



**State Scientific Research and Design
Institute of Basic Chemistry,
Kharkiv city, Ukraine**

NIOCHIM: UNIQUE EXPERIENCE OF COOPERATION WITH INDIAN SODA ASH MANUFACTURERS



State Institution «State Scientific Research and Design Institute of Basic Chemistry» (NIOCHIM) was founded in 1923

NIOCHIM is the only institute in Ukraine and the whole former Soviet Union that is able of complex research, engineering and development works in creation and updating basic chemicals manufacturing plants

Institute develops highly effective technologies and designs chemical plants with guaranteed reliability of rational natural and power resources usage

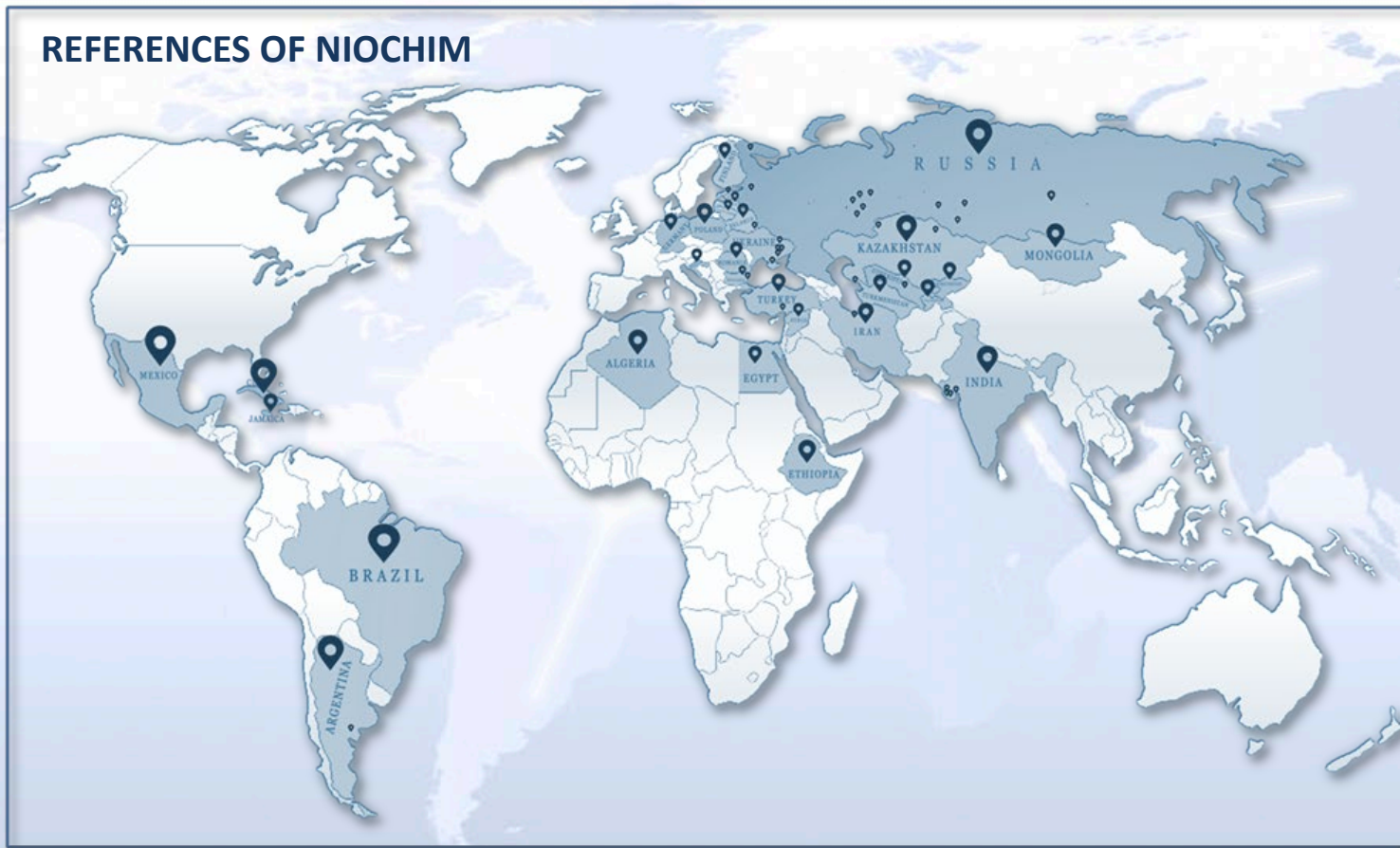
Our scientific competence includes more than 60 chemical products, including:

