



WE OFFER

PERFECT MIXING TECHNOLOGIES



PERMIX PDI HIGH-SPEED
MIXER/GRANULATOR
PRECISION MIXING FOR
EVERY INDUSTRY

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Controlled Particle Engineering in Minutes

High-speed mixing is not about RPM.

It is about energy density.

The PerMix PDI High-Speed Mixer (also called a high-shear mixer or wet granulator) is designed to apply controlled mechanical energy to powders so they transition from loose, aerated particles into uniform, dense, free-flowing granules.

Inside the PDI chamber, particles are not simply blended — they are forced into controlled collision, layering, densification, and structural bonding.

That difference is why high-shear granulation dominates pharmaceutical, nutraceutical, chemical, and food industry.

What Is High-Shear Granulation?

Granulation is the science of turning fine powders into engineered particles with:

- ✓ Improved flow
- ✓ Controlled density
- ✓ Reduced dust
- ✓ Enhanced compressibility
- ✓ Improved solubility
- ✓ Consistent particle size distribution

High-shear granulation achieves this by introducing liquid binder under intense mechanical shear.

The PerMix PDI uses:

- ✓ A central impeller
- ✓ A high-speed side chopper
- ✓ Precision liquid addition
- ✓ Controlled mixing time

The result is a reproducible, engineered granule structure.

How the PerMix PDI Works

Step 1: Powder Charging

Powders are loaded from the top of the vessel. The chamber geometry is engineered to promote continuous particle circulation with minimal dead zones.

The PDI features:

- ✓ Top loading
- ✓ Side Discharge
- ✓ Modular feeding configurations

Once charged, the impeller begins rotating at controlled speed.



* The Y-shaped rotor blade for efficient homogenization and uniform mixing.

Step 2: Shear Field Creation

The central impeller is not just a blade.

It is a fluidization generator.

The specially designed Y-shaped aerodynamic rotor profile creates:

- ✓ Radial flow
- ✓ Axial lifting
- ✓ High-velocity particle acceleration

Particles enter a multi-dimensional shear field where:

- ✓ Fine particles collide
- ✓ Surface energy increases
- ✓ Localized compression occurs

This mechanical energy activates the powder bed.

Step 3: Liquid Binder Introduction

Granulation requires precise wetting — not flooding.

Binder is introduced through:

- ✓ Spray nozzles
- ✓ Injector pipes
- ✓ Jacketed binder systems for high-viscosity liquids
- ✓ Metered dosing pumps

Uniform atomization ensures:

- ✓ Even nucleation
- ✓ Minimal lump formation
- ✓ Controlled granule growth

The PDI allows controlled addition with programmable timing and rate.

Step 4: Nucleation Phase

When droplets contact powder:

- ✓ Liquid bridges form
- ✓ Fine particles adhere
- ✓ Micro-nuclei develop

This stage determines the starting granule population.

Step 5: Growth & Densification

As mixing continues:

- ✓ Nuclei collide and grow
- ✓ Layering builds particle size
- ✓ Mechanical compression increases density

The high-speed chopper prevents uncontrolled agglomeration.

- ✓ Breaking oversized clumps
- ✓ Maintaining narrow PSD
- ✓ Ensuring uniform structure

The balance between impeller speed and chopper speed controls final granule characteristics.

Step 6: Discharge

Once target granule size and density are achieved:

- ✓ The batch is discharged via bottom or side discharge
- ✓ “No dead zone” valves ensure complete emptying

Minimal residue. Maximum yield.

Why High-Shear Granulation Is Superior to Conventional Blending

Traditional blending only rearranges particles.

High-shear granulation:

- ✓ Modifies particle morphology
- ✓ Controls density
- ✓ Reduces segregation
- ✓ Improves downstream handling

This is why tablet manufacturers rely on it. This is why instant beverage producers depend on it. This is why detergent and catalyst producers use it.

Industries & Applications



Pharmaceutical Industry

Applications:

- ✓ OSD tablet granulation
- ✓ Controlled release formulations
- ✓ API blending
- ✓ Potent compound processing

Advantages:

- ✓ Improved compressibility
- ✓ Better tablet uniformity
- ✓ Reduced dust
- ✓ GMP compatibility
- ✓ Closed containment options

Scale-up from lab to full production is seamless using the PDI platform.



