

NAUTA MIXER

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Process Technologies for Tomorrow

HOSOKAWA MICRON CORPORATION



URL <http://www.hosokawamicron.co.jp>

Hosokawa Micron Corporation is a member of the Hosokawa Micron Group, responding to global needs through emphasis on materials science and engineering. The Group is an international provider of equipment and systems for powder processing, thermal processing, environmental protection, and plastics processing. The Group maintains facilities for research, engineering, manufacturing, and service in each of the world's major industrial markets.



Process Technologies for Tomorrow

HOSOKAWA MICRON CORPORATION



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The Newly Born Best Selling Powder Mixer!

New Type Available Now
References over 10,000 units!

Nauta Mixer

High Grade Type With Advanced Technology
Accompanied with a compact body and sanitary design

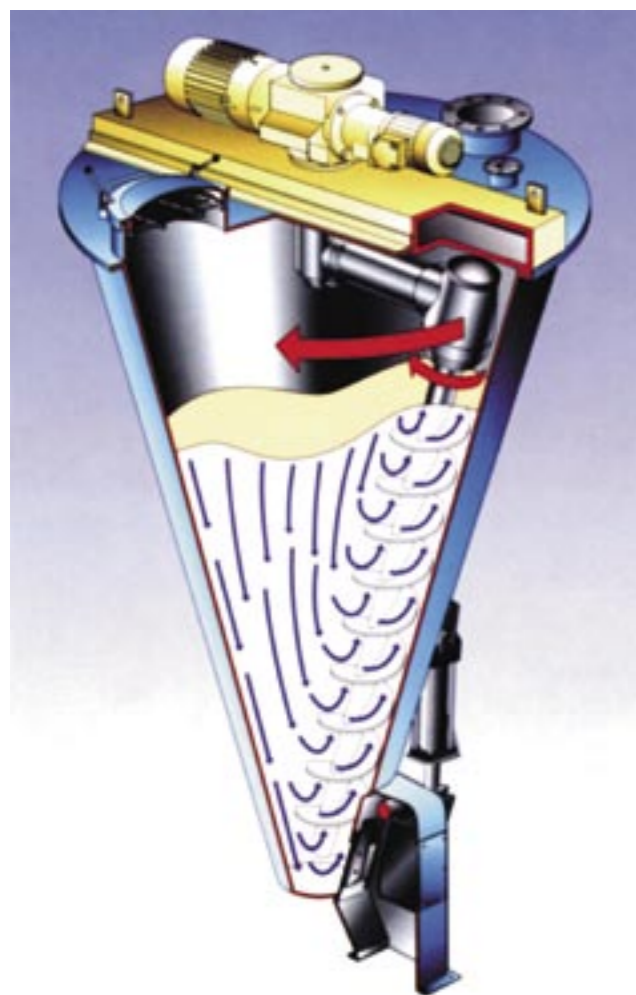
General

Hosokawa Nauta Mixer is the best selling powder mixer in the world.

It features a conical mixing vessel with an orbiting arm and rotating mixing screw. This structure gives the mixer many advantages such like quick mixing time, higher mixing accuracy, and lower power consumption and so on. More than 10,000 units are delivered in the world. There is a wide variety of models and options to meet various material property and characteristics, working environment, operational conditions and applications.

