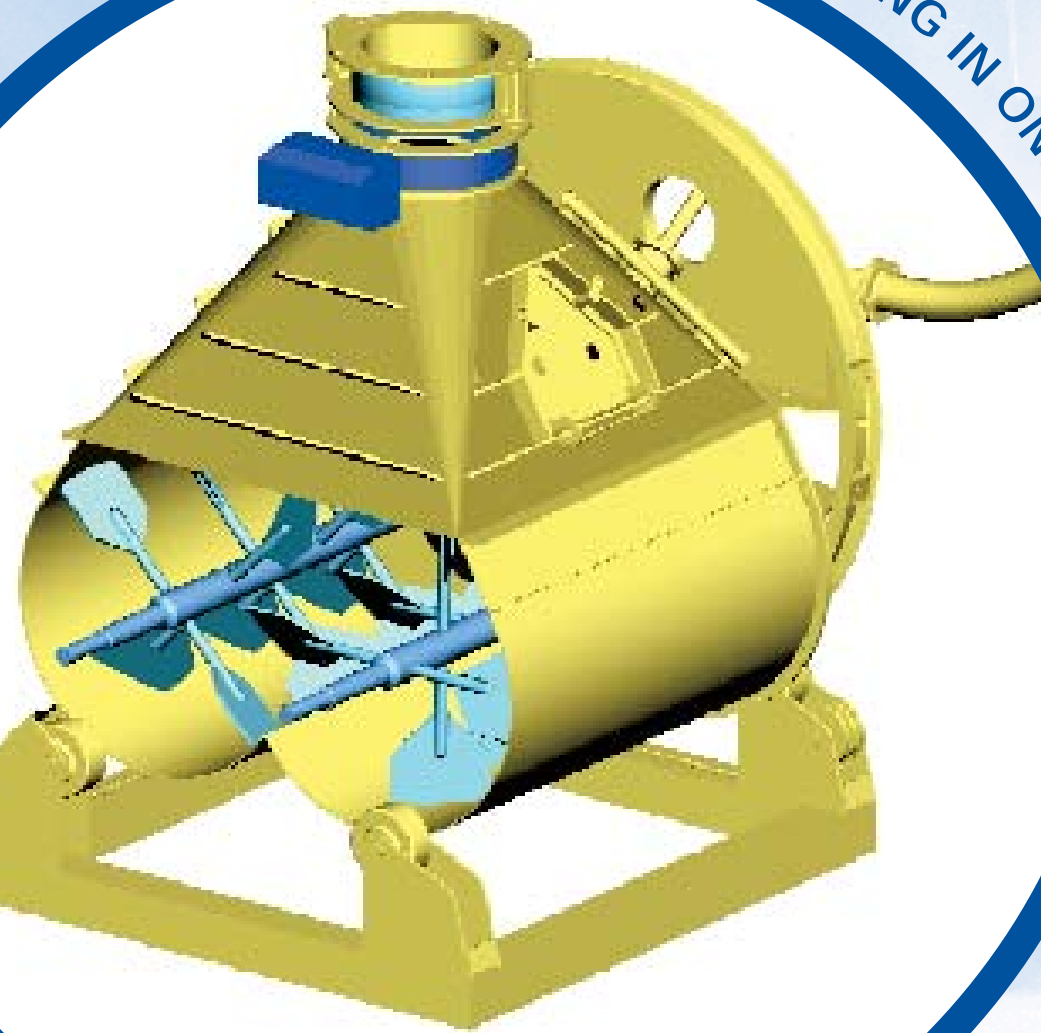


MIXING AND CORE COATING IN ONE MACHINE



MIXING AND VACUUM PROCESS TECHNOLOGY

PROCESS TECHNOLOGY

The Forberg **Rotating Vacuum Coater RVC** represents the top of the line Forberg vacuum coater. It has been especially developed for the core coating of aquatic feed extrudates, feed pellets, pet food kibbles and food extrudates. The very gentle mixing and coating of the product and the outstanding process reliability makes the machine an ultimate success. The well-proven process technology is documented by first class references word wide.

