



Process Engineering
Division

Niro Pharma Systems

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BUCK
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NEW PMA-Compact™ High Shear Mixer/Granulator

Pharmaceutical Pilot Scale

The PMA-Compact™ High Shear Mixer/Granulator is a multi-purpose processor equally suitable for high speed dispersion of dry powders, aqueous or solvent granulations, effervescent products and melt pelletization.

The PMA-Compact™ is supplied with the mixing bowl enclosed in a stainless steel base which also incorporates the operator control station. Electrical equipment is installed in a separate sealed enclosure mounted the machine base.

Process Description

The overall concept of the New PMA-Compact™ stems from the common needs of consistent processing and ease of operation and cleaning. The mixing bowl is therefore shaped to wet granulate the widest range of products in a reproducible manner in respect of batch size, density and flow characteristics. Its shallow, wide diameter bowl guarantees a consistent product vortex and reduces any tendency towards product adhering to bowl walls. Product yields are further improved by the positioning of mixer blades close to the bowl base.

A typical 3 minute dry mix operation is followed by introduction of a granulation fluid under pressure using a spraying unit. A free-flowing granulate is produced after 3-5 minutes, and the granules are then rapidly discharged.

New design features:

- Modified design, improving exterior appearance and cleanliness by replacing the multiple maintenance access panels with one access door for all maintenance procedures.
- Hinge mounted control cabinet to the rear of the machine allows easy access to the controls and motor/gearbox assemblies for maintenance and servicing.
- Reduced weight of the machine improves mobility.
- Optional ATEX Approved Purged Control cabinet allows on-board location of flameproof controls, making the unit suitable for location in a Zone 1 /21 area.



PMA-Compact™ High Shear Mixer/Granulator



Drive Shaft Seals

The unique PMA-Compact™ shaft seal design separates the bowl process area from any external mechanical parts, thus preventing eventual product contamination. Filtered low pressure air is fed into sealing cavities around the shafts creating a barrier to prevent powder entering the seal areas. As a secondary precaution, should any powder pass the air seal it will fall to the bottom of the catch pot from where it cannot re-enter the product area. Both seals are removable and easily accessed from inside the bowl for inspection.

Cleaning

PMA-Compact™ is designed to be easily cleaned with minimum risk of cross contamination between product changes.

The inner bowl surfaces are made of mirror polished stainless steel and other FDA approved materials. This ensures easy cleaning by partially filling with cleaning liquid and running both impellers. At the same time the two wash-in place drive shaft areas are flushed through without removal of the main impeller or agitator.

External surfaces of the PMA-Compact™ are made from polished stainless steel or other hygienic materials for easy cleaning. Dust seals fitted to the cover can be instantly removed, if necessary, and cleaned separately.

Controls

In order to ensure safe, efficient operation of the unit, the system is controlled through an industrial computer Human-Machine Interface (HMI), with all functions deriving from a plc controller.

This design allows the control interface to be completely washed down during product changeover. Furthermore the HMI may be upgraded to allow processing with flammable organic solvents, in an ATEX Zone 1/21 area. Completing the ATEX Zone 1/21 upgrade, flammable gases may be prevented from entering the controls enclosure in the base of the machine by purging with compressed air.

The physical safety of the operator is assured with the use of non-electrical safety locks to prevent access to the bowl and discharge when the equipment is operating. Binder addition and end point determination may also be controlled through the HMI, with an optional Powercell providing the direct feedback of the power required to turn the impeller.

Data acquisition can be delivered through a 21 CFR Part 11 compliant, on-board data capture device recording critical parameters throughout the process and allowing information downloads through an Ethernet connection.

As expected with a mobile machine, installation is simple, through a 3-phase electrical connection, together with simple connections to the compressed air and wash water supplies.

Capacities

Lab / Pilot Plant		PMA1	PMA25C	PMA65C
Bowl Volume	Liters	3 / 7.5 / 10	25	65
Typical Weight @ 0.6 g/l	kg	1.2 / 3 / 4	10	26
Main Impeller	kW	3	5.5	7.5
Mixing Impeller	rpm	300-1500	50-500	40-400
Granulator Motor	kW	0.15	1.3/1.8	1.3/1.8
Granulator Speed (50 Hz)	rpm	1000-3000	1500/3000	1500/3000
Granulator Speed (60 Hz)	rpm	1000-3000	1800/3600	1800/3600
Weight (approx)	kg	230	640	665



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Niro Pharma Systems unites the technologies of Aeromatic, Buck, Collette, Courtoy, Fielder, Nica and Niro to supply advanced processing solutions for solid dosage forms to the pharmaceutical industry.

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