

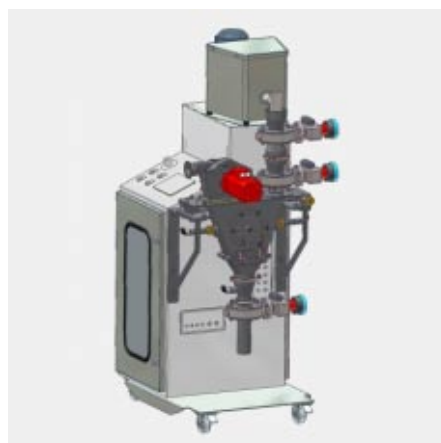


MULTINO®-M/S/M OPPOSED JET MILL RANGE

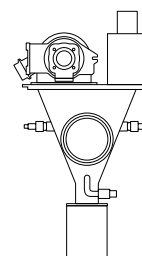
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MultiNo® 1270-M/S/M
SPIRAL OUTLET CONNECTED TO
PROCESSED MATERIAL CONTAINER



MultiNo® 1270-M/S/M



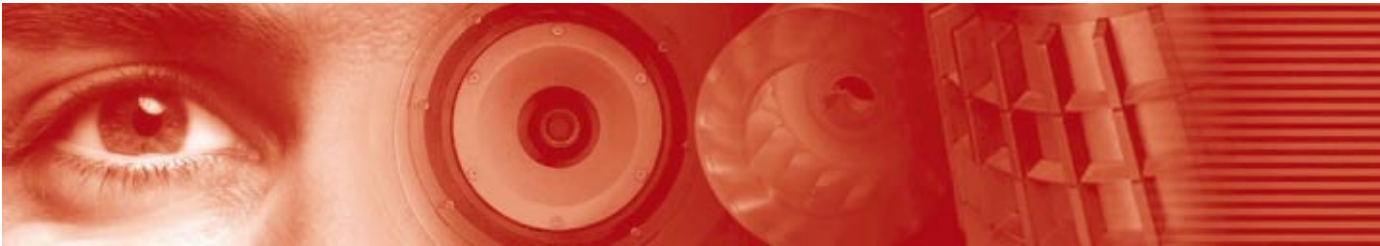
MultiNo®-M/S/M MEANS GRINDING, CLASSIFYING AND MIXING WITH ONLY ONE SYSTEM! THANKS TO ITS **VERY EASY MAINTENANCE AND CLEANING**, IT IS IDEALLY SUITED FOR FREQUENT AND QUICK PRODUCT CHANGES. ITS SPECIAL ADVANTAGE IS THE **PROCESSING OF ABRASIVE, HIGH-PURITY AND GLUEY PRODUCTS**. GENTLE PROCESSING AND **LITTLE COSTS DUE TO WEAR** ARE POSSIBLE THANKS TO ITS ABRASION-FREE GRINDING. WHEN USED AS A LABORATORY SYSTEM, **OPTIMUM RESULTS COMBINED WITH MINIMUM PRODUCT CONSUMPTION** ARE OBTAINED IN GRINDING TESTS AND/OR IN SMALL LOT PRODUCTION.

- ▶ FULLY AUTOMATIC OPERATION
- ▶ COMPACT DESIGN
- ▶ EASY AND QUICK CLEANING
- ▶ MULTIFUNCTIONAL USE
- ▶ EXTREMELY POWERFUL

CONTACT:

NOLL PROCESSING TECHNOLOGY

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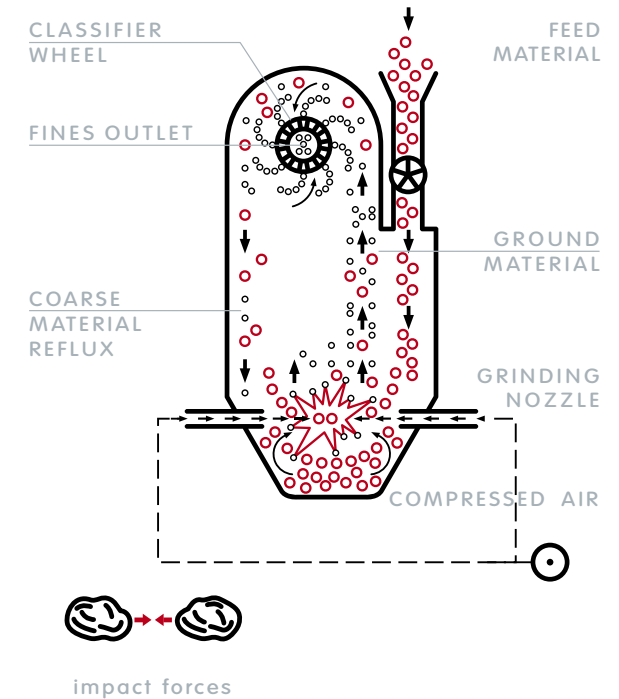
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WORKING PRINCIPLE MILLING - DEAGGLOMERATION

The starting material that can be stored in Big-Bags enters the hopper of the gravimetric dosing unit. Through a feed timing flap the material is fed continuously into the milling chamber, where the material is fluidised by the compressed air from the opposed air nozzles. Dry, oil-free air ensures an uncontaminated product. The fines in the starting material are directly transported to the classifier. This pre-classification insures that work is only performed on the fraction larger than required: improving energy usage.

