TUGANSK ORE MINING AND PROCESSING ENTERPRISE

ILMENITE

CONTENTS

THE COMPANY

TUGANSK ORE MINING AND PROCESSING ENTERPRISE “ILMENITE”

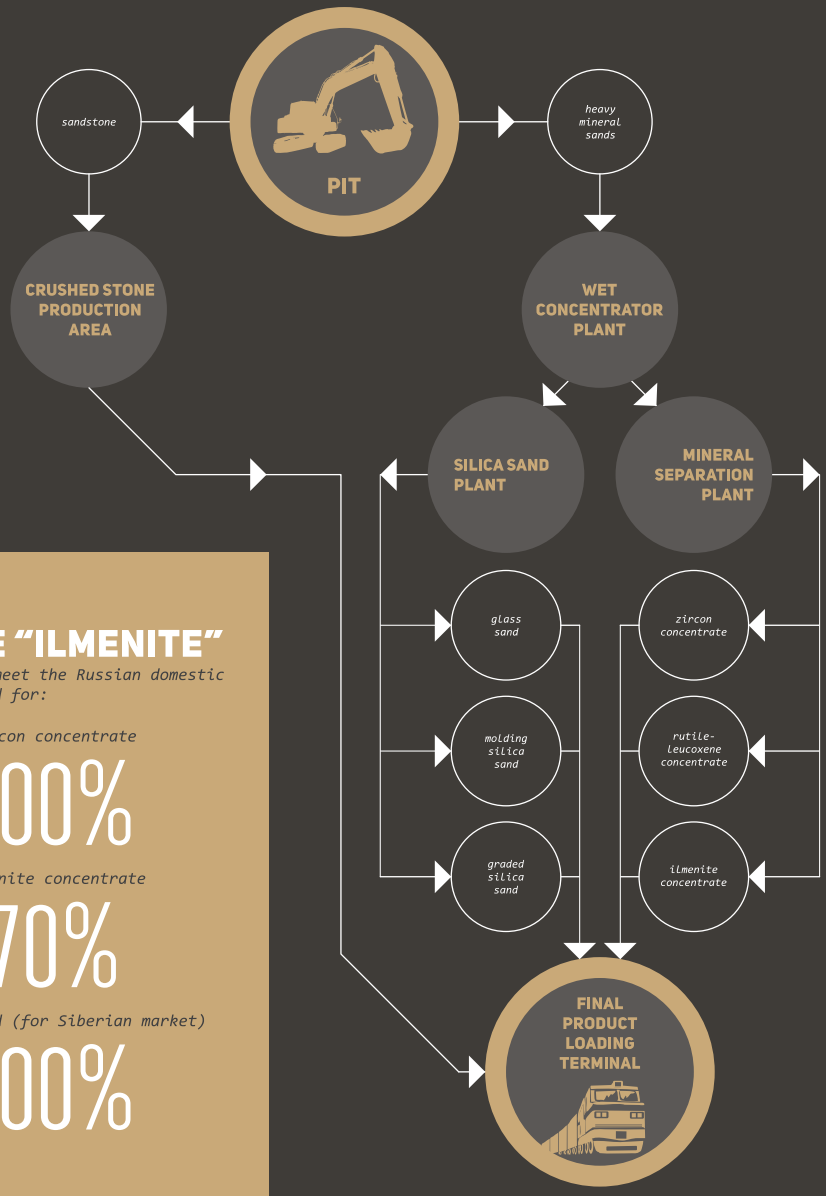
was founded in

2002

Stock Company Tugansk Ore Mining And Processing Enterprise ILMENITE has been developing the Tugan placer of ilmenite-zircon sands since 2005. Until 2016 it produced heavy mineral ore concentrates (zircon, ilmenite) and nonmetal products (silica sands, crushed rock) with a view to preparing the placer for commercial exploitation.

Nowadays, the pilot factory is being renovated to reach the production capacity of 575 ktpa (Phase I). The engineering of Phase II with three stages of 2.3 mtpa each is planned for 2022-2023.

After reaching the full production capacity, TOMPE “Ilmenite” is going to provide Russian customers with domestically produced raw material which is currently imported. This will have a beneficial effect on industrial development of the whole country as well as of the Siberian Federal District, where the plant is located.



