

FRYMA Toothed Colloid Mill Type MZ

MZ-170/In-line — horizontal execution for the installation in a closed pipe-line system.

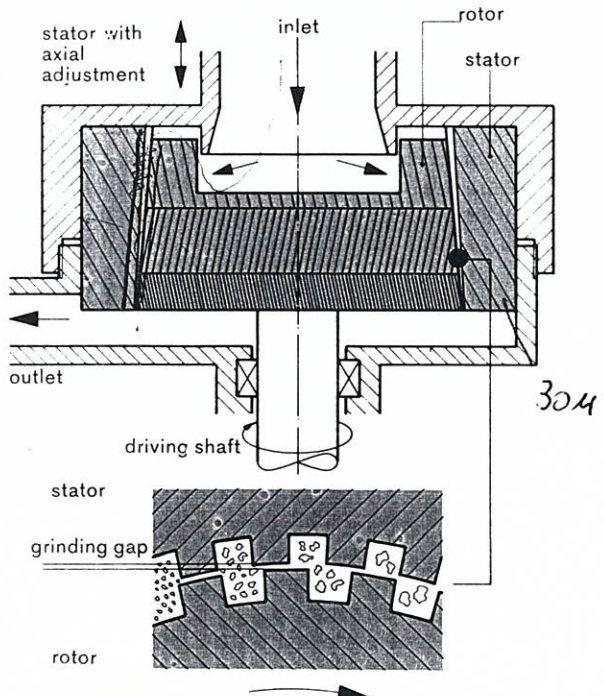
**Grinding Homogenizing Emulsifying
Dispersing Moistening Mixing**

FRYMA Toothed Colloid Mills are used for the processing of fluid up to highly viscous products.
Examples:

Pharmaceutical and cosmetic industry
creams, ointments, emulsions, tooth pastes, shampoos, make up products

Chemical industry
detergent slurry, bitumen emulsions, PVC-dispersions, spinning fibre compounds

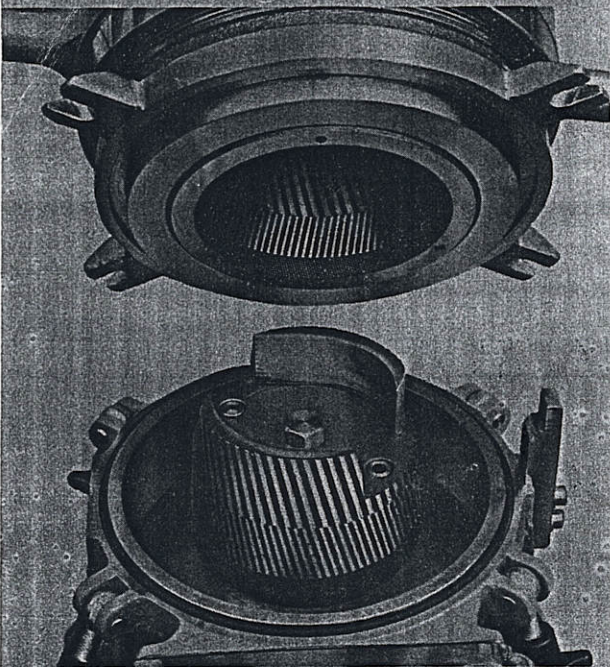
Food industry
fruit juices, baby food, sausage fillings, mayonnaise, salad dressings, ketchup, peanut butter