Application

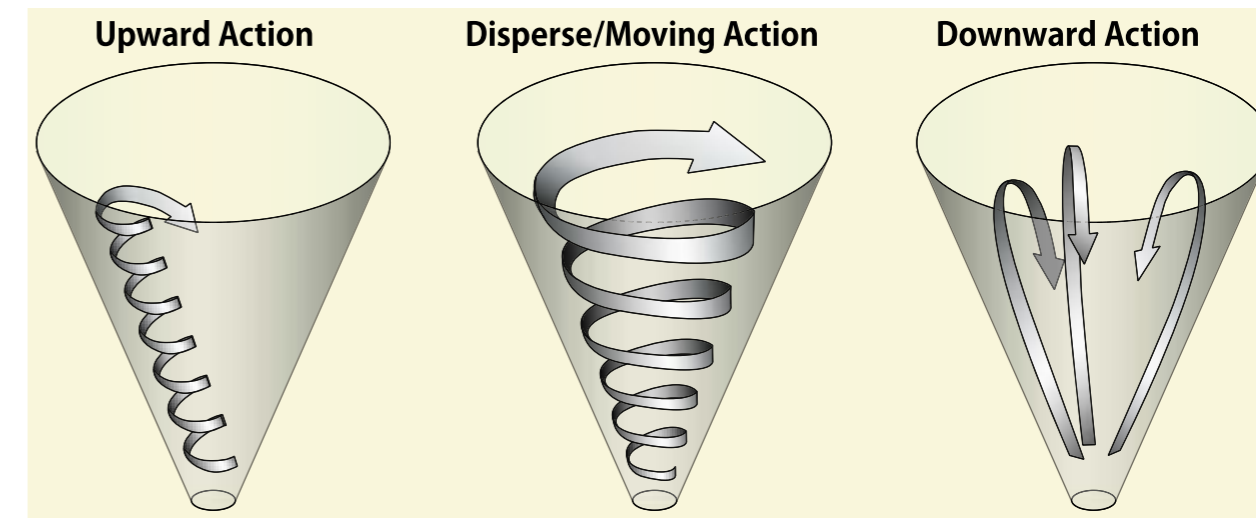
Not only for foods and chemicals but also suitable for pharmaceuticals, agrochemicals, feeds and dyestuffs, pigments and so on. Taking the advantages of the mixing functions, Nauta mixer can be utilized in process of heating, drying, cooling and reaction as well.



VN Type Construction

Basic Principle of Mixing

Raw materials move upward due to screw rotation. The swing arm orbits the mixing screw along the inner vessel wall, moving and dispersing the material. On the other hand, the material where there is no screw moves downward. Based on this principle, very effective mixing action takes place in the mixer at high accuracy.



Comparison with other powder mixers

	Nauta Mixer	Container revolving types	Ribbon Blender
Mixing Time	◎	○	◎
Mixing Accuracy	◎	○	○
Power	◎	△	△
Damage onto powders	○	◎	△
Ease at discharge	◎	△	△
Inspection/cleaning	○	△	△
Automation	◎	△	○
High capacity	◎	△	△
Install area	◎	△	◎
Install Height	△	△	◎
Cost	○	◎	○



New Compact Type VN Type

Cost Reduction by standardized parts and specification



Features

- Gear Transmission Efficiency is increased by 40%
- New Shaft Seals designed for preventing powder into lubrication
- Simplified Design enabled cleanability of interior/outside increased.
- Compact body increase ease of installation
- Cost Reduction by Cantilever design

3 types of Bottom Support are available



Cantilever

Radial Locator

Pin Joint

Specification

Model	Water Fill Capacity [L]	Screw Support Type	Screw/Arm Power [kW]	Approx. Dimensions [mm]			Approx. Weight [kg]
				Max. dia.	Container Height	Overall Height	
VN-5	500	Cantilever	3.7/0.4	1450	1750	2520	960
VN-10	1000	Cantilever	3.7/0.4	1710	2180	2950	1090
VN-10	1000	Cantilever	7.5/0.75	1750	2250	3170	1540
VN-15	1500	Cantilever	3.7/0.4	1910	2500	3280	1210
VN-15	1500	Cantilever	7.5/0.75	1940	2560	3480	1650
VN-20	2000	Cantilever	3.7/0.4	2090	2800	3570	1320
VN-20	2000	Cantilever	7.5/0.75	2090	2800	3720	1770
VN-20	2000	Radial Locator	3.7/0.4	2090	2800	3570	1340
VN-30	3000	Cantilever	7.5/0.75	2330	3190	4120	1940
VN-30	3000	Radial Locator	5.5/0.55	2330	3190	3960	1460
VN-40	4000	Cantilever	7.5/0.75	2570	3580	4500	2200
VN-40	4000	Radial Locator	7.5/0.75	2570	3580	4500	2170
VN-50	5000	Radial Locator	7.5/0.75	2780	3740	4670	2320
VN-50	5000	Radial Locator	11/1.1	2920	3970	4900	2460
VN-60	6000	Radial Locator	11/1.1	2920	3970	4900	2460
VN-60	6000	Radial Locator	15/1.5	3000	4090	5250	3600
VN-60	6000	Radial Locator	18.5/1.5	3000	4090	5280	3650
VN-70	7000	Radial Locator	11/1.1	3050	4180	5110	2560
VN-70	7000	Radial Locator	15/1.5	3130	4310	5470	3750
VN-70	7000	Radial Locator	18.5/1.5	3130	4310	5490	3800
VN-80	8000	Radial Locator	11/1.1	3170	4370	5300	2650
VN-80	8000	Radial Locator	15/1.5	3250	4500	5660	3900
VN-80	8000	Radial Locator	18.5/1.5	3250	4500	5680	3950
VN-100	10000	Radial Locator	15/1.5	3450	4830	5990	4250
VN-100	10000	Radial Locator	18.5/1.5	3450	4830	6010	4300

