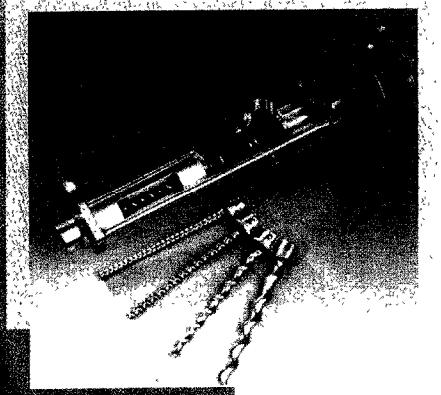
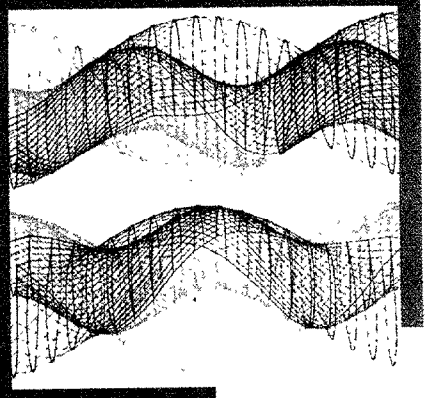
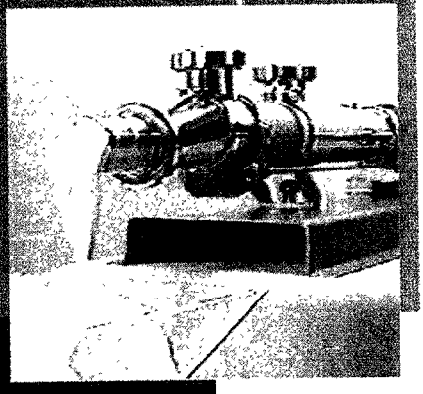
NEMO® PROGRESSING CAVITY PUMPS





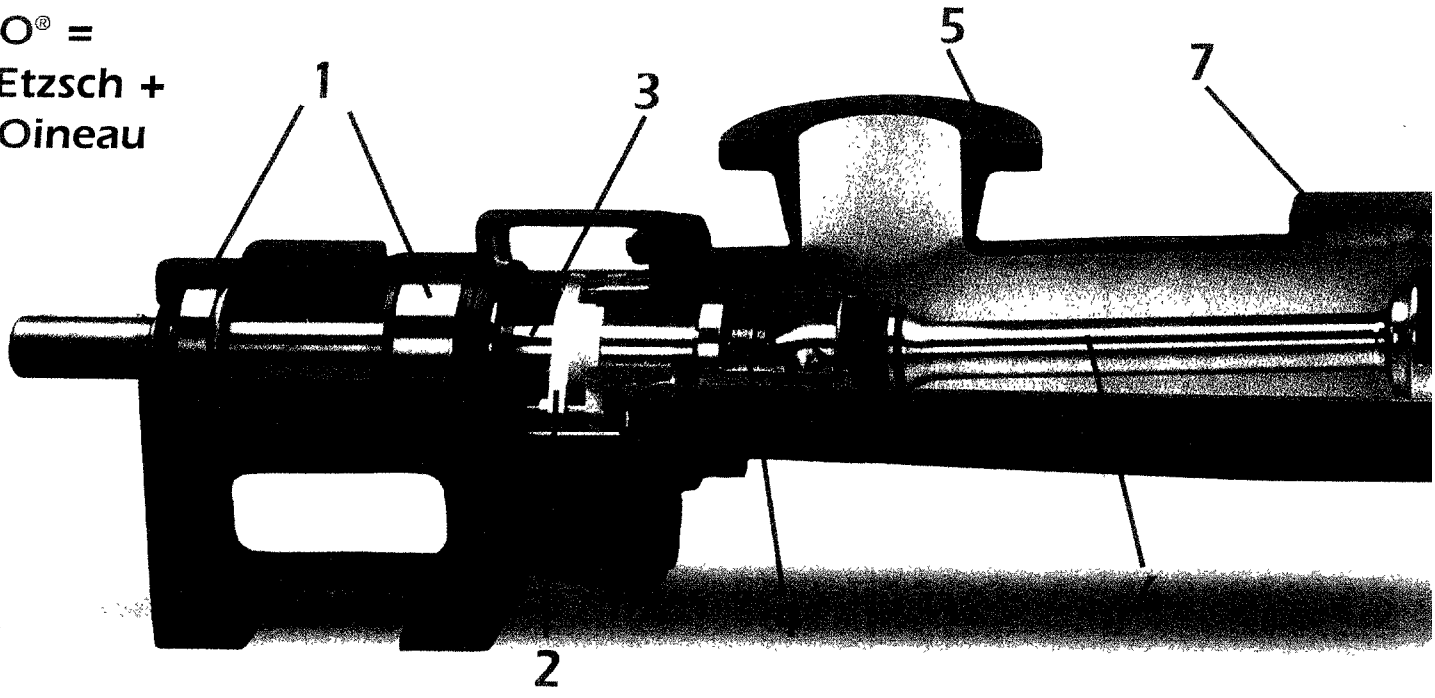


NM SERIES

From the World Leader
In Pumping Technology

NETZSCH

NEMO® =
NEtzsch +
MOineau



1 **DEEP-GROVE BALL BEARINGS** have a calculated B-10 life of greater than 100,000 hours.

2 **SHAFT SEALING** variations, including packed stuffing box complete with lantern ring and grease zerk, mechanical seal, or special seals are located on a solid drive shaft with a short overhang which minimizes shaft runout. The window area of the pump is increased to allow easy access to the stuffing box. Cast iron pumps are supplied with a packed stuffing box. Stainless steel pumps come standard with a hard faced single mechanical seal. Other options are available.

3 **SOLID DRIVE SHAFT** eliminates any possibility of solids build-up. Unlike hollow shafts, material cannot accumulate or cause clogging.

4 **DRIVE SHAFT** joint head is removable. By taking off the universal joint head, the shaft seal can be removed and re-assembled without drive shaft removal.

5 **SUCTION HOUSING FLANGE** can be rotated to any of four positions in 90° increments.

6 **CONNECTING ROD** is extra long for extremely low angularity, resulting in less loading on the universal joint which provides longer joint life.

7 **TWO CLEAN OUT PORTS** come standard on larger pumps with a cast iron housing. Clean out ports are available on pumps with other metallurgy as an option.

8 **DRAIN PLUG** is located at the lowest point on the suction housing. This allows for the housing to be completely drained.

9 **UNIVERSAL JOINTS** are SM pin-type or double sealed joints on certain sizes. Sealed pivot-type joints are available on larger pumps.

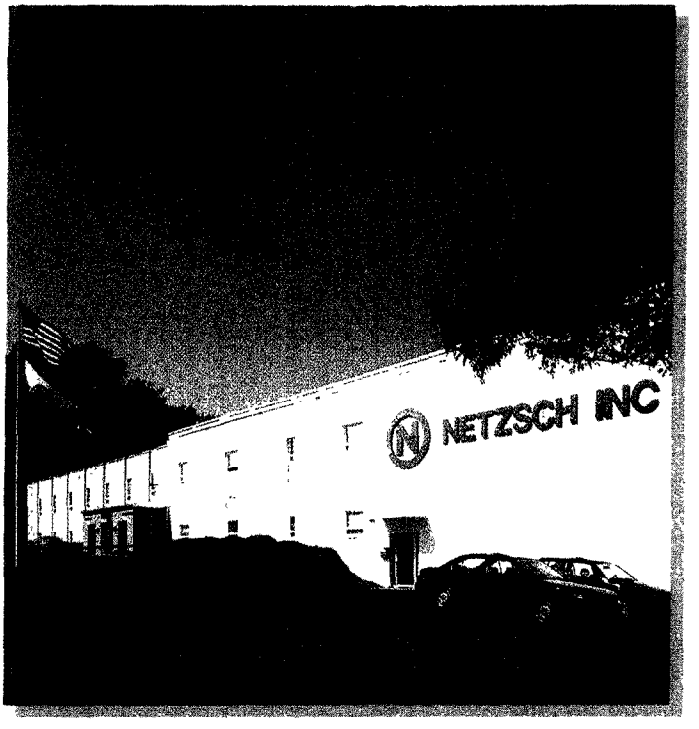
10 **ENLARGED SUCTION HOUSING** at the rotor end for non-restricted flow of heavy materials.

