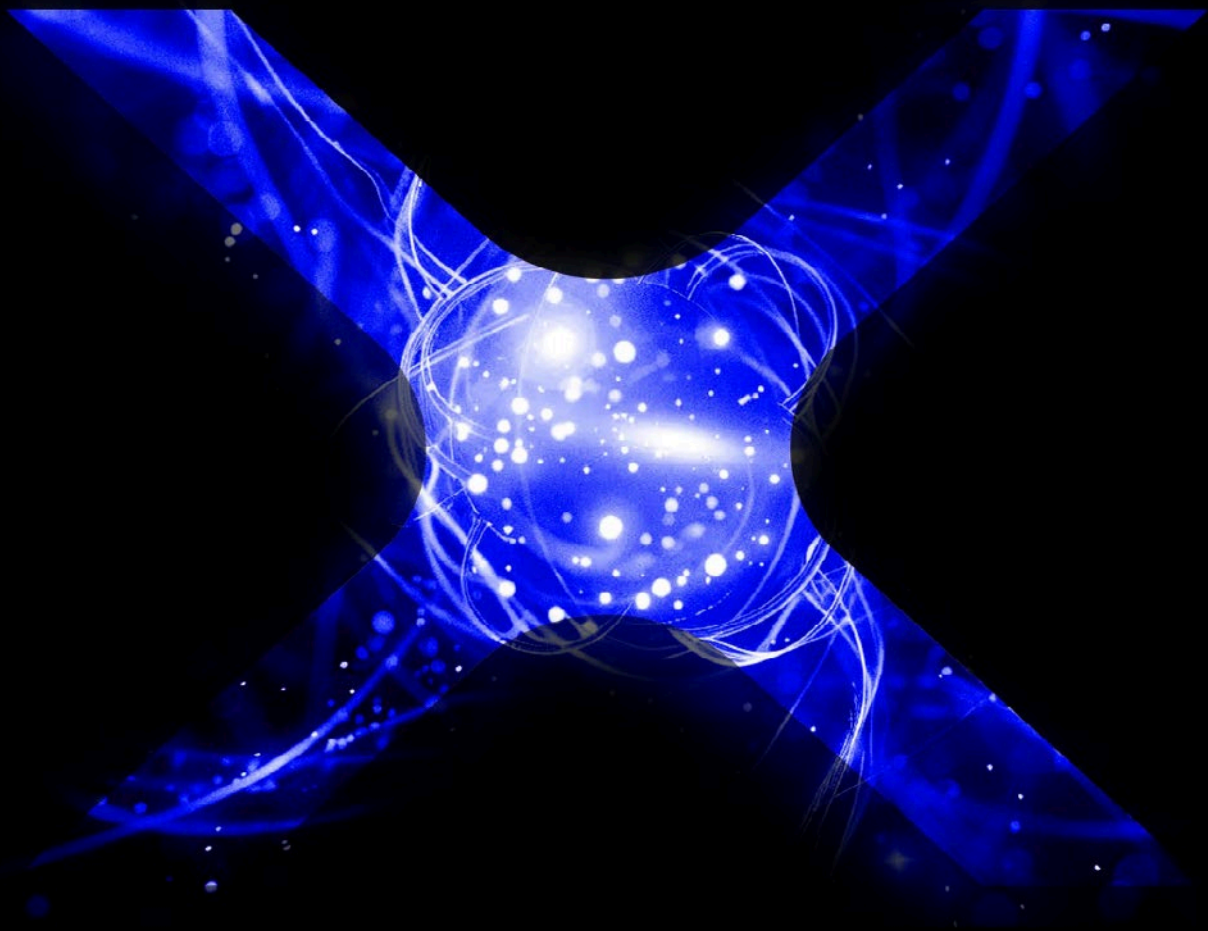


*Quantum***X**



**DOUBLE PLANETARY
MIXERS + VERTICAL
SIGMA MIXERS**

QuantumX PDP Double Planetary Mixers Vertical Sigma Mixers

Redefining High-Viscosity Mixing Efficiency

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When materials become too viscous, too sensitive, or too valuable for conventional mixers, manufacturers turn to

QuantumX Double Planetary Mixers.

Designed for precision, power, and process control, the QuantumX PDP series delivers exceptional mixing, kneading, dispersing, and deaeration for the most demanding formulations—across industries ranging from batteries and pharmaceuticals to cosmetics, coatings, and defense.



