



OSTCHEM

CHERKASY  
AZOT

PJSC “AZOT” (Cherkasy) is one of the largest chemical enterprises in Ukraine. PJSC “AZOT” production capacities enable to manufacture about 1 million tonnes of liquid ammonia, 1 million tonnes of granulated ammonium nitrate and 1.2 million tonnes of nitric acid.

Moreover, the chemical giant produces urea and urea-ammonium nitrate, aqueous ammonia, ion-exchange resins, liquid and crystalline caprolactam, crystalline ammonium sulfate and liquefied carbon dioxide. The products by PJSC “AZOT” are in great favour on the domestic and global market.

PJSC “AZOT” is open to innovative projects as in production sphere as regional development and environment protection. Biological treatment facilities on the Dnieper River provided by PJSC “AZOT” are the essential attribute of a modern chemical complex.

Being a city-forming enterprise of Cherkasy, PJSC “AZOT” aims to build and develop social partnership with the town and the region. Every year it invests a considerable funds in renovation of the streets and squares in Cherkasy as well as in social and educational institutions.

In 2010 PJSC “AZOT” became a part of OSTCHEM Group DF.



I am honored to present PJSC "AZOT", which is one of the leading Ukrainian enterprises included into OSTCHEM Group DF.

In its half-century history our company has experienced several modernizations. Today PJSC "AZOT" is a modern and dynamically developing chemical enterprise employing highly qualified specialists and equipped with advanced technologies.

Market expansion and strict observance of contract obligations, the state and corporate interests unity, high social responsibility of business, comfortable labor conditions and rest of employees increase the rating of our enterprise in the industry.

The primary tasks we are going to deal with in the near future are to increase energy efficiency of the operating enterprises, elaborate and apply innovative technologies as well as increase the production profitability.

Safety measures, labor protection and environmental preservation are the priority issues of the enterprise's activity. Social programs enlargement, team building, corporate values implementation are the essential part of PJSC "AZOT" further development.

*Vitaliy Sklyarov*

A handwritten signature in black ink, consisting of a stylized 'V' and 'S'.