TOMPE “ILMENITE”

is ready to meet the Russian domestic market demand for:

zircon concentrate

100%

ilmenite concentrate

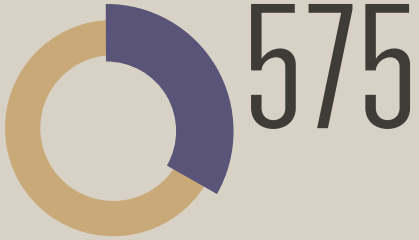
70%

silica sand (for Siberian market)

100%

THE COMPANY

THE 1ST STAGE 2021



575

KILO TONS PER ANNUM

The development of the Tugan placer at a pilot factory scale with a capacity of 125 ktpa has proved the presence of valuable components in the ore and the possibility of processing it to meet world quality standards.

Recommendations on process flow diagram improvement have been developed

Samples of concentrates (ilmenite, leucoxene and zircon) and silica sand corresponding to customers' requirements have been obtained

Marketing research has defined final products distribution markets

THE 2ND STAGE 2022-2026

6.9

MLN TONS PER ANNUM

By 2026 the capacity of the Tugansk processing factory will be increased to 6.9 mtpa of feed ore through entry into operation of Phase II:

the 2nd stage

production capacity will reach 6.9 mtpa by 2026.

The existing factory has been renovated since 2019. Leading national and foreign teams are taking part in the project, such as TOMS Engineering (St.Petersburg), Mineral Technologies Pty Ltd (Carrara, Australia), Minerali Industriali Srl (Italy), Giprotsvetmet (St.Petersburg), etc.

THE COMPANY

ON REACHING THE DESIGN CAPACITY THE OUTPUT OF SC TOMPE ILMENITE WILL BE UP TO:

148 ths. tons per annum	12 ths. tons per annum	43 ths. tons per annum	4 mln tons per annum	350 ths. m³ per annum
ilmenite concentrate (>58% TiO2)	rutile-Leucoxene concentrate (>85% TiO2)	zircon concentrate (66% ZrO2)	glass sand (GOST 22551-77), graded silica sand, molding silica sand	crushed stone (from silicified sandstone)

The customers of SC TOMPE "Ilmenite" are Russian and foreign companies engaged in aircraft engineering, nuclear, chemical, metallurgical, ceramic and glass industries.

THE PLANT CONSTRUCTION AND FULL CAPACITY START-UP WILL BE ECONOMICALLY EFFICIENT ON DIFFERENT LEVELS:

RUSSIAN FEDERATION

-import substitution of strategically important raw material for industrial development

MADE IN RUSSIA

-exploitation of substantial natural resource potential

SIBERIAN FEDERAL DISTRICT

-diversification and industrial development on the basis of available raw material

-gross regional product growth

TOMSK OBLAST

-new infrastructure and industrial facilities

-new job opportunities

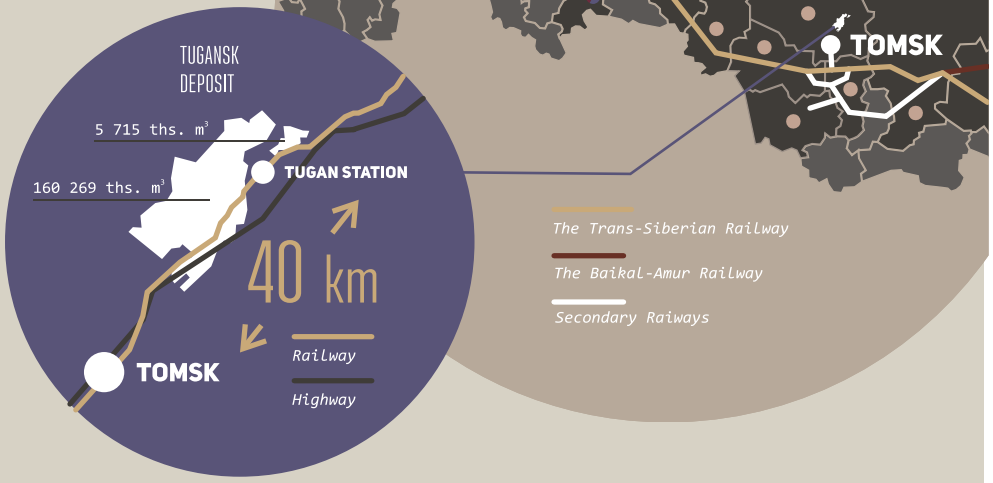
The Tugansk deposit is located in the center of the Russian Federation within the area with well-developed infrastructure 40 km away from Tomsk - major scientific and industrial center of the Siberian Federal District.
The Trans-Siberian Railway and Federal Highway are situated in proximity to the plant.