- ✓ Soda ash
- ✓ Sodium bicarbonate
 - technical grade
 - food grade
 - pharmaceutical grade





REFERENCES OF NIOCHIM



Brief analyze the trends in the soda ash market

Global soda ash production has ranged from 65 to 70 million tons per year, with India contributing 3.5 – 3.6 million tons.

By this indicator, India ranks fourth, following China (28–30 million tons), the USA (approx. 13 million tons), and Turkey (6.1 million tons)

India lags significantly behind most soda ash-producing countries in terms of per capita production (only 2.42 kg/year) compared to the global average consumption level of 8.13 kg/year.

The Indian soda ash market possesses significant growth potential.



№	Country	Number of Soda Ash Plants in the Country	Estimated Soda Ash output in 2025, thousand tons	Population in 2025	Estimated Soda Ash output per capita, kg
1	Bulgaria	1	1500	6668	225.0
2	Bosnia and Hercegovina	1	550	3114	176.6
3	Botswana	1	298	2603	114.4
4	Turkey	3	6150	87926	69.9
5	USA	5	13000	347246	37,4
6	Poland	2	1100	37843	29.1
7	Germany	3	1800	83644	21.5
8	China	34	36000	1416097	25.4
9	France	2	1300	66746	19.5
10	Russian Federation	5	2800	143394	19.5
11	Spain	1	600	47851	12.5
12	Italy	1	600	58926	10.3
13	United Kingdom	1	550	69932	7.9
14	Iran	3	700	93168	7.5
15	Uzbekistan	1	200	37724	5.3
16	Kenya	1	280	58636	4.8
18	India	7	3550	1463865	2,4
19	Mexico	1	300	132998	2.3



Chemical Market Analytics by OPIS, a Dow Jones Company World Soda Ash-2025 conference

- ✓ India remains a high-growth soda ash market
- ✓ With a 2025–2030 CAGR of ~5.5%, domestic demand is projected to hit ~6.0 million mt by 2029
- ✓ Flat and solar glass expansions remain the primary growth engines
- ✓ Indian operating rates averaged 89% in 2024 and are expected to average 90% in 2025. Producers are maintaining high output to keep unit costs stable

Soda ash plant production capacity in India is projected to grow to over 5 million tons by 2030, up from 4.3 million tons in 2025



Ammonia-soda ash plants in India

No	Name of Soda Ash Plant and Company	Year of Commissioning	Soda ash capacity, tpa	Soda Ash output, tpa (estimated)
1	Tata Chemicals Ltd, Mithapur, Gujarat	1944	1093 000	792 000 (2025)
2	Nirma Ltd. Bhavnagar Chemical Complex, Gujarat	2000	1200 000	800 000 (2025)
3	Saukem (Saurashtra Chemicals Division of Nirma Ltd), Birlasagar, Porbandar - Gujarat	1959	420 000	300 000
4	GHCL Ltd (Gujarat Heavy Chemicals Limited), Village Sutrapada, near Veraval, Dist. Gir Somnath - Gujarat	1988	1250 000	1 005 000 (2025)
5	Rohit Surfactants Private Ltd (RSPL), National Highway 8E, Near Devbhoomi Dwarka, Kuranga - Gujarat	2020	550 000	500 000
6	DCW Ltd (Dhrangadhra Chemical Works), soda ash division, Dist. Surendra Nagar, Dhrangadhra - Gujarat	1939	108 000 (250 tpd)	90 000
7	Tuticorin Alkali Chemicals & , Fertilizers Ltd (TACF), Harbour Construction Road, SPIC Nagar, Tuticorin, Tamil Nadu	1982	180 000	62 300
Total			4 250 000	3 550 000



