



M E E T T H E L E G E N D



GrodnoAzot OJSC is the largest enterprise of the chemical sector of Belarus and CES where the state-of-the-art know-how and technological processes are aggregated together.

## THE PRODUCTION AND THE OUTPUT OF GRODNOAZOT OJSC

urea.....	1 000 000 t/year;
ammonia .....	1 000 000 t/year,
LIQUID NITROGEN BASED FERTILIZER (carbamide-ammonia mixture).....	760 000 t/year,
ammonia sulfate.....	400 000 t/year,
caprolactam.....	122 000 t/year,
methanol.....	80 000 t/year,
carbon dioxide liquid.....	24 000 t/year,
hydroxylamine sulfate crystalline, commercial-grade sulfuric acid.	







**BASIC MARKETS:**

United States, Asia, Latin and South America, Europe, the Baltics, Russia, Ukraine. Daily ships 8000 fertilizer 40 countries.

JSC "GrodnoAzot" is located 20 km from the border with Poland and Lithuania, in close proximity to the ports of the Baltic Sea.



In 2013 JSC "GrodnoAzot" reorganized by merging it as a technological complex of "Man-made fiber." The largest manufacturer and supplier to the world market of polyamide and polyester yarns primary polyamide - 6 and polymer composite materials based on it.

Train evorokoleya suited to the shipping platform. 45 kilometers wide fabric and 60 km of roads run through the plant. This structure includes its own fleet of rolling stock.





## ENERGY EFFICIENCY and ENERGY SAVING

enter into the set of five foreground trends of technological development of the Belarusian enterprises stated by the Head of the State. For the first time gas turbine power plant was constructed in the country at GrodnoAzote OJSC together with SIEMENS. The capacity of the total complex is 16 M/W.



## ECOLOGIC SAFETY of the TECHNOLOGICAL PROCESSES

is the demand of modern world market. It is too costly to contaminate the nature. That is the reason why the scattering gas- waterproof installations to reduce the atmospheric emission were provided at the plant: catalysis systems, air and water filtration and purification.







The production of mineral fertilizers experiences the demand in huge water sources. It is specially treated water. The chemical composition of water influenced not only the manufacturing process but also the price of the product itself. In the process of ammonia and methanol manufacturing, the industrial condensates are formed; they are free of mineral impurities but contaminated with organic substances, hence this water cannot be used. For the purpose of its application in the production instead of desalted water it is to undergo the complete purification. The scientists of the enterprise laboratory found out a new type of catalyst that provided the valid purification of water. This scientific design took out the industrial patent of the Republic of Belarus.



Every hour 20 tons of water undergo the process of purification. Part of it is supplied onto the treatment facilities where it is treated by a natural bioorganic method. At least 23 thousand cubic meters of water pass 3 cascade systems and this favors total elimination of course impurities. The best indicator of its quality is animals and birds inhabiting the proximity to the treatment facilities.





# AMMONIA liquid technical

## AMMONIA liquid technical

PACKING:

TRANSPORTATION:

rail tank cars, steel bottles.  
by road and railway.

It is produced according to GOST	6221-90
Ammonia fraction, %	not less than 99.9
Water fraction, %	not more than 0.1
Mass concentration of oil, (mg/dm <sup>3</sup> )	not more than 2
Mass concentration of iron, (mg/dm <sup>3</sup> )	not more than 1
Total chlorine fraction, mln-1 (mg/kg)	absent
Carbon dioxide fraction (IV), mln-1 (mg/kg)	absent



# METHANOL

METHANOL	
PACKING: TRANSPORTATION:	special rail tank cars. r/w transport.
Methanol is manufactured according to GOST	2222-95
Appearance: colorless transparent liquid, without insoluble admixtures.	
Density at 20 °C, g/sm <sup>3</sup>	0,791 – 0,792
Mixes with water without any traces of turbidity and opalescence.	
<b>Temperature limits:</b>	
Boiling limits, °C	C 64,0 – 65,5
99% of the product is distilled in the limits, °C	not more than 0,8
<b>Mass fraction:</b>	
Water, %	not more than 0,05
Free acids on formic acid basis, %,	not more than 0,0015
Aldehydes and ketones on acetone basis, %	not more than 0,003
Volatile compounds on Fe basis, %,	not more than 0, 00001
Ammonia and amino compounds on NH <sub>3</sub> basis, %	not more than 0,00001
Chlorine, sulfur, %, each,	not more than 0, 0001
Fixed residual after evaporation, %	not more than 0, 001
Test with potash permanganate, min	not less than 60
Mass fraction of ethyl spirit, %	not more than 0,01
Color on platinum-cobalt scale, Hazen units	not more than 5
Mass fraction of methanol, %	not less than 99,95
Conductivity, Ohm/m	not more than 3x 10 <sup>-5</sup>