11 **THRU-BOLT CONSTRUCTION** for easier maintenance, stator removal/installation.

12 **STATORS** are available in a wide range of materials including natural or synthetic rubbers, cast iron, stainless steel, a wide variety of rigid plastics, and others. The inlet side of the stator is chamfered to allow for unobstructed uniform feeding to the rotor and stator elements. Gaskets are an integral part of the stator on non-rigid materials.

Wetted parts are available in numerous materials. Housings are made of cast iron, rubber-coated cast iron and stainless steel. Rotating parts are available in mild steel, stainless steel or other special metals. Contact factory for other metallurgy options

NETZSCH



NEMO® Progressing Cavity Pumps is one of four operating divisions of NETZSCH Incorporated, a U.S. manufacturer of specialized industrial equipment. NETZSCH Incorporated is, in turn, part of the NETZSCH Group of companies whose multinational manufacturing and sales facilities operate in 17 countries on four continents.

With access to comprehensive global resources in engineering, research and development, NETZSCH brings our customers the optimal benefits of our continually advancing technology. NETZSCH subscribes to recognized worldwide standards in quality certification and process control. Our full capabilities in the functional areas of design, development, production, sales and service meet the highest demands established by the ISO 9001 International Quality Guidelines. Our customers rely on this commitment to deliver products of absolute reliability and exceptional quality.

Located in Exton, Pennsylvania, a western suburb of Philadelphia, our seven acre campus contains over 85,000 square feet with manufacturing, engineering, testing laboratories, marketing and corporate offices. Our employees assist and service the far reaching requirements of our customers throughout North America.

NETZSCH Worldwide Organizations:

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- Sales Office Sao Paulo BRAZIL
- NETZSCH Mohnopumpen GmbH GERMANY
- NETZSCH ASIA PACIFIC PTE LTD SINGAPORE
- NETZSCH (Thailand) Ltd. THAILAND
- NETZSCH NEMO® - Pumps Ltd. GREAT BRITAIN
- HEISHIN-NETZSCH Co Ltd. JAPAN
- Manufacturing: Higashi-Monobe JAPAN
- NETZSCH - Mohnopumpen GmbH VIETNAM
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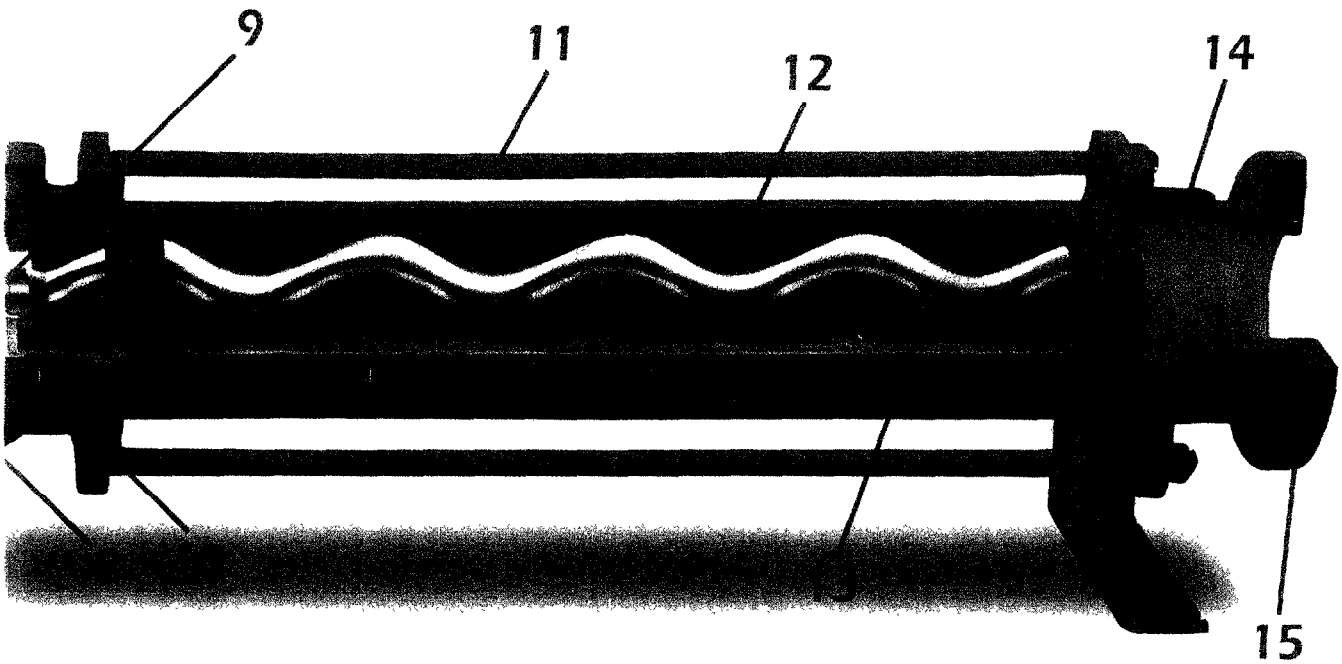


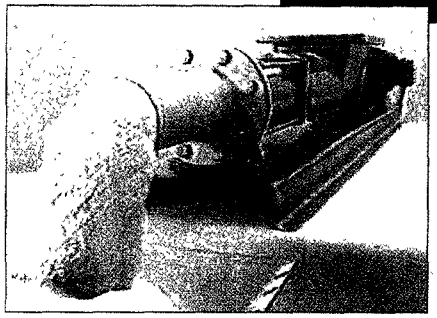
TYPICAL COMPONENTS WITHIN A STANDARD NM SERIES PUMP

13 **ROTORS** are available in a broad range of materials including hardened tool steel, chrome plated hardened tool steel, stainless steel and others with optional chrome plating. NEMO® CERATEC® is also available in various sizes.

14 **ACCESSORY CONNECTION** is threaded to allow the attachment of measuring instruments or can be used for draining. The connection can also be rotated in 90° increments and can be used for gauges or other instrumentation. Accessories can be added in any position.

15 **DISCHARGE FLANGE** is a standard connection matched to the individual pump discharge pressures. Flanges are sized to ensure self-cleaning velocities essential when pumping sludges and slurries. Flange can be rotated in 90° increments.

NEMO® NM SF Pump used to transport bread dough



NEMO® Progressing Cavity Pumps are positive displacement pumps and operate on the Moineau principle. Invented by Professor Rene Moineau, this principle is based on the geometric fit between the rotating element (rotor) and the stationary element (stator) of the pump. The rotor has a single helix shape and is normally made of a metallic material. The stator is formed as a double helix with twice the pitch of the rotor and is normally an elastomer. The interference (compression) fit between the rotor and stator creates a series of sealed chambers called cavities.