Note

- 1) Motor power is calculated on the basis that the bulk density of the mixture is 0.6g/cc.
- 2) Effective volume may vary depending on the powder characteristics. In general it is 80-100% of water fill.

Cantilever Screw Type DBX Type



Drive unit is direct coupled with motor. Completely cantilevered, without bottom support. This type is best suited for heat sensitive, abrasive, and brittle.

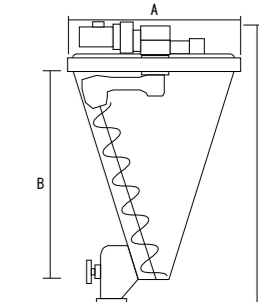
Specification

Model	Water Fill Capacity [L]	Screw/Arm Power [kW]		Approx. Dimensions [mm]			Approx. Weight [kg]
		Screw	Arm	Max. dia.	Container Height	Overall Height	
DBX-600	600	3.7	0.4	1610	1990	2800	900
DBX-1000	1000	3.7	0.4	1810	2320	3130	1000
DBX-1500	1500	3.7	0.4	2030	2630	3450	1200
DBX-2000	2000	3.7	0.4	2180	2880	3700	1300
DBX-3000	3000	5.5	0.55	2430	3290	4100	1500
DBX-4000	4000	7.5	0.75	2700	3640	4600	2300
DBX-5000	5000	7.5	0.75	2870	3910	4870	2500
DBX-6000	6000	11	1.1	3140	4350	5590	4000
DBX-7000	7000	11	1.1	3270	4560	5800	4300
DBX-8000	8000	11	1.1	3370	4730	5970	4600
DBX-10000	10000	11	1.1	3580	5080	6400	5000
DBX-10000	10000	22	2.2	3770	5040	6720	9000

Note

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Dimensional Drawing



ORIGINAL Type NX Type



Available in small, medium and very large capacities. Basic original type with many references and high performance.

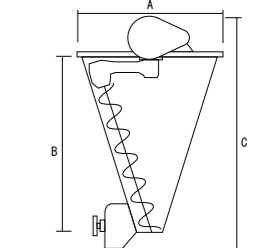
Specification

Model	Water Fill Capacity [L]	Screw/Arm Power [kW]		Approx. Dimensions [mm]			Approx. Weight [kg]
		Screw	Arm	Max. dia.	Container Height	Overall Height	
NX-1	100	1.5	-	1060	1130	2100	600
NX-2	200	2.2	-	1220	1380	2470	700
NX-3	300	2.2	-	1330	1560	2600	800
NX-6	600	2.2	-	1550	1950	2920	850
NX-10	1000	2.2	-	1760	2290	3260	950
NX-15	1500	3.7	-	1980	2600	3570	1050
NX-20	2000	3.7	-	2130	2850	3820	1150
NX-30	3000	5.5	0.75	2380	3260	4130	1200
NX-40	4000	7.5	1.5	2820	3830	4980	2400
NX-50	5000	7.5	1.5	2980	4090	5230	2600
NX-60	6000	11	1.5	3120	4290	5460	2800
NX-70	7000	11	1.5	3250	4530	5670	2900
NX-80	8000	11	1.5	3360	4720	5850	3000
NX-100	10000	11	1.5	3570	5060	6210	3300
NX-150	15000	18.5	1.5	4070	5780	7010	6000
NX-200	20000	22	1.5	4480	6440	7830	8000
NX-250	25000	30	2.2	4820	6960	8460	11000
NX-500	50000	37	3.7	5110	7440	9020	16000

Note

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Dimensional Drawing





Satellite Screw Type D2SX Type

Rational Mixing Performance

Features

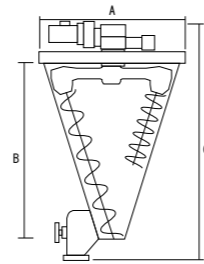
In addition to a standard mixing screw, another large diameter satellite screw is provided. With only 30% increase of running power, mixing time can be reduced by half or below.

