"Innovativeness as a condition for the development of Strzeblowskie Kopalnie Surowców Mineralnych Sp. z o.o. ".

International Mining Conference within the REMIX _ Intelligent and green mining regions of the EU project

Danuta Rajczakowska

Wrocław 15.05.2019

Strzeblowskie Kopalnie Surowców Mineralnych Sp. z o.o. – a solid company with traditions

We have over 100 years of tradition and experience in the production of mineral resources

SKSM Sp. z o. o. is a leader in the production and sale of feldspar raw materials in Poland as well as a major manufacturer of quartz flours on the market.

The catalog of it also includes road aggregates and rinsing grits.

SKSM products are invisible but present in all Polish homes.

SKSM is the largest employer in the municipality.

It employs a total of 130 people working on over 100 hectares. Thanks to this, the company is permanently inscribed in the economic landscape of the region.

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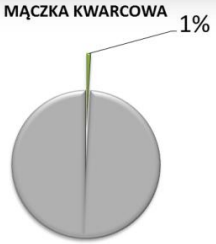
Main product groups

Feldspar - quartz grits	Feldspar - quartz flours	Quartz flours	Aggregates

Feldspar-quartz grit

Feldspar-quartz flour



Quartz flour

Granite and amphibolite aggregates

The company runs production on 7 production lines that provide a diversified portfolio of approx. 45 products. The company uses the synergy effect due to infrastructure, electricity and water supplies which are common for all production plants.

The production of feldspar-quartz grits and flours and aggregates is made from own deposits.

The deposits owned by SKSM Sp. z o. o. are unique in the scale of the Lower Silesian Region and the country.


Pagórki Zachodnie


Pagórki Wschodnie


Strzeblów I


Stary Łom

The production of quartz flours is made of sand from the Kopalnia and Zakład Produkcji Piasków Szklarskich "Osiecznica" Sp. z o. o.

The total amount of documented raw materials is approx. 48 million Mg

One of the company's priorities is the continuous increase of raw materials resources by documenting the deposits owned and searching new, potentially developmental ones.

Client - the best source of knowledge about the value of our product.

Feldspar in ceramic masses is the basic flux component.

The vitreous phase formed during firing exerts a significant influence on the properties of the forming structure of the material.

Expectations of the producers of ceramic products regarding feldspar:	Problems in meeting customer requirements
1. Low content of coloring dyes (Fe_2O_3 and TiO_2).	1. Poor recognition of deposits.
2. Stable sinter color.	2. Diversified quality parameters of the mineral.
3. High content of fluxes ($Na_2O + K_2O$).	3. Variable color of the sinter.
4. Stable quality.	4. Low performance of technological lines.
5. Available upon request.	5. Low production flexibility.
6. Relatively cheap.	
7. Tailored to individual needs.	

Strategy

Permanent expansion of the product portfolio, mainly in the field of specialist products

Permanent documenting deposits

Gradual expansion of production capacity

Gradual extension of storage yards

Implementation of modern, automated production systems

Construction of a laboratory and purchase of research equipment for the Research, Development and Technology department

2008 -2009 Increase in the production capacity of the plants pre-processing from 630 thousand Mg to 1,000,000 mg