# UREA prill

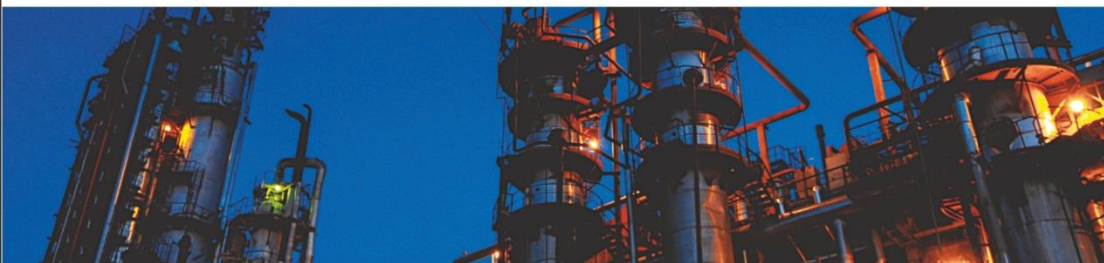
<b>UREA prill</b>	
<b>PACKING:</b> <b>TRANSPORTATION:</b>	in bulk; in 50 kg bags. by rail and road.
<b>It is produced according to GOST</b>	<b>2081 – 92</b>
<b>Nitrogen content on dry basis, %</b>	<b>not less than 46,2</b>
<b>Biuret mass fraction, %</b>	<b>not more than 1</b>
<b>Water mass fraction, %</b>	<b>not more than 0,5</b>
<b>Static granule strength, kgf/granule</b>	<b>not less than 0,7</b>
<b>Looseness, %</b>	<b>100</b>
<b>Size of granules, %</b>	
<b>Mass fraction of granules 2 - 4 mm</b>	<b>not less than 85</b>
<b>Mass fraction of granules less than 1 mm</b>	<b>not more than 3</b>
<b>Residual on sieve not more than 6 mm</b> (to be determined by contract)	<b>absent</b>





## UREA with plant growth regulator

<b>UREA with plant growth regulator</b>	
<b>PACKING:</b> <b>TRANSPORTATION:</b>	in bulk; in 50 kg bags. by railway and road.
<b>It is produced according to TU RB</b>	<b>500036524.100-2001</b>
<b>Nitrogen mass fraction, %</b>	<b>not less than 46,0</b>
<b>Biuret mass fraction, %</b>	<b>not more than 1,4</b>
<b>Water mass fraction (drying method), %</b>	<b>not more than 0,3</b>
<b>Water mass fraction (Fisher method),%</b>	<b>not more than 0,5</b>
<b>Mass fraction of organic substances (inc. humic subst.),%</b>	<b>not less than 0,05</b>
<b>Static granule strength, kgf/granule</b>	<b>not less than 0,5</b>
<b>Looseness, %</b>	<b>100</b>
<b>Size of granules, %</b>	
<b>Mass fraction of granules less than 1 mm</b>	<b>not more than 5</b>
<b>Mass fraction of granules 1 - 4 mm</b>	<b>not less than 94</b>
<b>Mass fraction of granules more than 6 mm</b>	<b>absent</b>



# AMMONIUM SULFATE

AMMONIUM SULFATE	
<b>PACKING:</b> <b>TRANSPORTATION:</b>	shipped in bulk (railway, cars, trucks). by road and rail means.
<b>It is produced according to GOST</b>	<b>9097 – 82</b>
<b>Appearance - white or transparent crystals.</b>	
<b>Nitrogen mass on dry basis, %</b>	<b>not less than 21.0</b>
<b>Water mass fraction, %</b>	<b>not more than 0.2</b>
<b>Free sulphuric acid mass fraction, %</b>	<b>not more than 0.03</b>
<b>Fraction composition, mass fraction:</b>	
<b>More than 0.5 mm, %</b>	<b>not less than 80</b>
<b>Less than 6 mm, %</b>	<b>100</b>
<b>Looseness, %</b>	<b>100</b>
<b>Mass fraction on insoluble in water residue, %</b>	<b>not more than 0.02</b>





## CAPROLACTAM liquid and technical

### CAPROLACTAM liquid and technical

**PACKING:**

liquid-rail and road tank cars; crystalline-double packing on pallets.

**TRANSPORTATION:**

by road and rail means.

It is produced according to GOST	7850 – 86
Permanganate index, <b>unit</b>	not more than 4
Color of 50% water solution, <b>Has. Units</b>	not more than 3.0
Volatile base content, <b>mmol/kg</b>	not more than 0.4
Temperature of crystallization, <b>°C</b>	not less than 68.8
Mass fraction of Fe, <b>%</b>	not more than 0.00002
Mass fraction of cyclohexanone oksime, <b>%</b>	not more than 0,002
Optical density of 50% water solution <b>%</b>	not more than 0,04
Alkalinity, <b>mmol/kg</b>	not more than 0,1
Acidity, <b>mmol/kg</b>	not more than 0.05
pH of 20% water solution	6,7 – 7,3



# LIQUID NITROGEN BASED FERTILIZER(UAN)

## LIQUID NITROGEN BASED FERTILIZER (UAN)

PACKING:

railway tank cars, tank trucks.

TRANSPORTATION:

by road and rail means.

