



EKOR
Limited Liability Company
Research & Engineering Enterprise

**The system for monitoring and control of
neutralization processes in ammonium nitrate
production with the controller**



ISO 9001:2008



The system for monitoring and control of neutralization processes in ammonium nitrate production delivers measuring and regulating of:

- Redox- potential in the reaction zone of reactors-neutralizers
- ammonia and nitric acid concentrations in the solutions at the exit of reactors-neutralizers



The system can be realized on the base of the

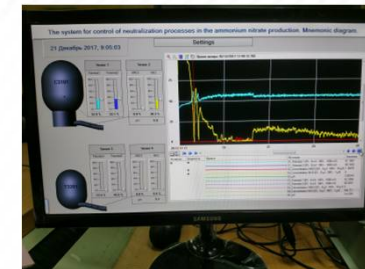
Industrial PC



Honeywell MasterLogic200
controller using SCADA
Experion HS



Potentiostat
controllers
of our own design

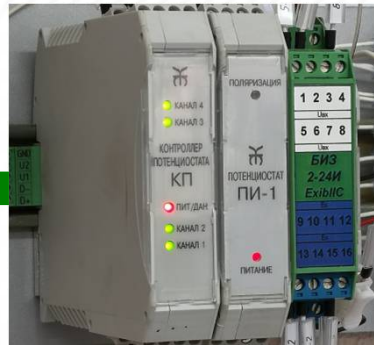


Elements of the system

Controller Honeywell
MasterLogic200
with 2 input-output units



Spark protection unit
Potentiostat controller
Potentiostat

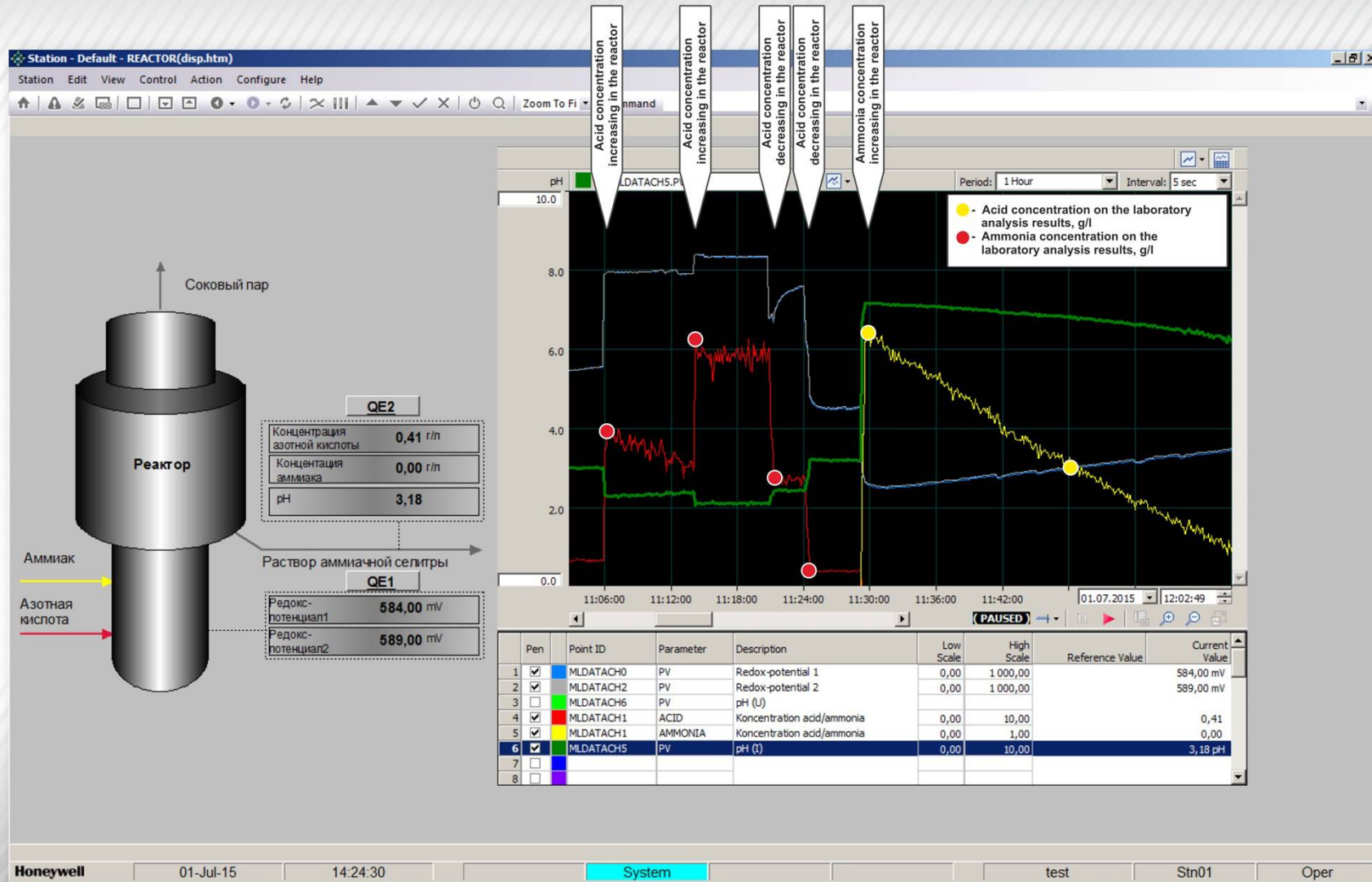


Concentration
sensor



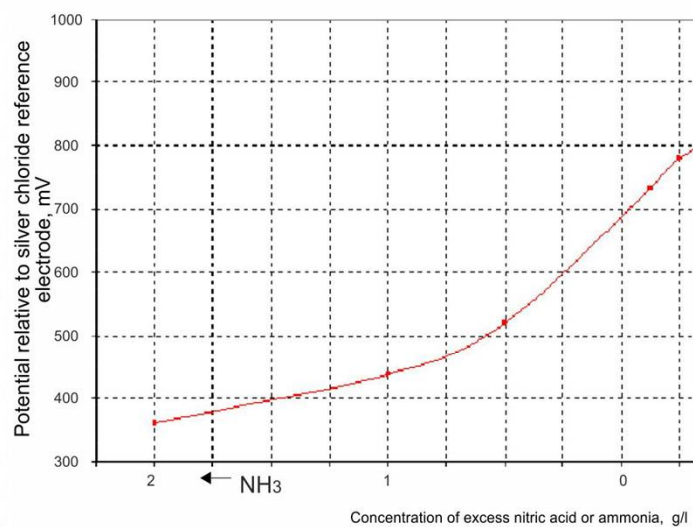
SCADA Experion HS

Screen of the SCADA Experion HS

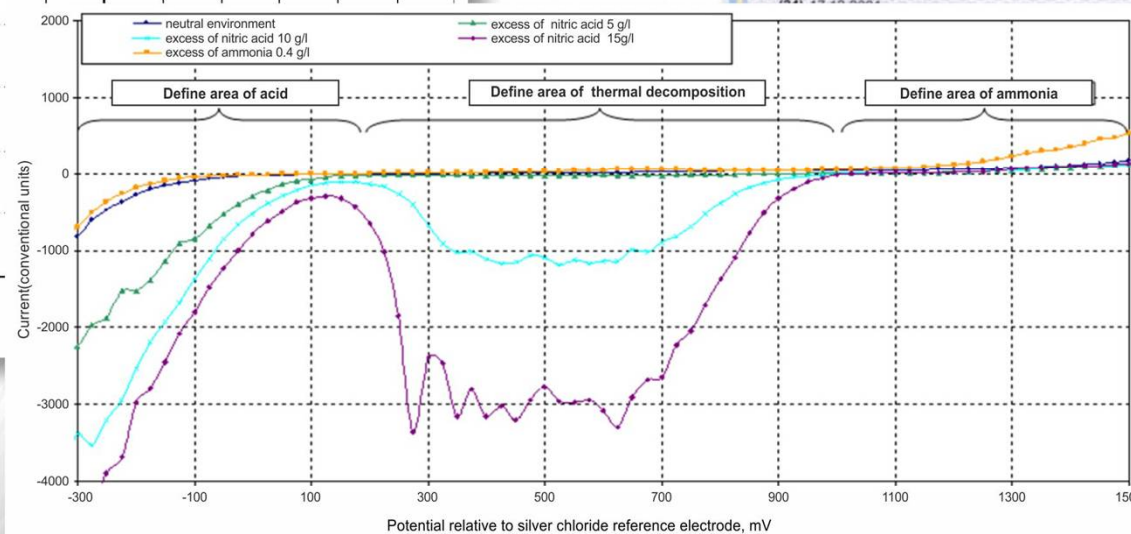


System is based on the dependence between the

redox potential (a) and redox currents (b) in the ammonium nitrate solution and ammonia and nitric acid concentration