2011 Starting a homogenization plant for feldspar grits enabling the mixing of 3 semi-finished products

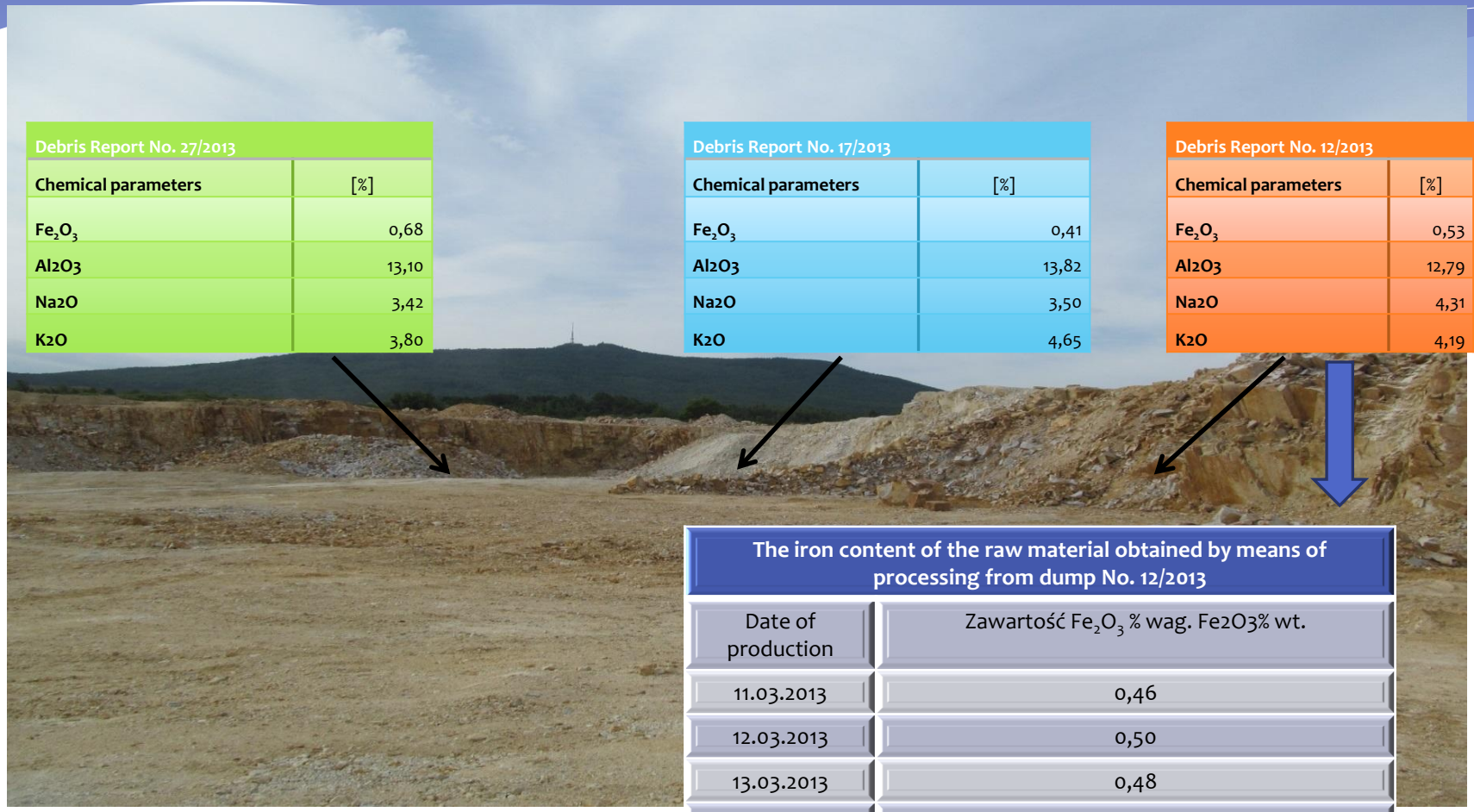
2014 Construction of an automatic homogenization line with a tunnel that enables collecting semi-finished products from under the cones and assembly of tensor weighers dosing the semi-finished product in a wide range guaranteeing weighing with an accuracy of 1%

2014 Installation of automatic samplers in order to precisely determine the chemical composition of semi-finished products and commercial assortment

2014-2015 Expansion of storage boxes for the finished product up to 160,000Mg

The value of investment tasks performed in order to implement the assumed strategy of the Company amounted to PLN 23 726.2 thous. PLN with aid from the structural funds with a total value of PLN 8,885.4 thous.