*PJSC "AZOT" Chairman of the Board*

# PJSC "AZOT" (Cherkasy)



**1** million tonnes

of ammonium nitrate per year. It is the highest rate in Ukraine



**5,4** UAH billion

products realization sum in 2012



**60** UAH million

was spent on environmental projects in 2010-2012



**4500**

people employs PJSC "AZOT" enterprise

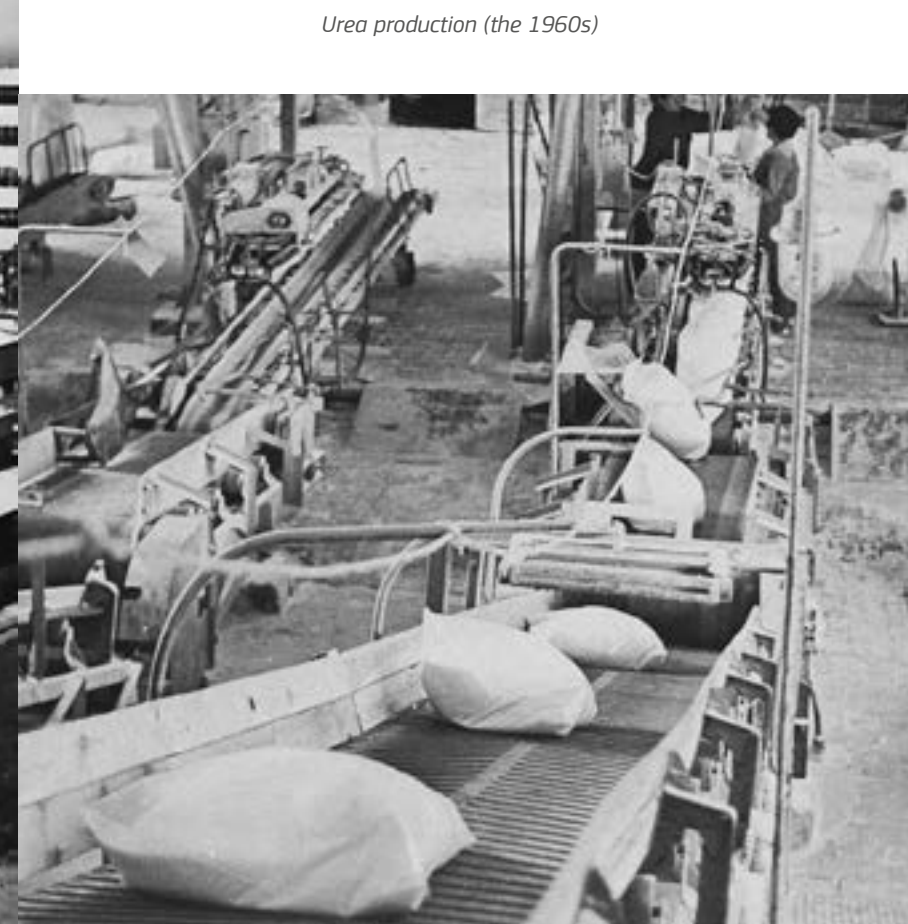
# History



*Nitrogen Fertilizer Plant  
Construction (the 1930s)*



*Field clearance for nitrogen fertilizer  
construction (1962)*



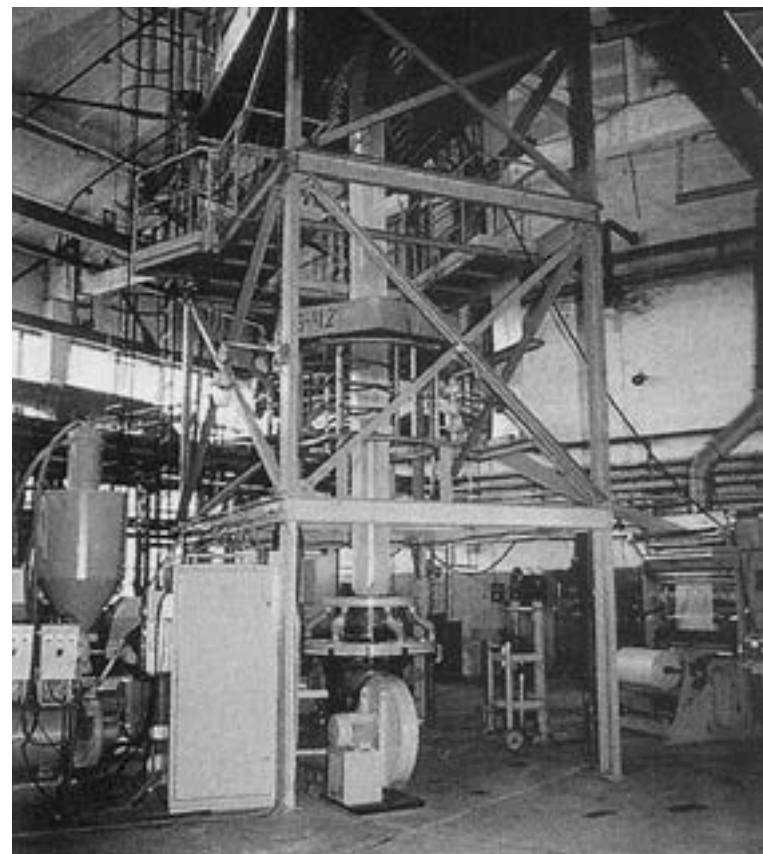
*Urea production (the 1960s)*



*Ammonium nitrate production (the 1970s)*

PJSC "AZOT" (Cherkasy) produced its first liquid ammonia in March, 1965. Having been built at high tempo (less than three years) the enterprise began developing actively.

In 1968 the urea production site was put into operation at the enterprise. At the beginning of 1970 the shops producing liquid ammonia, non concentrated nitric acid and ammonium nitrate started operating. During the following two years manufacturing capacities on non concentrated nitric acid and ammonium nitrate were doubled. In May 1973 the first millionth tonne of urea and the next month the first millionth tonne of liquid ammonia were produced at the plant.



Installation of equipment for polymer film production

By the mid-1970s the formation process of main production capacities had almost been completed and in 1975 Cherkasy chemical plant became Cherkasy Production Association "Azot".

