

AURELIA®



HIGH SPEED DISPERSERS IN MULTI-SHAFT MIXERS

HIGH
SPEED
DISPERSERS

J & M CORPORATION CUSTOMISED ENGINEERING

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PROCESS EQUIPMENT • TAILOR MADE MACHINES • VARIOUS AUTOMATION

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Abstract

The classic High Speed Dispenser is a common mixing tool used throughout the process industries. Aurelia discusses different designs, features, and custom configurations and simple applications to serve as a helpful guide in equipment selection.

INTRODUCTION

The High Speed Dispenser, also previously called High Speed Dissolver, is a standard workhorse used in the manufacture of chemicals, plastics, coatings, inks, paints, adhesives, composites and many other products. An economical and relatively simple piece of mixing equipment, its primary purpose is to incorporate powders into liquid and break down particle agglomerates to produce a fine dispersion. Running at tip speeds up to around **5,000 ft/min**, the open disc blade of the High Speed Dispenser creates vigorous turbulent flow within a low viscosity batch. It also generates a characteristic **vortex** into which dry ingredients can be added for quick wet-out. The disperser blade may be located on or off center depending on the depth of the vortex (an off center blade produces a smaller vortex and reduces air entrapment). As the batch thickens or increases in volume, blade speed is adjusted to maintain the vortex and rate of material turnover. A few other basic guidelines are typically followed in the sizing and operation of the High Speed Dispenser, including :

- Normal operating viscosity range: water-like to around 50,000 centipoise(cP)
- Motor specification: 1 HP for every 10 gallons of product
- Disperser blade diameter: approximately 1/3 of vessel diameter
- Disperser blade location: 0.5 blade diameter off the vessel bottom – 1.5 blade diameter Below the batch surfaces
- Full holding capacity of mix vessel: about 130% of batch size to provide sufficient freeboard Above the product level.
- Typical blade designs



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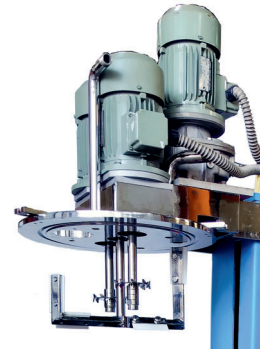
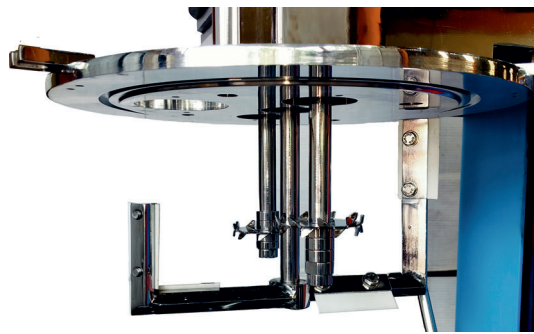
When a batch process frequently suffers from insufficient product flow, consider upgrading your High Speed Dispenser to a Multi-Shaft Mixer. For instance, in Dual –Shaft Mixer, the disperser is complimented by a slow –speed anchor agitator which helps promote bulk flow and uniform batch temperature. The simple addition of an anchor extends the high speed disperser's viscosity range to several hundred thousand centipoise. A Triple- Shaft Mixer may also be used, wherein the anchor agitator works in combination with a disperser shaft and a rotor/stator assembly for increased shear input. Sample applications of Multi-Shaft Mixers include pureed foods, sauces and syrups, hot melt adhesives, rubber solutions, clay dispersions, cosmetic creams, medical gels, pharmaceutical suspensions, printing inks, specially coatings, polymer dispersions, conductive pastes, lubricants, metallic and ceramic slurries, etc.