Diversification of the quality parameters of the deposit



Debris Report No. 27/2013	
Chemical parameters	[%]
Fe_2O_3	0,68
Al2O3	13,10
Na2O	3,42
K2O	3,80

Debris Report No. 17/2013	
Chemical parameters	[%]
Fe_2O_3	0,41
Al2O3	13,82
Na2O	3,50
K2O	4,65

Debris Report No. 12/2013	
Chemical parameters	[%]
Fe_2O_3	0,53
Al2O3	12,79
Na2O	4,31
K2O	4,19

The iron content of the raw material obtained by means of processing from dump No. 12/2013	
Date of production	Zawartość Fe_2O_3 % wag. Fe2O3% wt.
11.03.2013	0,46
12.03.2013	0,50
13.03.2013	0,48
28.03.2013	0,51
02.03.2013	0,35

The method of averaging the raw material before applying the automatic line for the homogenization of feldspar-quartz grits

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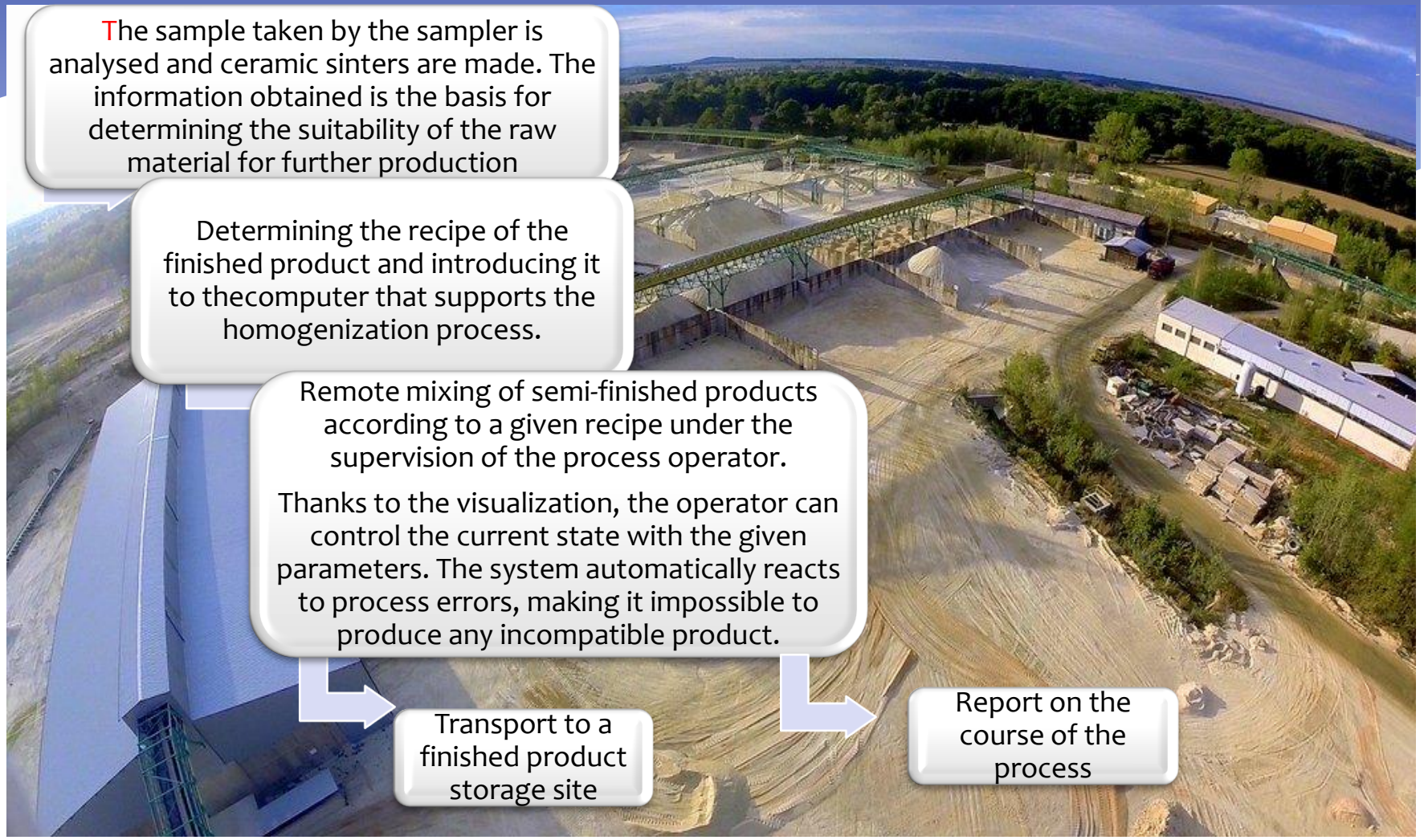
Homogenization – the process



The sample taken by the sampler is analysed and ceramic sinters are made. The information obtained is the basis for determining the suitability of the raw material for further production

Determining the recipe of the finished product and introducing it to thecomputer that supports the homogenization process.

