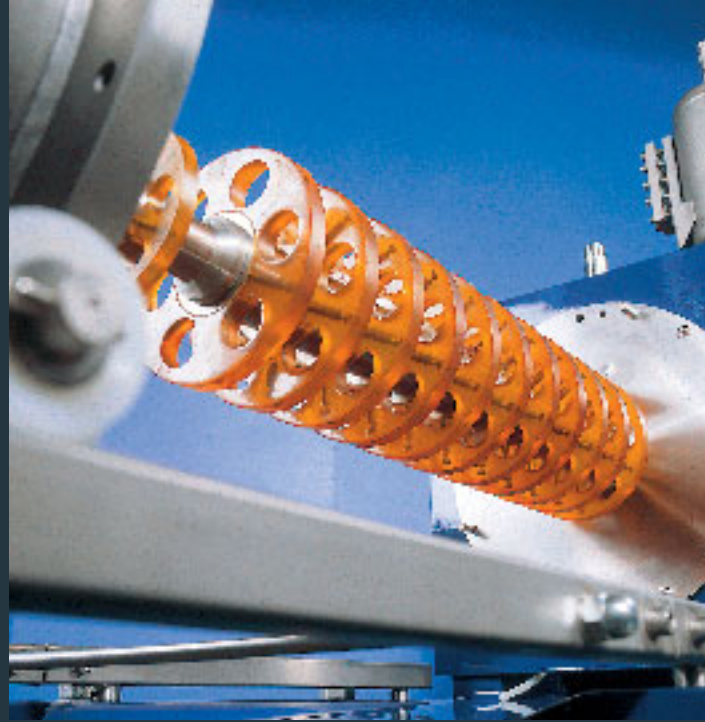


SuperTex[®]

Horizontal Agitated
Media Mill



Perl Mill® PM/PMC SuperTex® – A concept for your benefit

PM SuperTex® – High-capacity horizontal agitated media mills with intensive cooling

PMC SuperTex® – High-capacity horizontal agitated media mills with nonmetallic lining

Highly efficient and user-friendly for the:

- Economic dispersing and micro wet grinding up to largest batches.
- Fully continuous, microfine wet preparation with highest flow rates.



Applications

- Paints and lacquers
 - Primers
 - Extenders
 - Dipping paints
 - Electrophoretic products
 - White paints
- Ceramic industry
 - Zirconium sand
 - Aluminium oxide
 - Zirconium oxide
 - Kaolin
- Chemical industry
 - Pigments
 - Agrochemicals (Flowables)
 - Textile dyestuffs
 - UV blockers
 - Optical brighteners
 - Spin fibre solutions
 - Titanium dioxide suspensions
 - Pigment concentrates
- Paper industry
 - Calcium carbonate
 - Calcium sulphate
 - Paper filler material
 - Paper coating material
 - Thermosensitive coatings
- Mineral processing
 - Ore concentrates
 - Precious material liberation

Design of mill frame:

a) Horizontal mill frame of conventional design (up to size SuperTex® 60): Ensuring optimal user and service friendliness (Fig. 3.1).

b) Modern flat design, floor-mounted skid (from size SuperTex® 140): Resulting in the same advantageous user and service friendliness with large-volume agitated media mills (Fig. 3.2).

Technical features:

- Highly efficient horizontal agitated media mills for the economic dispersing and micro wet milling up to largest batches
- Operationally safe separation of micro grinding media by a new arrangement of Drais^{DM} flat screen cartridges or by proprietary Drais^{DM} modular separator
- User- and service-friendly design
- Grinding vessel removable without special devices or lifting jacks (Fig. 3.1)
- Lateral arrangement of drive motor with large-volume mills from size PM SuperTex® 140 (Fig. 3.2)