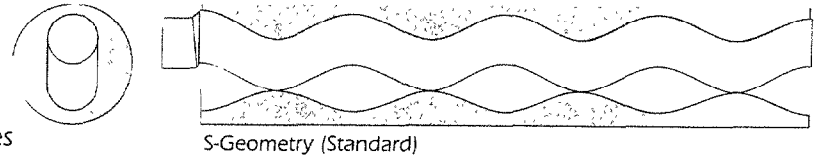
Pumping action is achieved by the rotor turning eccentrically within the stator. Fluid enters the cavity formed at the inlet and progresses within that cavity to the outlet. The result is a positive, non-pulsating flow that is directly proportional to the pump's speed.

The interference fit is critical to the proper operation of a progressing cavity pump. Other key concerns are the selection of the appropriate stator material and the operating temperature of the pump. To insure your pump's optimally efficient operation and proper selection of the geometric fit for your application, consult with your NEMO® pump representative.

NEMO® NM SERIES FEATURES

Geometries

NEMO® S-Geometry offers:
- Multiple stages
- Pressure capabilities up to 1000 psi
- Used where lower internal velocities are required



S-Geometry (Standard)

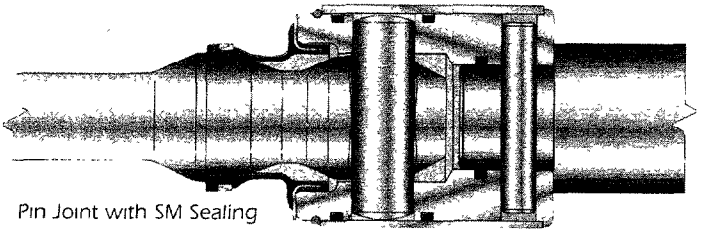
NEMO® L-Geometry offers:
- Twice the volume per cavity
- Greater volumetric efficiency
- Lower circumferential velocity

L-Geometry

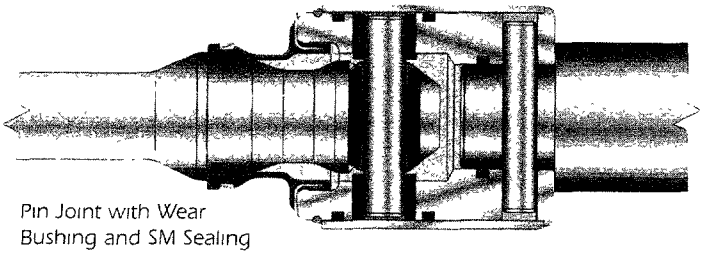
Joint Variations

The correct joint design for a NEMO® Pump has a decisive influence on the reliability and the life cycle costs. A variety of criteria must be considered for this selection including operating conditions, resistance of materials, temperature and pressure of the conveying liquid and lubricant compatibility. NEMO® totally sealed, oil-filled joints are easily and quickly maintained because of a minimum number of parts.

* Other joint options are available



Pin Joint with SM Sealing



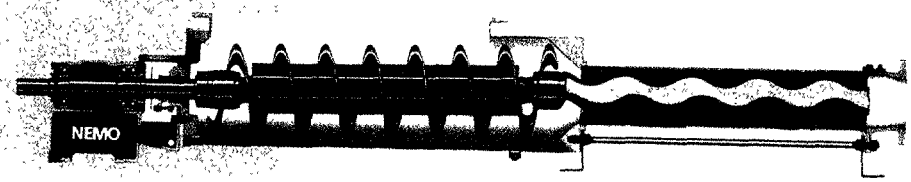
Pin Joint with Wear Bushing and SM Sealing

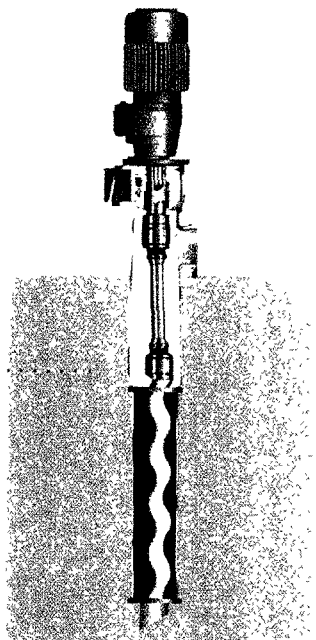
NEMO® NM Series Pumps are designed specifically for difficult pumping situations. You can be assured of the following:

- Low shear rate
- Non-pulsating metered flow
- Volume practically unaffected by viscosity changes
- Flow that is proportional to the pump's operating speed
- High viscosity and solids content pumping capabilities
- Self-priming
- Low, medium and high pressure pumping capabilities
- Non-vapor and air locking operation
- Low noise levels
- Flexibility in operation and mounting options

SF SERIES

The NEMO® SF series with patented* feed screw design is manufactured to easily handle materials with high viscosities. This pump incorporates NETZSCH's exclusive oversized open throat auger feeding system. This system expands the possibilities of efficiently pumping dry, non-flowing materials. *Patent #EP 0713974



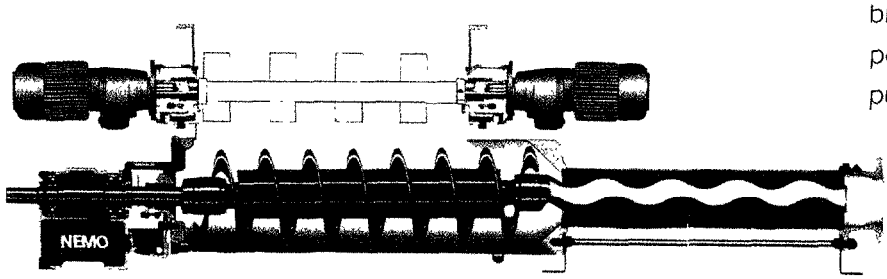


BT SERIES

The NEMO® BT series offers a vertical solution to your pumping requirements. This close coupled design is available in immersion depths to meet your individual application needs. These pumps deliver the same non-pulsating flow capabilities as our other NM series pumps.

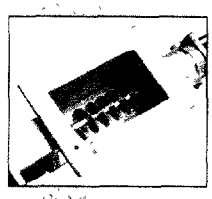
SP SERIES

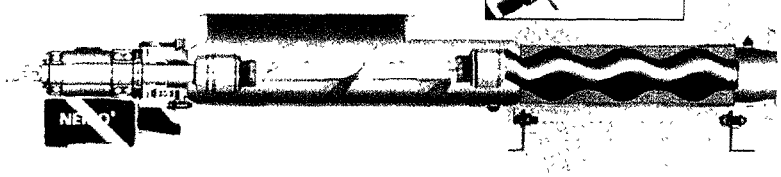
Like the SF series, the NEMO® SP series incorporates NETZSCH's patented oversized auger feeding system. In addition, this pump also includes counter rotating bridge breaking paddles, which eliminates the possibility of product bridging over the pump's auger.



SO SERIES

The NEMO® SO series, available in extended hopper length, is designed to easily handle materials with high viscosities. Products that are semi-flowing to non-flowing can be handled with this style pump. The open throat design, auger feed and void feeding area ensure efficient feed rates to the rotor and stator.





