

More than a rotating container

– many factors influence capacity and quality

A cursory glance reveals that tumblers are containers that rotate a number of times. For almost 30 years now, this statement has been synonymous with the truth. But today, tumbling is a closely controlled process at each phase! The aim is to maximize the number of product rotations per revolution. Tumbler capacity is being increased and all stages directly associated with tumbling are reduced proportionately.

THE MOVEMENT of product is not only affected by the number of revolutions, which is normally specified in a slightly misleading fashion as a coefficient of capacity, but also by several other factors. Some of the most important are: drum design, the diameter (in relation to volume), tumbling time (in revolutions), the number of revolutions in combination with the drum-design, the number of chicanes and their design.

TUMBLER COOLING (cooling capacity and cooling area) is vitally important to production of the final product, as heat is produced by the system's surroundings, motors, equipment and motion. Simply placing the tumbler in a cold store is not enough. The machine has a hydraulically-adjusted drum. Powerful stainless steel hydraulic cylinders control the level of the drum, which is equipped with a cooling jacket. This ensures a considerably larger cooling surface than other cooling solutions. An infrared sensor controls the temperature in the drum.

TUMBLER DESIGN; Garos MDF tumblers are equipped with 6 short staggered chicanes/carriers that tumble products



using an efficient "pushing motion".

USER FRIENDLY PLC-SYSTEM; The advanced PLC-system can store up to 50 programs. Total processing time, interval time, start time, vacuum percentage,



vacuum ranges, product temperature, rotation speed, direction of rotation can all be controlled. All variables in combination provide unrivaled opportunities to adapt one program for each individual product. The MDF tumblers are equipped with advanced control systems, including balance-load cells for precision checking of the product load.

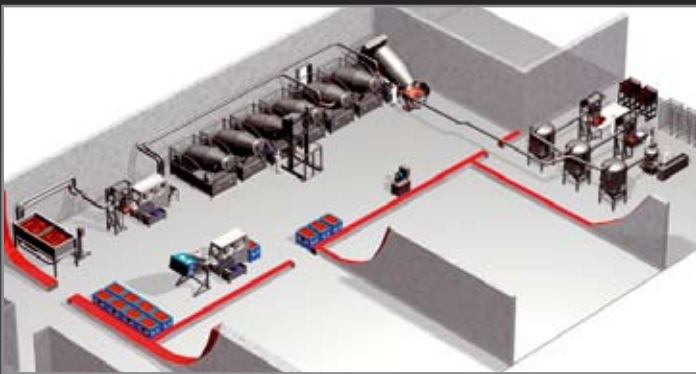
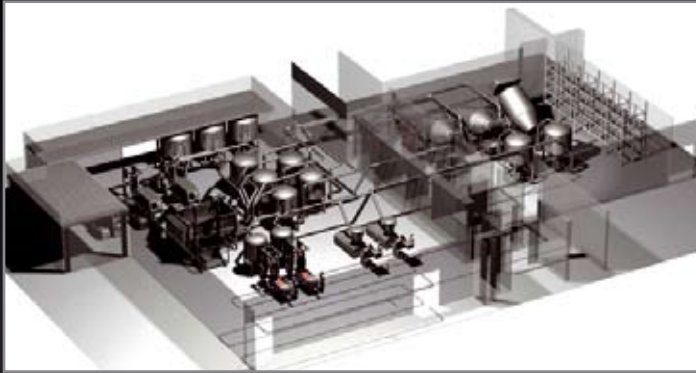
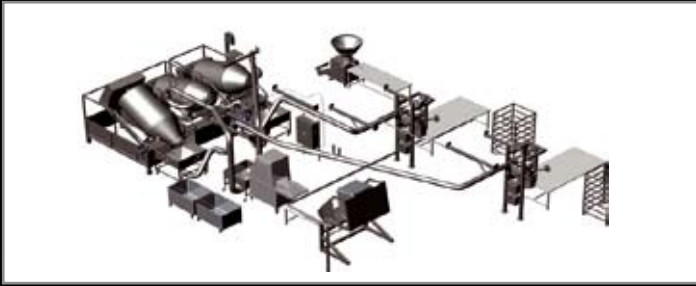
CLEANING AND MAINTENANCE; The machine housing is designed for easy servicing and cleaning. Component equipment is easily accessible from the front. A vacuum pump



and hydraulic unit are installed on extending cradles. The electrical cabinet is hinged and can be swung outwards for servicing and maintenance. The cover can be removed quickly for cleaning without the need for tools.