Nutraceutical Industry

Applications:

- ✓ Protein agglomeration
- ✓ Instantized supplements
- ✓ Vitamin blends
- ✓ Functional drink bases

Advantages:

- ✓ Improved solubility
- ✓ Reduced caking
- ✓ Enhanced mouthfeel
- ✓ Higher bulk density



Food Industry

Applications:

- ✓ Sugar agglomeration
- ✓ Soup mixes
- ✓ Flavor granules
- ✓ Spice blends
- ✓ Dairy powders

Advantages:

- ✓ Better rehydration
- ✓ Reduced dusting
- ✓ Consistent granule size
- ✓ Faster dissolution



Chemical Industry

Applications:

- ✓ Pigments
- ✓ Masterbatches
- ✓ Catalyst blends
- ✓ Detergent powders
- ✓ Powder coatings

Advantages:

- ✓ Uniform liquid incorporation
- ✓ Stable agglomerates
- ✓ Improved material handling



Cosmetics Industry

Applications:

- ✓ Face powders
- ✓ Ceramic dental mixtures
- ✓ Pressed cosmetic bases

Granulation improves texture, density, and product feel.

Specifications

PerMix High-Speed Granulator Mixer

Model	Total L	Working L (min)	Working L (max)	kW	RPM	Chopper kW	Chopper RPM	L	W	H	KG
PDI-3	3	0.9	1.8	1.1	400	0.75	3000	850	650	1200	200
PDI-5	5	1.5	3	1.5	400	0.75	3000	950	680	1250	250
PDI-10	10	3	6	2.2	381	1.1	3000	1250	700	900	300
PDI-15	15	4.5	9	2.2	360	1.1	3000	1300	720	920	350
PDI-20	20	6	12	3	350	1.5	3000	1350	750	980	400
PDI-30	30	9	18	3	320	1.5	3000	1400	780	1000	480
PDI-45	45	13.5	27	4	300	2.2	3000	1500	800	1050	500
PDI-50	50	15	30	4	288	2.2	3000	1650	800	1100	550
PDI-60	60	18	36	4	288	2.2	1500	1780	820	1140	600
PDI-70	70	21	42	5.5	277	2.2	1500	1800	880	1190	680
PDI-100	100	30	60	5.5	277	2.2	1500	1820	900	1200	720
PDI-150	150	45	90	7.5	193	3	1500	2000	1000	1350	750
PDI-200	200	60	120	7.5	193	3	1500	2100	1100	1400	850
PDI-250	250	75	150	11	185	4	1500	2180	1230	1500	900
PDI-300	300	90	180	11	176	4	1500	2210	1270	1560	1000
PDI-400	400	120	240	15	176	5.5	1500	2600	1500	1600	1200
PDI-500	500	150	300	18.5	165	5.5	1500	2900	1680	1650	1300
PDI-600	600	180	360	22	149	5.5	1500	3200	1770	1700	1400
PDI-700	700	210	420	22	140	5.5	1500	3250	1800	1750	1600
PDI-750	750	225	450	30	135	7.5	1500	3280	1800	1800	1800
PDI-800	800	240	480	30	124	7.5	1500	3300	1830	1860	2000
PDI-1000	1000	300	600	37	114	11	1500	3400	1900	1950	2200
PDI-1200	1200	360	720	45	105	15	1500	3580	1920	2100	2500
PDI-1500	1500	450	900	55	99	18.5	1500	3780	1960	2250	2800
PDI-2000	2000	600	1200	75	82	18.5	1500	4000	2200	2400	3500

Introducing the PerMix PDI Vacuum High-Speed Mixer & Dryer

Many processes require:

- ✓ Moisture removal
- ✓ Solvent evaporation
- ✓ Deaeration
- ✓ Oxygen-free processing

The PerMix PDI Vacuum High-Speed Mixer & Dryer integrates:

- ✓ High-shear granulation
- ✓ Jacketed heating
- ✓ Vacuum drying
- ✓ Deaeration
- ✓ Closed containment

All in one vessel.

How Vacuum Changes the Process

Under vacuum:

- ✓ Boiling point decreases
- ✓ Moisture evaporates faster
- ✓ Lower temperatures protect heat-sensitive ingredients

Vacuum also:

- ✓ Removes entrapped air
- ✓ Prevents oxidation
- ✓ Enables solvent recovery systems
- ✓ Improves granule stability

This is especially critical in:

- ✓ Pharmaceutical drying
- ✓ Specialty chemicals
- ✓ Advanced materials
- ✓ High-value formulations



Jacketed Heating & Cooling System

Available with:

- ✓ Steam
- ✓ Hot water
- ✓ Thermal oil

Integrated temperature probes provide real-time control.

This allows:

Granulate -> Dry -> Deaerate -> Discharge

Without transferring product to separate equipment.

Reduced footprint. Reduced contamination risk.

Reduced handling.