Remote mixing of semi-finished products according to a given recipe under the supervision of the process operator.

Thanks to the visualization, the operator can control the current state with the given parameters. The system automatically reacts to process errors, making it impossible to produce any incompatible product.

Transport to a finished product storage site

Report on the course of the process

Selection of semi-finished products for the production of finished products

Mineralnych Sp. z o.o.
Ul. Torowa 1,
55-050 Sobótka
Tel. + 48 (71) 390 42 11 Fax.+48 (71)390 42 68

Data modyfikacji 07.10.2014 Wersja 1

KARTA KATALOGOWA GRYSU SKALENIOWEGO GS.08.T/01

Produkcja grysów skaleniowo-kwarcowych jest oparta na własnym surowcu.
Grysy skaleniowo-kwarcowe dostarczamy m. in. dla:
- przemysł płytek ceramicznych: do produkcji masy i szkliwa,
- przemysł wyrobów sanitarnych: do produkcji masy i szkliwa,

przemysł porcelany elektrotechnicznej.

PARAMETRY CHEMICZNE

Skład chemiczny		
SiO_2	max	79,00 %
Al_2O_3	min	12,50 %
Na_2O+K_2O	min.	6,5%
Fe_2O_3		0,55- 0,65 %
TiO_2	max	0,10 %
MgO	max	0,50 %
CaO	max	0,50 %
Straty prażenia		1,00 %

WŁAŚCIWOŚCI FIZYCZNE

Granulacja	
Dopuszczalna pozostałość na sicie kontrolnym 8mm	10%

Wilgotność		
Dopuszczalna wilgotność	max.	5%

Skład mineralogiczny	
Skaleń potasowy	33,9 %
Skaleń sodowy	24,6 %
Kwarc	37,4 %
Muskowit, Biotyt, Chloryt	4,1 %

Sposób odbioru

LUZEM
1. Całowagonowy z bocznicy własnej SKSM Sp. z o.o.
2. Samochodami Odbiorcy.

Informacje ogólne

Jeśli chcieliby Państwo zasięgnąć dokładniejszych informacji na temat naszego wyrobu służymy wiedzą i doświadczeniem z zakresu jego zastosowania.

	Nazwa usypu		Boks 19		Data uwolnienia							
		1			Fe_2O_3		Al2O3		Na2O		K2O	
Data i miejsce produkcji półproduktu	Komponenty	masa[Mg]	γ, %	Σγ, %	l %	b %	l %	b %	l %	b %	l %	b %
19.12.15 T-28B	I	2000	35,71	35,7143	0,69	0,69	12,50	12,50	4,51	4,51	4,59	4,59
18.12.15 T-28C	II	1800	32,14	67,8571	0,57	0,63	12,99	12,73	4,40	4,46	4,41	4,50
14.12.15 T-28F	III	1800	32,14	100	0,62	0,63	12,83	12,76	4,43	4,45	4,48	4,50
0	III	0	0	100	0,00	0,63	0,00	12,76	0,00	4,45	0,00	4,50
0	V	0	0	100	0,00	0,63	0,00	12,76	0,00	4,45	0,00	4,50
0	VI	0	0	100	0,00	0,63	0,00	12,76	0,00	4,45	0,00	4,50
		5600			0,63		12,76		4,45		4,50	

Name of the dump Ii Box 19 Ii Release date
Date and place of the semi-finished product production II Components II Weight [Mg]