WHAT IS A DOUBLE PLANETARY MIXER?

02



A double planetary mixer is a vertical, batch-operated, high-torque mixing system specifically engineered for materials that are too viscous, too shear sensitive, or too highly filled for conventional agitators or high speed dispersers.

At its core, the machine uses two independently rotating mixing tools mounted on a common drive head. Each tool performs two simultaneous motions:

- Rotation about its own axis (tool rotation)
- Revolution around the central axis of the mixing vessel (planetary motion)

This compounded motion creates a continuously changing shear field that sweeps 100% of the vessel volume, from the sidewalls to the center and down to the vessel bottom. Unlike single shaft mixers, no fixed mixing zone exists—material is constantly folded, stretched, and redistributed.

Because the mixing action is torque driven rather than tip speed driven, double planetary mixers excel at processing:

- Extremely high viscosities (often exceeding 1,000,000 cP)
- High solids loading and filler content
- Shear sensitive or structure dependent materials
- Products that entrap air and require controlled deaeration

This makes the double planetary mixer a preferred solution where uniformity, repeatability, and process control are more important than raw speed.

The QuantumX PDP series is built around a heavy duty planetary gearbox that transmits high torque to each mixing tool while maintaining precise synchronization between rotation and revolution.

➤ MIXING MECHANICS

During operation:

- Each mixing blade rotates on its own axis, generating localized shear and kneading forces
- Simultaneously, the blades orbit the vessel, sweeping material away from the sidewalls
- Material is continuously pulled from the perimeter into the center mixing zone
- Optional bottom and wall scrapers prevent buildup and renew the heat transfer surface

This produces a characteristic fold over and laminar mixing pattern, ideal for dispersing powders into liquids, wetting pigments, breaking agglomerates, and maintaining homogeneity without damaging sensitive components.

➤ HEAT TRANSFER EFFICIENCY

Because the material is constantly swept along the vessel walls, double planetary mixers achieve exceptionally efficient heat transfer when paired with a heating or cooling jacket. The scrapers continuously expose fresh product to the jacketed surface, reducing thermal gradients and preventing localized overheating.

➤ VACUUM OPERATION

When operated under vacuum:

- Entrained air and volatile solvents are removed directly from the bulk material
- Liquid penetration into powders is enhanced
- Oxidation reactions are suppressed
- Product density, surface finish, and consistency are improved

The vertical configuration allows QuantumX to design true vacuum rated vessels without the leakage risks associated with horizontal designs.

➤ BATCH DISCHARGE + VESSEL HANDLING

QuantumX PDP mixers can discharge by:

- Bottom discharge valves for flowable products
- Tilting or lift off vessels
- Integration with discharge presses for non flowing pastes

Portable and interchangeable vessel designs allow a single drive unit to support multiple vessels, improving throughput and minimizing downtime between batches.

HOW THE QUANTUMX PDP WORKS

04



The QuantumX PDP series uses two vertically mounted planetary mixing tools driven by a robust gearbox. Each tool rotates around its own axis while revolving around the center of the vessel.

Optional bottom scrapers continuously clean the vessel floor and sidewalls, improving heat transfer and preventing material buildup.

This mixing action:

Forces material

from the vessel walls back into the mixing zone

Continuously renews

renews the product surface for improved heat exchange

Produces thorough dispersion

without excessive shear

**The result is fast,
repeatable, and highly
uniform mixing—even
for the most challenging
formulations.**

ADVANTAGES OF VACUUM DOUBLE PLANETARY MIXING

05

Adding vacuum capability transforms a planetary mixer into a powerful process tool:

DEAERATION + DEGASSING

Removes entrained air, solvents, and volatiles

IMPROVED PRODUCT DENSITY + APPEARANCE

Critical for cosmetics, adhesives, and battery slurries

OXIDATION PREVENTION

Protects sensitive chemistries and active ingredients

ENHANCED WET OUT

Liquids penetrate powders more effectively under vacuum



QuantumX vacuum planetary mixers are designed with heavy duty seals, vacuum rated vessels, and optional condenser and recovery systems for solvent handling.

advantages

HEATING & COOLING JACKET ADVANTAGES

06

QuantumX offers precision heating and cooling jackets to tightly control product temperature during mixing:

Steam, hot oil, or electric heating

Chilled water or glycol cooling

Uniform heat transfer across the entire vessel surface

Benefits include:

