

# TRI-AGI EMULSIFYING MIXER



## LABORATORY EMULSIFIERS

### TRI-AGI & BI-AGI

Lleal laboratory emulsifier are very versatile mixer, widely used in the cosmetics, pharmaceutical, and food industries for formula development (R&D), as well as for pilot plants, since they allow for the control all the parameters associated with the process and its scaling up to industrial level.

We manufacture two different series: with slow stirring anchor (**BI-AGI**) or with an anchor and counter-rotating blades (**TRI-AGI**), both with product discharge by tilting the tank and with a compact design, prepared to have all the services housed inside the equipment: vacuum pump, hydraulic unit, electrical panel, etc, and even with the possibility of having an auxiliary melting boiler integrated on the other side of the equipment.

The BI-AGI equipment has a slow agitation system equipped with an anchor, a transversal blade and self-adjusting scrapers that sweep the surface of the vessel. At the bottom, they have a Multident emulsion turbine, which is especially suitable for the manufacture of all types of emulsions.



Model	Volume		Slow agitation (kW)	Turbine (kW)	Dimensions (mm)		
	Useful	Total			Width	Height	Bottom
<b>BI-AGI 5</b>	5	8	0.15	0.5	1,030	900	600
<b>BI-AGI 10</b>	10	15	0.37	1.1	1,230	1,000	600

Unlike BI-AGI, **TRI-AGI** are equipped with a heart-shaped anchor with transversal blades and self-adjusting scrapers that keep the useful surface of the mixer clean. They also have a central shaft with transversal blades, rotating in counter-rotation.

Following the design of industrial equipment, the laboratory TRI-AGI have a hemispherical bottom vessel, prepared to work under pressure and vacuum conditions, and equipped with a double chamber for product cooling and/or heating. The emulsifying turbine is installed at the bottom of the tank, in this case, available in three different models, to be chosen depending on the characteristics of the product to be processed.



Model	Volume		Slow agitation (kW)	Turbine (kW)	Dimensions (mm)		
	Useful	Total			Width	Height	Bottom
<b>TRI-AGI 15</b>	15	25	0.37	1.5	1,620	1,780	770
<b>TRI-AGI 30</b>	30	50	0.37	1.5	1,800	1,780	770

## Components

Most of the physical/chemical processes developed in the cosmetic, food and, pharmaceutical industries involve heating, pre-mixing, addition, emulsification and dispersion, as well as de-aeration and cooling of the finished product.

The TRI-AGI is the equipment with which Lleal optimally solves all these operations in a clean, safe, and fast process, eliminating cross-contamination risks.

The TRI-AGI offers the following advantages, resulting from its careful design and construction:

- » There are no dead zones in either the triple agitation system or the vessel.
- » The self-adjusting scrapers sweep the surface corresponding to the volume used in the operation, preventing incrustations on the walls that could deteriorate the product.
- » The system is prepared for multiple working configurations under vacuum and pressure conditions up to -1/4 bar.
- » Possibility to interchange high-speed emulsifying turbines, according to the needs of each product.
- » Easy to clean.
- » User-friendly.
- » Possibility of adding solids through the bottom of the vessel using vacuum.
- » Simple and versatile installation with options for structure, support feet or monobloc execution.