The deposit is unique in terms of main and associated components of mineral sands.
At the present time, this is an exclusive complex deposit of ilmenite-zircon sands being developed in the Russian Federation and the largest in Russia in silica sands reserves.

SC TOPME ILMENITE holds a License № TOM 02052 ТЭ to mine the Yuzhno-Aleksandrovsk and Kuskovo-Shiryaevo sectors of the Tugan placer.

SALES GEOGRAPHY:

- SILICA SAND
- RUTILE-LEUCOXENE
- ILMENITE
- ZIRCON



THE DEPOSIT

ORE RESERVS TO LAST OVER 30 YEARS

ZIRCON
1.5 mln tons

ILMENITE
3.6 mln tons

RUTILE+LEUCOXENE
0.6 mln tons

SILICA SAND
171 mln tons

EXPORT:

EUROPE – ZIRCON
KAZAKHSTAN – ILMENITE
CHINA – ILMENITE, ZIRCON
JAPAN – ZIRCON
MEXICO – ZIRCON
BRAZIL – ZIRCON

PRODUCTION

ILMENITE CONCENTRATE

Ilmenite concentrate is a fine-graded material of natural grain size. This material is intended for production of metallic titanium, titanium dioxide pigment, welding electrodes, ferrotitanium ect.

PILOT ILMENITE CONCENTRATE. OUTPUT BETWEEN 2005 AND 2016

TU 1715-001-58914756-2005

CHEMICAL COMPOSITION:

OXIDES		CONTENT, WT %
TiO_2	not less than	58.0
	standard	58.4-62.0
Al_2O_3	not more than	4.0
	standard	2.5-3.2
SiO_2	not more than	4.0
	standard	2.5-3.0

PARTICLE SIZE DISTRIBUTION:

CLASS, MM	CLASS DISTRIBUTION, %
+0.1	2.79
-0.1+0.063	82.32
-0.063+0.05	14.69
-0.05+0	0.2
total	100

Moisture content is not more than 0.5%

SHIPMENT OPTIONS

Road transport: up to 20 t in big bags with 1 t net weight

Railway transport: hopper wagon up to 72 t in bulk, open wagon up to 69 t in big bags with 1 t net weight

INDUSTRIAL ILMENITE CONCENTRATE

in accordance with the process flow diagram developed by Mineral Technologies Pty Ltd (Downer EDI Mining), the following characteristics are going to be achieved:

CHEMICAL COMPOSITION:

OXIDES	CONTENT, WT %
TiO_2	59.2
Al_2O_3	1.41
SiO_2	0.64
Cr_2O_3	3.01

PARTICLE SIZE DISTRIBUTION:

CLASS, MM	CLASS DISTRIBUTION, %
+0.1	7.1
-0.1+0.063	73.7
-0.063+0.05	18.3
-0.05+0	0.9
total	100

Moisture content is not more than 0.5%

PRODUCTION

RUTILE-LEUCOXENE CONCENTRATE

Rutile-leucoxene concentrate, as well as ilmenite and rutile concentrates, is a titanium mineral which is used as an additive to rutile in production of welding electrodes coating.

INDUSTRIAL RUTILE-LEUCOXENE CONCENTRATE

in accordance with the process flow diagram developed by Mineral Technologies Pty Ltd (Downer EDI Mining), the following characteristics are going to be achieved:

CHEMICAL COMPOSITION:

OXIDES	CONTENT, WT %
TiO_2	89.9
Fe_2O_3	2.03
$SiO2$	3.76
Al_2O_3	1.27
Cr_2O3,	0.07

PARTICLE SIZE DISTRIBUTION:

CLASS, MM	CLASS DISTRIBUTION, %
+0.1	7.6
-0.1+0.063	53.4
-0.063+0.05	37.2
-0.05+0	1.8
total	100

Moisture content is not more than 0.5%

SHIPMENT OPTIONS

Road transport: up to 20 t in big bags with 1 t net weight

Railway transport: hopper wagon up to 72 t in bulk, open wagon up to 69 t in big bags with 1 t net weight

PRODUCTION

ZIRCON SAND

Zircon sand is a light brown grained material of natural grain size. This material in intended for ceramic industry, production of refractories, zirconium metal, zirconium alloy etc.