Being "production association" the plant changed its development vector from quantity to quality. In 1967 industrial and research site of ion-exchanging production started operating at the plant. It was the most advanced site in the USSR that gathered the leading scientific and technical experts in the industry. This contributes to the new products launching as well as modern manufacturing technologies and equipment implementation.



Experts working in the ion-exchanging production shop



Caprolactam production


The 1990s period was the most difficult in the Association's history. Settled economic contacts were ruined and the approach to business was being changed. Owing to a joint stock company formation in 1995 JSC "Azot" (Cherkasy) managed to keep its qualified personnel and did not allow production volume to decrease.

Joining OSTCHEM Group DF in 2010 gave Cherkasy chemical industry specialists new perspectives in both equipment modernizations and production capacities rising.

PJSC "AZOT" will celebrate its 50th anniversary in March, 2015.
















# Production capacities



Production capacities constant growth and modernization are the principal directions in PJSC "AZOT" (Cherkasy) development.

# Main production capacities

Fertilizers production	Number of sites	Total production capacities (thousand tonnes per year)
Weak nitric acid		1 200
Granular ammonium nitrate		1 000
Liquid ammonia	 	964
Urea granulated	 	760
Urea-ammonium nitrate (UAN)		500
Aqueous ammonia		252
Crystalline ammonium sulfate		153
Liquid caprolactam		60
Crystalline caprolactam		50
Liquefied carbon dioxide		24
Cationite (ion-exchange resins)		3,25

# Daily production capacities

Ammonia (A-5, A-3)



2 900 tonnes

Urea (M-2, M-6)



2 000 tonnes

Ammonium nitrate (M-9)



2 910 tonnes

## Technological Processes Brief Description

## Ammonia Production

## Shop A-3

The technological process of ammonia production was developed by Grande Paroisse and the gas synthesis process was elaborated by Foster Wheeler. The general project was prepared by EMCA-France.

Planned production capacity is 400 000 tonnes of ammonia per year.

The production of synthetic ammonia includes two process lines.

Method of production implies ammonia synthesis from nitrogen and hydrogen by combining them under the pressure of 32-35 MPa and the temperature range of 430-570 °C using iron based catalyst.

## Shop A-5

The technological process of liquid ammonia production was elaborated by Kellogg Brown & Root LLC, USA. The project of all the sites (except construction, underground pipelines and liquid ammonia loading platforms) was presented by "TEC", Japan.

Planned production capacity is 450 000 tonnes of ammonia per year.

The shop was put into operation in January, 1980. During the period 2006-2008 there were two phases of site's reconstruction aimed to increase production capacity of liquid ammonia up to 562 700 tonnes per year.

The production of synthetic ammonia is made in a single technological line.

## Ammonium Nitrate Production

## Shop M-9

The technological process of liquid ammonia production was elaborated by PJSC "GIAP", Moscow.

Planned production capacity is 970 000 tonnes of ammonium nitrate per year.

The production of ammonium nitrate consists of two technological lines.

## Urea-ammonium nitrate (UAN) Production

## Shop M-7

The technological process of urea-ammonium nitrate was developed by Spie Batignolles, France.

Planned production capacity is 200 000 tonnes of UAN per year.

The site was renovated in 2009, as result the capacity reached 500 000 tonnes of UAN per year.

The production of urea-ammonium nitrate consists of two technological lines.

## Urea Production

## Shop M-2

The technological process of urea production was developed by Chemoproject, the Czech Republic and "know-how" was based on the license of Stamicarbon, Netherlands.

Planned production capacity is 330 000 tonnes of urea per year.

The production of urea is made in a single technological line.

## Shop M-6

The technological process of urea production was developed by Chemoproject, the Czech Republic and "know-how" was based on the license of Stamicarbon, Netherlands.

Planned production capacity is 330 000 tonnes of urea per year.

The production of urea is made in a single technological line.

## Liquefied Carbon Dioxide Production in M-6 shop

The shop was built and put into operation under the project of Chemtechnology (Cherkasy subsidiary), Scientific research and Design Institute of Chemical Technologies in 2003 with subsequent increase in production capacity of liquid carbon dioxide twice up to 24 000 tonnes per year in 2005.

## Non Concentrated Nitric Acid Production

## Shop M-5

The technological process of non concentrated nitric acid production was developed by GIAP, Dneprodzerzhinsk subsidiary.