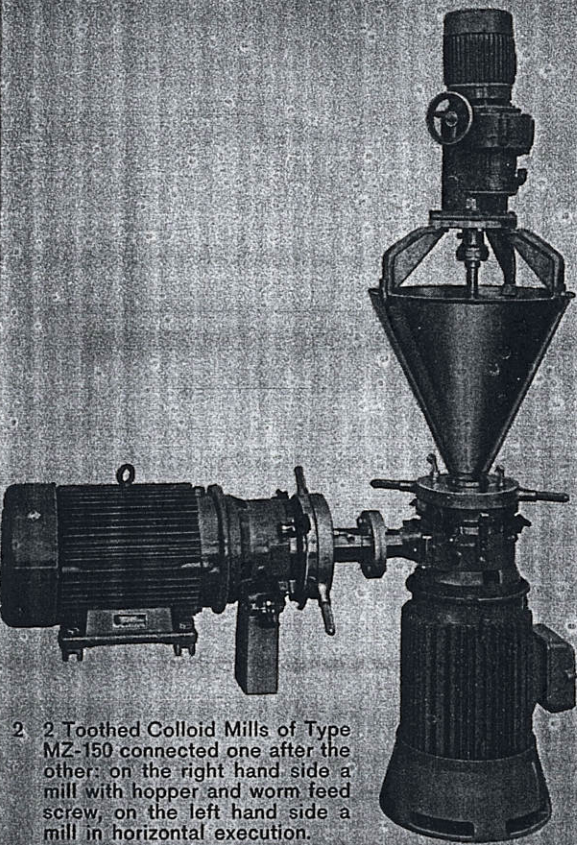
Mode of action of FRYMA Toothed Colloid Mills

The product is subjected to high shearing, cutting and rubbing forces between two metal toothed surfaces, whereby the stator is fixed and the rotor turns at 3000 rpm.

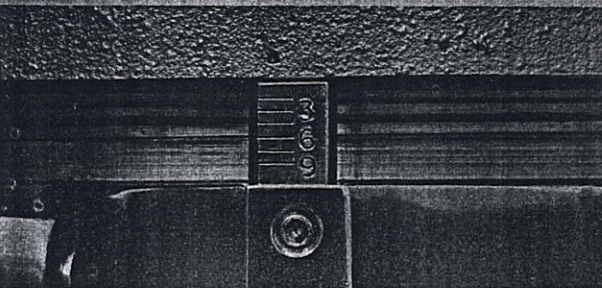
The tothing of the grinding set causes powerful vibrations, which treat the particles with high traction and pressure forces. The intense whirling multiplies the grinding and mixing effect. The degree of grinding and the through-flow are depending, apart from the characteristics of the product, on the size and tothing of the grinding set.



1 MZ-150 — Opened mill with view on the rotor (below) and the stator (above)



2 2 Toothed Colloid Mills of Type MZ-150 connected one after the other: on the right hand side a mill with hopper and worm feed screw, on the left hand side a mill in horizontal execution.



3 Reading scale — standard

1. Construction

The FRYMA Toothed Colloid Mills are designed according to the system of an assembly of prefabricated machine parts. They can therefore be suited to all different kinds of grinding goods and procedures, and exceed very much the possibilities of the conventional grinding and homogenizing machines. Chapter 6 of this prospectus informs you about the many completing and rebuilding possibilities.

FRYMA Mills are normally driven by a three phase current squirrel cage motor which builds a unit together with the housing and, in most cases, serves as basis. The rotor is directly coupled with the motor shaft. The grinding gap is regulated by an axial adjusting of the stator by means of a precision winding. The slight conical shape of the grinding set allows an adjusting of the grinding gap to an exactness of 0,05 mm. The opening of the grinding gap can be read from a scale (fig. 3) and can be reproduced at any time. One rotation of the adjusting ring of the standard execution corresponds to a grinding gap adjustment of 0,35 mm. The FRYMA Toothed Colloid Mills are working continuously or batchwise. They can work either in an open system, fed by a hopper or be installed in a closed pipe-line system. In this last case, the mill can be delivered in horizontal execution (cover photo). Movable executions are also possible.

2. Grinding elements

The final fineness of the grinding goods is mainly determined by the kind of toothings. Depending on the application field, three-staged normal toothed grinding sets, for high capacities coarse toothed grinding sets and for high grinding finenesses crosswise toothed grinding sets are used (see photo page 1).

By most models, stator and rotor can also be delivered in coolable execution.