Controlled viscosity during mixing

Faster dispersion and reaction control

Improved batch repeatability

Safe processing of thermally sensitive materials

Jackets can be combined with vacuum for advanced mix heat cool degas processing in a single system.



heating + cooling

GAS PURGE & INERT PROCESSING OPTIONS

07

For oxygen sensitive or hazardous materials, QuantumX planetary mixers can be equipped with gas purge systems:

- Nitrogen, argon, or custom inert gases
- Positive pressure or vacuum purge cycles
- Ideal for battery materials, energetic compounds, and specialty chemicals

**These systems
enhance safety,
product stability,
and regulatory
compliance.**



PORTABLE & INTERCHANGEABLE MIXING VESSELS

08



QuantumX offers portable mixing vessel designs to maximize plant flexibility:

Multiple vessels per drive unit

Roll out or lift off vessel configurations

Seamless transfer between mixing, discharge, and downstream processing

This approach reduces downtime, improves throughput, and supports multi SKU production environments.

flexibility



The term “Vertical Sigma Mixer” is often used in industry to describe double planetary mixers equipped with sigma style or rectangular mixing blades.

Unlike traditional horizontal sigma (Z blade) mixers, a vertical sigma configuration:

- Maintains a compact vertical footprint
- Enables full vacuum operation
- Allows jacketed vessels for precise thermal control
- Simplifies cleaning and vessel change out

QuantumX PDP mixers can be configured with sigma style tools, combining the kneading strength of a sigma mixer with the versatility and cleanliness of a vertical planetary design.

QuantumX Double
Planetary & Vertical
Sigma Mixers are trusted
worldwide across high
value industries:

Battery & Energy Storage

Anode/cathode slurries, solid state materials,
conductive pastes

Pharmaceuticals

Ointments, gels, transdermal systems, high
potency compounds

Cosmetics & Personal Care

Creams, lotions, balms, makeup bases

Paints, Coatings & Inks

High solids coatings, fillers, pigments, specialty
inks

Chemical Processing

Adhesives, sealants, polymers, specialty
compounds

Defense & Aerospace

Energetic materials, composites, classified
formulations

Food & Nutraceuticals

High viscosity pastes, functional blends,
specialty formulations



QuantumX mixers are engineered to order, with options including:

304, 316, AND 316L STAINLESS STEEL

**ABRASION RESISTANT AND
SPECIALTY ALLOYS**

**SANITARY, PHARMACEUTICAL, OR
INDUSTRIAL FINISHES**

**PLC/HMI CONTROLS WITH RECIPE
MANAGEMENT**

LOAD CELLS FOR BATCH ACCURACY

**INTEGRATED DISCHARGE PRESSES
AND DOWNSTREAM EQUIPMENT**

Capacities range from lab scale units to large volume production systems, supporting scale up with confidence.



QuantumX Double Planetary Mixers are not just machines—

they are process platforms.