On certain models, the lid is controlled hydraulically using buttons on the control panel. A large opening (900 mm) makes loading, emptying and cleaning easier.

The design is focused firmly on safety aspects and gives full protection regardless of drum position.



A NEW WAY OF WORKING

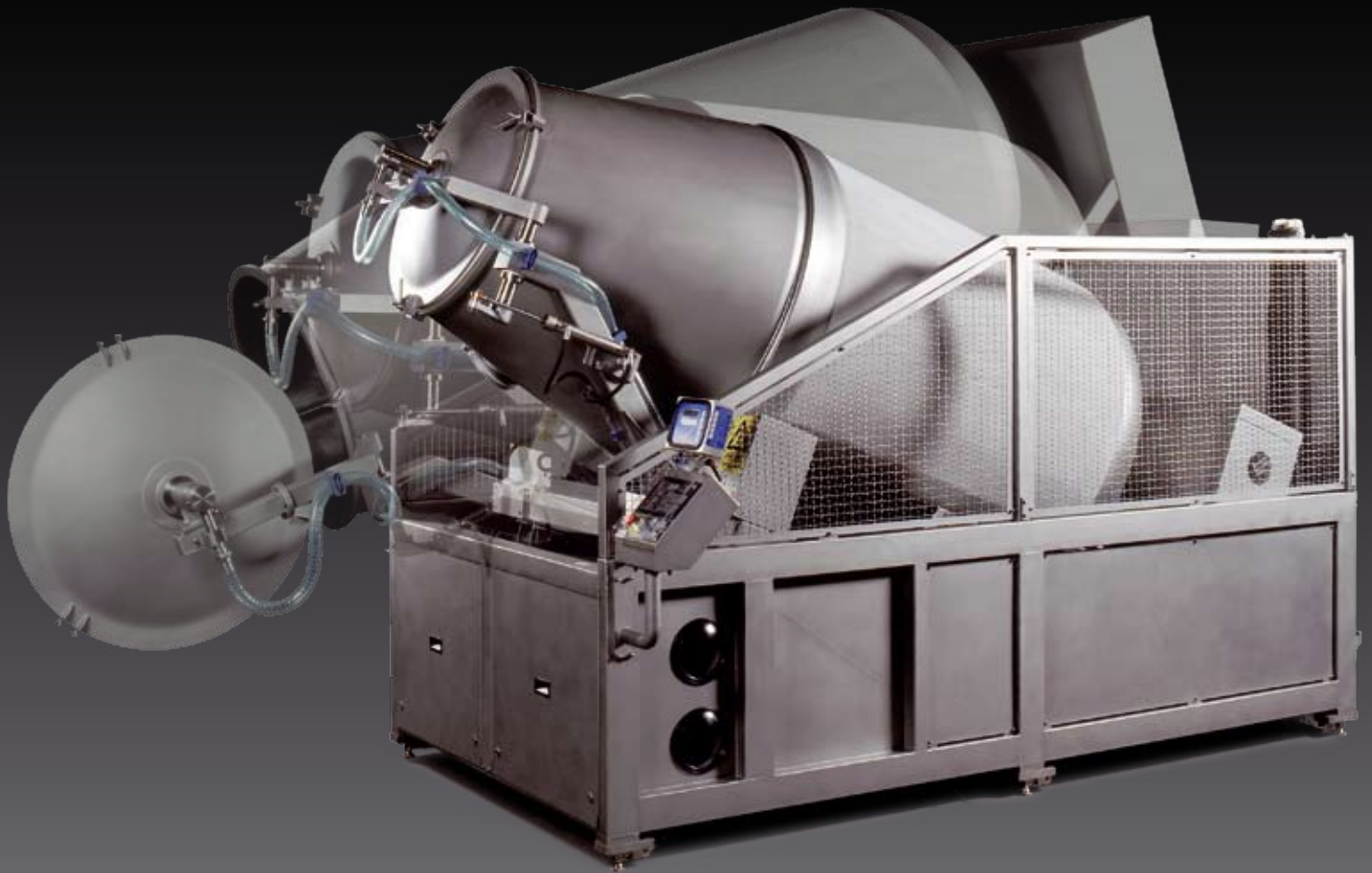
- The importance of tumblers in the Brining and Marinating process is constantly increasing
- Today, we are working with the principle of an integrated process
- This way cost can be reduced by as much as 80 %
- A line can comprise 1 tumbler or 20 or more tumblers
- The work environment is improved in all areas
- More efficient control in the entire production process
- A complete line can be constructed piece by piece
- Our systems are used in Sweden, Norway, Denmark, the Netherlands, Belgium, Italy, China, Japan and Australia, to name but a few