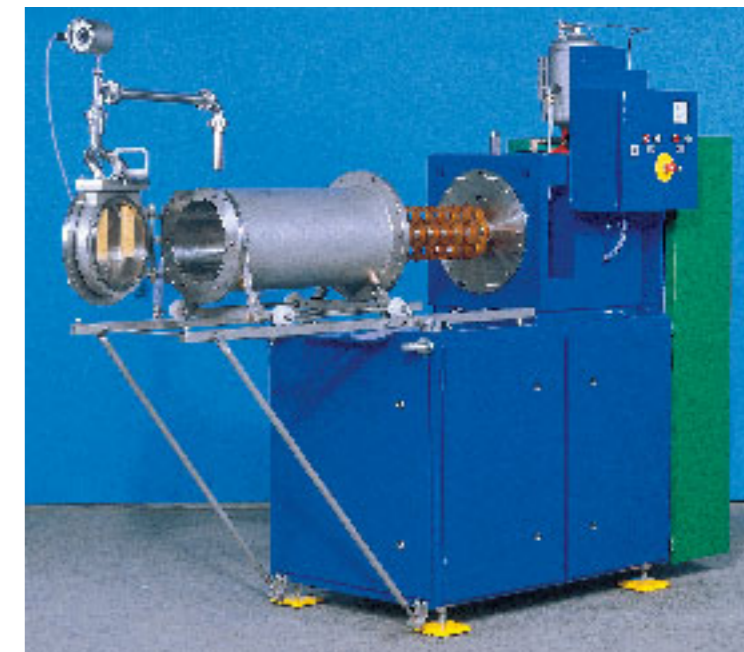


Fig. 3.1:
PM SuperTex® 30 with removed grinding vessel

Fig. 3.2:
PM SuperTex® 1200



SuperTex® – registered trademark of Bühler GmbH

Perl Mill® PM SuperTex® – Design and function

Design and function

Drais^{DM} horizontal agitated media mills of the series PM SuperTex® and PMC SuperTex® excel by their functional and user-friendly design:

Drive unit

With the mill sizes PM SuperTex® 30 and 60, the bearing cube and the flanged process unit are arranged at user-friendly height above the horizontal machine frame. The drive motor is accommodated in the machine frame. With mills from the size PM SuperTex® 140, the bearing cube and the laterally arranged drive motor are mounted on a low common frame providing optimum accessibility. The agitator shaft is sealed by a double-acting mechanical seal within the flange lid at the drive side.

Process unit

On the cantilevered agitator shaft, highly effective Drais^{DM} agitator discs are arranged at variable distances. The grinding vessel is flanged at the drive end. The product discharge side is equipped with either a flat lid or for applications requiring an additional turbulence disc a dished bottom lid is provided. With the smaller mill sizes, the flange accommodating the screen cartridges can be swung out. The smooth inner jacket of the grinding vessel can be replaced easily.

Cooling

With the PM SuperTex® series the grinding vessel and optionally the end lid are jacketed. By the precise guiding of the cooling agent in narrow, spiralled channels, an efficient cooling of the product is achieved. The cooling channels are sealed most effectively against the smooth inner jacket by elastic elements.

Grinding media

Grinding media of the most different materials can be used in the diameter range 0.3 - 2.0 mm (in special cases 3.0 mm). Usual grinding media filling degrees (ratio bulk volume of grinding media to useful volume of process unit) can vary between 50 % and 90 % depending on the application.

Product flow

With a pump tailored to the specific application, the product is continuously conveyed through the grinding chamber. The product inlet is arranged in the flange lid at the drive end. The product flow in the direction of the bottom lid opposite the bearing relieves the mechanical seal.

Grinding

From the intensive agitator the mixture of product and grinding media is set in highly effective relative motion. The result is the effective dispersing resp. grinding of the solid particles in the liquid phase of the product formula.

Grinding media separation

The end section of the grinding vessel opposite the drive end features the flat screen cartridges inserted from outside and favouring an optimum product flow. The screen slot width ranges from 100 µm up to 1000 µm depending on the diameter of the grinding media used and the product viscosity. As a result of the pressure produced by the feed pump in the grinding chamber, the product flows through the screen cartridges in upward direction out of the mill. As the slot widths of the screen cartridges are chosen distinctly smaller than the grinding media diameter, the grinding media is safely retained in the vessel.

Special feature

For maintenance purposes the screen cartridges can be pulled out in only a few minutes. As the openings for removal are arranged topside, both product and grinding media remain completely in the process chamber. Only the discharge unit flanged above the screen cartridge openings must be removed (Fig. 7.1).