Planned production capacity is 1 200 000 tonnes of acid per year.

Non concentrated nitric acid production is made with 10 technological lines based on UKL-7 sites which give 120 000 tonnes per year.

## Technological Processes Brief Description

## Caprolactam Production

## Liquid Caprolactam Production in shop K-1

*The technological process of caprolactam production was developed by GIAP, Moscow and SMK, Germany.*

*Planned production capacity is 50 000 tonnes of caprolactam per year.*

*The production capacity reached 60 000 tonnes of caprolactam per year after the reconstruction of the unit conducted in 2007.*

*Caprolactam production consists of two technological lines.*

## Crystalline Caprolactam Production in shop K-7

*The technological process of caprolactam crystalline production was introduced by Chemtechnology (Cherkasy subsidiary), Scientific research and Design Institute of Chemical Technologies.*

*Planned production capacity is 50 000 tonnes per year.*

## Crystalline Ammonium Sulfate Production in shop K-2

*The technological process of crystalline ammonium sulfate production was elaborated by GIAP (Kemerov subsidiary), Science and Design Institute of Chemical Technologies and SMK, Germany.*

*Planned production capacity is 140 000 tonnes of ammonium sulfate per year.*

*The production capacity reached 153 000 tonnes per year after the reconstruction of the unit conducted in 2007.*

*Ammonium sulfate production consists of two technological lines operating simultaneously.*

## Air Separation Products Production in shop K-3

*The production is intended for complex air separation into Nitrogen, Oxygen and Argon.*

*The technological process of air separation is based on the low-temperature rectification method and includes:*

- purification of atmospheric air from admixtures;*
- pressure;*
- subsequent cooling;*
- liquefaction;*
- low temperature rectification to produce main components (Nitrogen, Oxygen and Argon).*

*Air separation products manufacture consists of two identical air separation sites Azh Kz KAArzh-2 and KA-5.*

## Aqueous Ammonia Production

## Shop M-7

*The technological process of aqueous ammonia production was elaborated by GIAP (Severodonetsk subsidiary).*

*Planned production capacity is 252 000 tonnes of aqueous ammonia per year.*

*Aqueous ammonia production is conducted in a single technological line.*

## Ion-exchange Resins (Cationite) Production in I-1shop

## Shop I-1

*The technological process of cationite production was performed by the Scientific and Production Association "Plastmassy" (Plastics), Moscow. Technological batch scheme is used*

*The production capacity reached 3 250 tonnes of cationite per year in terms of Ku-2-8 after the reconstruction of the unit conducted in 2005.*

# Main products

## Nitrogen fertilizers

Product	Standard
Ammonium nitrate	DSTU 7370:2013
Ammonium nitrate, a by-product of ammonium nitrate	TU U 24.1-00203826-041:2009
Ammonium sulfate	GOST 9097-82
Ammonium sulfate fertilizer, a by-product of ammonium sulfate	TU U 24.1-00203826-043:2011
Aqueous ammonia technical	GOST 9-92
Liquid ammonia technical (anhydrous ammonia)	GOST 6221-90
Liquid nitrogen fertilizers (UAN)	TU U 24.1-00203826.024-2002
Urea	DSTU 7312:2013
Urea, a by-product of urea	TU U 24.1-00203826-018:2009 (DSTU 7312:2013)

## Organic products

Product	Standard
Aqueous hydroxylamine sulfate	TU U 00203826.019-99
Crystalline caprolactam	GOST 7850-86
Cyclohexane technical	GOST 14198-78
Cyclohexanone technical	GOST 24615-81
Liquid caprolactam	GOST 7850-86
POD oil	TU U 20.1-33270581-023:2012
Spirit fraction of caprolactam production	TU U 24.3-00203826-033:2005

## Gases

Product	Standard
Liquefied carbon dioxide	DSTU 4817:2007
Nitrogen gaseous	DSTU GOST 9293:2009
Nitrogen liquid	DSTU GOST 9293:2009
Oxygen gaseous technical	DSTU GOST 5583:2009
Oxygen liquid technical	GOST 6331-78