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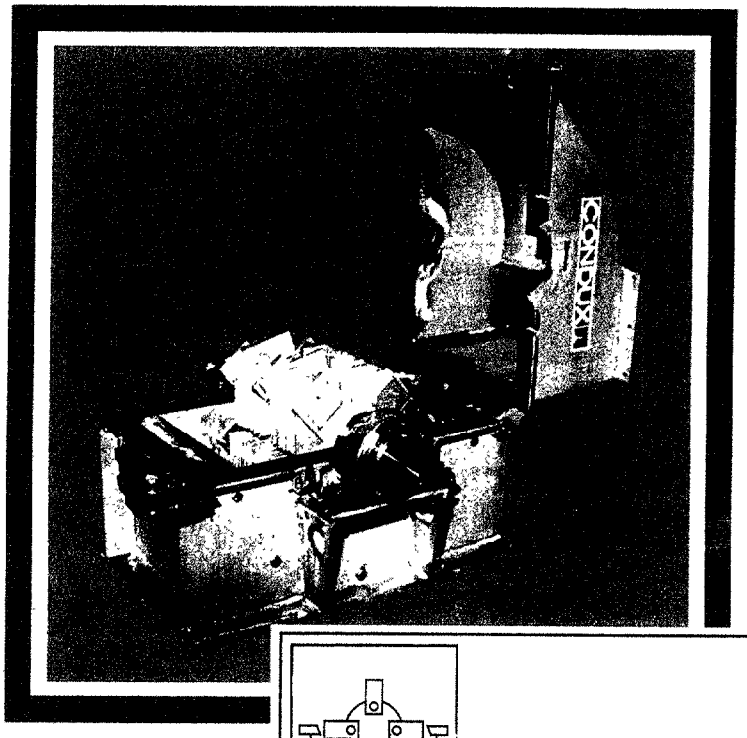
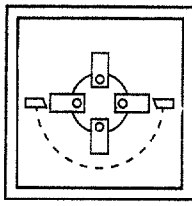




Hammermühle CHM
Hammer Mill CHM

Hammermühlen CHM Hammer mills CHM

Einsatzgebiet

Hammermühlen werden gewöhnlich dort eingesetzt, wo das Endkorn nicht kleiner als ca.1 mm sein soll, z.B fein-, grob- und vorzerkleinern, auflockern und zerfasern weicher bis mittelharter, kristalliner, spröder, fettiger, wärmeempfindlicher, zäher und fasriger Stoffe, zum Aufschlagen von Mehrfachkorn und zum Desagglomerieren verklumpter Salze.

Application

Hammer mills are usually used where the final particle size should not be smaller than appr. 1 mm, e.g. fine-grinding, crushing, disaggregating and defibrating soft to semihard, crystalline, brittle, fat, heat sensitive, tough and fibrous substances, for breaking agglomerated or lumped particles.

Standardausführung

Solide Schweißkonstruktion, ab der Baugröße 40/22 aufklappbar. Sicherheitsvorrichtung als Verriegelung oder Endschalter in der Teilfuge. Außenliegende Lagerung und separate Wellenabdichtung zum Gehäuse, daher kein Fettaustritt in die Mahlkammer.

Standard execution

Solid steel welded housing, hinged as of type 40/22. Safety appliance by locker or limit switch. Outside bearings and separate sealing of shaft to housing, therefore no grease release to milling chamber.

Sonderausführungen

Ausführungen in rostfreiem und säurebeständigem Stahl, mit Verschleißschutz, gasdicht oder druckstoßfest lieferbar.

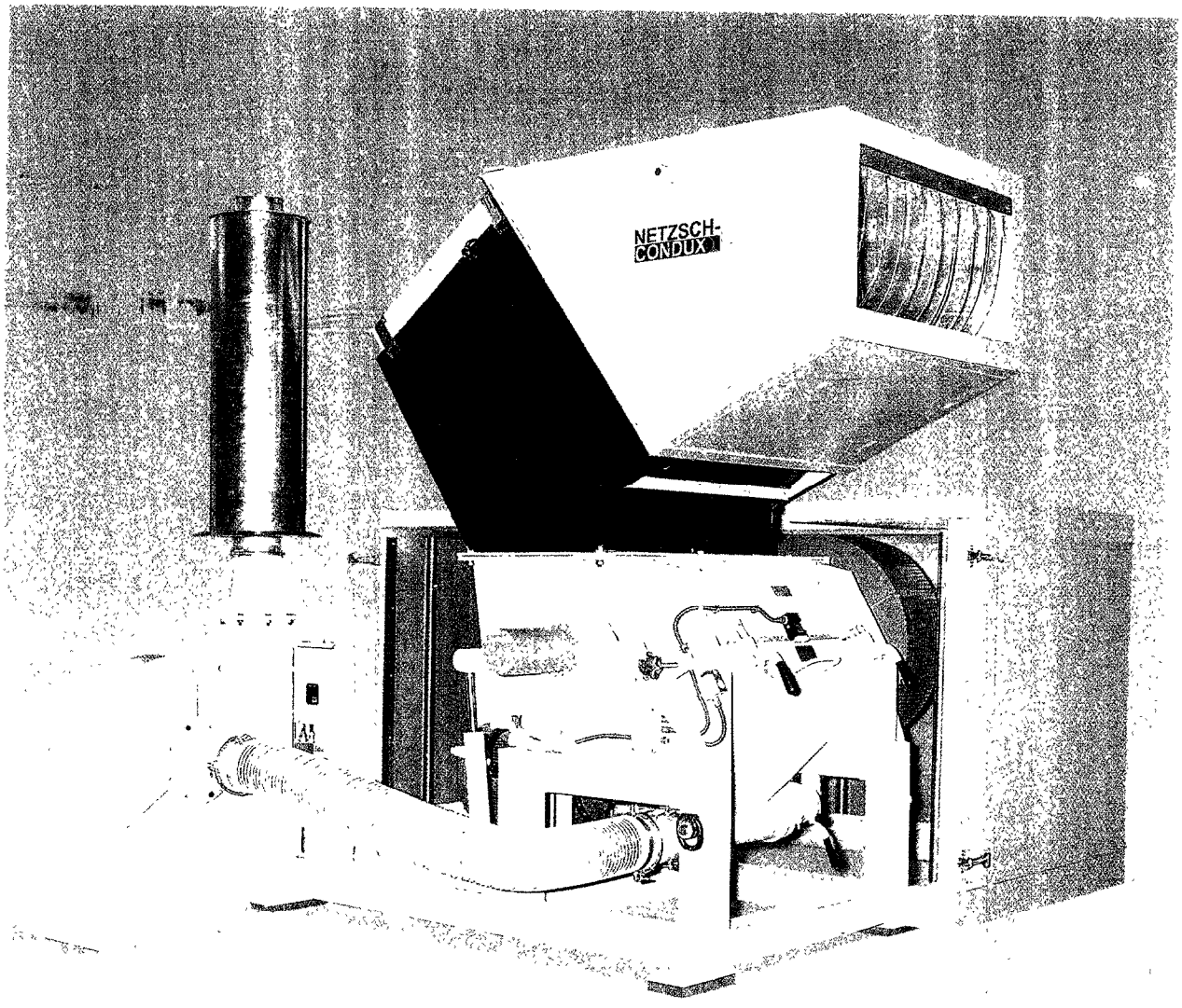
Options

Executions in corrosion and acid resistant steel, with wear resistance, gastight and/or pressure tight available.