Materials

Tailor-made for the most different applications, all product contact parts of the process chamber such as intensive agitator discs, distance sleeves, inner cylinder of



Fig. 5.1:
PM SuperTex® II 140

grinding vessel as well as end lids and flanges are available in a variety of wear-resistant steels, stainless steels and ceramic materials. In addition, surface coatings are available, when required from special materials. Drais^{DM} Perl Mills® PM SuperTex® distinguish themselves by their extremely long service life.

The advantages

- Flow direction relieving mechanical seal
- Supercooling capability
- Smooth-surfaced, exchangeable inner liner
- Screen cartridge flange can be swung out (Fig. 5.2)
- Optional flat end lid
- Optional dished end lid for installation of an additional turbulence disc
- Excellent cleanability

Fig. 4.1:
PM SuperTex® schematic

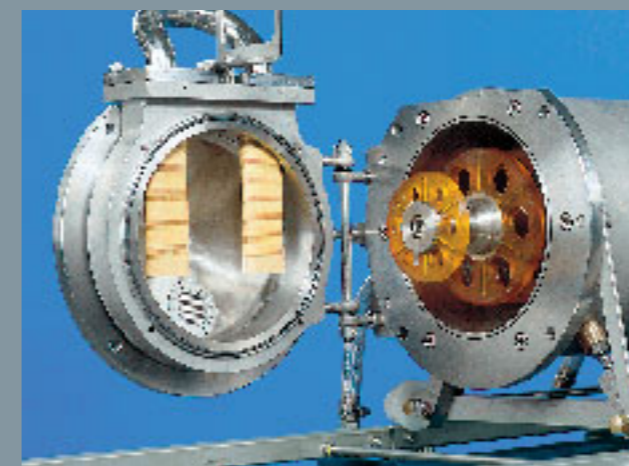
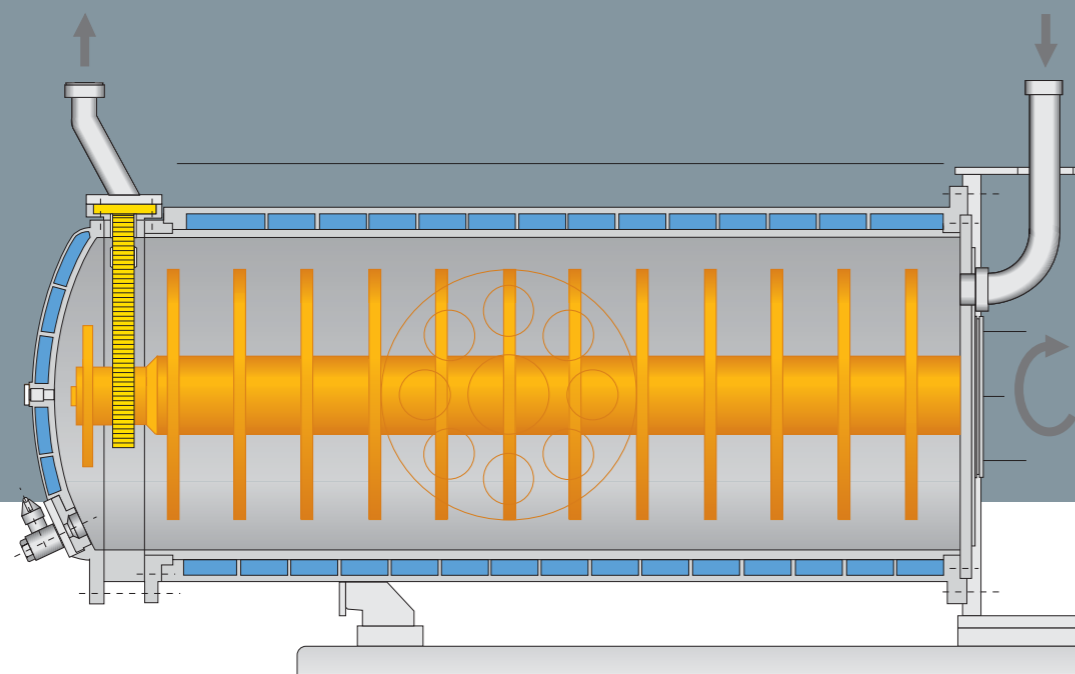


Fig. 5.2:
Screen cartridge flange swung out

Perl Mill® PMC SuperTex® – Contamination-free micro wet grinding



Fig. 6.1:
SuperTex® 1200 in wet grinding plant for white pigments

Perl Mills® of the series PMC SuperTex® are identical in design and function as described for the PM SuperTex® series. Distinctive features result from the special lining of the process chamber (Fig. 7.2).

