



References:

UKRAINE

Shamraevka Sugar Plant, Chortkiv Sugar Plant, Kupiansk Sugar Plant, Volodymyr-Volynsky Sugar Plant, Savyntsi Sugar Mill, Chapaevka Sugar Plant, Tomashpil Sugar Mill, Oleksandrivka Sugar Plant, Gaisyn Sugar Plant

RUSSIA

Eletsk Sugar Plant, Novokubansk Sugar Plant, Borinsk Sugar Plant, Kamensky Sugar Plant, Elan-Kolenovskyy Sugar Factory, Gryazi Sugar Plant, Izobilnenskyy Sugar Factory, Olhovatsky Sugar Factory, Dobrinka Sugar Plant, Uspensk Sugar Plant, Valuiki Sugar Plant, Rzhhevsky Sugar Plant, Leningradsky Sugar Factory, Balashov Sugar Factory, Argun Sugar Plant, Erken-Shakhar Sugar Factory, Chernyansky Sugar Plant

BELARUS

Skidel Sugar Factory, Zhabinka Sugar Plant

CZECH REPUBLIC

Vrdy Sugar Plant, Vrbatky Sugar Plant

LATVIA

Liepaja Sugar Plant



TECHINSERVICE™



L I M E S E C T I O N M O D E R N I Z A T I O N

TECHINSERVICE PATENTED TECHNOOGY



Vibrating Screen for Lime Milk Separation



To improve technical and economic performance, decrease fuel and raw material consumption and to increase gas output, **Techinservice** offers to apply the following equipment:

- limestone and fuel treatment and weighing unit;
- unit for mixing limestone and fuel before charging the kiln;
- **Techinservice** patented loading unit with rotary hopper;
- **Techinservice** patented stationary distribution unit;
- kiln gas cooling and purification unit;
- lime section control system;
- lime milk separation system equipped with vibrating screen.

First of all, it allows broadening a range of solid fuels used:

- **coke** – traditional fuel for calcination with a stable low content of volatiles up to 4% and sufficient hardness;
- **anthracite** – alternative solid fuel used for calcination with a higher content of volatiles and lower hardness compared to coke.

Both these fuels can be used for calcination of limestone, but only after modernization of the lime kiln according to the **Techinservice** technology you will be able to reach the guaranteed performance.

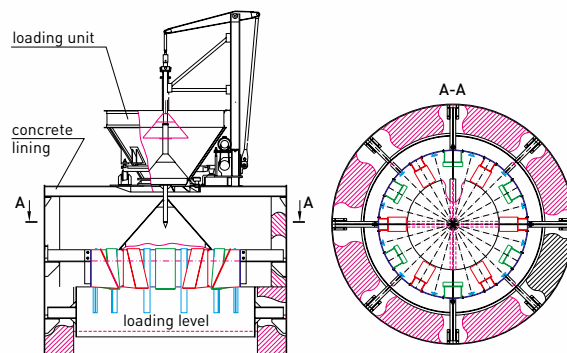
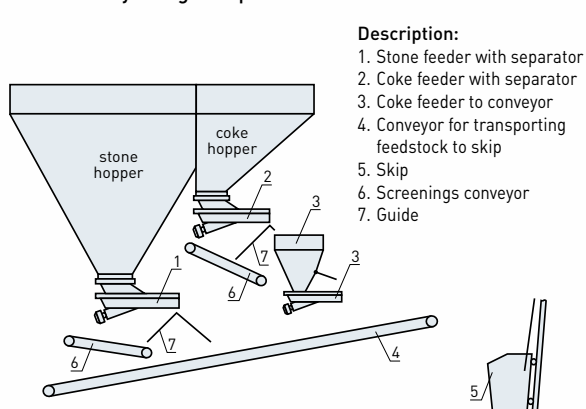
The basic purpose of modernization is primarily to eliminate the reasons leading to distortion of the firing zone as it is the main factor that hampers the high technical and economic performance of the lime section.

The installation of the loading unit with a rotary hopper and stationary distribution unit almost eliminates the segregation of feedstock and uniformly distributes the feedstock throughout the cross-section of the kiln, which excludes the destruction of fuel during coking when feeding it to the firing zone, which, in its turn, stabilizes the firing zone.



Loading Unit in Motion

Feedstock preparation line before charging the lime kiln by using a skip hoist





Daily Storage Hoppers & Visual Control Panels



General View of the System for Feedstock Preparation and Loading to Skip



Limestone Vibratory Feeder



Fuel Vibratory Dosing Feeder

When operated, the lime kiln features the following:

- high flexibility of regulation within a wide output range;
- high stable content of CO₂ in kiln gas;
- high reactivity of lime milk.

After modernization of the lime kiln according to the **Techinservice** patented technology we guarantee:

- kiln nominal output, not less than 14 t 85% CaO/m² per day;
- CO₂ content in kiln gas:
 - 1) the lime kiln under vacuum – not less than 36%;
 - 2) the lime kiln with forced aspiration – not less than 40%;
- outlet gas temperature – not more than 140°C;
- outlet lime temperature is higher than ambient temperature by 20°C;
- lime slaking time – up to 3 min. at the slaking temperature of 80°C;
- degree of burning – not less than 90%.