Typ CHM	23/20	40/22	45/30	45/60	60/80	**Type CHM**
Maßblatt	7-737	7-558	7-765	7-556	7-625	Drawing No
Antriebsleistung kW	3,0	7,5	11,0	22,0	37,0	Drive kW
max. Drehzahl 1/min	3500	2200	200	200	1500	max. rpm 1/min
Eintrittsquerschnitt mm	115x200	150x220	150x320	200x600	212x800	Feed cross section mm
Rotordurchmesser mm						
Rotordiameter mm						
Arbeitsbreite mm	200	220	320	600	800	Working width mm
Schlägerdicke mm	10	8	10	10	20	Beater thickness mm
max. Aufgabegröße mm	60	70	100	120	120	max. feeding size mm
Platzbedarf f. Plan	7-808	7-754	7-778	7-695	7-747	Space req. for plan No
Aufgabehöhe mm	1700	2160	2815	2780	1700	Feeding height
Auslaufhöhe mm	600	500	1036	720	–	Discharge height
Höhe mm	1700	2160	2815	3000	2430	Height mm
Breite mm	1000	1300	2000	2000	1500	Width mm
Tiefe mm	1000	500	1000	1250	2150	Depth mm
Sonderausführungen						
Schlägerdicke 3 mm MP						Beater thickness 3 mm MP
Schlägerdicke 10 mm MP						Beater thickness 10 mm MP
Schlägerdicke 20 mm MP						Beater thickness 20 mm MP
gasdicht Plan	7-567	7-516a	–	7-768	–	gastight Plan
druckstoßfest bis 10 bar						pressure tight up to 10 bar
Plan	7-567	7-516a	–	7-768	–	Plan
Rost- und säurebeständig	7-737	7-558	7-765	7-556	7-625	corrosion and acid tight
verschleißgeschützt	7-737	7-779	7-765	7-585	7-684	resistant to wear and tear

CONDUX-Cutting Granulators

CS 300/400-II - CS 650/1200-III A
with diagonally divided machine housing



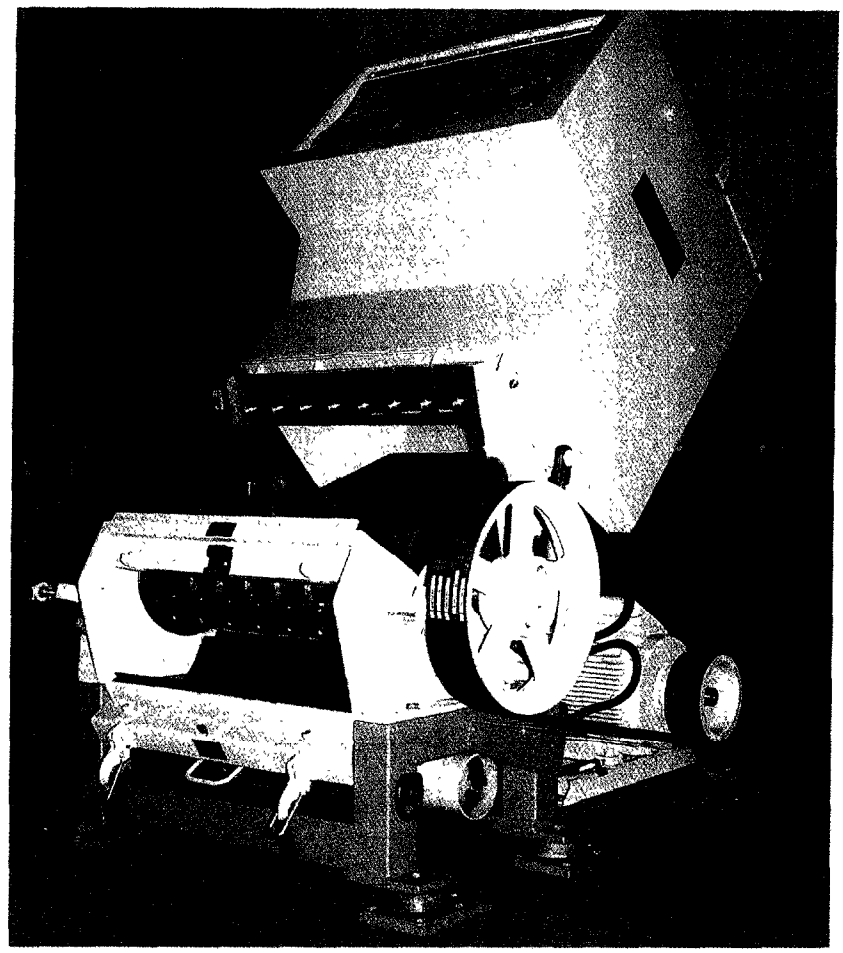
CONDUX-Cutting Granulators with diagonally divided housing stand out due to their user- and

The efficient granulators in several sizes and variants guarantee an economic crushing of a variety of

NETZSCH

CONDUX-Cutting Granulators...

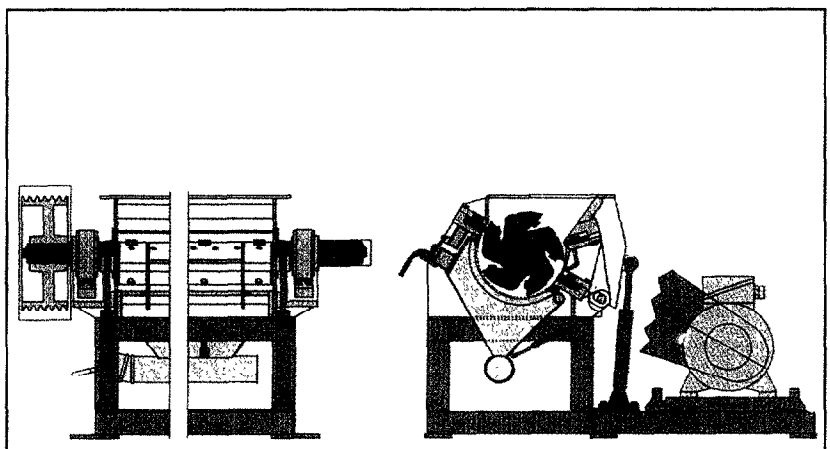
The latest type CS 300/400-IIA to CS 650/1200-IIIA machines with diagonally divided housings from NETZSCH-CONDUX Mahltechnik are the logical development of our well-proven cutting granulator design. Increased operating and maintenance-friendliness and optimising efficiency were the most important factors in the development and construction of this latest generation of granulators.



Cutting granulator CS 300/800-IIIA; opened

Construction

All cutting granulators of the new type have a diagonally divided machine housing with the feed opening eccentrically positioned to give an optimum feed angle.
Depending on the application, this machine can be supplied with 2 or 3 rows of bed knives
The wide inlet opening of the "TE-Design" with 2 bed knife rows in conjunction with the very advantageous feed angle allows the direct feeding of bulky, thin-walled parts, for example hollow components from blow or injection moulding including runners



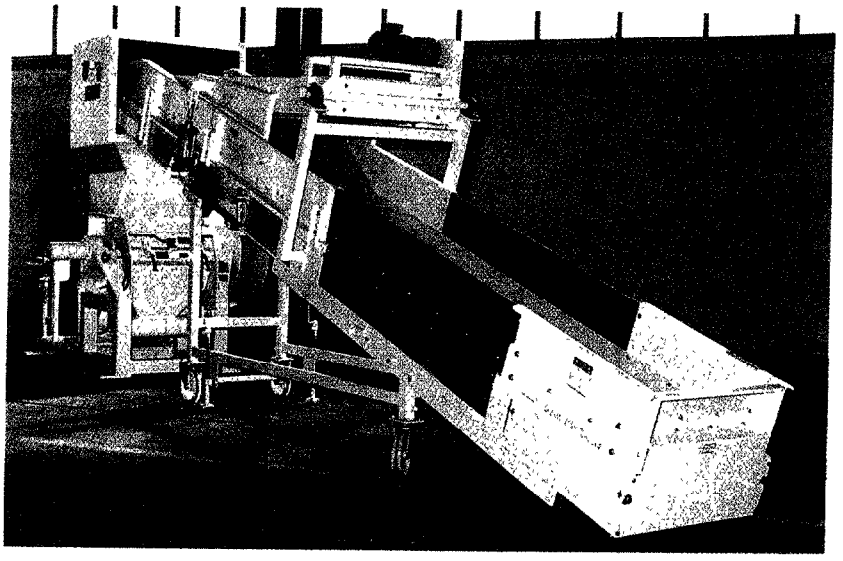
sectional view

The "IIIA-design" with 3 bed knife rows was developed for crushing of, for example solid scrap parts and biaxial stretched foils.
The top housing is hinged and can be opened rapidly to give access to the rotor and cutting area. Sieve removal can be carried out without the use of tools by swivelling the combined outlet and sieve basket, which is supported by gas filled struts. Standard maintenance work like sieve change, knife change or cleaning can be carried out in a matter of minutes