Elastic lining

All product contact parts of the process chamber are coated with highly wear-resistant, elastic materials DraisElast®. As DraisElast® materials are heat insulators, cooling jackets for the grinding vessels are not necessary with the PMC SuperTex® series.

Ceramic modular separators

In a PMC SuperTex® the screen cartridges for retaining the grinding media are designed as ceramic modular separators (can be delivered as option for PM SuperTex®!). A large number of specially designed ceramic plates (modules) are fastened together to create a modular separator by the interlaying of gap-forming spacer discs (thickness from 100 µm). By loosening of the nuts with which the module package is clamped, foreign particles can be removed easily and quickly. Ceramic modular separators excel by extraordinary durability.

Particular benefits:

- Long durability
- User-friendliness
- Easy maintenance

Heat removal

With the use of a PMC SuperTex®, the energy introduced into the process chamber is removed by the temperature increase of the product flow. In multipass or recirculation operation it may be advantageous to guide the product flow through an external heat exchanger.

PMC SuperTex® – The advantages

- Micro wet grinding without metal contamination
- Long service life even with abrasive products
- Excellent user and service friendliness
- High economic efficiency

Perl Mill® PM/PMC SuperTex® – Production capacity

The maximum production capacity \dot{M} , which is the quantity of finished product ground to specification per unit of time, e.g. tonnes/hour, can be estimated on the basis of the specific energy requirement E_M for the respective application and the converted driving power $P-P_0$:

$$\dot{M} \text{ [t/h]} = \frac{(P-P_0) \text{ [kW]}}{E_M \text{ [kWh/t]}}$$

\dot{M} : mass flow rate
 P : power consumption

P_0 : idle power
 E_M : specific energy requirement

Example

If in a PM SuperTex® a power of $P-P_0 = 300$ kW is converted and the specific energy requirement is $E_M = 50$ kWh/t, the maximum net production capacity is $\dot{M} = 6$ t/h (relating to dry solid matter).



Fig. 7.1:
PMC SuperTex® 140 – Removal of a ceramic modular separator

The economic efficiency in comparison

The specific energy requirement of a PM SuperTex® is considerably lower than for conventional micro grinding procedures which are common in process technology. This results in superior economic efficiency and higher productivity relating to the process chamber volume.

