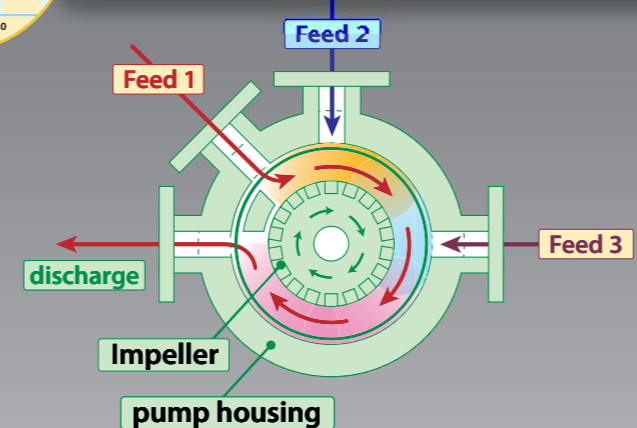
Version E02-1200-45 high pressure



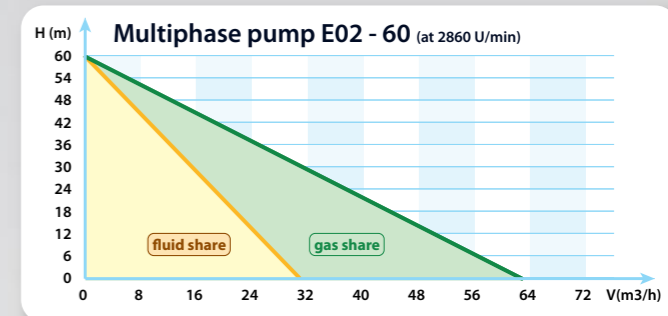
Version E02-10-170 TH heatable



Version E02-10-170 process



Multiphase mixer



Pumping of multiphase mixtures up to 40% gas content.

Gas enrichment in liquids to multiphase mixtures up to 40% gas through the targeted entry of gas into the pumping chamber of the pump.

In special design gas enrichment up to **gas content of 50%**.

Fine dispersely distribution of gases in liquids and solution of gases to the saturation degree by intensive mixing and turbulence of the peripheral pump- function.

Gas entry such as CO2 with finely dispersed distribution in the reaction product or in a melt during pumping spared additional mixing- and stirring vessel.

Water / wastewater treatment with air, oxygen or ozone as the oxidant. (gas-flotation)

By **depressurization flotation** separation of finest residual contaminants from wastewater.

Removal of nitrates from pre-purified waste water by means of hydrogen (denitrification).

Neutralisation of alkaline solutions through the gas entry of carbon dioxide.

Treatment of oil-water emulsions, fat separations, final clarification in biological treatment plants.

Crude / water separation in refineries, biofuel plants, on oil rigs and oil fields.

Gas accumulation of liquids in bioreactors.



* All data shown in the characteristic curves have been carefully determined with reference liquid. The pressure build-up was determined by the open system and with the pressure-side throttling. The measured values are used to select a suitable pump and are not guaranteed performance. The suitability of each pump lies in the responsibility of the user.

Under different operating conditions, the pump can be precisely adapted to the operating point of the application.