...maintenance-friendly and efficient

Advantages

- double shear cut
- diagonally divided, hinged machine housing
- robust welded construction
- compact low height
- bearing mounted outside cutting chamber
- open, rigid cutting rotor
- rotor and bed knives externally adjustable
- sieve change without the use of tools



Cutting Granulator CS 400/600-IIIA with Double Conveyor Belt

Additionally on type CS 300:

- integrated, compact sound-protection
- vibration free, free standing
- mobile (including sound protected model)
- variable inlet geometry with 2 or 3 rows of bed knives

Options

Cutting rotors of different construction and number of knives available to suit different products Similarly the materials of construction can be chosen from a wide range of carbon and stainless steels.

Installations

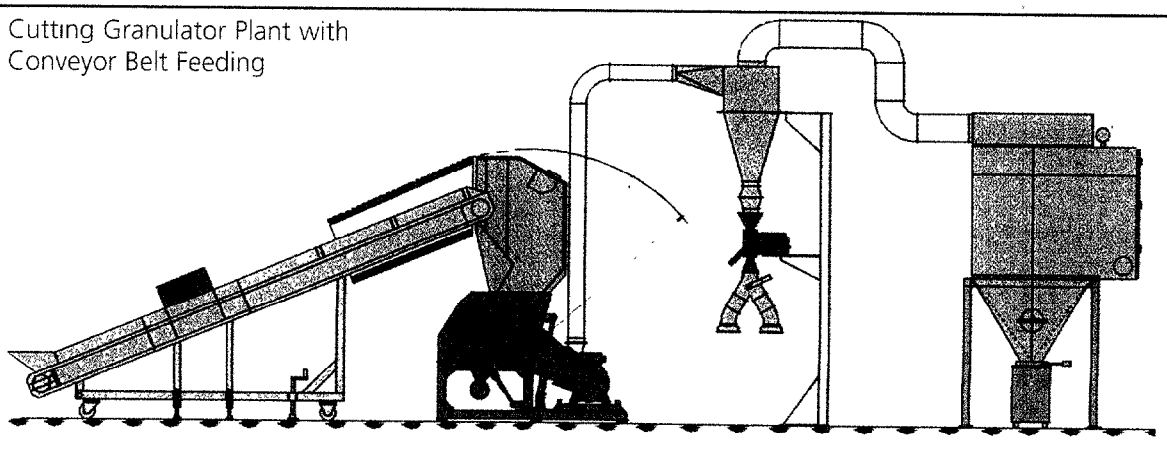
The type CS Cutting Granulator may be at the heart of the plant, but NETZSCH-CONDUX can supply a range of feed and discharge systems, including reel feeding and belt conveyors, sound proofing, metal separation, filters and the associated control equipment to complete turn-key installations at the customer's request.

Application

Plastic industry:
injection moulding
blow moulds
thermal moulds
profile extrusion
foil extrusion
foam working

Pharmaceutical industry
Food industry
Paper and cellulose industry
Chemical industry
Wood industry
Waste Recycling industry

Cutting Granulator Plant with Conveyor Belt Feeding



Technical Data

Type CS 300

Machine size		CS 300/400	CS 300/600	CS 300/800	CS 300/1000	CS 300/1200
Rotor diameter	*mm*	300	300	300	300	300
Working breadth	*mm*	400	600	800	1000	1200
Drive power	*kW*	5,5 - 37	5,5 - 37	7,5 - 37	11 - 37	11 - 37
Inlet opening IIA-design	*mm*	440 x 430	440 x 630	440 x 830	440 x 1030	440 x 1230
Inlet opening IIIA-design	*mm*	340 x 430	340 x 630	340 x 830	340 x 1030	340 x 1230
Rotor knife rows	*amount*	3	3	3	3	3
Necessary floor space	*mm*	1850 x 1050	1850 x 1250	1850 x 1450	1850 x 1650	1850 x 1850
Weight	*kg appr.*	ca 1000	ca 1250	ca 1500	ca 1750	ca 2000

Type CS 400

Machine size		CS 400/400	CS 400/600	CS 400/800	CS 400/1000	CS 400/1200
Rotor diameter	*mm*	400	400	400	400	400
Working breadth	*mm*	400	600	800	1000	1200
Drive power	*kW*	15 - 55	15 - 55	15 - 55	15 - 55	22 - 75
Inlet opening IIA-TE-design	*mm*	400 x 430	400 x 630	400 x 830	510 x 1030	510 x 1230
Inlet opening IIIA-design	*mm*	310 x 430	310 x 630	310 x 830	310 x 1030	310 x 1230
Rotor knife rows	*amount*	3 bis 7	3 bis 7	3 bis 7	3 bis 7	3 bis 7
Necessary floor space	*mm*	1900 x 1250	1900 x 1600	1900 x 1750	1900 x 2000	2000 x 2300
Weight	*kg appr.*	1300	1700	1830	1950	2100

Type CS 650

Machine size		CS 650/800	CS 650/1000	CS 650/1200
Rotor diameter	*mm*	650	650	650
Working breadth	*mm*	800	1000	1200
Drive power	*kW*	37 - 110	37 - 110	37 - 110
Inlet opening IIA-TE-design	*mm*	670 x 830	670 x 1030	730 x 1230
Inlet opening IIIA-design	*mm*	670 x 830	670 x 1030	–
Rotor knife rows	amount	5 bis 7	5 bis 7	5 bis 7
Necessary floor space	*mm*	2450 x 2000	2440 x 2300	3800 x 2800
Weight	*kg appr.*	3600	4800	6000