## Acids

Product	Standard
Non concentrated (weak) nitric acid	TU U 00203826.021-2000

## Other products

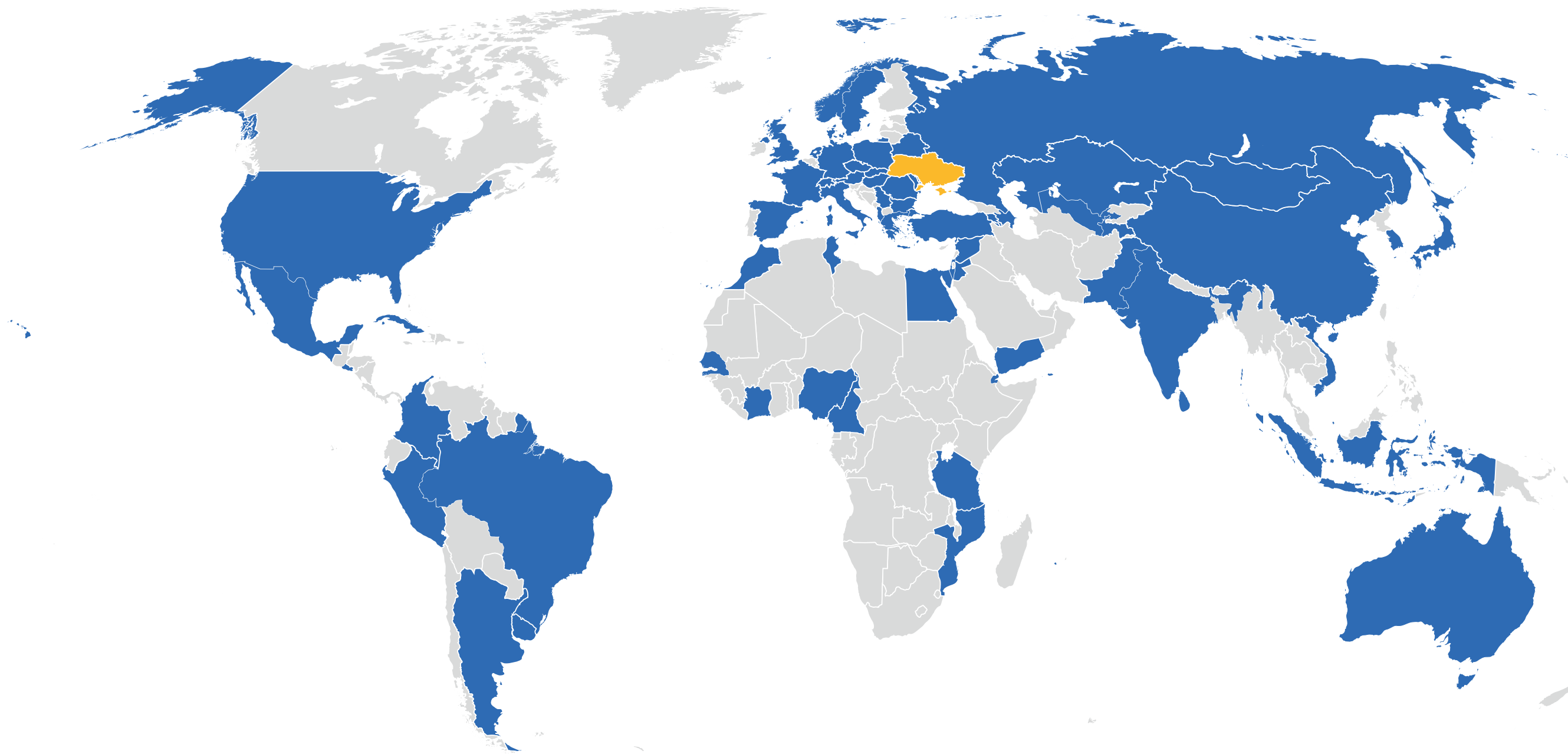
Product	Standard
Melt of sodium carbonate	TU U 20.1-00203826-044:2013

## Polymers and polymer products

Product	Standard
Copolymer of styrene and 8% divinylbenzene, coarse fraction	TU U 24.1-00203826-028-2003
Ion-exchange resins – anionites: Grade AB-17-8	GOST 20301-74
Ion-exchange resins. Strongly acidic cation exchangers: Grade KU-2-8	GOST 20298-74, TU U 24.1-00203826-042:2009