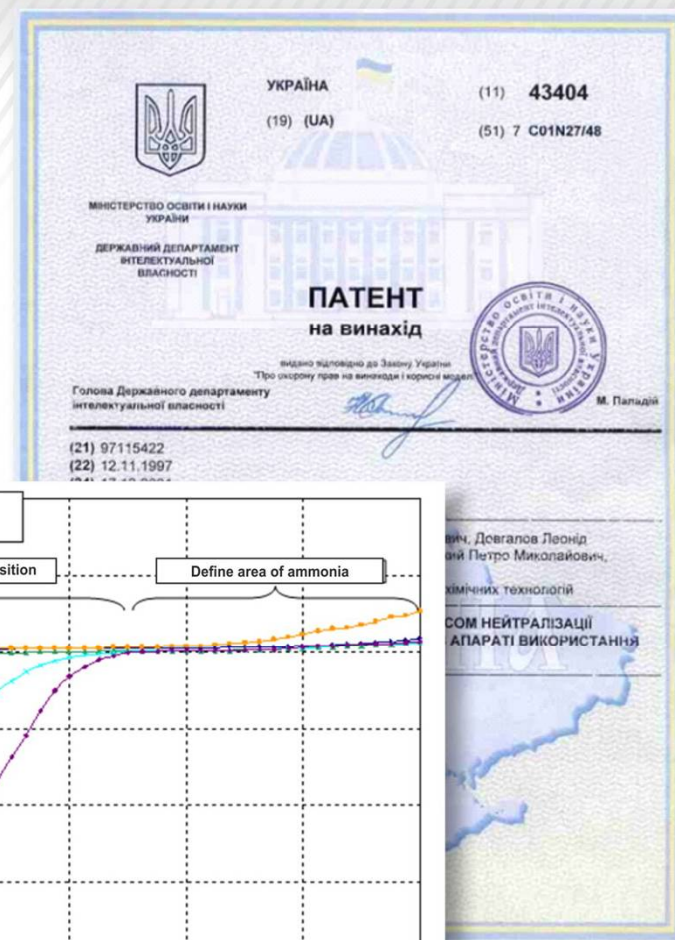


a

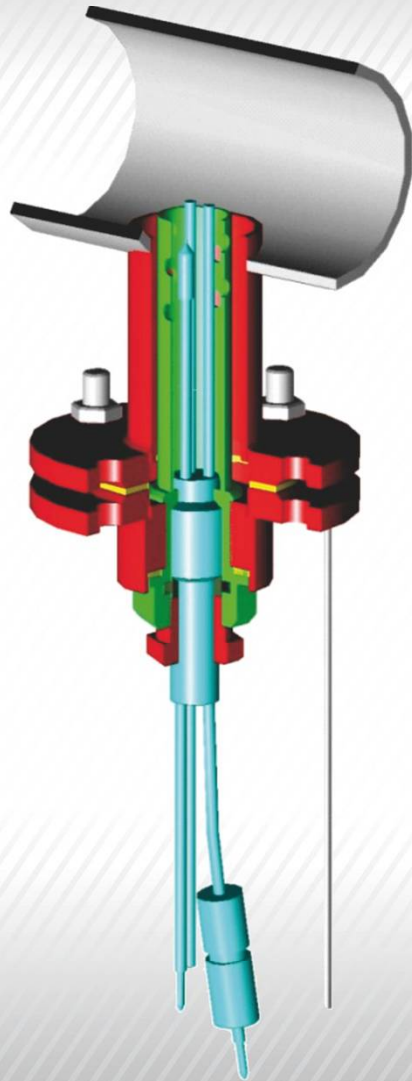


160°

б



Concentration sensor

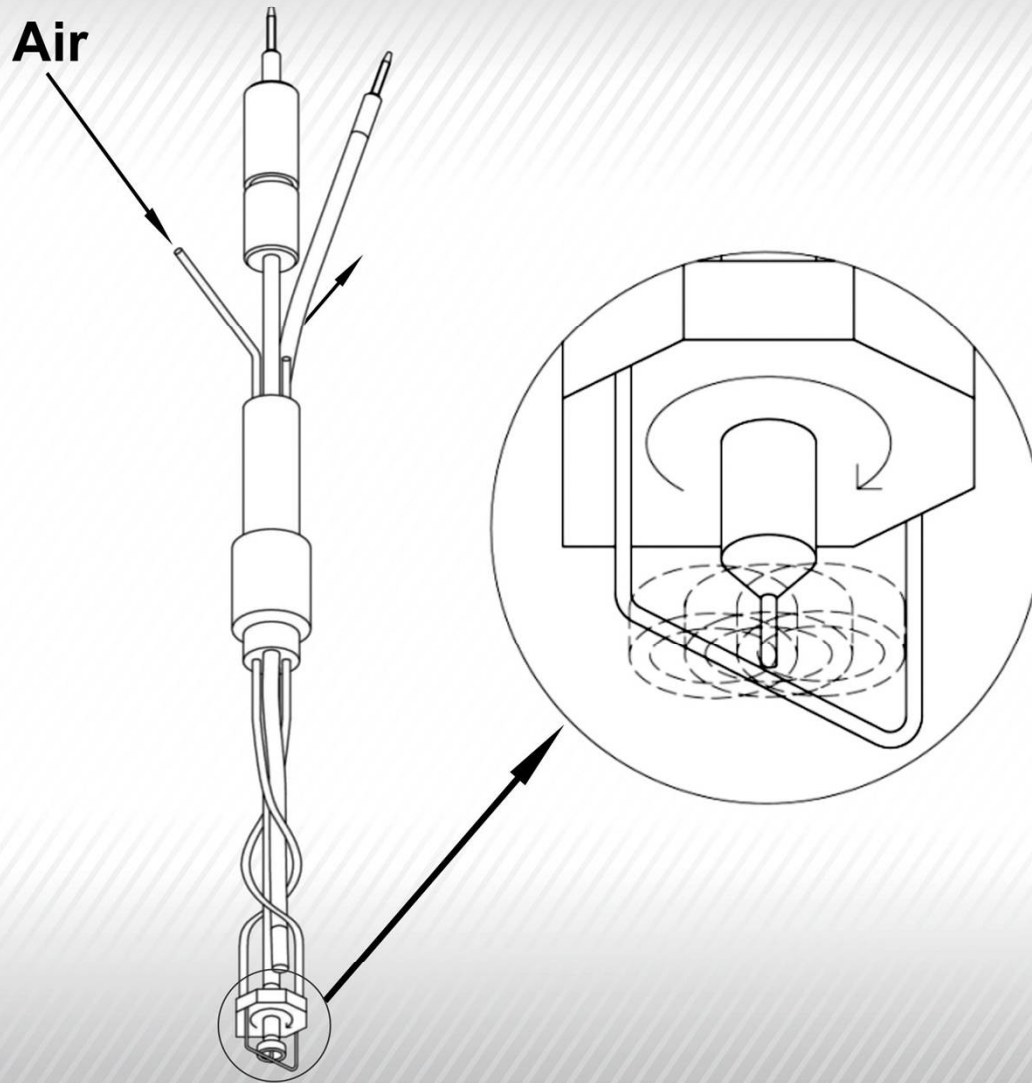


The design of the concentration sensor gives a possibility to operate it under the following conditions:

- at high temperatures (up to 190°C) and pressures (up to 8 atm)
- in aggressive environments with precipitation