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system MDF
tumbler

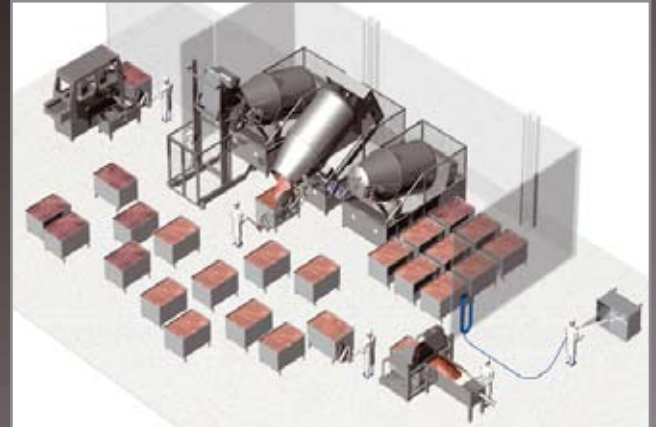
A new way of working!

– reduce handling, storing and transport

BRINING, TENDERISING/TUMBLING AND CHASING; Traditionally these are labour-intensive operations involving a lot of handling, transport and storing between each stage in the process. As long as each processing stage is treated as a separate batch operation, increased efficiency is hard to obtain.

FROM BATCH PROCESSING TO CONTINUOUS LINES; We have integrated “the main stations” – the Brine Mixer, Brine Injector, Tenderizer and Tumblers – by adding new equipment: Vacuum Filling Systems (VFS), Vacuum Metering Loading Systems (VMS) and storage containers/tanks, etc. This has led to the creation of new continuous, integrated lines, where we can view brine mixing, brining, tenderizing, tumbling and the stuffing of fibrous casings, nets and molds as a true, continuous process.