The coarser particles entering the air stream are accelerated to high speeds and collide upon each other in midair resulting in impact particle size reduction. The remaining kinetic energy of the particles and carrier gas create an upward current transporting the milled product tangentially to the internal classifying unit. The specially designed classifying wheel separates the coarse and fine particles by use of centrifugal and drag forces. Adjusting the classifier wheel speed can alter the top cut particle size. A specially generated air stream along the classifier wheel insures that no powder can enter the bearings or block the classifying wheel.

The unmilled and from the classifier returning coarser material is internally recycled and flows with the downward current back into the fluidized product bed. The fine material according to specification exits the machine through the tangential exit, where it is packaged in the appropriate packaging medium. For metal free processing the MultiNo®-M/S/M can be supplied with various abrasion resistant linings, such as polyurethane, polyamide or ceramic coatings.



PRODUCT-SPECIFIC MACHINERY CONFIGURATION:

CONTACT:

NOLL PROCESSING TECHNOLOGY



CLASS. WHEEL

- ▶ Stainless steel
- ▶ Special steel
- ▶ Polyurethane
- ▶ Polyamide
- ▶ Ceramic



INTERNAL LINING

- ▶ Stainless steel
- ▶ Special steel
- ▶ Steel+polyurethane
- ▶ Steel+polyamide
- ▶ Steel+ceramic



NOZZLES

- ▶ Stainless steel
- ▶ Special steel
- ▶ Polyurethane
- ▶ Polyamide
- ▶ Ceramic

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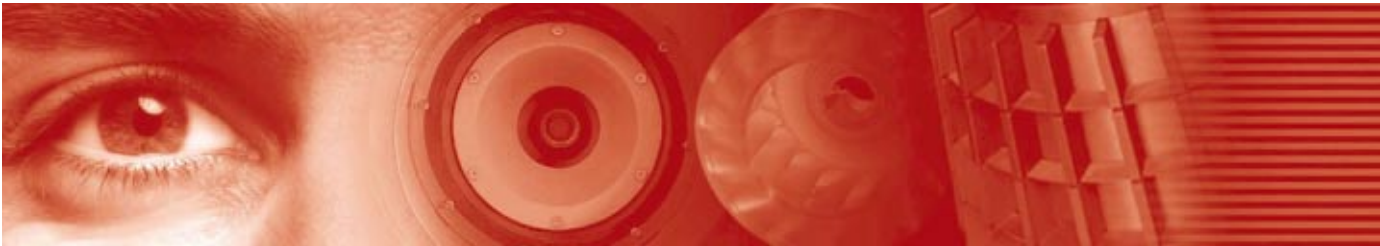
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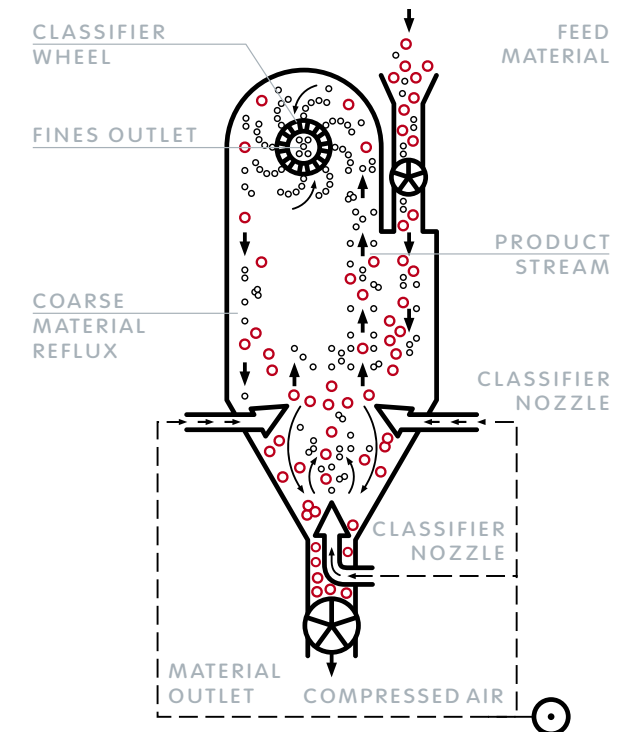
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WORKING PRINCIPLE CLASSIFICATION

The starting material that can be stored in Big-Bags enters the hopper of the gravimetric dosing unit. Through a feed timing flap the material is fed continuously into the classifying chamber. The air stream directly transports the entering product to the NOLL design classifier wheel. Dry, oil-free air ensures an uncontaminated product. The unique classifier wheel separates the fine particles from the coarse by centrifugal forces with very steep particle size distributions.