Product	Standard
Grade KU-2-8 Na	TU U 24.1-00203826-042:2009
Grade KU-2-8 Na schS (AQUACATION)	TU U 24.1-00203826-040:2009
Grade KU-2-8 Na chS (AQUACATION)	TU U 24.1-00203826-040:2009
Grade KU-2-8 Kr	TU U 24.1-00203826-042:2009
Grade KU-2-8 chS	GOST 20298-74
Grade KU-2-8 chS (AQUACATION)	TU U 24.1-00203826-040:2009
Grade KU-2-8 Kr Na	TU U 24.1-00203826-042:2009
Grade KU-2-6	TU U 24.1-00203826-042:2009
Grade KU-2-6 Na	TU U 24.1-00203826-042:2009
Grade KU-2-4	TU U 24.1-00203826-042:2009
Grade KU-2-4 Na	TU U 24.1-00203826-042:2009
Grade KU-2-10	TU U 24.1-00203826-042:2009
Grade KU-2-10 Na	TU U 24.1-00203826-042:2009
Grade KU-2-20	GOST 20298-74
Grade KU-23-10/60	GOST 20298-74
Grade KU-23-15/100	GOST 20298-74
Grade KU-23-30/100	GOST 20298-74

# Geography



Countries where the products  
of PJSC "AZOT" (Cherkasy) are exported to:

Albania	Ecuador	Japan	Senegal
Argentina	Egypt	Lebanon	Slovenia
Armenia	El Salvador	Lithuania	Sudan
Australia	Ethiopia	Malaysia	Syria
Benin	France	Mexico	Taiwan
Brazil	Georgia	Moldova	Tanzania
Bulgaria	Greece	Morocco	Tunisia
China	Guyana	Nigeria	Turkey
Colombia	Guatemala	Pakistan	USA
Costa Rica	Hong Kong	Peru	
Côte d'Ivoire	Hungary	Poland	
Cuba	India	Romania	
Djibouti	Indonesia	Russia	
	Israel		
	Italy		

# Quality Management System

PJSC "Azot" (Cherkasy) aims to rise long-term competitiveness and positive image of the enterprise in the industry as well as to increase customers and society's loyalty.

The key task of PJSC "Azot" is to manufacture high-tech, science intensive and competitive products as well as to provide the employees with safe working places and minimize the environmental damage effects.

To achieve these goals the integrated management system (IMS) was implemented at the enterprise in 2004.

## **The integrated management system at PJSC "Azot" covers:**

**elaboration and development of production processes, manufacture and sale of:**

- ammonia, ammonia processing products and by-products in ammonia production;
- air separation products;
- ion-exchange resins and by-products in ion-exchange resins production;
- caprolactam and by-products in caprolactam production.



IMS includes quality management system, environmental management system and labour as well as industrial safety management system.

Each of three systems meets the requirements of international standards.

The auditors from TNO Certification b. v. (Netherlands) assessed quality management system at PJSC "Azot" in May, 2005. According to the audit results the enterprise was provided with ISO 9001 Certification.

In 2006 the certification audit of environmental management system and labour safety management system was realized successfully. The certification audit was conducted by Moody International (UK). As result, PJSC "Azot" was issued certificate of compliance with ISO 14001 and OHSAS 18001.

Since then the enterprise has been improving the effectiveness of its own integrated management system and successfully undergoes a routine surveillance or recertification audit, realized by outside controllers.

PJSC "Azot" became the laureate of the 17th Ukrainian National Quality Competition based on EFQM model in 2012. The enterprise was awarded the diploma and Excellence Award.

# Key results

2010—2012

## Production volume of main products, tonnes

	2010	2011	2012	Growth rate (2010–2012)
Nitrogen fertilizers in 100% terms	628 410	724 049	680 594	108%
Ammonia	922 910	964 796	866 238	94%
Urea	648 671	759 935	775 739	120%
Ammonium nitrate	847 046	971 056	879 927	104%
UAN	219 971	161 525	190 889	87%

## Financial Results (UAH, thousand)

	2010	2011	2012	Growth rate (2010–2012)
Production volume of commercial output in established price*	3 897 187,0	6 089 578,7	5 400 804,2	139%
Capital investments	174 237	277 649	241 406	139%
Payments to budget and off-budget funds	132 096	214 562	212 957	161%
Social welfare maintenance including capital expenditure	4 365,2	8 330,5	65 022,9	

\*Footnote: decrease in growth rate of commercial output in 2012 is related the steep decline in caprolactam market price.