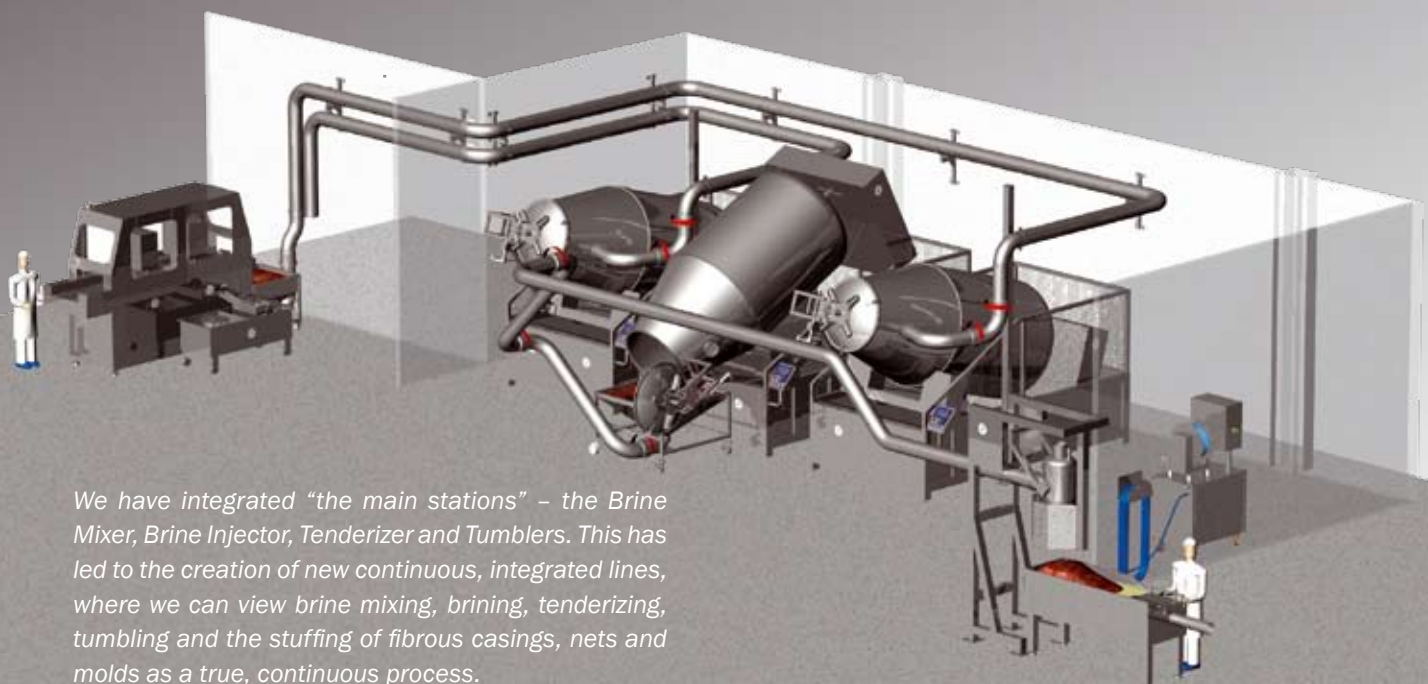
IN THE FUTURE; Over the coming years, the development of your company will undoubtedly be further strengthened by the computerization and automation of processes used to produce unmixed cured meat products.



THE TRADITIONAL SOLUTION; Production in a conventional manner using separate stations:

Vessels and/or trolleys need to be loaded and emptied in order to be able to transport products after each stage and between each station.

- How much transportation, loading, emptying and lifting is required?
- How much work does it take?
- How much time is consumed?
- How much equipment is required?
- How much space is required?



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Make savings of up to 80%!

– let us see together where your savings can be made

We know that in some cases the figures really can be that good. Let us do the calculations together and we will get a good idea of where your savings can be made.

NOT JUST FOR LARGE OPERATIONS; There are savings to be made – for large scale production volumes as well as small scale producers. We can assure you and demonstrate that this type of production can be optimized just as easily as other parts of your production.