Specification

Model	Water Fill Capacity [L]	Screw/Arm Power [kW]		Approx. Dimensions [mm]			Approx. Weight [kg]
		Screw	Arm	Max. dia.	Container Height	Overall Height	
D2SX-1000	1000	3.7	0.4	1810	2320	3130	1200
D2SX-1500	1500	5.5	0.55	2030	2630	3450	1400
D2SX-2000	2000	5.5	0.55	2180	2880	3700	1600
D2SX-3000	3000	7.5	0.75	2630	3550	4700	2300
D2SX-5000	5000	11	1.1	2980	4090	5300	2800
D2SX-10000	10000	15	1.5	3570	5060	6200	3500

Note 1) Motor power is calculated on the basis that the bulk density of the mixture is 0.6g/cc.
2) Effective volume may vary depending on the powder characteristics. In general it is 80-100% of water fill.

Dimensional Drawing



Combi-type mixer, cope with high capacity CX Type

Features

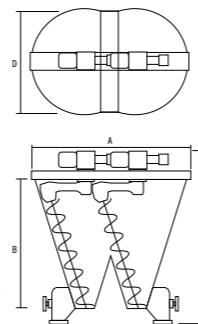
Combi-type mixer, cope with high capacity. CX type is two units of NX type are combined into one piece. Beside the standard mixing action, material moves adjacent container therefore it accelerates further mixing. CX type also save installation height and processing time. Mixing time and discharge time can be shorter. Screw load is relieved therefore stable operation is possible.

Specification

Model	Water Fill Capacity [L]	Screw/Arm Power [kW]		Approx. Dimensions [mm]			Approx. Weight [kg]
		Screw	Arm	Max. dia. D × A	Container Height	Overall Height	
CX-4	400	2.2	0.4	1330 × 2010	1380	2340	1100
CX-6	600	3.7	0.4	1330 × 2010	1580	2540	1200
CX-11	1100	3.7	0.4	1540 × 2260	1950	2910	1550
CX-18	1800	5.5	0.75	1760 × 2600	2290	3230	1850
CX-37	3700	7.5	1.5	2130 × 3150	2850	3820	2300
CX-55	5500	5.5 × 2	1.5	2380 × 4120	3260	4240	2700
CX-110	11000	11 × 2	2.2	3120 × 4670	4400	5300	6000
CX-175	17500	22 × 2	3.7	3720 × 5570	5300	6590	10000

Note 1) Motor power is calculated on the basis that the bulk density of the mixture is 0.6g/cc.
2) Effective volume may vary depending on the powder characteristics. In general it is 80-100% of water fill.

Dimensional Drawing



Small lab. production DBY Type



Features

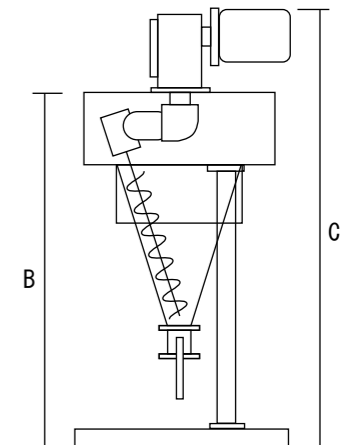
Down scaled from standard Nauta Mixers, this type is suitable for small production or make small samples. For 10 liter capacity satellite type is also available.

Specification

Model	Water Fill Capacity [L]	Power [kW]	Approx. Dimensions [mm]		Approx. Weight [kg]
			Container Height	Overall Height	
DBY-10	10	0.2	470	1200	100
DBY-20	20	0.4	570	1350	130
DBY-30	30	0.4	670	1580	180

Note 1) Motor power is calculated on the basis that the bulk density of the mixture is 0.6g/cc.
2) Effective volume may vary depending on the powder characteristics. In general it is 80-100% of water fill.