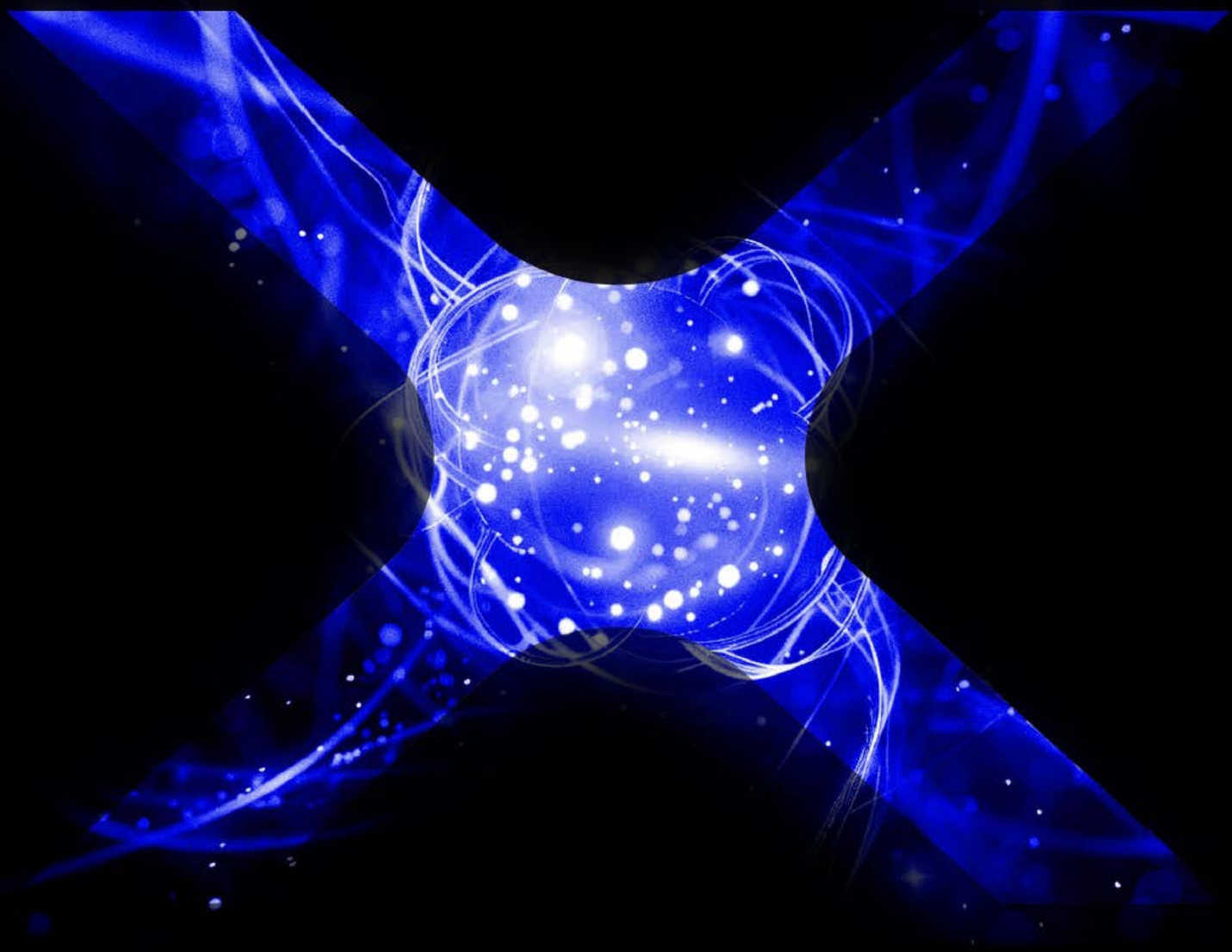
By combining torque driven mixing, vacuum capability, thermal control, and modular vessel design, QuantumX delivers unmatched performance for manufacturers who cannot afford compromise.

QuantumX – Perfect Mixing Technologies,
Engineered for What Others Can't Mix.

Model	Total Volume (liter)	Working Volume (liter)	Power for Arms (kW)	Arm Speed (RPM)	L (mm)	W (mm)	H (mm)	Weight (kg)
PDP-3L	3	2	1.1	170	990	520	720	180
PDP-5L (	5	4	1.5	120	1,000	530	750	200
PDP-10	10	8	1.5	90	1,350	700	900	300
PDP-15	15	11	2.2	90	1,400	720	920	350
PDP-20	20	15	2.2	80	1,450	750	950	400
PDP-30	30	23	4	70	1,660	860	1,050	500
PDP-45	45	34	4	65	1,700	900	1,150	600
PDP-50	50	38	5.5	65	1,700	950	1,200	750
PDP-60	60	45	5.5	65	1,730	1,000	1,450	950
PDP-70	70	53	7.5	65	1,850	1,100	1,550	1,200
PDP-100	100	75	7.5	63	2,060	1,260	1,680	1350
PDP-150	150	110	11	60	2,200	1,350	1,780	1450
PDP-200	200	150	11	60	2,460	1,400	1,800	1600
PDP-250	250	190	15	48	2,500	1,600	1,850	1,700
PDP-300	300	230	15	48	2,530	1,700	1,960	1800
PDP-400	400	300	18.5	45	2,800	1,750	2,000	2600
PDP-500	500	380	22	40	3,190	1,800	2,100	3100
PDP-600	600	450	30	38	3,350	1,860	2,200	4500
PDP-700	700	530	37	33	3,500	1,900	2,300	6,000
PDP-750	750	550	37	33	3,660	2,000	2,400	7000
PDP-800	800	600	37	33	3,700	1,200	2,500	7,200

* Mixers Can be made to have a total volume of 15,000 L.

double
planetary mixer



*Quantum***X**