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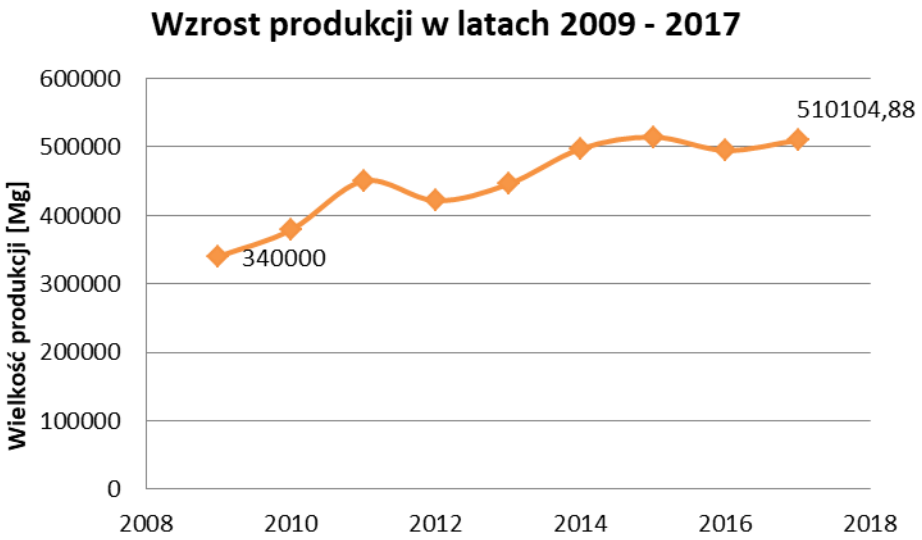
The finished product is stored in storage boxes. We currently have 23 storage boxes dedicated to the homogenization series with a total capacity of approx. 160,000 Mg.

Increase in the capacity of storage boxes		
2011	**2014**	**2015**
72 000 Mg	88 000 Mg	160 000 Mg

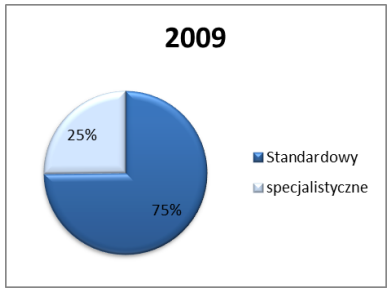
Increase in the production of feldspar-quartz grits over the years



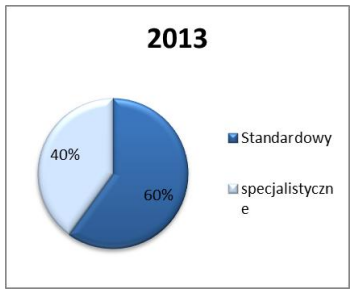
Production growth in 2009-2017
Production volume {Mg}

Thanks to flexibility and skillful product matching with the expectations of customers the company has an advantage in the field of specialized products (dedicated to the customer). Standard products are, however, an essential complement to the specialist product offer.

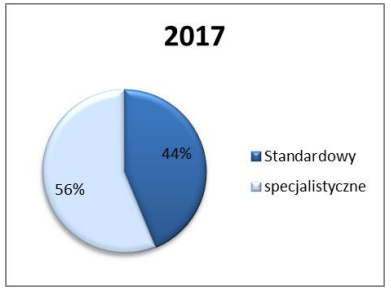
Increase in the share of specialized products production



Standard
Specialized



Standard
Specialized



Standard
Specialized

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Feldspar and quartz flours

Grinding flours with a granulation of 0.100 - 0.500 mm;

Glasswork flours with granulation: 0.063mm; 0.071 mm; 0,200 mm.

Feldspar flour (fine) is used by sanitary porcelain manufacturers where it is a basic flux component and is also used in the production of engobe and other ceramic products.

Feldspar (glasswork) flour is a basic component of a raw material set for the production of glass and mineral fiber, acting as a carrier of aluminum oxide.

The possibility of supplying raw materials from local sources, and thus minimizing transport costs, is the measurable effect of using domestic raw materials, which can have a significant impact on the business activity of the producers of precious and technical ceramics.

Quartz flours

Quartz flours with grain size: 0.100 mm; 0.075 mm; 0.056 mm; 0.040 mm; 0.030 mm.