Dimensional Drawing



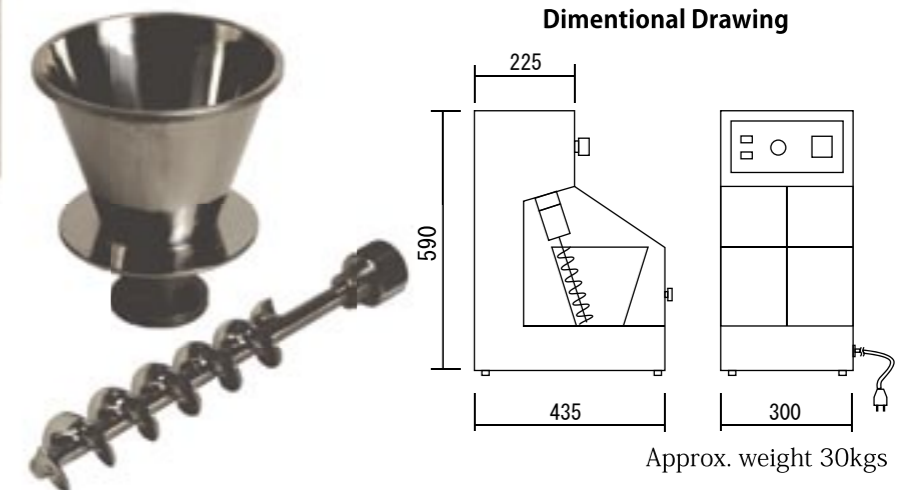
Laboratory Mixer LV-1 Type



Features

Lab mixer (LV-1) is a small lab mixer. The mixer uses the same principle as Hosokawa Nauta Mixer. However, in this lab mixer, mixing screw arm is stationary and both a mixing screw and conical vessel are rotated. The screw and the conical vessel can be removed one touch from the main unit. The vessel then can be used as a product container. Cleaning of the vessel and the screw is very easy.

Dimensional Drawing



Approx. weight 30kgs



Multipurpose - Domed type with Jacket Vacuum / Pressure Type



Features

Taking advantages of Nauta Mixer's superior mixing functions, vacuum/pressure type is so designed that operations of vacuum drying, reacting, heating, cooling and sterilizing are possible. Since applicable range is wide, it is very suitable for rationalization of the production process and labour saving.

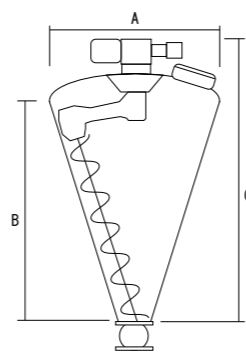
Test Plant



Specification (Cantilever Screw Type)

Model	Water Fill Capacity [L]	Screw/Arm Power [kW]		Approx. Dimensions [mm]			Approx. Weight [kg]
		Screw	Arm	Max. dia.	Container Height	Overall Height	
DBX-600RWV	600	3.7	0.4	1400	2110	2980	2200
DBX-1000RWV	1000	5.5	0.75	1700	2660	3530	3500
DBX-1500RWV	1500	5.5	0.75	1900	3030	3900	3600
DBX-2000RWV	2000	5.5	0.75	2050	3310	4180	3900
DBX-3000RWV	3000	7.5	0.75	2300	3700	4570	4800
DBX-4000RWV	4000	11	1.1	2650	4330	5350	6000
DBX-5000RWV	5000	11	1.1	2800	4650	5880	7000
DBX-6000RWV	6000	11	1.1	2950	4300	6130	8000
DBX-7000RWV	7000	18.5	2.2	3100	5100	6510	11000
DBX-8000RWV	8000	18.5	2.2	3200	5260	6670	12000
DBX-10000RWV	10000	22	2.2	3400	5640	7050	14000