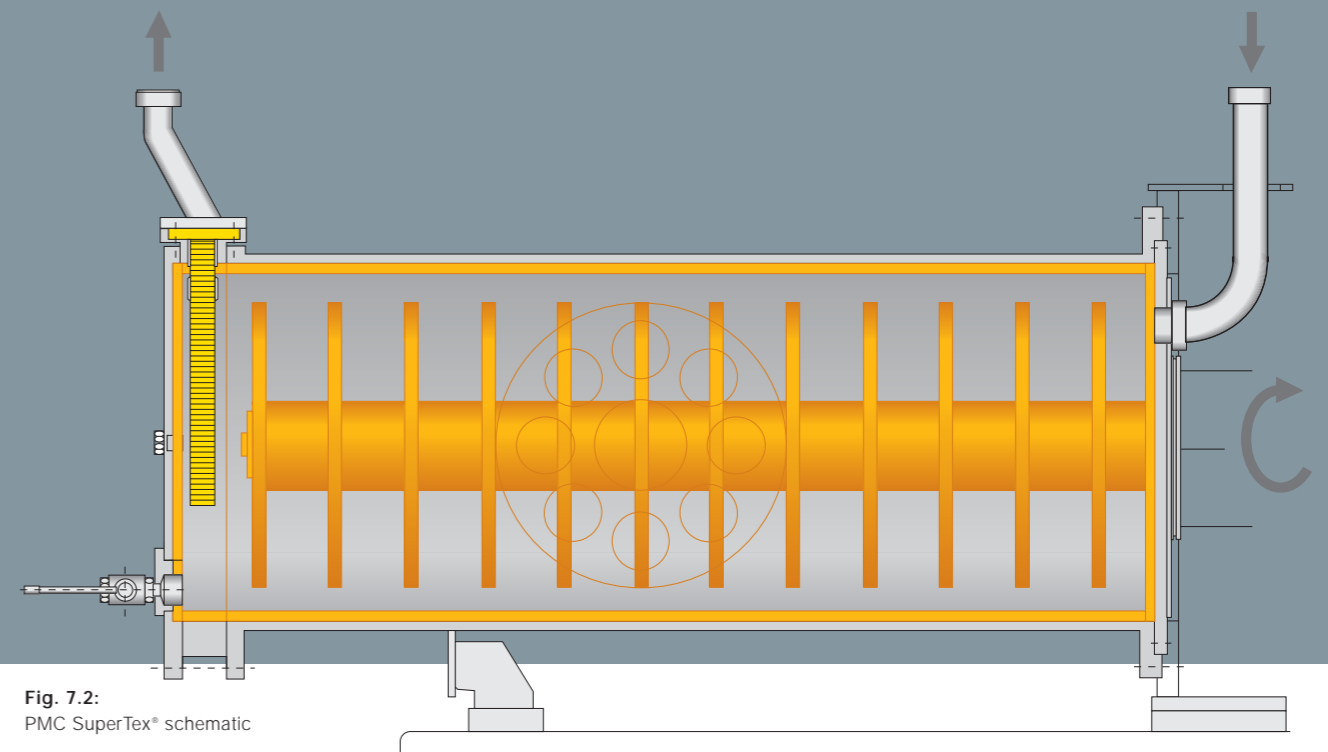


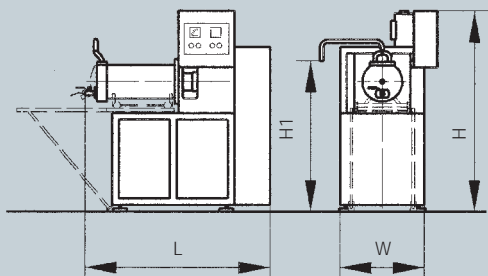
Fig. 7.2:
PMC SuperTex® schematic

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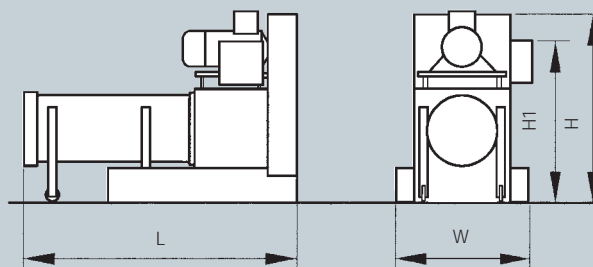
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Design H



Design F



PM SuperTex®		30	60	140	270	600	1200
Design of mill frame		H	H	F	F	F	F
Lid	flat	■	■	■	■	■	■
	dished	■	■	■	■	■	-
Screen cartridges	stainless steel	■	■	■	■	■	■
	ceramics	■	■	■	■	■	■
Cooling	vessel	■	■	■	■	■	■
	lid	■	■	■	■	■	■
Vessel removal aid		■	■	■	■	■	■
Dimensions [mm]	L	1600	1950	2140	2445	3500	3920
	W	785	930	910	1160	1360	1360
	H	1750	2000	1830	2060	2460	2650
	H1	1410	1610	1700	1800	1500	1500
Mill chamber volume [l] (flat lid)	gross	30	60	140	270	605	1215
	net	26	52	123	232	526	1063
Mill chamber volume [l] (dished lid)	gross	31	61	147	275	623	-
	net	27	53	128	238	542	-
Drive [kW]		22-30	30-45	44-75	75-110	132-200	250-355
Weight [kg]		1350	1950	2500	3450	6500	9800

■ Standard ■ Option All data are approximate. Subject to technical alterations. - International patented / patentee: Bühler GmbH