FRYMA toothed colloid grinding sets are executed in wear-resistant chrome-steel; a special hardening guarantees a high life-time of these grinding elements.

3. Feeding devices

Generally, a feeding hopper is sufficient for self-flowing products (fig. 4). The mill can be equipped with a worm feed screw for slowly flowing or highly viscous products (fig. 2).

The feeding of the product by means of a pump allows a very high throughflow (up to 50 t/h) and is especially preferred when the Toothed Colloid Mill is part of an «in-line» production line. The cover picture shows a FRYMA Colloid Mill for the installation in the closed pipe-line system.

The throughflow direction can be chosen horizontal, vertical or sloping. This mill is equipped with a double acting sliding ring seal for a system pressure upto 6 bar excess pressure (for higher pressure, special executions are available). The mill can be adjusted infinitely variable during operation and under high pressure by means of a patented, pressure-relieved grinding gap adjusting mechanism.

FRYMA Toothed Colloid Mills develop a high pumping effect which can be used for recirculating and treating the product by means of a circulation pipe until the requested fineness is attained (fig. 5). With the installation of a circulating pipe it is also possible to add and to treat the single components one after the other. Finally, the product is discharged by means of the three-way valve. The pumping effect also allows

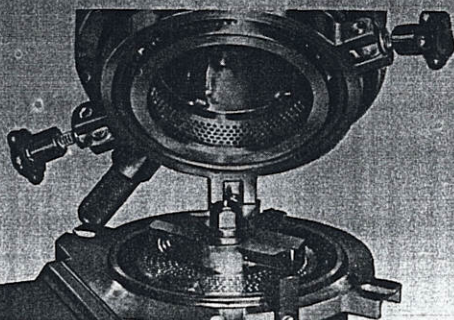
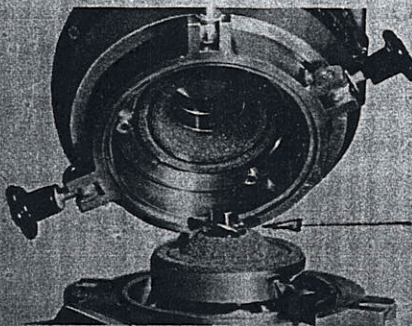
4 MZ-150
standard
model



5
MZ-150
with circulating pipe



MZ-Toothed Colloid Mill after the interchanging into a
6 Corundum Stone Mill Type MK ▲
7 Perforated Disc Mill Type ML ▼



to feed the product to filling or other machines without an additional pump.

4. Heating and cooling possibilities

If required, the mill can be equipped with

- coolable housing
- coolable stator
- and, beginning with type MZ-120, with
- additional rotor cooling

so that there is an optimum cooling resp. heating possibility. The cooling jacket is suitable for cooling water or steam at a maximum pressure of 6 bar excess pressure. The FRYMA Toothed Colloid Mill is installed for products with temperatures of -30° — upto 200° C, depending on the execution.

5. Material execution and seals

FRYMA-Mills are delivered in the qualities R (stainless chrome-nickel steel) and G (normal cast execution). The material qualities are described in detail on page 4, point 13 and 14.

The standard execution of the MZ-Toothed Colloid Mills is equipped with single acting sliding ring seals. For the installation in a closed pipe-line system, single-acting sliding ring seals (upto 3 bar excess pressure) or for high pressure double acting sliding ring seals (upto 6 bar excess pressure) are installed. For higher pressure special executions are available. Material execution of the seals see page 4, point 16.

6. Supplementary and rebuilding possibilities

The construction according to the system of an assembly of prefabricated machine parts allows the rebuilding of a MZ Toothed Colloid Mill into a Corundum stone Mill type MK or into a Perforated Disc Mill type ML (compare page 4, point 10). Fig. 6 and 7 show these two interchangeable grinding elements which, by very little extra expenses, extremely enlarge the possibilities of the Toothed Colloid Mills. The interchange of one mill type into the other can be carried out quickly and without difficulties.