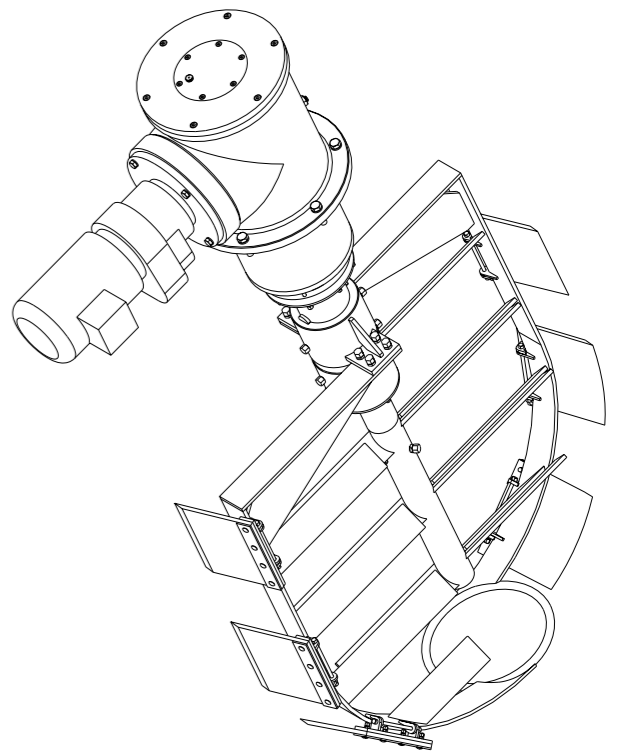


**THE REACTOR:** The hemispherical bottom design provides the equipment with several key advantages for all processes: maintaining a constant temperature, improving agitation currents, and facilitating heat transfer. Its double jacket configuration for heating and/or cooling allows it to work with different thermal fluids, depending on the required temperature level.

**THE COVER:** Pumped design for vacuum operation and equipped with hydraulic lifting for easy maintenance and cleaning.

**THE FUSING KETTLE:** Indispensable for the manufacture of emulsions with solid fats at room temperature. Equipped with double jacket and an agitator. The product is transferred to the TRI-AGI by vacuum.

**THE STRUCTURE:** The TRI-AGI can be easily integrated into any food, cosmetics, or pharmaceutical industry thanks to the versatility of its assembly, either by means of platform-type structures, with feet placed directly on the floor or in monobloc systems (Plug & Play). The latter option allows all the services and peripherals to be integrated into a service cabinet attached to the reactor, which is suitable to control the entire process at the machine location.



### ANCHOR AND COUNTER-ROTATING AGITATOR

The slow agitation system consists of an anchor with inclined blades and self-adjusting scrapers that keep the surface corresponding to the useful volume of the mixer clean and a central shaft, also equipped with inclined blades turning at counter rotation. Both agitations can have a common or independent transmission system. The configuration of this agitation system ensures the homogenization of 100% of the product and its passage through the emulsifying turbine.

### EMULSIFYING TURBINE

Located at the bottom of the vessel and designed to achieve the emulsification of the different phases, as well as the dispersion of solids. We have three models of turbines: MULTIDENT, STARMIX, and EMULSER to be chosen depending on the viscosity range and process characteristics: liquid-liquid emulsions or solid-liquid mixtures.



Multident

Starmix

Emulser

## Components

### AUTOMATION AND CONTROL

In order to provide maximum versatility to TRI-AGI mixers, Lleal offers a wide range of automation and control options, adapting the equipment to the needs of each customer. As a result, TRI-AGI is the leading equipment in the food, cosmetics, and pharmaceutical sectors.

- » BASIC: simple control using push-button and frequency inverters installed on the control panel.
- » ADVANCED: semi-automatic control of functions by HMI + PLC.
- » PRO: 4.0 Industry, installation with Audit Trail recipes, etc.
- » PHARMA: 21 CFR 11 compliant according to GAMP-5 guidelines.

Lleal's technology is offered with upgradable systems, allowing the evolution of the equipment during its useful life, according to the customer's needs.