The particles are subject to two forces. First the drag force of the air flow trying to pull them through the wheel. Second, there is the opposing centrifugal force pushing the particles away from the classifier. By adjusting the classifier wheel and air flow, a very precise control over the top cut size of the powder is achievable. A specially generated air stream along the classifier wheel insures that no powder can enter the bearings or block the classifying wheel.

The coarse material is recycled and flows with the downward current back into the coarse separation zone. Here the particles are intensely mixed with turbulent air to separate the smaller agglomerated particles from the coarse. The air-treated coarse particles continue in a free fall through the bottom timing flap exit. Adjusting the air volume and throughput, as well as the classifying wheel rotational speed optimizes the classifying performance. The fine material according to specification exits the machine through the tangential exit, where it is packaged in the appropriate packaging medium. For metal-free processing the MultiNo®-M/S/M can be supplied with various abrasion resistant linings, such as polyurethane, polyamide or ceramic coatings.



PRODUCT-SPECIFIC MACHINERY CONFIGURATION:

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CLASS. WHEEL

- ▶ Stainless steel
- ▶ Special steel
- ▶ Polyurethane
- ▶ Polyamide
- ▶ Ceramic



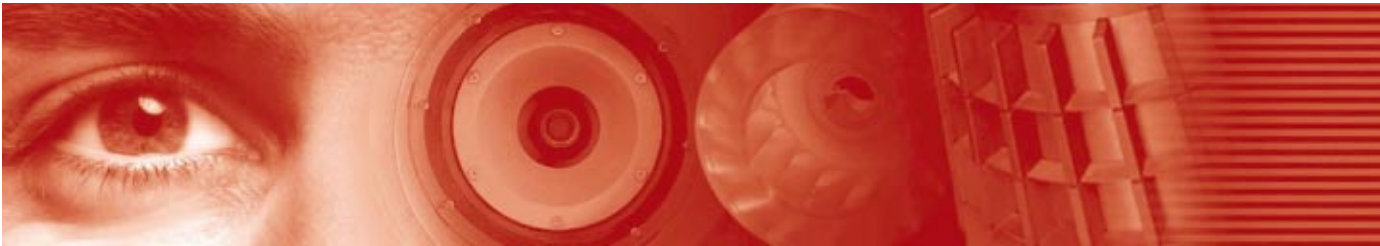
INTERNAL LINING

- ▶ Stainless steel
- ▶ Special steel
- ▶ Steel+polyurethane
- ▶ Steel+ceramic



NOZZLES

- ▶ Stainless steel
- ▶ Special steel
- ▶ Polyurethane
- ▶ Polyamide
- ▶ Ceramic



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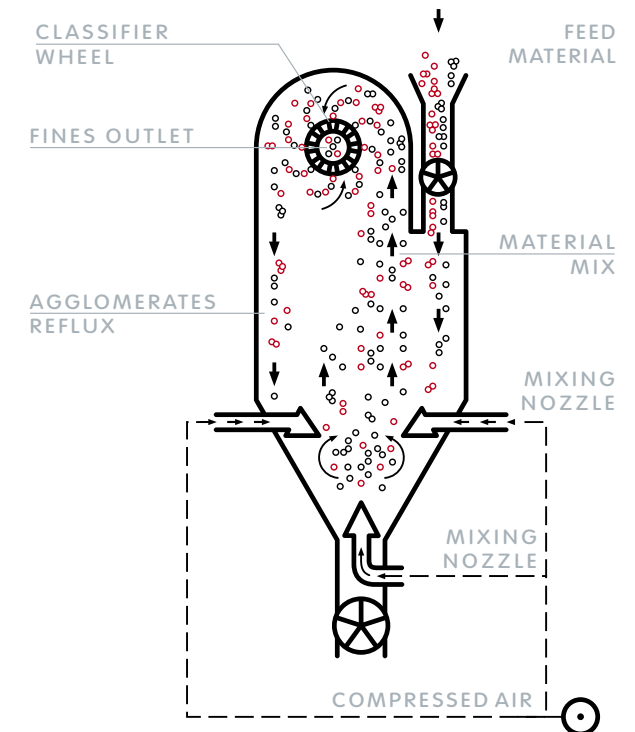
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WORKING PRINCIPLE MIXING