Quartz flour is used by manufacturers of sanitary and noble ceramics, radio and electrotechnical ceramics as well as in the enamel, paint, match, household chemistry and acid resistant mortars.

The production of feldspar and quartz flours is carried out from grit raw material with defined chemical parameters. In order to ensure production stability over a longer period of time, the raw material constituting the feed for the grinding process is stored in storage boxes in the amount of approx. 3 thousand tones.

The production of quartz flour is carried out from the raw material from sand mined by KiZPS Osiecznica from the Osiecznica II deposit in the Bolesławiec basin.
This sand is characterized by a high content of SiO_2 and a low content of coloring oxides (Fe_2O_3 and TiO_2) and other components such as Al_2O_3.

Problems:

1. Old production lines = high failure rate + low efficiency.
2. Low flexibility of the production line.
3. The possibility of introducing external pollution
4. No information about the course of the production process.

"Stabilization for the butterfly is a pin" Sztaudynger

Strategy

Permanent extension of the product portfolio and adjustment of the assortment and quality of the offered products to the changing needs of customers.

Construction of a grinding plant to increase the technological potential of the company through the implementation of new proprietary production solutions and new and significantly improved products for the needs of the construction chemicals industry and sanitary products.

Gradual expansion of storage tanks

Implementation of modern, automated production systems

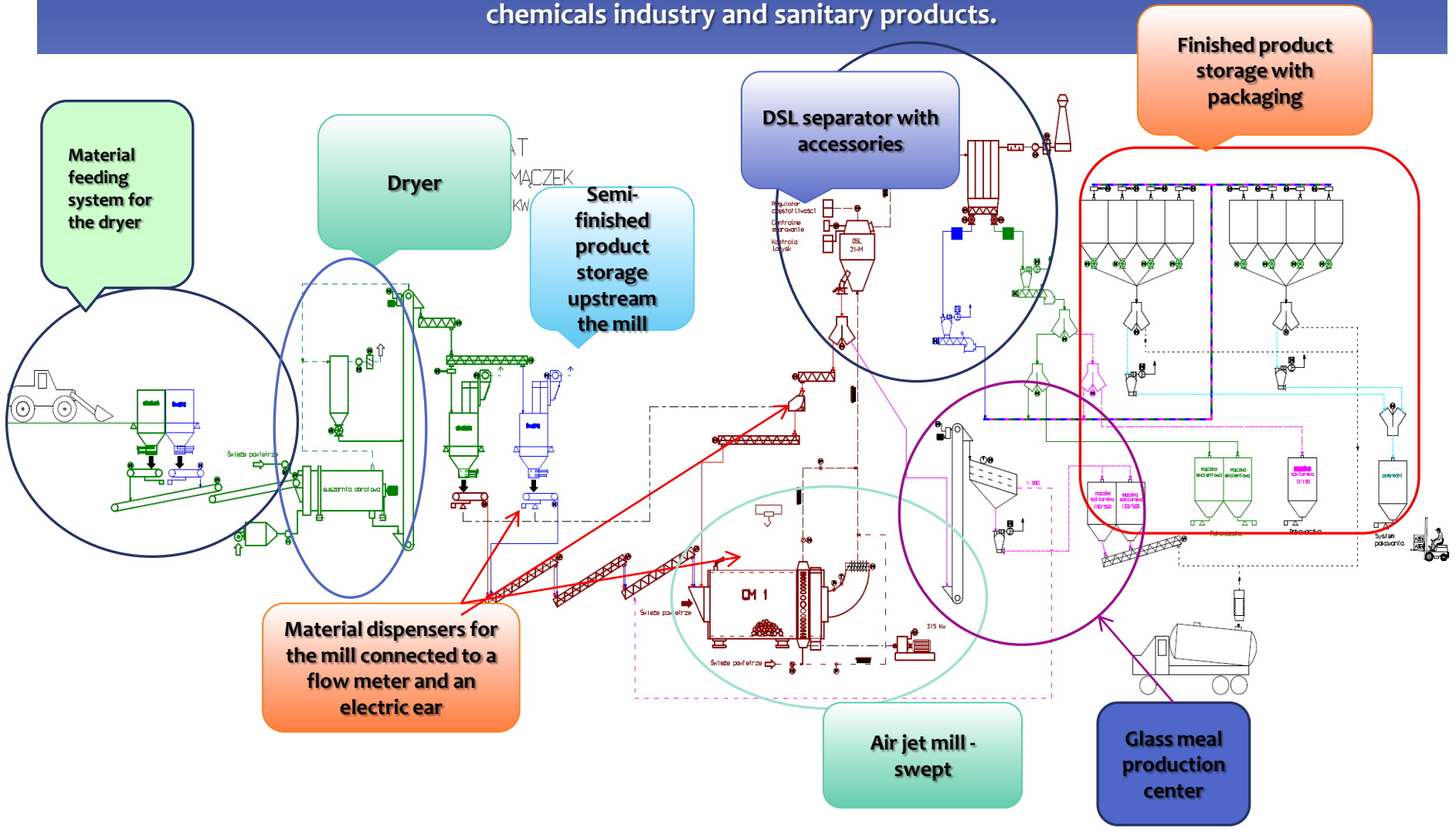
Construction of a laboratory and purchase of research equipment for the Research, Development and Technology department