During the period  
2010–2012  
the average salary  
at the enterprise  
increased on

**156%**  
(from 3 203 UAH  
to 4 986 UAH)

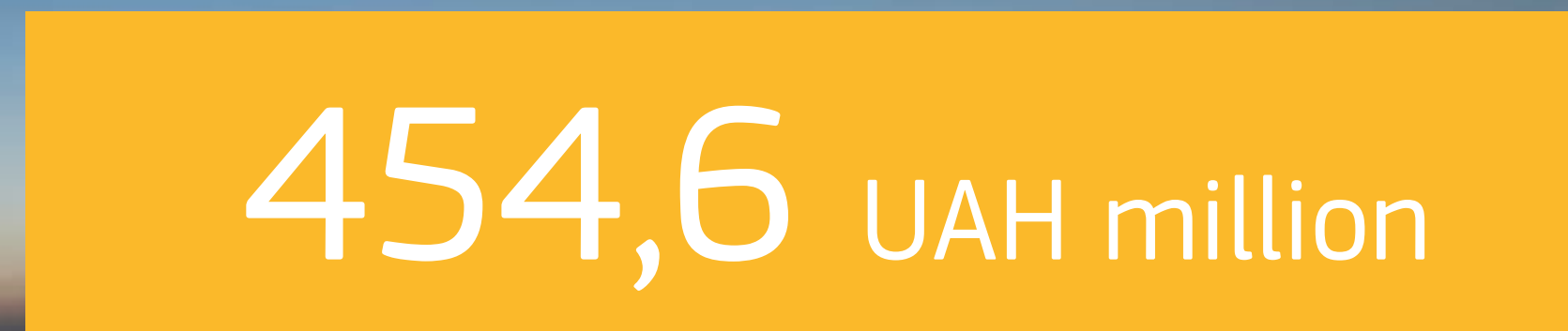


# Investments and modernization

Since PJSC "Azot" joined OSTCHEM group the enterprise has invested 454.6 UAH million in technical development and modernization programs.

It allowed PJSC "Azot" to implement a number of projects which contributed to the increase of basic technical and economic performance indices.

## Investments




The reconstruction of ammonia production site was completed in 2008, as a result:

- site capacity was increased up to 1 700 tonnes per day;
- natural gas specific consumption for ammonia production was reduced from 1 250 Nm<sup>3</sup>/t to 1 090 Nm<sup>3</sup>/t.

The investments in this project amounted to

238,7  
UAH million



A wide-angle photograph of an industrial plant at dusk. In the foreground, a large, glowing industrial lamp hangs from a pole. The background shows various industrial structures, including tall distillation columns, pipes, and buildings, with some lights on and smoke rising from a chimney. The sky is a deep blue with some clouds.

In 2011 there was realized pipeline installation for the filtered river water supply to caprolactam production.

As a result PJSC “Azot” was able to refuse using expensive desalinated water and significantly reduce material and energetic resources consumption on caprolactam production.

The reconstruction of urea production has been conducting since 2010.

As a result the increase in production capacity from 1 000 to 1 600 tonnes per day is expected.

The investments in this project amounted to

426,6  
UAH million

# Social Responsibility



Constant improvement of labour conditions and life quality of employees are the key focus of social responsibility PJSC "Azot".

One of the most important events in Cherkasy over the last years was the renewal of Culture Center "Druzhba narodiv" the largest concert hall in the region.

60

UAH million

was invested by PJSC "Azot" in the reconstruction of the Culture Center and the square around it.

Every year the enterprise's employees have possibility to rest at a sea resort. About 700 families spent their holidays at Crimean recreation centers. Their vacation packages were 50% paid by PJSC "Azot".

5

UAH million

was allocated by the enterprise to the internal social programs in 2012.

## PJSC "Azot" External Social Policy

8

UAH million

was invested by PJSC "Azot" in the foundation of rehabilitation center for CNS children in Regional infantile hospital in Cherkasy.