Dimensional Drawing

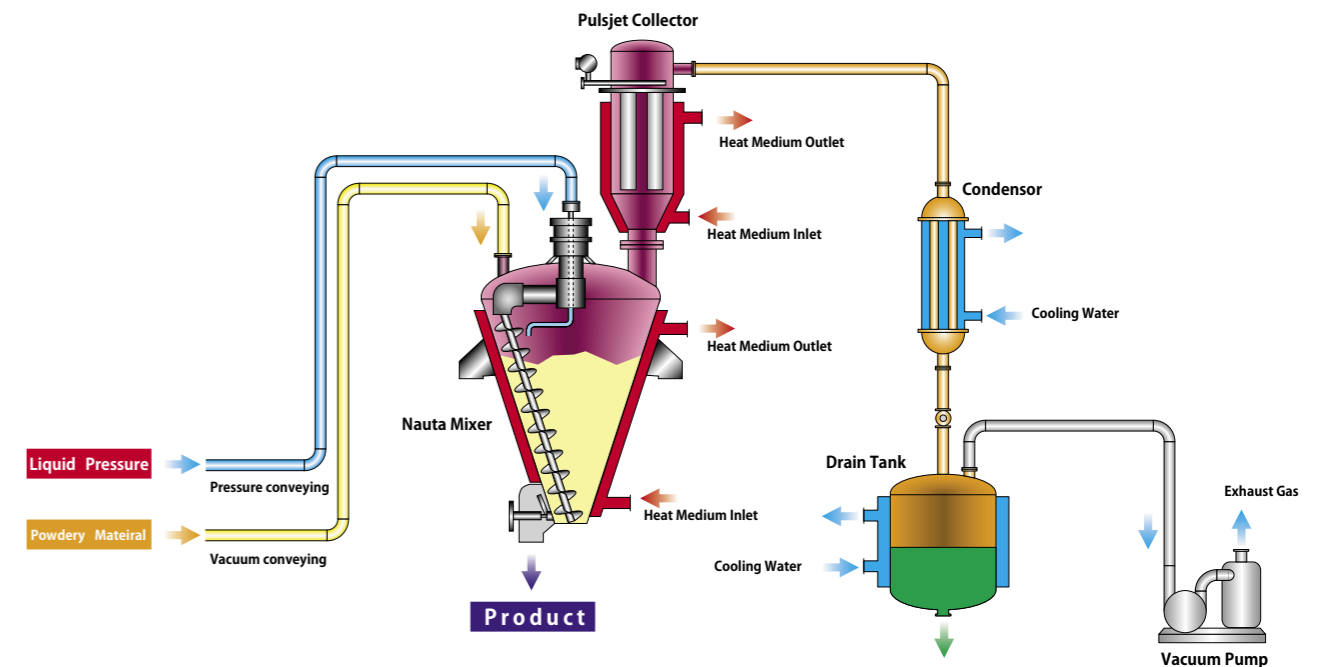


Note 1) Motor power is calculated on the basis that the bulk density of the mixture is 0.6g/cc.
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Nauta Mixer is Multi-Functional!

Examples of Multi-Processing with a single machine

Following is an example of one single unit of Nauta Mixer, multi-processing of pneumatic feeding of raw material, weighing, mixing with liquid addition, reacting, vacuum drying and cooling.



Specification (Pin Joint Type)

Model	Water Fill Capacity [L]	Screw/Arm Power [kW]		Approx. Dimensions [mm]			Approx. Weight [kg]
		Screw	Arm	Max. dia.	Container Height	Overall Height	
NXV-1	100	3.7	-	1000	1500	2360	1000
NXV-2	200	3.7	-	1150	1690	2570	1200
NXV-3	300	3.7	-	1300	1920	2800	1300
NXV-6	600	5.5	0.75	1500	2340	3440	1800
NXV-10	1000	5.5	0.75	1650	2620	3720	2200
NXV-15	1500	5.5	0.75	1850	3000	4090	2700
NXV-20	2000	5.5	0.75	2050	3360	4460	3300
NXV-30	3000	7.5	0.75	2450	3390	5240	5000
NXV-40	4000	11	1.5	2650	4370	5610	6000
NXV-50	5000	11	1.5	2800	4640	5890	6700
NXV-60	6000	11	1.5	2950	4920	6170	7800
NXV-80	8000	11	1.5	3100	5210	6460	10000
NXV-100	10000	18.5	2.2	3300	5570	6930	12000
NXV-150	15000	22	2.2	3700	6220	7600	15000
NXV-200	20000	30	3.7	4100	6940	8470	20000

Note 1) Motor power is calculated on the basis that the bulk density of the mixture is 0.6g/cc.
2) Effective volume may vary depending on the powder characteristics. In general it is 80-100% of water fill.