2007 Purchase of Rhewum separator
2010 Expansion and roofing boxes for sand quartz
2011 Construction of storage tanks for quartz flour
2014 Production of feed for feldspar on the homogenization line. Introduction of a min. batch of 3 thousand Mg.

2013-2015 Research work on an innovative production line of high-quality ceramic and glasswork raw materials

2015 Obtaining funding for the construction of a "Grinding plant" within the Operational Program Smart Development (PO IR) Priority axis III: Support for innovation in companies Measure 3.2: Support for the implementation of the results of R&D works
Sub-measure 3.2.2: Credit for innovations
2016 Construction of a glasswork flour storage tank with a capacity of 250 m3.
2018-2019 Construction of a new production line for high-quality ceramic and glasswork raw materials

Increasing the technological potential of the company through the implementation of new proprietary production solutions and new and significantly improved products for the needs of the construction chemicals industry and sanitary products.



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Value of the project – PLN 17,200 thousand
The co-financing amount is PLN 6,000 thousand

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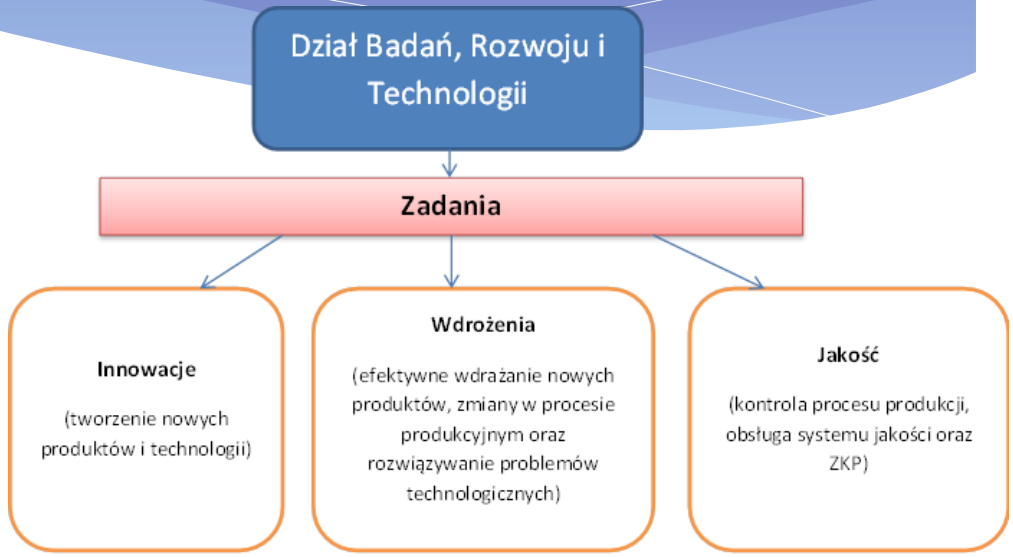
In the interest of quality and development ....