PILOT ZIRCON SAND. OUTPUT BETWEEN 2005 AND 2016

TU 1762-002-58914756-2005

CHEMICAL CONMOSITION:

OXIDES		CONTENT, WT %
$ZrO_2+(HfO_2)$	not less than	58.0
	standard	58.5-59.8
Fe_2O_3	not more than	1.0
	standard	0.2-0.4
TiO_2	not more than	6.0
	standard	2.5-3.5
Al_2O_3	not more than	1.0
	standard	0.2-0.3

PARTICLE SIZE DISTRIBUTION:

CLASS, MM	CLASS DISTRIBUTION, %
+0.1	0.4
-0.1+0.063	50.1
-0.063+0.05	42.8
-0.05+0	6.7
total	100

Moisture content is not more than 0.5%

INDUSTRIAL ZIRCON SAND

in accordance with the process flow diagram developed by Mineral Technologies Pty Ltd (Downer EDI Mining), the following characteristics are going to be achieved:

CHEMICAL COMPOSITION:

OXIDES	CONTENT, WT %
$ZrO_2+(HfO_2)$	66.2
TiO_2	0.12
Al_2O_3	0.17
Fe_2O_3	0.04
SiO_2	32.7
P_2O_5	0.15

PARTICLE SIZE DISTRIBUTION:

CLASS, MM	CLASS DISTRIBUTION, %
+0.1	0.4
-0.1+0.063	50.1
-0.063+0.05	42.8
-0.05+0	6.7
total	100

Moisture content not more than 0.5%

SHIPMENT OPTIONS

Road transport: up to 20 t in big bags with 1 t net weight

Railway transport: covered rail wagon and open wagon both up to 69 t in big bags with 1 t net weight

PRODUCTION

ZIRCON FLOUR

Zircon flour is a light grey powder obtained after zircon sand milling process. This material is used in a variety of applications, including ceramic frits, foundry mould coatings, ceramic shells for investment casting, refractories, friction products, insulating fibres and glass.

PILOT ZIRCON FLOUR OUTPUT BETWEEN 2005 AND 2016

TU 1762-002-58914756-2005

CHEMICAL COMPOSITION:

OXIDES		CONTENT, WT %
$ZrO_2+(HfO_2)$	not less than	58.0
	standard	58.5-59.8
Fe_2O_3	not more than	1.0
	standard	0.2-0.4
TiO_2	not more than	6.0
	standard	2.5-3.5
Al_2O_3	not more than	1.0
	standard	0.2-0.3

PARTICLE SIZE DISTRIBUTION:

CLASS, MM	CLASS DISTRIBUTION, %
+63	4.0
-63	96.0
total	100.0

Moisture content is not more than 0.5%

INDUSTRIAL ZIRCON FLOUR

in accordance with the process flow diagram developed by Mineral Technologies Pty Ltd (Downer EDI Mining), the following characteristics are going to be achieved:

CHEMICAL COMPOSITION:

OXIDES	CONTENT, WT %
$ZrO_2+(HfO_2)$	66.2
TiO_2	0.12
Al_2O_3	0.17
Fe_2O_3	0.04
SiO_2	32.7
P_2O_5	0.15

PARTICLE SIZE DISTRIBUTION:

ZIRCON FLOUR-63 (200 MESH)		ZIRCON FLOUR-45 (325 MESH)	
MESH SIZE, μm	CLASS DISTRIBUTION, %	MESH SIZE, μm	CLASS DISTRIBUTION, %
+63	3.0	+45	2.0
-63	97.0	-45	98.0

Moisture content is not more than 0.5%

SHIPMENT OPTIONS

Road transport: up to 20 t in big bags with 1 t net weight

Railway transport: covered rail wagon and open wagon both up to 69 t in big bags with 1 t net weight

PRODUCTION

GLASS SAND

Silica sand for glass production is used in production of glass containers, float glass, automotive glazing, fiberglass etc.

PILOT GLASS SAND OUTPUT BETWEEN 2005 AND 2016

VS-050-1 (GOST 22551-77)

CHEMICAL COMPOSITION:

CHARACTERISTICS	GOST 22551-77	STANDARD
SiO_2, min	98.5	>99.0
Fe_2O_3, max	0.05	0.047
Al_2O_3, max	0.6	0.4-0.5
Moisture, max	0.5	0.03

PARTICLE SIZE DISTRIBUTION:

CHARACTERISTICS	GOST 22551-77	STANDARD
Oversize No. 08, max	0.5	0.1
Undersize No. 01, max	5.0	0.5

INDUSTRIAL GLASS SAND

The following grades are going to be produced (GOST 22551-77):