LABORATORY HIGH SPEED DISPERSERS

Most lab- scale High Speed Dispensers today, used for batches ranging from 1 to 15 litres, are conveniently equipped with an electronic lift for raising and lowering the blade. Heavier duty bench-top mixers feature an air/oil hydraulic lift, a set up that resembles that of production size floor-mounted models. To accommodate variations in the batch size, different diameter disperser blades are supplied. Vacuum-rated units, on the other hand, consist of a mixer cover that matches to a dedicated vessel. Sight/charge ports are installed on the cover for easy ingredient additions and for viewing the batch during the mixing cycle. In an R & D setting, multi-purpose mixers designed for use with interchangeable agitators are very essential tools. Each agitator that easily swaps with another extends the spectrum of tests that a single machine can accomplish. Mixer versatility and utility are thus increased without taking up additional space. For this reason Aurelia Laboratory mixers are offered with different disperser blades, propeller blades and rotor/stator assembly with different style stator heads. While High Speed Dispensers are generally used for straightforward solid-mixing requirements, rotor/stator mixers are utilized for emulsification, particle size reduction and homogenization purposes. Conventional rotor/stators, also High Shear Mixers.

PILOT AND PRODUCTION SCALE HIGH SPEED DISPERSERS

Dispersers equipped with a 5HP motor or larger are considered pilot and production scale mixers. The standard design is floor mounted unit with an air/oil hydraulic lift which allows the use of interchangeable vessels and the handling of low liquid volumes during the initial stages of mixing. Having the ability to raise and lower the disperser blade is also beneficial in terms of eliminating any "stratification" or possible layering within the batch. Vacuum capable High Speed Dispersers may include a hydraulic lift but blade position cannot be adjusted during mixing. Instead, a secondary blade can be used to ensure proper batch turnover. Tank mounted dispersers are used in applications wherein the batch size does not vary or at least not severely. At all stages of the mix cycle, product level must always be sufficiently above the disperser.

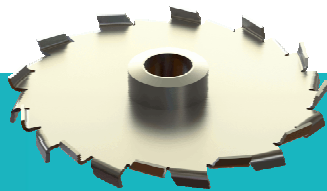


TYPE	MOTOR (KW)	LIFTING (mm)	RPM (r / min)	DISK DIA (mm)	SLURRY CAPACITY (l)	TANK DIMENSION (mm)
Aurelia-5HP	4	800	1500	180	100-200	Ø550 x 850 (Ht.)
Aurelia-10HP	7.5	1000	1500	250	200-400	Ø750 x 905 (Ht.)
Aurelia-15HP	11	1000	1200	280	400-600	Ø850 x 1060 (Ht.)
Aurelia-20HP	15	1100	1100	300	600-1000	Ø900 x 1575 (Ht.)
Aurelia-25HP	18.5	1200	1000	330	800-1200	Ø1000 x 1530 (Ht.)
Aurelia-30HP	22	1200	1000	350	1000-1500	Ø1050 x 1750 (Ht.)
Aurelia-40HP	30	1400	1000	380	1200-2000	Ø1150 x 1925 (Ht.)
Aurelia-50HP	37	1400	900	400	1400-2500	Ø1200 x 2200 (Ht.)
Aurelia-75HP	55	1600	800	450	2500-3000	Ø1350 x 2100 (Ht.)
Aurelia-100HP	75	1700	750	500	3000-3500	Ø1500 x 2000 (Ht.)



SAW TOOTH DESIGN

Most popular blade balances high shear dispersion with pumping action



HIGH VAN DESIGN

High pumping capacity and minimal shear ideal for let-down requirements and heat sensitive products.



CUTTER DESIGN

Provides good batch movement and high shear mixing; excels in high viscosity and high solids batches.



POLYPELLER

Made from Ultra-High Molecular Weight Polyethylene for superior wear resistance to abrasive applications.

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PHARMA INDUSTRIES

PAINT AND STATIONERY INDUSTRIES



CHOCOLATE INDUSTRIES

TOOTHPASTE INDUSTRIES



DETERGENT PRODUCT INDUSTRIES

BODY CARE PRODUCT INDUSTRIES



PETROLEUM INDUSTRIES

FOR ALL PROCESS INDUSTRIES

The world's finest High Speed Dispersers at an affordable price.



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