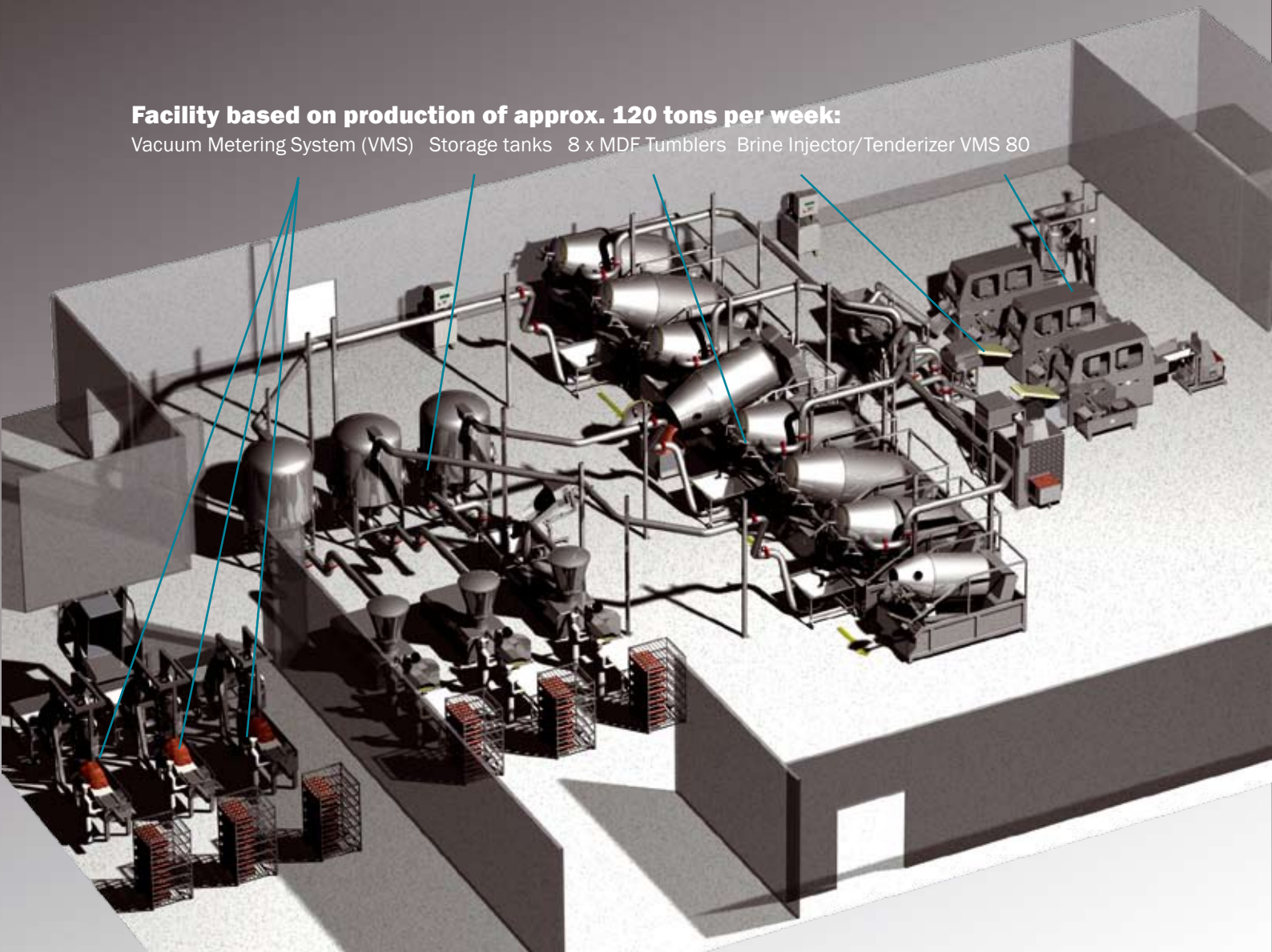
There is no need to do “everything” in one go, as changes can be implemented gradually. Your investments can be done step by step, based on a long term strategy.



EXPERIENCE? We have references from customers and companies with systems using a single tumbler to over 20 tumblers in; Sweden, Denmark, Norway, the Netherlands, Belgium, Italy, China, Japan and Australia, to name but a few.