Typical Applications

- Aqua feed industry for the core coating of the extrudates with fat, oil and medicine
- Animal feed industry for the coating of poultry pellets with additional fat
- Food industry for the coating of muesli cereals with flavour, sugar and vitamins
- Pet food industry for the equal distribution of antioxidants, vitamins, medicine, flavour and fat
- Pharmaceutical industry for research purposes and product development
- Chemical industry for the coating of porous bulk material

Process Technology

The process of vacuum (core) coating is based on the principle that a pressure difference allows for additional penetration of a liquid into a porous product. In the case of the Forberg Rotating Vacuum Coater the pressure difference is created with the help of a vacuum. The air inside the product is evacuated and allows for later penetration with liquids. On the "air-empty" product, liquids are sprayed and due to the constant mixing action every particle is carefully surface coated. After a perfect surface coating (which is a precondition for the optimum coating results) the air is released back into the mixing/vacuum chamber. The pressure equalisation is the most important step of the process and is fully computer controlled. Depending on the base products, kind of liquids and process

targets different release curves can be programmed to provide the best possible core coating (penetration) effects. The process can be used to apply multiple layers of liquids or "seal" the surfaces of the products. For fish feed pellets for example an additional penetration of up to 40% of fat and oil can be achieved.

These so called post extrusion or post-pelleting applications also have the benefit of saving heat sensitive ingredients, while adding them at a later stage of the process

mixer allows to manufacture the machine with a smaller gap between the paddles and the mixer housing. In addition the breakage of the products in the gaps of the doors is completely eliminated. The updated third generation today represents the top of the line vacuum coaters and shaft mounted gearboxes increase the reliability even further.

Since the applications are very versatile and depend on the individual customer many different options to up-grade or modify the standard machine are offered.



Sample of uncoated fish feed pellets



Forberg Vacuum Coater F-3600-RVC during factory acceptance test (FAT)



Sample of coated fish feed pellets

Machine Technology

The Forberg Rotating Coater RVC is already the third generation of coaters. In the beginning a standard twin shaft mixer was used for surface coating, but the penetration results were limited to the natural absorbance of the base material. In order to increase the penetration a pressure difference with the help of vacuum was applied. The process worked just perfect, only the mechanical side needed to be improved. In order to have a more reliable process and smooth operation Forberg finally came up with the idea to put a standard twin shaft mixer on a rotating frame. This innovative concept led into an easy-to-seal mixing chamber. Today the Forberg Vacuum Coater is sealed with the help of a reliable industrial butterfly valve. The absence of the doors at the bottom of the

Available Options:

- basic material mild or stainless steel
- different treatment of the surfaces, such as polishing, glass bead shot
- electrical heated walls to avoid sticking
- weighing or feeding hopper
- load cells and frame under the machine
- liquid dosing cabinet
- control system with touch screen
- extra large vacuum pump
- safety cage for operation security
- special air cyclone



ROTATION (how it works)



Charging and spraying position
In this position the machine is charged with material and after the closing of the butterfly valve, the machine is evacuated. The spraying of liquids as the first step of the coating process can now start.



Rotation starts
After the finish of the coating process, the machine turns for discharging. The whole rotation only takes a few seconds.



Rotation continuous
The RVC turns upside down. The picture also shows the maintenance position of the machine. Without the bottom doors free access is given and cleaning and maintenance is easy.

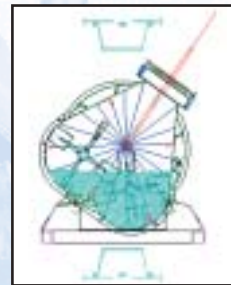


Discharge position
The machine is now ready to discharge the ready products into a hopper. The filtering and surveillance of the evacuated air is properly done to protect the environment.



Sample of coated products

WASH DOWN (option)



1. Water Filling

For fully automatic cleaning in place (CIP) the machine can be filled with water (pressurised as an option) in a 20° off position. The special washing liquid can be stored in a tank above the machine to minimise filling time.

2. Washing Process

For optimum cleaning results of the housing and mixing paddles the machine starts mixing and creates a heavy turbulence of the washing liquid. The shafts will also counter-rotate to improve the washing results. Depending on the products warm cleaning water or any other cleaning liquid such as alcohol, gasoline, ammoniac, etc. can be used.