NIOCHIM's experience of cooperation with Indian soda ash manufacturers

RSPL project – Soda Ash Plant in Kuranga

NIOCHIM's contribution:

- novel high-efficiency developments for heat and mass exchange process columns
- up-to-date practices in manufacturing process running
- front-end solutions for automatic process control
- technical support in the course of detailed engineering
- on-the-job training for technical personnel



RSPL project – Soda Ash plant in Kuranga



✓ RSPL plant contributed to a 20% increase in soda ash production in India compared to 2012 levels



NIRMA projects

- ✓ 200 tpd food grade refined sodium bicarbonate plant.
Annual production of refined sodium bicarbonate in India increased by nearly 35%
- ✓ Simultaneous update of carbonation and sodium bicarbonate washing system.
Consumption of reverse osmosis water was reduced by 0.35 m^3 (700,000 m^3 /year), and steam for calcination by 50 kg (100,000 tons per year)
- ✓ Mushroom carbonation column with 250-260 tpd capacity. Carbonation columns with a total capacity of 750 tpd (275,000 tpa) were installed
- ✓ SAUKEM. Reduction in soda ash consumption for raw brine purification by 57%
— from 98.5 kg/t to 40–42 kg/t of soda ash





TATA CHEMICALS projects

- ✓ 100 tpd pharmaceutical grade sodium bicarbonate plant.
- ✓ Soda Ash Brown Field Expansion 500 000 TPA Soda Ash Project Design and Basic Engineering

GHCL projects

- ✓ 250 tpd carbonation tower. Engineering design.
Design on the foundations of less productive, obsolete columns increased the capacity of each column from 160 tpd to 250 tpd, totaling 100,000 tpa
- ✓ GHCL Green Field Soda Ash Project. Basic Engineering development for Soda ash plant capacity of 0,55 million TPA (1700 TPD LSA, including 1200 TPD DSA).



Summary

From 2012 to the present, NIOCHIM has executed extensive work for three major soda ash companies, thereby contributing to the growth of total soda ash production in India to 3,550 thousand tons per year — a 45% increase over 2012



Main NIOCHIM's achievements outside of India

Poland, Qemetica

- ✓ 350-400 tpd soda ash carbonation column

Germany, Qemetica

- ✓ Modernization of distillation system
- ✓ Engineering design of 350 tpd carbonation column

Malaysia, Petronas

- ✓ 50 000 tpa food and 50 000 tpa pharma grade Sodium Bicarbonate Plant

Saudi Arabia

- ✓ debottlenecking some stages of soda ash process
- ✓ refined sodium bicarbonate, including pharmaceutical grade plant

Chile, NorQuim

- ✓ 520 000 tpa soda ash plant



Main advantages of carbonation tower designed by NIOCHIM:

- ✓ High sodium utilization degree
- ✓ Process mode provides for high quality of sodium hydrocarbonate crystals that allows:
 - to decrease crystals moisture content on filter
 - decrease steam consumption for calcination
- ✓ Decrease of chilled water consumption

Main advantages of distiller designed by NIOCHIM:

- ✓ Decrease of steam consumption
- ✓ Decrease of specific materials consumption
- ✓ Substantial simplification of filter lye supply and discharge piping system
- ✓ Expected life of steam and gas mixture condensation and cooling system makes up to 40-50 years
- ✓ Minimum run between cleanings is 90 days



NIOCHIM's new developments and proposals :

Carbonation column: unique 450-500 tpd soda capacity

Completed design with basic parameters:

Diameter, mm $\varnothing 3600$

Height, mm ~31000

Column capacity, tpd soda	Specific metal consumption, T metal per 1 t of soda
250	0,93
400	0,8
500	0,7

New column is similar to 350-400 tpd carbonation column, but has larger heat transfer surface if cooling zone.

New column ensures high quality of sodium bicarbonate crystals and 75-76% Na recovery degree.



NIOCHIM's new developments and proposals :

Electrical engineering and automation (IEC, NEMA, GOST, etc.)