All tpyes with 2 or 3 stator knife rows available

Subject to technical changes

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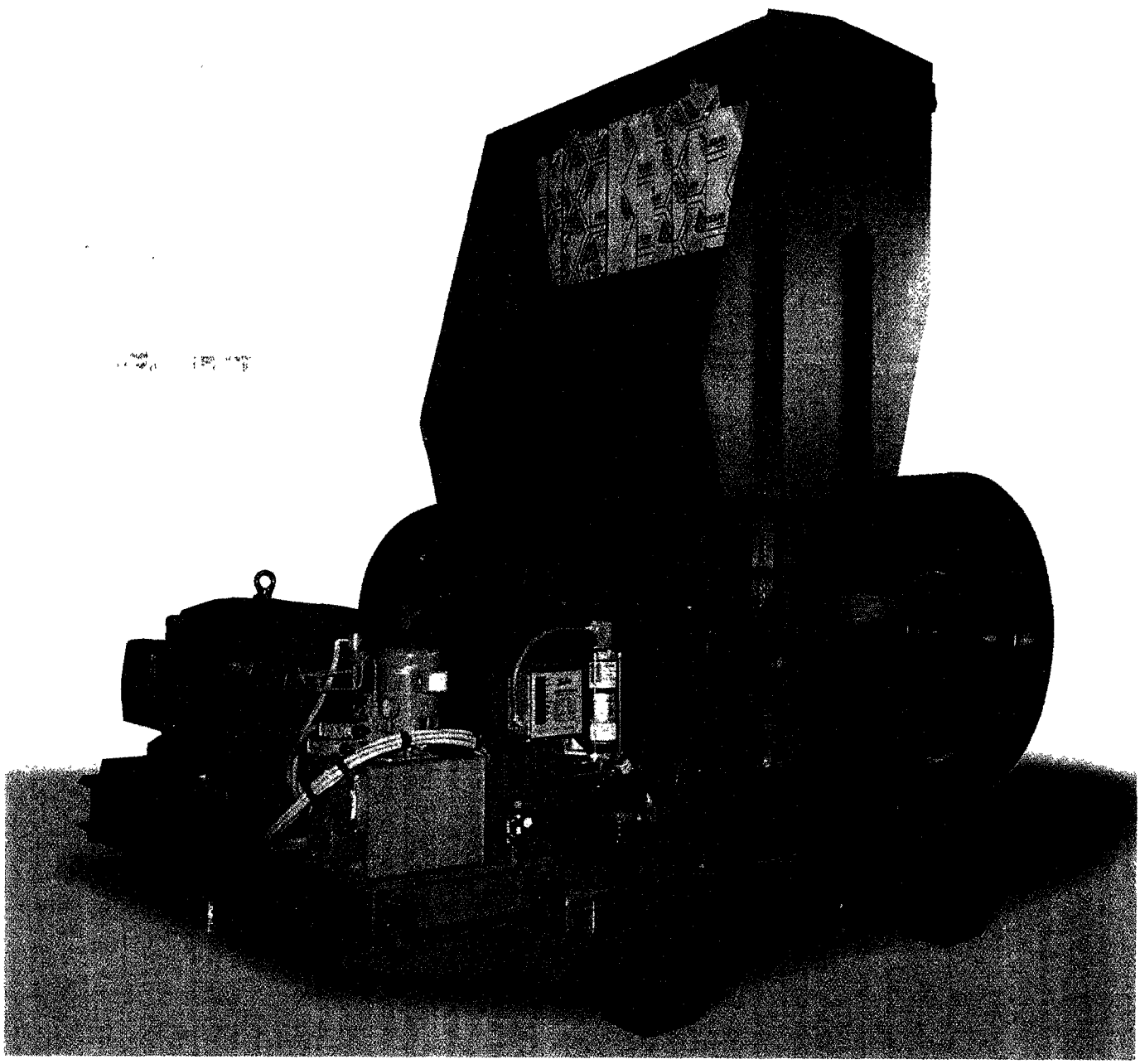
CONDUX Cutting Granulators

CS 500/600-II A – CS 1000/2400-III A horizontally divided

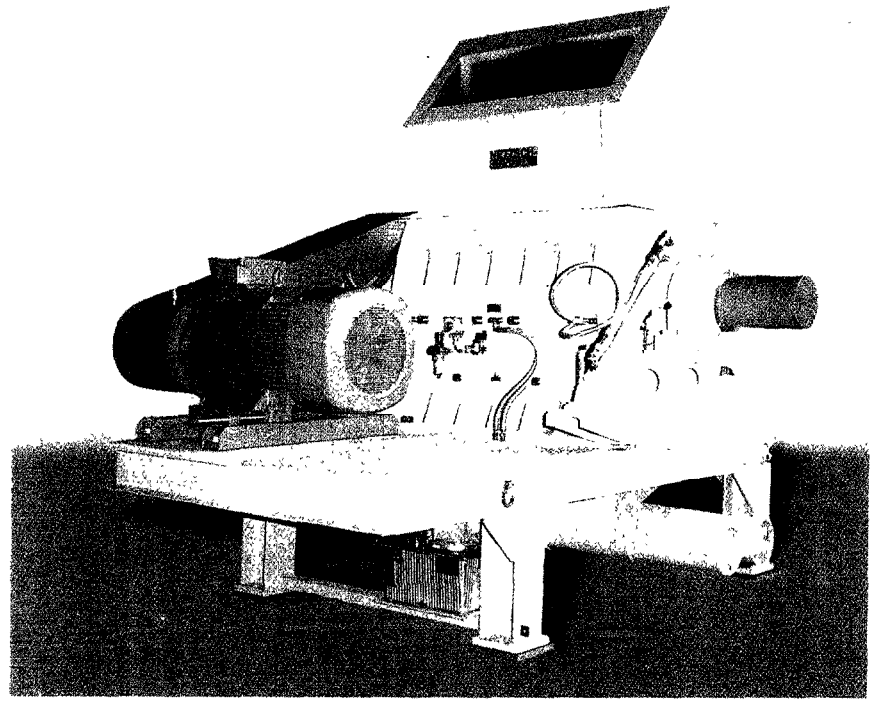


CONDUX Cutting Granulators with horizontally divided housing represent the latest technical standard with regard to universal operational possibilities, robustness, accident safety and operation comfort. The field of application includes the size reduction of solid lumps, tubes, profiles, foils, fibers and other materials.

NETZSCH

Taylormade design...

CONDUX has developped Cutting Granulators that offer optimal conditions in a wide range of applications. Depending on the application, executions with different numbers of knives and cutting geometry are available.
Also the shape and execution of the rotor body is adapted to the specific application characteristics of the actual product.
For easier handling, the machine housings are divided and hingeable via a hydraulic system. The screen inserts are easy to change. The knives can be adjusted outside the machine. The machines with 2 rows of stationary knives are especially suited for processing of thinwalled, voluminous and bulky hollow bodies and distinguish themselves by their good acceptance behaviour.
Compact parts, i.e. heavy extruder melt lumps and plates or stretched foils and fibers can be processed on the machine execution with 3 rows of stationary knives.



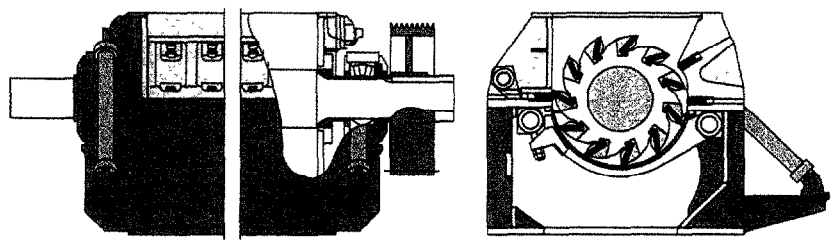
Cutting Granulator
CS 650/1200-IIIA

... Construction

Housing:
solid, welded execution
upper part of housing resp. housing parts hingeable via sturdy frame joints

Rotor:
welded construction shaft material ultrasonic tested
welded in hot condition and stress relieved

Bearing:
outside of the cutting chamber on both sides heavy self-aligning roller bearings, pillow block housing made of rolled steel each pillow block is equipped with a grease lubrication disc.
For regreasing of the pillow blocks a dismounting of the bearings (is not necessary)



Cutting Granulator

Rotary and stationary knives:
high-alloy tool steel
hardened, with adjusting screws at knive back
adjusting outside the machine in knife adjusting tool

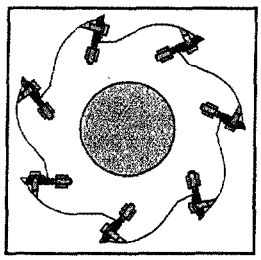
Screen Removal:
Screen insert alternatively manual or hydraulically hingeable

Sealing between housing and rotor shaft:
felt ring sealing, seal gas sealing, or radial shaft sealing rings (depending on application)

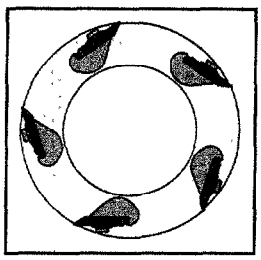
Cutting action:
depending on the application given, the optimal cutting action resp. position of the rotary knives to the stationary knives will be determined, for example:
double diagonal cut (DSS)
or single diagonal cut (ESB)

... The rotor designs

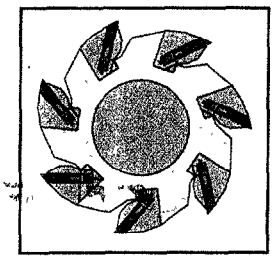
Claw-Type Rotor: open execution, rotor shaft over whole rotor length, supported rotary knives, rotor star discs welded to rotor shaft.