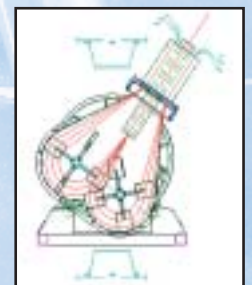
3. Discharge of Washing Liquid

The washing liquid can then be discharged in a recycling system or drainage. (depending on the product). This technology clearly separates the product from the washing liquid. In conventional systems it has always been a problem to separate this from the production line.



4. Drying of Machine

To reduce the time for cleaning the system it can be equipped with an automatic dry out device. Hot/warm air is blown into the machine to dry out the mixer body and the shafts. The moisturised air can be filtered. This process helps to reduce drying time significantly and avoids product damage due to unwanted moisture for the next batches being produced.



TECHNICAL DETAILS



Charge and discharge valve
For the secure sealing of the vacuum coater over a long period of time, a butterfly valve is used. This component is easy to maintain and parts are available all over the world.



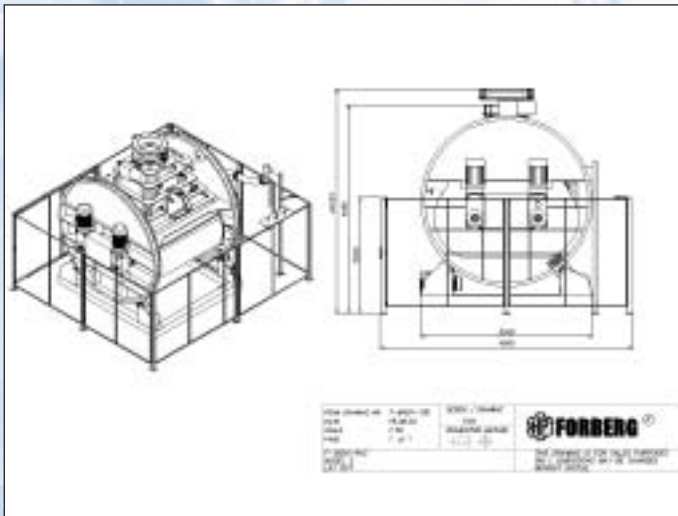
Closing valve
To protect the vacuum pump from product, Forberg has developed a special valve, which closes the coater towards the vacuum pump during the rotation process. In addition we recommend our cyclone system to avoid particles sucked into the vacuum pump.

DIMENSIONS OF THE VACUUM COATER

MODEL/ VOLUME	CAPACITIES LITRES	MOTOR SIZE kW	VACUUM PUMP kW	MEASURES		
				LENGTH mm	WIDTH mm	HEIGHT mm
F-6-RVC	2,5-9	0,37	0,37	1185	700	1340
F-60-RVC	25-90	2 x 1,5	1,5	2950	2300	2400
F-120-RVC	50-170	2 x 1,5	1,5	3060	2430	2670
F-500-RVC	200-700	2 x 4	11	3400	2500	2050
F-750-RVC	300-1000	2 x 5,5	15	3600	2600	2300
F-1000-RVC	500-1400	2 x 7,5	18,5	3750	2750	2450
F-1500-RVC	750-2100	2 x 11	2 x 18,5	4200	3110	2670
F-2000-RVC	1000-2800	2 x 15	2 x 18,5	4500	3500	3050
F-2500-RVC	1250-3500	37	2 x 18,5	4900	4000	3350
F-3600-RVC	1500-5000	45	3 x 18,5	5500	4950	4430
F-5000-RVC	2000-7000	55	3 x 22	5800	5200	4500

Measures and powers are only guidelines and can deviate, depending on application.

Technical data can be changed without any notice. Measures and weights must not be used in engineering.



Data sheet (Example Drawing)

We provide for all sizes of machines the corresponding data sheets so the "planning-in" is easy to handle. On request these dimensions are also available on floppy disc or via e-mail in AutoCAD format



Forberg Rotating Vacuum Coater F-3600-RVC

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