SKSM has its own research and measurement laboratory which supervises the safety of the quality of the manufactured products. It is part of the Research, Development and Technology department

In 2017, a new laboratory was put into operation.

The lab's tasks include performing quality tests of the parameters of semi-finished products and finished products, researching the deposit, in particular:

- Sampling,
- Preparation of samples for analysis,
- Performing the analysis, i.e., determinations and tests,
- Documenting, reports, data transfer,
- Archiving samples and data
- Equipment supervision, quality control, audits, training
- Waste management in consultation with an environmental specialist



Quality control process

Research and development department
Works
Innovation (creation of new products and technologies)
Implementations (effective implementation of new products, changes in the production process a
technological problems
Quality (control of the production process)

The laboratory has modern measuring equipment

S8 TIGER X-ray spectrometer with WDXRF wavelength dispersion with a stapler

Laser analyzer for Malvern particle size analysis with a hydro adapter

MiniPal 2 Panalytical X-ray spectrometer

Constant maintenance of the highest level of quality and creating innovative solutions are the basic requirements for an industrial research and development laboratory in a modern enterprise.

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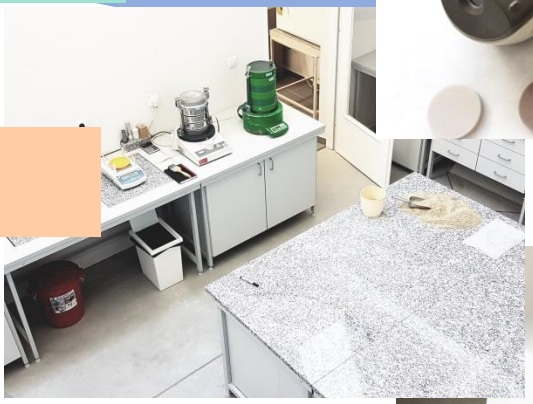
The laboratory has modern measuring equipment

Konica Minolta color meter to measure color

A modern laboratory for sample preparation



A modern chemical laboratory

Value of the project PLN 2 637.7 thousand The amount of co-financing PLN 549.9 thousand PLN

Cooperation with scientific units and recipients

	Plan of research works carried out in cooperation with scientific units
1.	**Development and implementation of technology as part of the "Construction of an innovative, integrated and highly automated production system of high-purity ceramic and glasswork raw materials using materials with various strength and chemical properties" project - own work in cooperation with research departments of the manufacturers of machines and technological devices**
2.	**"The use of post-production waste of the sanitary ceramics industry (recycled) for the production of ceramic flour for its application in the fine fireclay technology (FFC)." - own work**
3.	**"Lowering the share of the smallest ferrous pollutants by bioleaching."** - cooperation with the Chemical Engineering Department of the Wrocław University of Technology
4.	**"Reduction of ferrite impurities in feldspar-quartz and quartz flours as a result of modern methods of magnetic separation"** - own work in cooperation with research departments of the manufacturers of machines and technological devices
5.	**"Development of the optimal composition of potassium feldspar and quartz flour derived from deposits owned by SKSM."** - own work
6.	**"Development of framework recipes with the use of feldspar and quartz flour"** – cooperation with the University of Science and Technology in Krakow.
7.	**Research on quartz flours from Strzeblowskie Kopalnie Surowców Mineralnych Sp. z o. o. in Sobótka in building materials based on varnish resins compared to those currently used."- in cooperation with the Institute of Engineering of Polymer Materials and Dyes, the Department of Paint and Plastics based in Gliwice**
8.	**"Development and optimization of the amphibolite grit production process, among others in accordance with PN-EN 13043:2004 - Aggregates for bituminous mixtures and surface fixations used on roads, airports and other surfaces intended for traffic."- own work**
9.	**"Research on feldspar-quartz mineral samples from Strzeblowskie Kopalnei Surowców Mineralnych Sp. z o. o. in Sobótka with respect to the optimal chemical composition and grain size for the needs of the sanitary ceramics industry"- cooperation with the Institute of Mineral Resources and Energy of the Polish Academy of Sciences, based in Krakow**

"A ship in port is safe; but that is not what ships are built for." - Grace Hopper

Thank you for your time.

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