Option

Variation Suited to your needs

Strong Delumping Unit

Intensifier



A rotor mounted on the center shaft rotates at very high speed, and prevents agglomeration of the mixture. It is very effective to prevent remaining of the very light powder, generated at mixing of density different materials, over the mixture surface. Or it is also effective when very strong dispersing power is required at the liquid added mixing application. By rotating mixing screw, the material is consecutively fed to the intensifier resulting in effective mixing.

Disintegrator

Lump Breaker



The device is to disintegrate the mixture during mixing or liquid adding. One or more units are mounted at the side of the casing, and preventing the agglomeration.

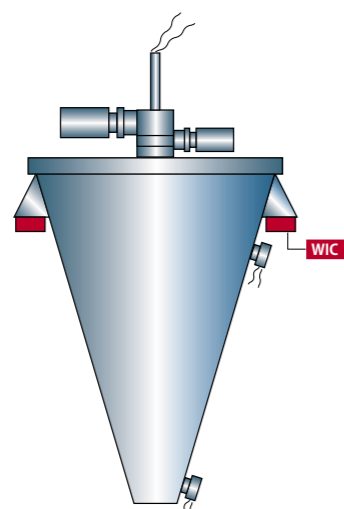
Vacuum/Pressure Sanitary

Dome Cover



Dome cover can be mounted when the vessel interior is in negative or positive pressure during operation. In this case, speed reduction unit or swing arm should be vacuum or pressure specification. And this type is also recommendable when ease of interior cleaning is required.

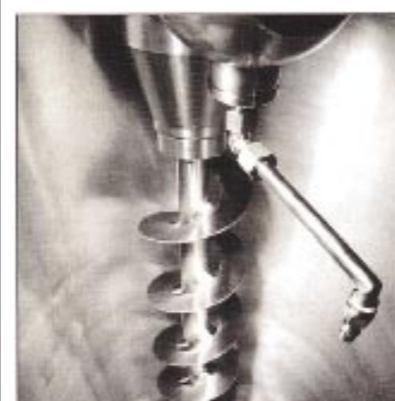
Level Control



With combination of load cells, feed quantity or discharge quantity can be checked during operation. Contents control is possible with the use of common levellers.

Liquid Adding Device

Micro Injection



This is the device to add liquid or condition humidity. The liquid is sprayed over the powder mixture via one or more nozzles, piped through the gear box.

Discharge method

Bottom Discharge



Slide Type



Ball Valve Type

Side Discharge



Swing Type (Manual) Swing Type (Automatic)

It is possible to select automatic or manual.

Nauta Mixer References

Classified by applications.