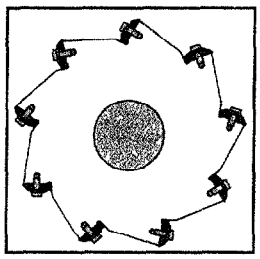
Cage Rotor: the most open rotor design with lowest shear, forged shaft and discs
rotor middle part is free of shaft.



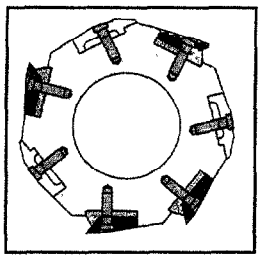
Beam Support Rotor: heavy open rotor design, rotary knives supported against cutting direction, rotor shaft over whole rotor length.



Multi-Edge Type Rotor: open rotor, rotary knives mounted in hanging position, size reduction with low friction with optimal intake characterisitics.



Cassette Rotor: closed, most solid rotor design, rotor can be water cooled, the number of knives can be altered by replacing knives with blanking plates.



... Inlet und Outlet systems

additionally to the inlet and outlet systems, e.g.
- conveying belts
- dosing screws
- lifting-hinging-devices
- nip-roll systems
- pneumatical conveying devices

also further process control components, e.g.
- metal detection
- metal removal
- dedusting units
- exhaust gas filtration
- noise protection installations

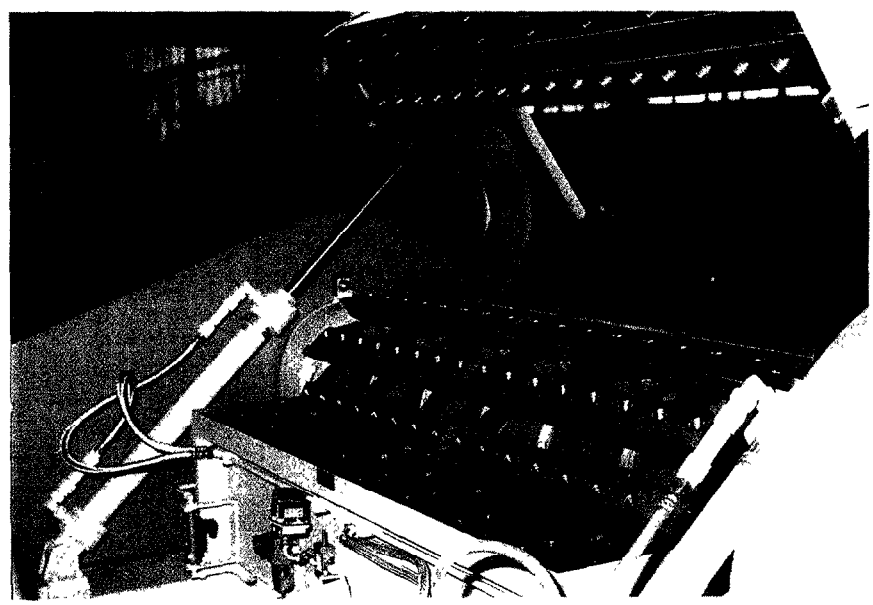
are available according to customer's request.

... Special executions

Additionally to the execution in stainless steel, for special applications in the field of chemical and plastic industry, gas- and fluid-tight cutting granulators in heaviest, welded execution were developped, with excellent access to grinding chamber.
The shaft exit at the housing is rinsed with gas or fluid.

... and Single Soures Engineering

Only by intelligent completion of suitable accessories the cutting granulating becomes a complete recycling plant, ready for operation, and creates economic operation conditions at a maximum performance.
CONDUX as single source supplier offers all this, optimal tuned with each other.



cutting granulator
CS 650/1600 III A,
speed housing hydraulic

Model CS 500

Machine size		CS 500/600	CS 500/800	CS 500/1000	CS 500/1200	CS 500/1600
Rotor diameter	*mm*	500	500	500	500	500
Working width	*mm*	600	800	1000	1200	1600
Drive capacity	*kW*	55-110	55-110	55-110	75-132	75-132
Inlet opening IIA-Version	*mm*	665x630	700x830	700x1030	700x1230	-
Inlet opening IIIA-Version	*mm*	580x630	580x830	580x1030	580-1230	580x1630
Rows of Rotary knives	*number*	3 bis 7	5 bis 7	5 bis 7	5 bis 7	5 bis 7
Area needed	*mm ca.*	4000x3000	4000x3200	4000x3400	4000x3600	4000x4000
Weight	*kg ca.*	4200	5000	6000	6800	7800

Model CS 650

Machine size		CS 650/1000	CS 650/1200	CS 650/1600	CS 650/2000	CS 650/2400
Rotor diameter	*mm*	650	650	650	650	650
Working width	*mm*	1000	1200	1600	2000	2400
Drive capacity	*kW*	75-132	75-132	75-160	132-250	132-320
Inlet opening IIA-Version	*mm*	750x1030	750x1230	-	-	-
Inlet opening IIIA-Version	*mm*	730x1030	730x1230	730x1630	730x2030	730x2430
Rows of Rotary knives	*number*	5 bis 11	5 bis 11	5 bis 11	5 bis 11	5 bis 11
Area needed	*mm ca.*	5000x4000	5000x4200	5000x4600	5000x5000	5000x5500
Weight	*kg ca.*	7000	9800	12000	13000	14000

Model CS 800

Machine size		CS 800/1000	CS 800/1200	CS 800/1600	CS 800/2000	CS 800/2400
Rotor diameter	*mm*	800	800	800	800	800
Working width	*mm*	1000	1200	1600	2000	2400
Drive capacity	*kW*	110-160	110-160	132-250	160-320	160-400
Inlet opening IIA-Version	*mm*	985x1030	985x1030	-	-	-
Inlet opening IIIA-Version	*mm*	900x1030	900x1230	900x1630	900x2030	900x2430
Rows of Rotary knives	*number*	7 bis 13	7 bis 13	7 bis 13	7 bis 13	7 bis 13
Area needed	*mm ca.*	5000x4000	5000x4200	5000x4600	5000x5000	5000x5500
Weight	*kg ca.*	8800	11000	14000	18000	20000

Model CS 1000

Machine size		CS 1000/1200	CS 1000/1600	CS 1000/2000	CS 1000/2400
Rotor diameter	*mm*	1000	1000	1000	1000
Working width	*mm*	1200	1600	2000	2400
Drive capacity	*kW*	200-315	200-400	250-500	320-500
Inlet opening IIIA-Version	*mm*	1115x1230	1115x1630	1115x2030	1115x2430
Rows of Rotary knives	*number*	9 - 15	9 - 15	9 - 15	9 - 15
Area needed	*mm ca.*	5000x4600	6000x5000	6000x5400	6000x5800
Weight	*kg ca.*	14000	18000	22000	24000

All models are available with 2 or 3 rows of stationary knives.

Under reservation of technical changes

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