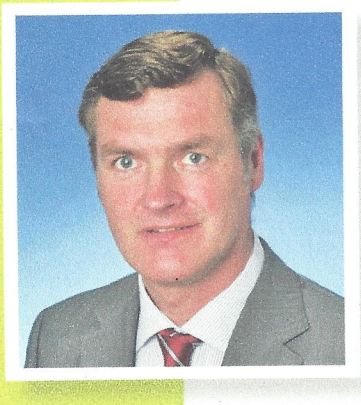

Thomas Strandt
Senior Division Manager
Petkus Engineering GmbH

Dry milling of wheat in the biotechnological added value chain

"The production of wheat starches is mainly done by wet separation process out of wheat flour, where wheat flour has a different specification in comparison to all bakery flours. Of course, the focus while producing starch flours lies mostly on achievement of the highest possible yield of starch inside the flour. Another aspect is to create a uniform granulation according to different requests of the wet technology by different suppliers. Furthermore, the content of remaining flour/starch in bran should be as minimal as possible."

Wheat, being the most important grain to produce bakery flour and bakery products, has a long history and tradition in human nutrition. However, apart from bakery purposes, wheat is also a source of a lot of other and innovative products in food, feed and non-food application.

Starch industry is a growing sector in Europe, where different starches are produced mainly from potato, maize and wheat. The production of all types of starch in 2016 in

the EU was approx. 11 million tons wherefrom approx. 60% - food and approx. 40% - non-food application (VGMS data). Native and modified starches as well as glucose derivates and gluten as a by-product are used in a great variety of food products.

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PETKUS/MMW group of companies has a long experience in grain handling and processing and created new competences in the dry milling process with new references, especially in Russia/CIS.

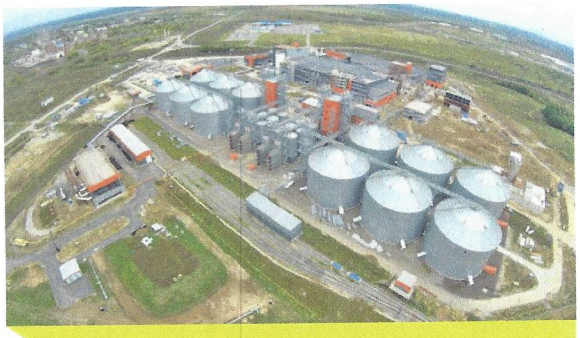
Russia is an upcoming market as far as starches and creative products out of wheat are concerned. Due to the fact that Russia is now one of the leading world producers and exporters of wheat, there are new governmental programs designed to use national grain potential inside Russia with new creative industrial projects.

Market volume of products of deep processing of grain and potato, mainly starch, increased last years to approx. 2,3 Mio tons/year, wherefrom wheat is major source and accounts for 84% (NEO 2019).

BIOTECHNOLOGICAL COMPLEX IN ROSWA, KALUGA REGION

The project with an area of 18 ha inside the industrial park of Kaluga includes a deep processing plant for wheat to produce liquid sugars for beverage industry. It includes an elevator for 170.000 tons, a flour mill with a capacity of 800 tons/day, a biotechnological complex, several warehouses and a logistics center. The whole complex was finalized in 2019 in a strong partnership with European providers of technology with a Russian investor under the supervision of a Moscow Engineering company NPK Ecology (Roswa data).

- Annual processing capacity 250.000 t wheat
- 18.000 tons gluten production
- 20.000 tons starch production
- 90.000 tons High Fructose Syrup (HFS)
- 40.000 tons sorbitol production
- 90.000 tons feed additives



View of the whole Roswa complex (foto NPK)

Moisture		13 ± 1	% of total
Starch content:	min.	74.4	% db
Protein (N x 5.7)	min.	10	% db
Fat	max.	1.5	% db
Fine fibre	max.	2.5	% db
Ash	max.	0.8	% db
Hagberg / falling number	min.	120 sec	
Remains on 250 mm sieve	max	2%	
Damaged starch:	max	4%	
flour fraction)		80-82%	