Facility based on production of approx. 120 tons per week:

Vacuum Metering System (VMS) Storage tanks 8 x MDF Tumblers Brine Injector/Tenderizer VMS 80



The Garos MDF product range

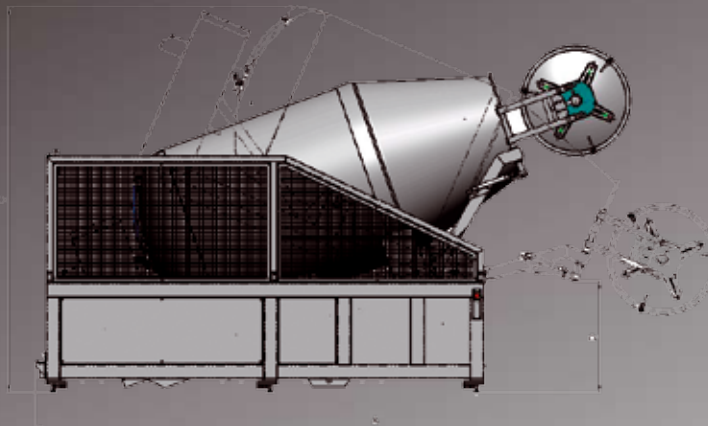
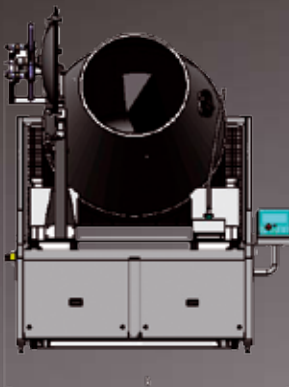
– standard units from 1 600 to 10 000 litres



GAROS MDF is available as standard units in 1 600 l, 2 600 l, 3 900 l, 5 600 l, 7 000 l and 10 000 l tumbler volumes. The output ratio is up to 65 % of the volume.

Options:

- Different carrier profiles for different applications
- Injection of CO₂ and N₂ to chill the products through an additional head
- Thawing of frozen raw material, is also a potential feature, for the TUMBLER MDF, This method gives significant advantages compared to traditional defrosting methods.



Technical data MDF:	1,600 l	2,600 l	3,900 l	5,600 l	7,500 l	10,000 l
A. Total length:	3,690 mm	4,315 mm	5,680 mm	6,080 mm	6,080 mm	6,220 mm
B. Width:	1,880 mm	2,115 mm	2,360 mm	2,580 mm	2,720 mm	3,440 mm
C. Max. height:	2,685 mm	3,120 mm	3,140 mm	3,440 mm	3,500 mm	3,640 mm
D. H to drum in lowered position	1,075 mm	1,200 mm	1,650 mm	1,700 mm	1,960 mm	1,960 mm
Weight:	1,685 kg	2,400 kg	3,400 kg	3,750 kg	4,750 kg	6,000 kg
Rated voltage:	380 V	380 V	380 V	380 V	380 V	380 V
Rated over-voltage:	24 V	24 V	24 V	24 V	24 V	24 V
Power, drive unit:	1.5 kW	2.2 kW	4 kW	5.5 kW	7,5 kW	11 kW
Power, vacuum pump:	1.5 kW	1.5 kW	2.2 kW	4 kW	6 kW	8 kW
Capacity, vacuum pump:	40 m ³ /hr	63 m ³ /hr	100 m ³ /hr	160 m ³ /hr	250 m ³ /hr	300 m ³ /hr
Power, hydraulic pump:	2.2 kW	2.2 kW	2.2 kW	2.2 kW	2.2 kW	2,2 kW
Max. load capacity:	1,100 kg	1,680 kg	2,500 kg	3,500 kg	4,500 kg	6500 kg
Rotation speed, drum:	1.8-8 rpm	1.8-8 rpm	1.8-8 rpm	1.8-8 rpm	1.8-8 rpm	1.8-8 rpm
Internal drum diameter:	1,100 mm	1,250 mm	1,390 mm	1,600 mm	2,200 mm	2,200 mm
No. of chicanes/carriers:	3+3	3+3	3+3	3+3	3+3	3+3
Diameter, drum opening:	500 mm	500 mm	900 mm	900 mm	900 mm	900 mm
Cooling capacity:	4.3 kW	5.1 kW	6 kW	7.2 kW	8,5 kW	8,5 kW
Volume, cooling jacket:	40 l	55 l	66 l	78 l	113 l	142 l