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Россия +7(495)268-04-70

Казахстан +7(7172)727-132

Киргизия +996(312)96-26-47

<https://gea.nt-rt.ru/> || gsg@nt-rt.ru

МИКСЕРЫ И БЛЕНДЕРЫ GRAF, PMA, PHARMACONNECT Технические характеристики



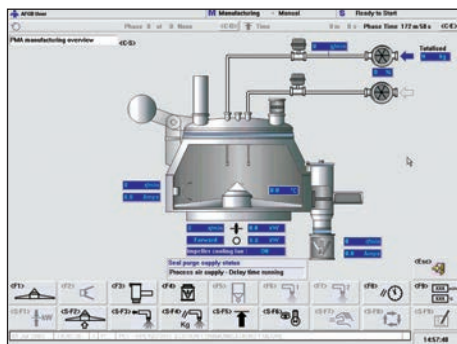
Granulation Technologies

GEA has supplied shear granulator plants and granulation and drying process expertise to various industries for more than a century, and to the pharmaceutical industry in particular for more than 50 years. This includes small capacity systems designed for R&D as well as industrial size plants for the batch and continuous production of pharmaceutical compounds under cGMP conditions.

With both top and bottom drive granulators available, we can help you to select the technology that is most suitable for your product and process.

The GEA high shear mixer and granulators — PMA™ and UltimaGral™ — are multipurpose processors that are equally suitable for the high speed dispersion of dry powders, aqueous or solvent granulations, effervescent products and melt pelletization. The design of both the Gral™ and the PMA™ allows for different ways to set up a standalone machine in a GMP-compliant manner. And, whether your installation is standalone or fully integrated, several features are available to ensure completely contained processing, such as GEA high containment split butterfly valves, isolator boxes and vacuum transfer systems. Contained processing also requires that the equipment can be cleaned in a contained fashion. Our high shear granulators can be equipped with a full CIP system that ensures cleaning-in-place of the product feed, product filter, bowl, lid and discharge valve. Even downstream equipment such as a mill can be incorporated in the CIP system.

Having established a credible pedigree of expert know-how in the pharmaceutical manufacturing industry, GEA provides optimal solutions for your applications: no other supplier offers such a complete range of granulation and drying equipment.



High Shear Granulation Bottom Drive

PMA™

PMA™ High Shear Mixer Granulators

The PMA™ family — PMA™ classic, PMA-Advanced™ and PharmaConnect™ — provides total flexibility in system design and capacities of 1–1800 L. It is the ultimate in versatility, with modular options for blending, high shear granulating and wet pelletizing. The design maximises product processing and handling containment. User-selected standard process modules are combined with advanced automation and cleaning-in-place (CIP) systems to create custom solutions that meet individual needs.

Key features include the following:

- process containment
- complete ease of operation (fully automated or manual)
- advanced process control for repeatability
- latest end-point detection techniques
- full opening cover for easy inspection
- modular upgrades are available for future requirements
- integrated WIP or CIP
- available as standalone or through-the-wall installations

PMA-Advanced™

Critically, the process geometry of the PMA-Advanced™ is identical to the PMA™ classic; modifications to the design have been made solely to benefit the user and owner in terms of ease-of-use, cleanability, process analysis and installation. The space saving PMA-Advanced™ has a small footprint and unit surface area, and service access is achieved through a GMP cover hinge. By uniting these new benefits with the proven PMA™ process technology, GEA is providing the logical solution for your granulation needs. The philosophy behind the design is that a combination of standardised options is configured into tailor-made plants to meet the requirement for a specific process (as such, granulators of equal capacity may be completely different with respect to design, configuration and physical size).

Production capacities

PMA size		150	300	400	600	800	1200	1800
Operating Range	Litres	60–115	120–225	160–300	240–450	320–600	480–900	720–1350
Typical Weight@0.6 g/mL	kg	60	120	120	240	320	480	720

Impeller and Chopper Options



Tapered Blade Impeller:

The standard impeller, designed for use with the conical bowl of the PMA™ high shear granulator.



M8 impeller:

An innovative swept-back design for improved mixing characteristics, faster processing and a more clearly defined end-point.



U-Shaped chopper:

The standard chopper, typically paired with a tapered blade impeller, to assist with the dispersion of granulation fluid throughout the batch.



Fir-tree chopper:

A multi-blade design improves binder solution dispersion and product movement at slow speeds.

High Shear Granulation Top Drive

UltimaGral™

UltimaGral™

High-Shear Mixer Granulators

With the Gral™ range, GEA pioneered the market for top-driven high shear mixer granulators. Still in demand after numerous product upgrades, this state-of-the-art processing workhorse is available with a wide range of bowl capacities to suit any production requirement. The equipment is built to comply with current cGMP standards and is recognised by companies worldwide as being low maintenance, high quality, robust and reliable.

Designed for production-scale functionality, special mixing tools are available for specific applications, as well as a jacketed bowl for temperature control during the process. And, as bowl shape, mixing tools and process parameters are exactly the same, all processes running on the Gral™ range can be immediately transferred to the UltimaGral™ and single pot UltimaPro™ granulators without changing any parameters.

With bowl capacities of 10–1200 L (useful bowl content up to 2/3 of gross capacity), the UltimaGral™ range can cover all requirements after the formulation stage. From clinical batch production for scale-up trials to large-scale production for marketed products, scalability is key to the system's success. The most important features of this design are the top-driven mixer and chopper, the removable bowl (Gral™ range only) and the through-the-wall installation of the larger machines.



Additional features include the following:

- easy to Wash-in-Place (WIP)
- built to GMP-standards
- total containment of the product
- ANBA™ mixer arm
- variable speed chopper and impeller
- operator control panel on the machine
- automation/PC/PLC controls
- controlled product discharge
- automatic end-point detection with PROCOLL-software
- explosion proof design
- heating and cooling units
- Fill-O-Matic (vacuum) or gravity loading system.

Production capacities

GRAL size (L)		10	25	75	150	300	400	600	900	1200
Bowl Volume	Litres	7.9	27	77	153	303	400	614	900	1166
Typical Weight@ 0.6 g/mL	kg	3	11	30	60	120	160	240	350	480

PharmaConnect™

PharmaConnect™ R&D High Shear Granulation

This innovative system provides a unique benefit to the pharmaceutical development industry, integrating a single control unit with a diverse range of process modules. Based upon GEA's class-leading PMA™ and Gral™ granulation technologies, the PharmaConnect™ provides the user with the ability to process batches from as little as 100 g, right up to 25 kg or more, all from a single control system. Standard module capacities are set at 1, 3, 5, 10, 15, 20, 30 and 60 L (with each unit being geometrically scalable). Critically, each of these modules features its own impeller drive motor, maintaining a consistent energy input per unit volume. By providing this level of flexibility, the development scientist operating at the 1 L level can provide true scale-up data for commercial expansion.

However the PharmaConnect™ is not limited to just granulation; the unique design of the control unit allows any number of process technologies to be operated from the single operator interface. The key technologies offered include high shear granulation, extrusion and spheronization, IBC blending systems and high shear blending.



Production capacities

PMA size		1	3	5	10	15	20	30	60
Operating Range	Litres	0.4–0.75	1.2–2.25	2.0–3.75	4–7.5	6–11.25	8–15	12–22.5	24–45
Typical Weight@ 0.6 g/mL	kg	0.4	1.2	2.0	4.0	6.0	8.0	12.0	24.0

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