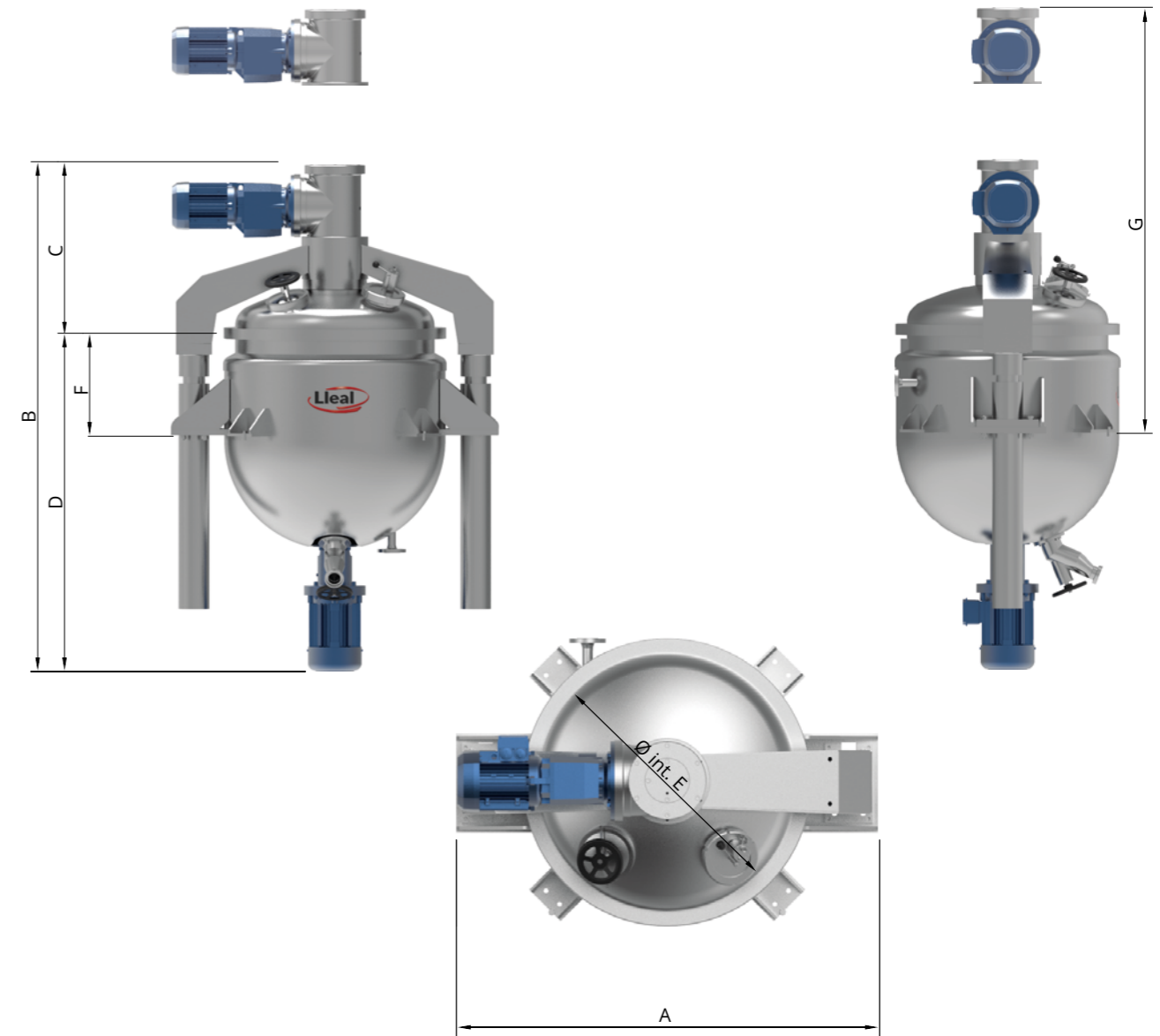


TRI-AGI equipment are complemented by auxiliary services such as:

- » Hot water steam generator.
- » Chiller.
- » Vacuum pumps.
- » Transfer pumps: Salomon type, lobes, pneumatics, etc.



## Technical data



Model	Useful volume (L)	Dimensions (mm)						
		A	B*	C	D*	E	F	G
<b>TRI-AGI 60</b>	60	1,050	1,723	915	822,5	540	280	1,415
<b>TRI-AGI 125</b>	125	1,146	1,833	960	876	640	330	1,560
<b>TRI-AGI 250</b>	250	1,330	2,182	1,110	1,088	800	410	1,810
<b>TRI-AGI 500</b>	500	1,716	2,891	1,489	1,402	1,060	525	2,389
<b>TRI-AGI 1000</b>	1,000	2,006	3,210	1,670	1,500	1,250	650	2,770
<b>TRI-AGI 2000</b>	2,000	2,320	3,737	2,008	1,742	1,550	835	3,508
<b>TRI-AGI 3000</b>	3,000	2,659	4,080	2,200	1,880	1,750	920	2,734
<b>TRI-AGI 4000</b>	4,000	2,740	4,316	2,335	2,042	1,950	1,035	4,035

\* The provided measurements are maximums values; these may vary depending on the motors installed.