GLASS SAND GRADES	Fe_2O_3	SiO_2	Al_2O_3	PARTICLE SIZE DISTRIBUTION:
GOST 22551-77	not more than	not less than	not more than	
VS-030-V	0.03	98.5	0.6	Oversize No. 08 is not more than 0.5% Undersize No. 01 is not more than 5%
VS-050-1	0.05	98.5	0.6	
C-070-1	0.07	98.5	0.6	
B-100-1	0.10	98.5	0.6	
PB-150-1	0.15	98.5	1.5	

Moisture content is not more than 0.5%

SHIPMENT OPTIONS

Road transport: up to 20 t in big bags with 1 t net weight

Railway transport: hopper wagon up to 72 t in bulk open wagon up to 69 t in big bags with 1 t net weight

PRODUCTION

GRADED SILICA SAND

Graded silica sand is used in decoration work, production of dry building mixes, poured floor, construction material, foam and gas concrete, paving slabs, façade tiles. This material is also used as molding material and applied in water cleaning filters.

PILOT GRADED SILICA SAND . OUTPUT BETWEEN 2005 AND 2016

TU 5717-005-58914756-2007

CHARACTERISTICS

Initials	P22	P11	P23	P21	P20	P12
				TU 5717-005-58914756-2007		
SiO_2, not less than, %	98.0	98.0	98.0	99.0	99.0	99.0
Clay, not more than, %	3.0	5.0	3.0	0.5	0.5	0.5
Moisture, %	0.5	7.0	2.0-15.0	0.5	0.5	2.0-15.0
Av. grain size, mm	0.12	0.13	0.13	0.14	0.17	0.75

INDUSTRIAL GRADED SILICA SAND

CHARACTERISTICS	CLASS, MM			
	-5.0+1.2	-1.2+0.8	-0.8+0.2	-0.2+0.1
SiO_2, not less than, %	98.5	98.5	98.5	98.5
Clay and dusty particals, not more than, %	1.0	1.0	1.0	1.0

Moisture content is not more than 0.5%

The production of other grades is possible upon the request of a customer.

SHIPMENT OPTIONS

Road transport: up to 20 t in big bags with 1 t net weight

Railway transport: hopper wagon up to 72 t in bulk, open wagon up to 69 t in big bags with 1 t net weight

PRODUCTION

MOLDING SILICA SAND

Molding silica sand is a principal component in production of foundry moulds and cores. Moreover, this material is a basic constituent of cement gauging, concrete block, synthetic resin and other construction materials.

INDUSTRIAL MOLDING SILICA SAND

GOST 2138-91

GRADES	CLAY MASS CONTENT, NOT MORE THAN, %	SILICON DIOXIDE WEIGHT CONTENT, NOT LESS THAN, %	HOMOGENEITY COEFFICIENT, %	AVERAGE GRAIN SIZE, MM
$1K_1O_2O16$	0.2	98.5	from 70.0 to 80.0	0.14÷0.18
$1K_1O_2O2$	0.2	98.5	from 70.0 to 80.0	0.19÷0.23
$1K_1O_2O25$	0.2	98.5	from 70.0 to 80.0	0.24÷0.28
$1K_1O_2O3$	0.2	98.5	from 70.0 to 80.0	over 0.28

SHIPMENT OPTIONS

Road transport: up to 20 t in big bags with 1 t net weight

Railway transport: hopper wagon up to 72 t in bulk, open wagon up to 69 t in big bags with 1 t net weight

PRODUCTION

CRUSHED STONE

SC TOMPE "Ilmenite" produces crushed stone by crushing silicified sandstone from the Tugansk deposit. Silicified slabby sandstone is a natural sedimentary rock with high mechanical strength (over 50 MPa).

350 ths, m³ per annum — *Extraction* / *Processing* — 300 ths, m³ per annum

The crushed stone of 5-20 mm, 20-40 mm, 40-70 mm, and 70-150 mm fractions corresponds to the GOST 8267-93 "Crushed stone and gravel of compact rock for construction works". It is intended for concrete production, road and other types of construction.

Crushed sandstone of the Tugansk deposit complies with the basic commercial parameters in terms of physical and mechanical properties:

PARAMETER	DEFINITION
Flatness	Pertains to the Average class (III). Needle-shaped and slabby grains content in crushed stone total weight varies from 15% to 25% inc.
Crushability	M800-M1200 Firm class
Cold endurance	F100 and F150 grades
Wearability	I-1 and I-2 grades

SHIPMENT OPTIONS

Road transport: in bulk, on 1200x1000cm euro pallets

Railway transport: in dumpcar in bulk

Apart from the crushed stone, SC TOMPE "Ilmenite" offers slabby sandstone which is widely used in housefront facing and landscape design.

ILMENITE 2020

Contacts

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