<b>TU RB</b>	<b>500036524.054-2004</b>
<b>Depending on nitrogen content three grades of UAN are produced</b>	<b>UAN-28; UAN-30; &amp; UAN-32</b>
<b>Total nitrogen content, %</b>	<b>not less 28; 30; 32</b>
<b>Urea/ammonium nitrate ratio</b>	<b>0,78±0,05</b>
<b>Alkalinity of the solution in terms of free ammonia, %</b>	<b>0,01 – 0,50</b>
<b>Corrosion inhibitor content, Corrogard, %</b>	<b>not less than 0, 008</b>





# HYDROXYLAMINE SULPHATE

## HYDROXYLAMINE SULPHATE (CRYSTALLINE)

PACKING:

25 kg PE bags.

TRANSPORTATION:

by rail and road.

<b>TU RB</b>	<b>00203832.083-97</b>
<b>Mass fraction of hydroxylamine sulfate, %</b>	<b>not less than 99.0</b>
<b>Mass fraction of ammonium sulfate, %</b>	<b>not more than 0.5</b>
<b>Mass fraction of Fe, %</b>	<b>not more than 0.0003</b>
<b>Mass fraction of the residue after calcination, %</b>	<b>not more than 0,02</b>
<b>Mass fraction of Pb, %</b>	<b>not more than 0.0001</b>
<b>Mass fraction of chlorides, %</b>	<b>not more than 0.0002</b>
<b>Mass fraction of water, %</b>	<b>not more than 0.5</b>
<b>pH of 5% water solution</b>	<b>not less than 3.0</b>



# UREA granular

## UREA granular

PACKING:	railway tank cars.
TRANSPORTATION:	r/w transport.
TU RB	500036524.096-2003
N content, % mass, not less than:	46,2
Biuret, % mass, not more than:	1,4
Water content by Fisher method % mass, not more than:	0,5 0,3
Fraction size:	
2-5 mm range, not less than:	95
Less than 1 mm range, not more than	0,5 %
Residue on sieve 6 mm	absence
Static strength of granules, kg/granule, not less than:	100
Free flowing.	2,0





# AQUA AMMONIA

<b>AQUA AMMONIA</b>	
<b>PACKING:</b>	PE cans, 35 l.
<b>TRANSPORTATION:</b>	by rail and road.
<b>It is produced according to GOST</b>	<b>24147 – 80</b>
<b>Ammonia content, %</b>	<b>not less than 25</b>
<b>Mass fraction of Al, Fe, Cd, K, Ca, Co, Mg, Bi, Mn, Cu, Na, Sn, Pb, Zn, Ni, Cr, Ag, %</b>	<b>for each <math>1 \cdot 10^{-6}</math> - <math>1 \cdot 10^{-8}</math></b>
<b>Mass fraction of carbonates (CO<sub>3</sub>), %</b>	<b>not more than <math>1 \cdot 10^{-3}</math></b>
<b>Mass fraction of sulfates (SO<sub>4</sub>), %</b>	<b>not more than <math>3 \cdot 10^{-5}</math></b>
<b>Mass fraction of chlorides (Cl), %</b>	<b>not more than <math>2,5 \cdot 10^{-5}</math></b>
<b>Mass fraction of substances reducing KMnO<sub>4</sub>, %</b>	<b>not more than <math>8 \cdot 10^{-4}</math></b>
<b>Mass fraction of residue after calcination, %</b>	<b>not more than <math>1 \cdot 10^{-3}</math></b>



# SULFURIC ACID

## SULFURIC ACID

**PACKING:** railway tank cars.  
**TRANSPORTATION:** r/w transport.

<b>It is produced according to GOST</b>	<b>2184 – 77</b>
<b>Monohydrate (H<sub>2</sub>SO<sub>4</sub>) content, %</b>	<b>92,5 – 94,0</b>
<b>Iron (Fe) content, %</b>	<b>not more than 0.006</b>
<b>Mass fraction of the residue after calcination, %</b>	<b>no more than 0.02</b>
<b>Mass fraction of N<sub>2</sub>O<sub>3</sub>, %</b>	<b>not more than 0.00005</b>
<b>Clarity</b>	<b>clear without dilution</b>
<b>Color in cm<sup>3</sup> of comparative solution</b>	<b>not more than 1</b>





# CARBON DIOXIDE liquid

## CARBON DIOXIDE liquid

**PACKING:**

in bottles with capacity up to 50 dm<sup>3</sup> and refrigerator tanks.

**TRANSPORTATION:**

by all modes of transport, in horizontally or vertically arranged bottles in special containers equipped with mandatory guarding to avoid falling.

It is produced according to GOST

**8050-85  
premium grade**

Carbon dioxide volume fraction, %

**not less than 99.8**

Mass concentration of mineral oils and mechanical impurities, mg/kg

**not more than 0.1**

Mass concentration of water vapor at a temperature of 20°C and a pressure of 101.3 kPa, g/m<sup>3</sup>

**not more than 0.037**

Carbon monoxide, hydrogen sulfide, hydrochloric acid, sulfurous and nitrous acids, organic compounds, ammonia and ethanolamines, aromatic hydrocarbons and vanadium oxides should not be present.



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