PJSC "Azot" supports town in organization of creative, cultural and sports events in Cherkasy and its region. The enterprise actively implements the program 'Save your city' initiated by Dmitry Firtash, the President of the Federation of Employers of Ukraine (FEU), the Head of the Board of Directors of Group DF. The program covers all regions where OSTCHEM group's enterprises operate and it is aimed to develop social infrastructure and increase life standards of citizens.

PJSC "Azot" provides city schools with technical and financial support, builds children's yards and sports facilities, allocates funds to road's repair as well as supports bright festivals and events in Cherkasy.

PJSC "Azot" contributes to development of chemical education on regional level and assists in school chemistry Olympiads organization. Furthermore, the enterprise promotes schoolchildren creativity and popularizes the healthy life style, volunteer movement and both native city and environmental protection among the growing up generation.

# Environmental commitment

Environmental responsibility is the key priority in PJSC “Azot” production policy. Having joined Responsible Care Global Charter PJSC “Azot” implements its own environmental activities in accordance with the “Responsible Care of the Chemical Industry in Ukraine” program.

The main environmental activities of the enterprise are directed towards Kremenchug water basin preservation and atmospheric air protection.



**RESPONSIBLE CARE**<sup>®</sup>  
OUR COMMITMENT TO SUSTAINABILITY

## Water resources protection

# 308

thousands of cubic  
meter per day

is the capacity  
of wastewater treatment  
facilities of both manufac-  
turing water and sewerage.

# 6

water cycles provide  
technological water supply  
for the productions sites.

To avoid Kremenchug water basin pollution "Azot" carries out triple control of the manufacturing water quality before it comes to the treatment facilities. The quality is controlled by the enterprise's laboratories under 33 criteria. It is also monitored at the biological treatment facilities on stage of purification and dropping processes.

# 21 UAH million

The enterprise's laboratories which realize the analytical control in the area of environmental protection are certified by the State Enterprise "Cherkasy Research and Production Center of Standardization, Metrology and Certification" of the State Committee of Ukraine on Technical Regulation and Consumer Policy.

Quality tests of sewerage dropped into Kremenchug water basin are regularly checked with the laboratory of State Ecological Inspectorate in Cherkasy region and sent to Department of Ecology and Natural Resources of Ukraine in Cherkasy Oblast State Administration every month in order to monitor the condition of water basin in Cherkasy and the region.

The treatment facilities at PJSC "Azot" (manufacturing water and sewerage purification shop) process about 70 000 cubic meters of city sewerage per day (it comes from the city districts and industrial enterprises).

In 2013 PJSC "Azot" invested 2.5 UAH million in modernization and replacement of emergency site of pressure manifold which convey city sewerage.

**is the total amount invested  
by the enterprise in pressure  
manifold repair**

## Atmosphere protection

80

PJSC “Azot” spent 60 UAH million on 53 projects aimed to reduce environment pollution in 2010–2012.

gas purifying units refine 96% of waste gases

These initiatives allowed reduce emissions of

ammonium nitrate dust	60 tonnes per year less
hydrocarbon	1,1 tonnes per year less
nitrogen dioxide	110 tonnes per year less
ammonia	6 tonnes per year less

along with production increase.

In 2013–2014  
PJSC “Azot” is planning  
to invest in environment  
protection about

42  
UAH million



# Employees development

Today PJSC "Azot" employs about 4 500 people. It constitutes 98% of the plant's full strength and confirms the high rate of the enterprise as employer. All specialists of PJSC "Azot" are well-paid and provided with social guarantees.

The important aspect of employment policy is the educative and training programs.

PJSC "Azot" employees training and professional development programs are realized both at the enterprise which has its own licensed training center and the educational institutions across Ukraine.

One of the main directions of employee development is cross training. The specific character of production at many PJSC "AZOT" shops and new technologies implementation require employees to have professional multi-skills. Cross training provides effective organization of all the production processes and increases the efficiency of production in general.

The number of employees trained at PJSC "Azot" in 2013

Professional training and retraining of employees	113 persons
Cross training	99 persons
Advanced training of employees	803 persons
Professional development of management team and experts	410 persons

The enterprise spent about 2 260 960 UAH on personnel development programs.





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