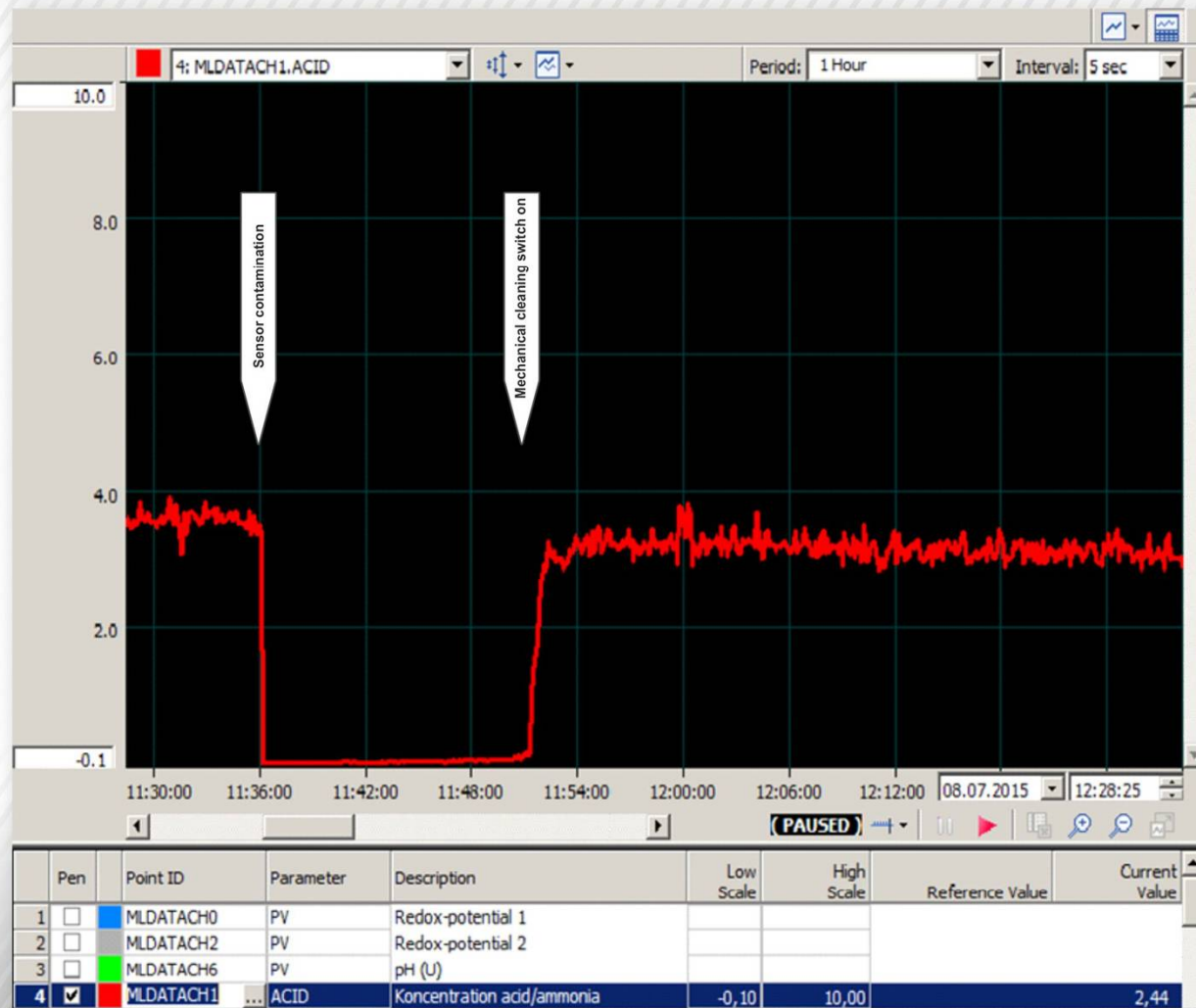
A special feature of the concentration sensor is that it can be located directly in process solution stream inside the equipment or piping, as well as a continuous mechanical (vibration) removal of contaminants

The operating principle of continuous mechanical cleaning



If necessary, the compact air-operated vibrator can be integrated in the construction of the sensor. Air-operated vibrator communicates the circular motion to the ring, which cleans the sensitive part of the concentration sensor from precipitations, oils and other contaminants.

Nitric acid concentration measuring using the mechanical cleaning



The system for monitoring and control of neutralization processes in the ammonium nitrate production is operated at the following plants:

- JSC “Severodonetsk Azot Association” (Ukraine)
- JSC “Concern “Stirol” (Ukraine)
- JSC “Rovnoazot” (Ukraine)
- JSC “Azot” (Ukraine)
- JSC “Azot” (Georgia)
- JSC “Cherepovets Azot” (Russia)
- JSC “KuibyshevAzot”(Russia)
- JSC “Azot” (Russia)
- JSC “Ammoniy” (Russia)
- Azot Branch of URALCHEM (Russia)
- KCKK Branch of URALCHEM (Russia)
- JSC “Farg’onaAzot” (Uzbekistan)
- Chemical Complex “KazAzot” (Kazakhstan)
- JSC “Achema” (Lithuania)
- HIP Azotara (Serbia)
- Complex “Alzofert” (Algeria)
- ZAP “Pulawy” (Poland)
- Fertiberia S.A. (Spain)



The proposed system enables to:

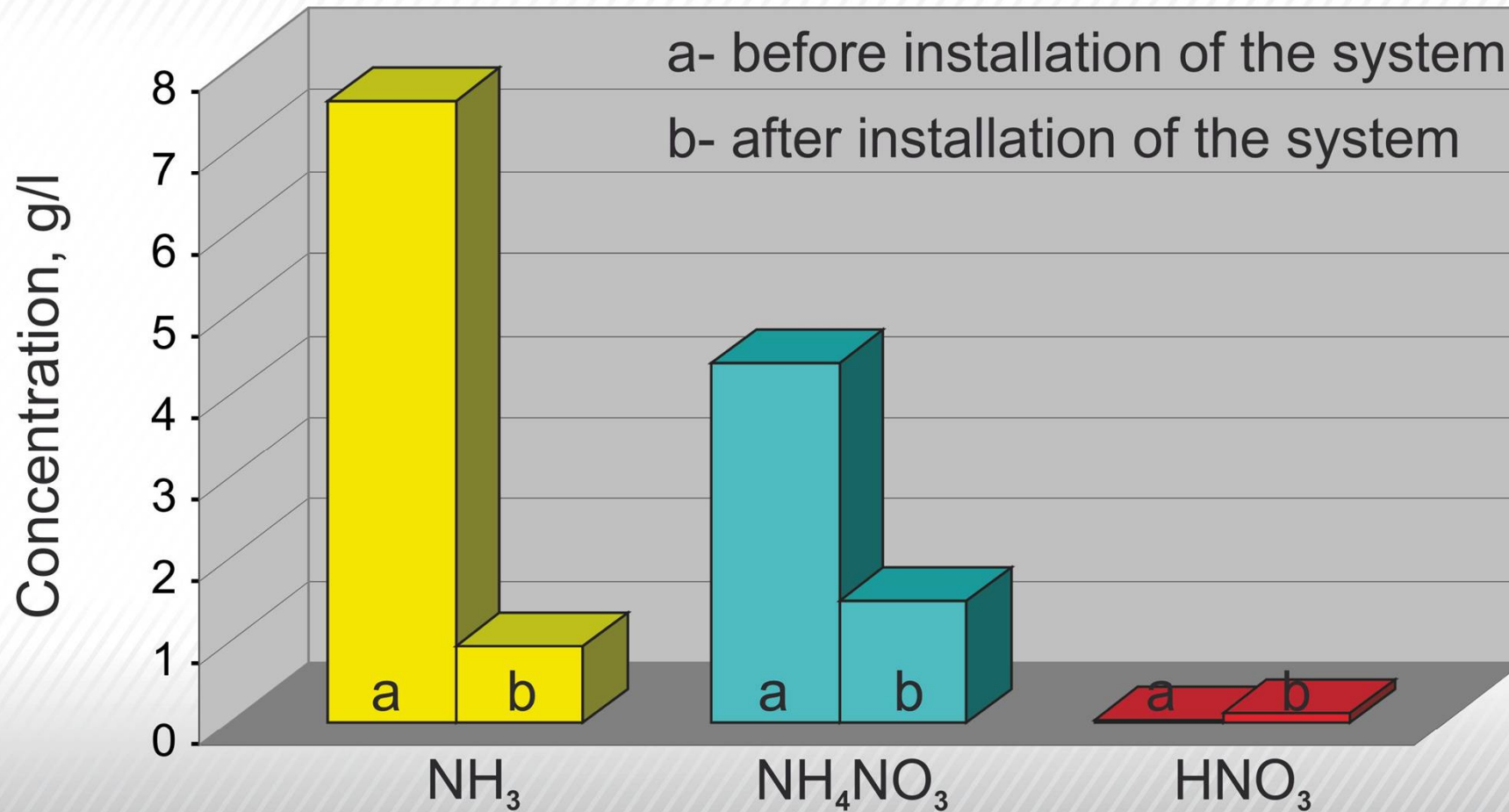
- Improve the neutralization process control quality
- Optimize the ammonium nitrate production process
- Enhance the process safety
- Reduce emissions to atmosphere
- Improve the final product quality



The economic benefit from the introduction of the system is achieved owing to the following:

- Reducing emissions of ammonia, acid and ammonium nitrate to the atmosphere
- Decreasing the energy consumption for ammonium nitrate solution evaporation
- Reducing costs for waste water treatment
- Decreasing corrosion damages of process equipment
- Less number of operating personnel
- Improving the ammonium nitrate quality and reducing the quantity of off-spec product

The economic benefit from the system introduction achieved due to reduction of emissions at 500000 tpy capacity is about 700 thousand USD.



The scope of supply includes:

- Complete set of the system;
- Erection supervision of sensor connection units;
- Erection of sensors and instruments of the system;
- Adjustment of the system;
- Preparation of technical description and operating manual;
- Operating personnel training;
- Performance test run and commissioning of the system.

The erection of sensor connection units and cable routing are performed by the Customer.

The proposed system is introduced into production during 4 months.