Model	Capacity [L]	Material	Application	Remarks
Food				
D2SX-1000	1000	Egg	Mixing	
CX-37	3700	Rice Powder	Mixing	
CX-55	5500	Gelatine	Mixing	
NX-100	10000	Starch	Mixing	
NX-150	15000	Cellulose	Mixing	
DBX-6000	6000	Food Additive	Mixing	
DBX-8000	8000	sugars	Mixing	
NXV-30	3000	Food Additive	Drying	
NXV-60	6000	Wheat Flour	Drying	
NXV-150	15000	Food Additive	Drying	
DBX-2000RWV	2000	Food Additive	Drying	
DBX-5000RWV	5000	Vitamins	Drying	
Pharmaceutical				
CX-6	600	Pharmaceutical	Mixing	
NX-30	3000	Chinese Medicine	Mixing	
NX-50	5000	Pharmaceutical	Mixing	
DBX-600	600	Pharmaceutical	Mixing	GMP
DBX-1000	1000	Pharmaceutical	Mixing	
DBX-2000	2000	Pharmaceutical	Mixing	GMP
NXV-30	3000	Pharmaceutical	Drying	
NXV-100	10000	Pharmaceutical	Drying	
DBX-600RWV	600	Pharmaceutical	Drying	GMP
DBX-1000RWV	1000	Pharmaceutical	Drying	
DBX-3000RWV	3000	Pharmaceutical	Drying	
DBX-4000RWV	4000	Pharmaceutical	Drying	
Chemicals				
CX-4	400	Organic Chemicals	Mixing	
CX-110	11000	Organic Chemicals	Mixing	
NX-50	5000	Organic Chemicals	Mixing	
NX-70	7000	Organic Chemicals	Mixing	
NX-100	10000	Organic Chemicals	Mixing	
DBX-1500	1500	Chemicals	Mixing	
DBX-2000	2000	Chemicals	Mixing	
DBX-3000	3000	Chemicals	Mixing	
NXV-80	8000	Organic Chemicals	Drying	
NXV-100	10000	Organic Chemicals	Drying	
DBX-3000RWV	3000	Organic Chemicals	Drying	
DBX-4000RWV	4000	Organic Chemicals	Drying	
Inorganic Chemicals				
D2SX-1000	1000	Glass	Mixing	
CX-37	3700	Manganese Dioxides	Mixing	
CX-55	5500	Nickel Hydrogen	Mixing	
CX-175	17500	Graphite	Mixing	
NX-70	7000	Nickel Hydrogen	Mixing	
NX-150	15000	Nickel Hydrogen	Mixing	
DBX-3000	3000	Nickel Hydrogen	Mixing	
DBX-5000	5000	Cement	Mixing	
NXV-20	2000	Nickel Hydrogen	Drying	
NXV-30	3000	Nickel Hydrogen	Drying	
DBX-3000RWV	3000	Carbon	Drying	
DBX-5000RWV	5000	Calcium Carbonate	Drying	

Model	Capacity [L]	Material	Application	Remarks
Dyestuff, Pigment				
D2SX-4000	4000	Powder Paint	Mixing	
D2SX-8000	8000	Dyestuff	Mixing	
CX-37	3700	Dyestuff	Mixing	
CX-110	11000	Dyestuff	Mixing	
NX-70	7000	Dyestuff	Mixing	
NX-100	10000	Dyestuff	Mixing	
NX-200	20000	Dyestuff	Mixing	
DBX-1000	1000	Synthetic Paints	Mixing	
DBX-2000	2000	Pigment	Mixing	
NXV-40	4000	Dye Intermediate	Drying	
NXV-80	8000	Dye Intermediate	Drying	
DBX-2000RWV	2000	Pigment	Drying	
Plastics				
D2SX-10000	10000	Polystyrene	Mixing	
CX-6	600	Polyethylene	Mixing	
NX-70	7000	Epoxy	Mixing	
NX-100	10000	PVA	Mixing	
NX-150	15000	Polymer	Mixing	
DBX-2000	2000	PP	Mixing	
DBX-5000	5000	Phenolic resin	Mixing	
DBX-7000	7000	Phenolic resin	Mixing	
NXV-40	4000	PVC	Drying	
NXV-60	6000	Polyethylene	Drying	
NXV-100	10000	Polymer	Drying	
DBX-3000RWV	3000	PVC	Drying	
DBX-4000RWV	4000	Epoxy	Drying	
DBX-7000RWV	7000	AS	Drying	
Agro Chem				
CX-37	3700	Agro Chem	Mixing	
CX-55	5500	Agro Chem	Mixing	
NX-50	5000	Agro Chem	Mixing	
NX-70	7000	Agro Chem	Mixing	
DBX-3000	3000	Agro Chem	Mixing	
DBX-5000	5000	Agro Chem	Mixing	
NXV-30	3000	Agro Chem	Drying	
NXV-40	5000	Agro Chem	Drying	
NXV-60	6000	Agro Chem	Drying	
DBX-3000RWV	3000	Agro Chem	Drying	
DBX-5000RWV	4000	Agro Chem	Drying	
DBX-7000RWV	7000	Agro Chem	Drying	
Others				
CX-55	5500	Seeds	Mixing	
CX-110	11000	Adhesives	Mixing	
NX-100	10000	Bone Powder	Mixing	
NX-150	15000	Tobacco	Mixing	
NX-500	50000	Compost	Mixing	
DBX-1500	1500	Silver	Mixing	
DBX-2000	2000	Bone Powder	Mixing	
NXV-10	1000	Titantium powder	Drying	
NXV-20	2000	Detergent	Drying	
DBX-2000RWV	2000	Starch	Drying	