MMW DRY MILL 800 TONS/DAY

PETKUS/MMW delivered the whole complex of a dry mill designed to process wheat of Russian classes 3 and 4 and to produce starch flour in accordance with below specifications:

The dry mill complex is divided in 2 lines for fine cleaning and milling, each with a capacity of 400 tons/day in a 24/7 operation. It includes grain, flour and bran storage and transportation to the wet process. All installed machines and equipment are produced by PETKUS and MMW in Germany or by partners in Germany/EU. MMW executed all engineering, supply of all machines and equipment, supply of all PETKUS internal smooth wall silos, supervision of installation and commissioning of the silos and the mill as well as training of local engineers.

For all in-house storage of wheat, dampened wheat, flour and bran PETKUS smooth wall silos with surface coating for grain/flour standards are used.

The fine cleaning sections contain all needed machines, including separators, de-stoners, indented cyl-

inder blocks and scouring machines for DON reduction.

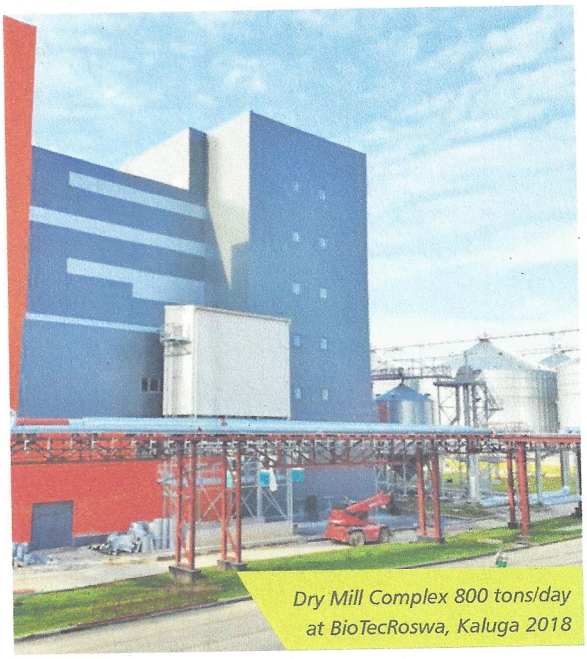
In response to special climate conditions in Russian Kaluga region a grain heating cabinet was installed in order to ensure optimal temperature of wheat for the dampening and milling process.

A special dampening system VIBRONET ensures very fast and uniform penetration of the added water to the grain and it reduces the retention time significantly. So, maximum retention time in order to reach optimal moisture content for the milling process is only 12 hours.

Implemented milling diagram is designed as an intensive short milling diagram, wherein modern MMW roller stands, plansifters and other surrounding equipment are used. The diagram as well as machine configuration (rollers' parameters, plansifter sieve schema) are the result of our own research with our references in CIS and Germany in a long-term partnership with the IGV Grain Research Institute in Potsdam, Germany. Contrary to various other mills, where often eight roller stands are used, only four roller stands are installed in the Roswa project. It effectively prevents damaging of starch granules and ensures optimal A-starch yield in the wet process.

Main Milling Machines:
24 MMW roller stands WS 4B 1250
4 MMW plansifters PLS3-8
12 MMW bran finisher KL
6 MMW vibro sifters VS

State-of-the-art MMW Roller stands WS 4 for milling lines at Roswa



Dry Mill Complex 800 tons/day at BioTecRoswa, Kaluga 2018

To ensure continuous running of the wet process the flour storage silos give a buffer of approx. 24 h that can be used also for maintenance of the mill.

Conclusion:
PETKUS/MMW provides innovative technological solutions in grain handling and processing of flour and acts as a competent partner inside the biotechnological chain of adding value to grain and grain products.

- Techniques for upgrading the quality of wheat and other grain
- Highly efficient dry milling technology focused on:
- highest yield of flour and starch
high capacity operation 24h/7d
- flour granulation profile according to the requirements of wet process
- minimal starch damage
- full utilization of by-products
- State-of-the-art machines made in Germany/EU
- Complete engineering and turnkey solutions for silo and dry mill complex
- Valuable long-term experience and actual references in Russia

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