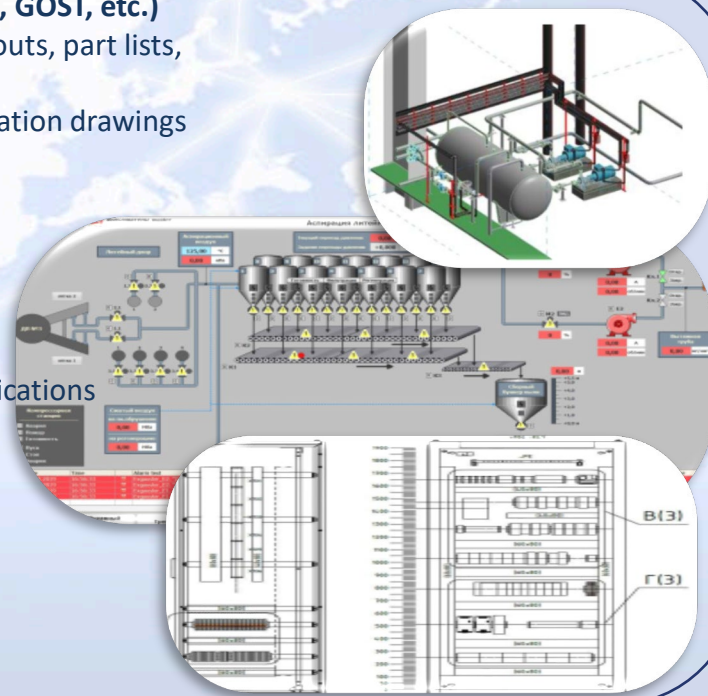
- Single line diagrams, circuit diagrams, cabinet layouts, part lists, specifications and installation instructions
- Instrumentation – detailed schematics and installation drawings
- PLC, HMI, SCADA, IoT and IT architecture
- Motor Control Center (MCC)
- Power distribution (LV)
- Safety

External territory design

- Cable routing, layouts in 2D, 3D, BIM
- Detailed installation components/materials specifications
- Detailed installation drawings

Other

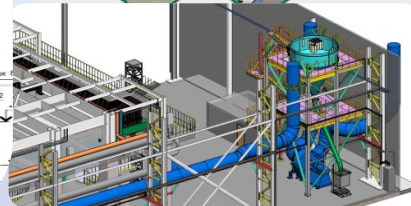
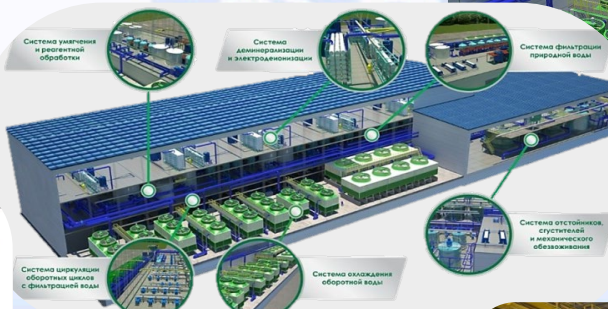
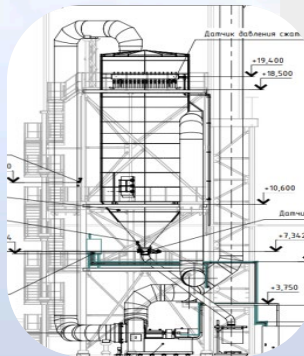
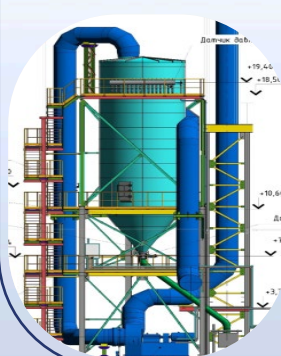
- Illumination design and calculations
- Earthing, selectivity etc. calculations
- Low voltage systems (CCTV, fire alarm etc.)
- PDF to CAD (Eplan, AutoCAD etc.)
- Eplan marcos development



NIOCHIM's new developments and proposals :

Development of engineering solutions, complete equipment units, achieving projects guarantee values

- Return water cooling systems
- Settlers, thickeners systems
- Filtration systems
- Gas treatment systems
- Aspiration systems



Thank you very much for your attention!

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