The starting material that can be stored in Big-Bags enters the hopper of the gravimetric dosing unit. Through a feed timing flap the material is fed continuously in the mixing chamber, where the material is fluidised by the compressed air from the three opposed air nozzles. Dry, oil-free air ensures an uncontaminated product. The particles entering the air stream are accelerated to high speeds and collide upon each other in midair resulting in impact particle size reduction and intense mixing. The remaining kinetic energy of the particles and carrier gas create an upward current transporting the milled product to the internal classifying unit. The unique classifier wheel separates the fine particles from the coarse by centrifugal and drag forces with very steep particle size distributions. The fine material according to specification exits the machine through the tangential exit, where it is packaged in the appropriate packaging medium.

The oversize material is recycled internally to the fluidized product bed for further size reduction and blending. The air throughput and air nozzle pressure can adjust the mixing intensity. NOLL has developed a range of surfactants addition techniques that make use of the fresh and newly created milled surfaces to influence the particles functionality. These very small dry or liquid surfactant additions are performed gravimetrically or by use of a high-pressure injection process.

For metal-free processing the MultiNo®-M/S/M can be supplied with various abrasion resistant linings, such as polyurethane, polyamide or ceramic coatings.



PRODUCT-SPECIFIC MACHINERY CONFIGURATION:



CLASS. WHEEL

- ▶ Stainless steel
- ▶ Special steel
- ▶ Polyurethane
- ▶ Polyamide
- ▶ Ceramic



INTERNAL LINING

- ▶ Stainless steel
- ▶ Special steel
- ▶ Steel+polyurethane
- ▶ Steel+ceramic



NOZZLES

- ▶ Stainless steel
- ▶ Special steel
- ▶ Polyurethane
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FIGURES - DATA - FACTS

MultiNo®-SERIES	MultiNo® 2000	MultiNo® 3000	MultiNo® 6000	MultiNo® 9000	MultiNo® 12000	MultiNo® 15000
TYPES	2070/90	3120/160	6240/300	9360/420	12480/12600	15720/15840
TYPE DESIGNATION	M - M/S - M/S/M			M - M/S		
MILLING CAPACITY (kg/h) 200 days/3 shifts (MT/year)	up to 50 240	up to 250 1200	up to 800 3840	up to 2000 9600	up to 4000 19200	up to 6000 28800
START. MATERIAL SIZE Metering screw (mm) Metering trough (mm)	< 0.2 < 2.0	< 0.3 < 3.0	< 0.5 < 5.0	< 0.5 < 5.0	< 1.0 < 10.0	< 1.0 < 10.0
FINENESS RANGE (D ₉₇ μm)	2 - 60	3 - 80	3 - 100	3 - 120	4 - 140	4 - 160
CLASSIFIER WHEEL (Ø mm)	70/90	120/160	240/300	360/420	480/600	720/840
MAX. AIRFLOW (m³/h)	300	1000	3000	8000	16000	24000
CLASS. WHEEL DRIVE (kW)	1.5	4	6.6	15	22	30
RADIAL FAN DRIVE (kW)	4	7.5	15	37	55	90
DIMENSIONS-H/W/D (m)	0.9x0.6x0.6	1.9x1.1x0.7	2.4x1.4x1.1	3.1x1.9x1.5	4.3x2.9x2.5	5.2x3.5x3.0
DESIGN	gas-proof			-	-	-
	shock and impact resistant up to 10 bar			-	-	-
MATERIAL I. CONTACT W. PRODUCT	Stainless steel, special steel, ceramics, polyamide, polyurethane					



Pigments - Zirconium iron red (Zr/Si/Fe), D₅₀ = 2 μm

APPLICATION EXAMPLES:

Inorganic pigments, coating powder, toners, technical ceramics, magnets, abrasives, graphite, chemical products, food, high-purity substances

OPERATING RANGE

APPLICATION RANGE abrasive, gluey, easily depositing, high-purity products
TEMPERATURE RANGE ±5°C up to 180°C
PRODUCT HARDNESS RANGE Mohs hardness 4-10

M: Micronization, grinding
M/S: Micronization, grinding, deagglomeration – supplementary nozzle at the bottom
M/S/M: Micronization, grinding, homogenization – classifying nozzle at the bottom; Deagglomeration – supplementary nozzle at the bottom

FUNCTION

MICRONISATION/GRINDING
MIXING
CLASSIFICATION
SELECTIVE GRINDING
HOMOGENISATION/DEAGGLOMERATION

MODE

CONTINUOUS
 DIS-/CONTINUOUS
 DIS-/CONTINUOUS
 DIS-/CONTINUOUS
 CONTINUOUS

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