7. Cleaning possibilities

Thanks to its simple construction, the FRYMA Toothed Colloid Mill can be dismantled and cleaned with very few manipulations. The mill cleans itself by flushing of water or suitable solvents.

By special executions the complete grinding head is easily removable and can be sterilized in an autoclave.

8. Trials

Without obligation and free of charge, our trial laboratory is at your disposal to carry out grinding tests. We have representatives in all industrial countries, of whom some have their own trial laboratories and test mills.


We would also like to draw your attention to our further manufacturing programme:

Corundum Stone Mills, Perforated Disc Mills, Jet Mills, Vacuum-Deaeration Units, Bitumen and Lubricating Grease Plants, Processing Plants, Mixing and Dispersing Plants and complete Production Lines.

Delivery possibilities			Laboratory and small production Mill				Production Mill					High production Mill			
1. Machine type			MZ-50	MZ-80	MZ-100	MZ-110	MZ-120	MZ-130	MZ-140	MZ-150	MZ-170	MZ-190	MZ-220	MZ-250	
2. Rotor grinding element ϕ mm			50	80	100	110	120	130	140	150	170	190	220	250	
3. output (kg/h) (approximate figures)	liquid (olive oil ca. 100 cP)		300	1000	2000	3000	5000	7000	10000	15000	20000	26000	33000	40000	
	viscous (cream ca. 3000 cP)		150	500	1000	1500	2500	3500	5000	7500	10000	13000	17000	20000	
	pasty (toothpaste ca. 50000 cP)		75	250	500	750	1300	1800	2500	3800	5000	6500	8500	10000	
4. Weight net kg			35	80	100	130	200	210	240	280	360	620	780	950	
5. Outer dimensions mm			height width depth	615 300 300	837 410 320	992 475 450	992 475 450	1190 605 450	1190 605 450	1415 670 580	1465 670 580	1576 630 600	1790 630 600	2060 720 600	2150 720 600
6. IEC-driving motor, protection IP 44, DIN 40050, rib-cooled (TEFC)	1 PS	0,75 kW	●	—	—	—	—	—	—	—	—	—	—	—	
	3	2,2	—	●	—	—	—	—	—	—	—	—	—	—	
	5,5	4	—	○	●	—	—	—	—	—	—	—	—	—	
	7,5	5,5	—	○	○	●	—	—	—	—	—	—	—	—	
	10	7,5	—	—	○	○	●	—	—	—	—	—	—	—	
	15	11	—	—	—	—	○	○	○	○	○	○	○	○	
	20	15	—	—	—	—	○	○	○	○	○	○	○	○	
	25	18,5	—	—	—	—	○	○	○	○	○	○	○	○	
	30	22	—	—	—	—	○	○	○	○	○	○	○	○	
	40	30	—	—	—	—	○	○	○	○	○	○	○	○	
	50	37	—	—	—	—	○	○	○	○	○	○	○	○	
	60	45	—	—	—	—	○	○	○	○	○	○	○	○	
	80	59	—	—	—	—	○	○	○	○	○	○	○	○	
	100	75	—	—	—	—	○	○	○	○	○	○	○	○	
125	90	—	—	—	—	○	○	○	○	○	○	○	○		
150	120	—	—	—	—	○	○	○	○	○	○	○	○		
180	132	—	—	—	—	○	○	○	○	○	○	○	○		
7. Construction	Hopper Mill	vertical	●	●	●	●	●	●	●	●	●	●	○	○	
		horizontal	○	○	○	○	○	○	○	○	○	○	○	○	
	hopper content (liters)		3	7	20	20	20	20	50	50	75	75	100	100	
In-line	Pipe-line connection NW		○	○	○	○	○	○	○	○	○	○	●	●	
			25	40	40	40	65	65	65	65	65	80	100	100	
8. Shaft joint	Sliding ring seal type 0,2		●	●	●	●	●	●	—	—	—	—	—	—	
	Sliding ring seal type 1		○	○	○	○	○	○	○	○	○	○	○	○	
	Sliding ring seal type 3		○	○	○	○	○	○	○	○	○	○	○	○	
	Sliding ring seal type 10 double acting		○	○	○	○	○	○	○	○	○	○	○	○	
9. Cool- and heatable execution (6 bar excess pressure)															
housing			○	○	○	○	○	○	○	○	○	○	○	○	
stator grinding element			—	—	—	—	○	○	○	○	○	○	○	○	
rotor grinding element			—	—	—	—	○	○	○	○	○	○	○	○	
10. Interchanging possibilities															
Corundum Stone Mill Type MK			—	○	○	○	○	○	○	○	○	○	—	—	
Perforated Disc Mill Type ML			—	○	○	○	○	○	○	○	○	○	—	—	