Specifications

PerMix High-Speed Granulator Mixer and Dryer

Model	Total L	Working L (min)	Working L (max)	kW	RPM	Chopper kW	Chopper RPM	L	W	H	KG
PDID-3	3	0.9	1.8	2.2	240	1.1	3000	980	720	1320	260
PDID-5	5	1.5	3	3	240	1.1	3000	1090	750	1380	330
PDID-10	10	3	6	4	229	1.5	3000	1440	770	990	390
PDID-15	15	4.5	9	4	216	1.5	3000	1500	790	1010	460
PDID-20	20	6	12	5.5	210	2.2	3000	1550	830	1080	520
PDID-30	30	9	18	5.5	192	2.2	3000	1610	860	1100	620
PDID-45	45	13.5	27	7.5	180	3	3000	1730	880	1160	650
PDID-50	50	15	30	7.5	173	3	3000	1900	880	1210	720
PDID-60	60	18	36	11	173	3	1500	2050	900	1250	780
PDID-70	70	21	42	11	166	3	1500	2070	970	1310	880
PDID-100	100	30	60	15	166	3	1500	2090	990	1320	940
PDID-150	150	45	90	18.5	116	4	1500	2300	1100	1490	980
PDID-200	200	60	120	18.5	116	4	1500	2420	1210	1540	1110
PDID-250	250	75	150	22	111	5.5	1500	2510	1350	1650	1170
PDID-300	300	90	180	30	106	5.5	1500	2540	1400	1720	1300
PDID-400	400	120	240	37	106	7.5	1500	2990	1650	1760	1560
PDID-500	500	150	300	45	99	7.5	1500	3340	1850	1820	1690
PDID-600	600	180	360	55	89	7.5	1500	3680	1950	1870	1820
PDID-700	700	210	420	55	84	7.5	1500	3740	1980	1930	2080
PDID-750	750	225	450	75	81	11	1500	3770	1980	1980	2340
PDID-800	800	240	480	75	74	11	1500	3800	2010	2050	2600
PDID-1000	1000	300	600	90	68	15	1500	3910	2090	2150	2860
PDID-1200	1200	360	720	90	63	18.5	1500	4120	2110	2310	3250
PDID-1500	1500	450	900	110	59	22	1500	4350	2160	2480	3640
PDID-2000	2000	600	1200	132	49	22	1500	4600	2420	2640	4550

CIP & Hygienic Design

Cleaning is strategic.

PerMix PDI offers:

- ✓ Fully integrated wet CIP
- ✓ Rotary spray heads
- ✓ Automated wash cycles
- ✓ Drain-optimized geometry
- ✓ Polished internal welds
- ✓ Sanitary shaft seals
- ✓ Air purge or mechanical sealing options

For dry environments:

- ✓ Air purge cleaning systems
- ✓ Reduced water consumption
- ✓ For pharmaceutical GMP:
- ✓ FDA compliant materials
- ✓ Electropolished interior
- ✓ Documentation packages
- ✓ Validation support



Construction & Materials

Available in:

- ✓ SS304
- ✓ SS316 / 316L
- ✓ Duplex Stainless
- ✓ Titanium
- ✓ Hastelloy
- ✓ Hardened stainless for abrasive products

Finish options:

- ✓ Industrial
- ✓ Sanitary
- ✓ Electropolished
- ✓ Pharmaceutical grade

Engineering Features

- ✓ Dual motor configuration
- ✓ Reduction gear drive
- ✓ Modular configuration
- ✓ Counterweighted or pneumatic lid
- ✓ Feeding & discharge customization
- ✓ Heating/cooling jackets
- ✓ Vacuum drying capability
- ✓ PLC/HMI recipe control
- ✓ Load cells
- ✓ ATEX / Explosion-proof design
- ✓ Nitrogen purge
- ✓ Containment execution



* The standard PerMix Christmas tree chopper design

Scale-Up Logic

The PDI line progresses from small lab units through full production models.

Because geometry and energy density remain consistent across sizes, process transfer from lab to production is predictable.

That is critical in regulated environments.

Why PerMix PDI Is a Strategic Platform

Instead of multiple machines:

Granulator -> Dryer -> Deaerator -> Transfer

You get:

Benefits:

- ✓ Lower footprint
- ✓ Reduced validation burden
- ✓ Shorter cleaning cycles
- ✓ Higher yield
- ✓ Greater process control
- ✓ Reduced operator intervention

The PerMix PDI is not just a mixer.

It is a controlled particle engineering platform designed for industries where precision matters.



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Besides, PerMix has been building a network of agents located in Southeast Asia, Australia, Russia, Middle East, Africa, and other countries & regions.