RESULTS OBTAINED:

Characteristics of Fuel and Raw Material:

Raw material – Limestone:

- d = 60-80 mm;
- CaCO₃ content – 97%

Fuel – Anthracite:

- calorific value – 7400 kKal;
- volatiles – up to 15%;
- ash content – up to 11%

Characteristics of Products Obtained:

Analysis of kiln gas:

CO₂ – 36.0%; CO – 0.4%; O₂ – 2.1%

Analysis of lime:

- CaO+MgO content – 95-96%;
- CaO_{active} content – 91%;
- degree of lime burning – 95.5%

KILN GAS COOLING AND PURIFICATION PLANT

Wet gas scrubber (washer).

The **Techinservice** scrubbers allow using high-polluted water in the closed circulating circuit (without a cooling tower). If necessary, the scrubber is fitted with dry or wet traps and circulating pump.

Kiln gas purification plant



Technical and Economic Performance of the Launched System (Guaranteed)

Purification efficiency, not less than, %	96
Aerodynamic resistance, not more than, mm water column	60
Size of trapped particles, micron	40
Diameter, mm	1600
Weight, kg	950

AUTOMATIC CONTROL SYSTEM FOR LIME SECTION



SimpleSug-Lime Kiln is an automatic control system developed by Techinservice for lime kiln and lime section.

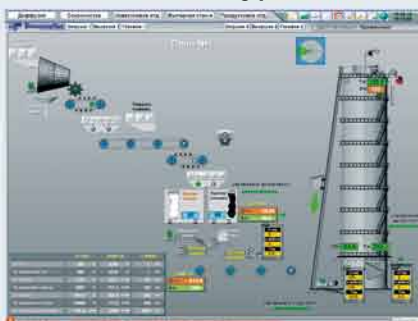
This system is an integral part of SimpleSug™, a unified software and hardware system for controlling sugar plants.

The control system is based on industrial controllers, control and monitoring devices of the world's leading manufacturers. Industrial operator panel-based human-machine interfaces are used for field control and management, and PC-based systems with SCADA are used for remote control and storage of data.

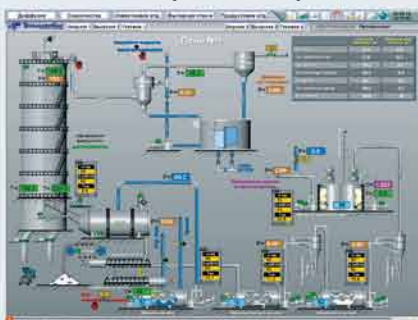
This system independently adapts to the sugar factory production capacity and adjusts the basic jobs.

The system is nominally divided into the following sub-systems:

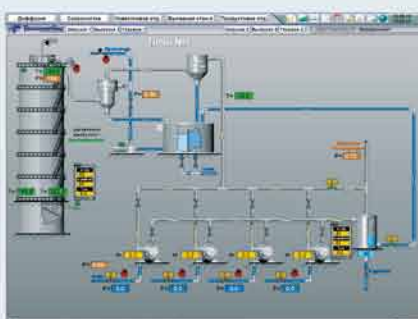
Control of feedstock preparation and kiln loading process



Control of kiln discharge and lime milk production processes



Control of lime kiln gas plant



In the feedstock preparation section a skip hoist is fed with a preset portion of feedstock prepared in the required proportion. Then feedstock is fed into a distribution unit at the top of the kiln, which ensures uniform distribution over the entire kiln cross section. The kiln loading rate, e.g. for IPSH-100 lime kiln, is about 1 ton per 2 minutes. To display the data about fuel and limestone quantity in daily storage hoppers, there are two indicator panels displaying a time left to emptying each hopper. And for total control and monitoring of feedstock preparation and feeding process from the operator workstation there is a video surveillance system.

The control system keeps the record of number of skips loaded into the kiln and total quantity of weighed fuel and feedstock in kilograms (per hour, last hour, shift, last shift, day, last day, campaign). This data is required for the on-line analysis of the lime section performance from a point of view of technological and economic parameters. This data is ready to be transmitted into the automatic process control system for the automatic on-line record keeping and processing.

The burned lime is discharged from the lime kiln by a table discharger driven by a frequency inverter. The frequency of operation of the discharger varies depending on lime milk consumption by the sugar factory. Water for lime slaking is fed proportioned to the discharged limestone simultaneously with feeding lime into the slaker.

Before feeding lime milk into the carbonator, the system controls the lime milk density, which is automatically adjusted within the range of 1.175-1.180 g/cm³.

The lime kiln gas section control system monitors:

- kiln gas evacuation depending on the current kiln capacity;
- lime kiln gas exit temperature within the preset range;
- required gas pressure for carbonation;
- water level in the gas receiver;
- required water consumption by gas pumps.

Just such extensive control and management allow ensuring the operation of lime section in fully automatic mode, and the operator to control the entire process from the plant control room.



Feedstock dosing mechanisms control



Kiln gas evacuation regulator