● Standard execution ○ possible execution — not available

11. Tothing (for all types available): coarse toothed  normal toothed  crosswise toothed 

12. Feeding aggregates (for all types available): -pump feeding with variable speed gear or by-pass  -worm feed screw

13. Material execution: stainless steel (Fryma Code **R**) [no 1.4301 (DIN X 5 Cr Ni 18 9; AISI 304; EN 58 E; Z 6 CN 18—10; V2A); no 1.4401 (DIN X 5 Cr Ni Mo 18 10; AISI 316; EN 58 J; Z 6 CN 18—12; V4A)]. Cast iron (Fryma Code **G**) [no 1693 (DIN GGG 42)].

14. Material execution of the colloid grinding set: hardened steel [no. 1.4034 (DIN X 40 Cr 13); AISI 420] or stainless steel [no. 1.4401].

15. Motors: standard voltage 380 V (3-phase current), 50 Hz. Other voltages and frequencies are deliverable. Protection: IP 44 as per DIN 40050 (protected against sprays of water). Special motors deliverable: - explosion proof (as VDE 0170/0171 [2.61] Ex "e" T2, Ex "e" T3, Ex d3 T4) and pole-interchangeable (1500/3000 rpm at 50 Hz).

16. Seals: Sliding ring pairings artificial carbon/ceramics, artificial carbon/hardmetal, for highly abrasive products hardmetal/hardmetal. O-Ring joints available in quality resistant to either acids, or alkalies, or solvents.



FRYMA-Maschinen AG

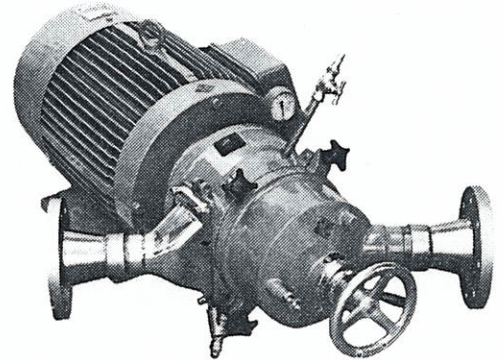
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FRYMA - TOOTHED COLLOID MILLS AS
SLURRY - HOMOGENIZERS
FOR THE SPRAY DRYING

- All over the world more than 200 FRYMA Toothed Colloid Mills are used everyday for the spray drying of detergents, casein, fruit extracts, starch, pigments etc.
- The FRYMA Toothed Colloid Mill grinds the solids and homogenizes the slurry
- The required fineness can be adjusted by means of the grinding gap and the tooting of the grinding elements (varying from a few microns to several millimeters)



FRYMA Toothed Colloid Mill MZ-170/R in-line
(37 kW) for a capacity up to 20 t/h

The FRYMA Toothed Colloid Mill

- ensures undisturbed spray drying and prevents the spray nozzles from blocking up
- guarantees a dry product of a constant, reproducible bulk weight
- makes sieving or filtration of the slurry superfluous
- prolongs the life of the high pressure pumps
- works in-line (max. working pressure in the pipe-lines up to 10 bar)
- is a modern slurry homogenizer of robust construction and cheap in maintenance

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