



***Enterprise Ltd «TEHNOROS»
equipment for the mining industry***



ABOUT



General director of "TEHNOROS",
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Enterprise Ltd "TEHNOROS" in the market of equipment for the mining industry there since 1995. The main type of products is the X-ray radiometric equipment for the enrichment and non-destructive testing of ores and industrial wastes.

The proposed technology is new and progressive, allowing for mining enterprises to reduce traffic flows, reduce reagent consumption, more efficient use of technology concentrators.

To date, more than 60 companies in Russia, CIS and foreign countries have successfully implemented and are implementing the method of X-ray radiometric separation and control of ores and industrial wastes with the help of products of LLC "TEHNOROS."



WELCOME!

Products Featured

The main products manufactured by the company are:

- Cages of various modifications (for X-ray radiometric method);
- Ore-station (on the X-ray radiometric method);
- Metal Detector, used to detect not crushability metallic inclusions (including non-magnetic) in the ore flow;
- Laboratory planetary mill for sample preparation of ores for chemical analysis.



Equipment for operational monitoring of mining raw materials in the flow



Ore Control Station (RCS-CM)

Equipment for operational monitoring of mining raw materials in the flow

Processing plants, as an intermediary between the mine (ore mining) and the metallurgical plant (production of metal), working on complex technological schemes, often at the same time assimilating a number of different ore types, which differ in content of valuable components, grain composition, moisture, texture and structural characteristics. In such circumstances, fortifier must meet certain requirements to the ore supplied to the factory, and the issue of operational quality control of raw ore in a stream is one of the most important in the mining industries.

At the moment, to control, typically used technological means that do not provide an operational definition of quality of ore in the stream entering the dressing redistribution. These methods include fairly laborious and expensive preparation of material prior to the procedure for determining the content of useful components, the complete absence of responsiveness.

Ore-station (RCS) offers solution to an operational definition of quality of crude ore in a stream on a conveyor belt, thus enabling the production engineers and geologists improve the efficiency of technological processes of production and processing of ores.

The proposed ore-controlling equipment and its purpose

Ore-station RCS - CM is intended for quality control of ore (for determining the quantitative content of chemical elements in the ore) in a continuous technological cycle, (real time) on the belt. Based sex workers laid X-ray radiometric method of determining the material composition.

As a source of primary X-ray X-ray tube is used, registration of fluorescent radiation from the chemical elements are solid-state Si-pin detector. The spectral composition and number of registered radiation detector, the calculation is carried out the percentage of elemental composition in a controlled grade.



Ore Control Station (RCS-CM)

For the first time in this modification of the station introduced ultrasonic altimeter, which is determined by the distance to a test surface to within 1 mm. It is possible to eliminate the effect of altitude according to the testimony of the station, but also made it possible to determine the estimated average content of monitored components in the ore at different time intervals (10-minute, hour, shift, day, month).



The station has a convenient interface that allows you to keep track of the dynamic mode: the level of load on the tape, stop motion, or tape, the contents of monitored components in a given time and allows for a retrospective review of indications station. Also performed in a continuous mode testing station on the performance of a reflection of the stations on the monitor.

Ore Control Station (RCS-CM)

RCS-CM to the station - the CM produced by "TEHNOROS" in the Federal Agency for Technical Regulation and Metrology of the Certificate of type approval of measuring instruments (RU.C.31.005.A; 31 227).



In their impact on the environment PKC is an environmentally friendly product.
Specifications RCS-CM

p/p	Parameter	Value
1.	Number of simultaneously controlled elements	to 5, depending on type of ore
2.	Range of recorded elements with atomic number Z	20 (Ca) to 92 (U)
3.	Range of determining the mass fraction of elements, %	from 0.1 to 80
4.	Minimum time averaging of measurements, sec	30
5.	Distance from the electronic unit to test surface ore, mm	300 ±150
6.	Surface sampling at a distance of 300mm from the surface, mm	not less than 120x200
7.	Cyclic testing of ore on a conveyor belt, sec	30
8.	Line Interface Unit Electronic communication with the computer operator RCS	RS-485 (izol.)
9.	Length of communication line RS-485 interface, m	no more than 1000
10.	Number of blocks of electronic PKC connected to one control panel	2
11.	Station continuous mode	Yes
12.	Operation mode setup time, min	no more than 30
13.	Supply voltage of electronic block, V ,	220 ±20%
14.	Power consumption of electronic block, kW	not more than 0.15
15.	Power supply remote control, V	220 ±20%
16.	Power consumption control unit, kW	not more than 0.45
17.	Overall dimensions of electronic block, mm	max (width x length x height) 330h 600h232
18.	Weight of e-RCS, kg	not more than 30
19.	Overall dimensions and weight control unit	depends on the type of personal computer
20.	Duration, years	at least 5

Quality control systems ores

Station type PKC-CM can be used to control individual threads, and for the organization on the basis of their quality control systems ores. Creating the past is relevant to the mining and processing enterprises, processing several technology types of ores or having a "sophisticated" scheme shipping ore (as an example: simultaneously or alternately shipment of ore from the mine and from the warehouse).



Quality control systems ores

In 2008. was put into operation a system of quality control of ore in the path of Mining and Geology Management Talnakh Concentrator (Norilsk industrial region, the contour of the GSU-PF). The system was designed and built based on ore-type plants RKS-CM.



Mine « Oktyabrskiy » (c. Norilsk, Rissia)

The general scheme of information flows « Quality control systems ore»



In the « Quality control systems ores» monitored every ore stream fed to the mill. The system receives a signal from PKC to the control panel, which is usually located near the point of installing the station.



On the remote control signal is processed, the result of the measurement of Ni and Cu is preserved and transmitted to the server system.



The server system is also connected to an automated workplace (AWP). ARM allows you to simultaneously monitor in real time on the quality of the ore mimic passing in all areas of shipping, display the dimension table of contents, build on the data derived graphs and make accounting documentation to averaging data over time with a minimum interval of 10 minutes.



Thus, a system of quality control of ore can automatically and in real time:

- Carry out the required control of the content of the analyzed components in all areas of shipping ore to the Pacific Fleet;
- To transmit information from all control points in the central control room;
- To maintain, store and display data on the quality of the ore on any of the areas of shipment;
- Process data on the quality of shipped ore and produce reports for specified time intervals.

The use of automated quality control system achieves the following ore positive effects for the mining and processing facilities:

- Improve the overall control of technological processes, directly influencing the quality of commercial products mines and concentration plants;
- Make an exception unauthorized shipment of substandard ore and rock in the technological chain of PF;
- Create conditions for improving the economic interest of mining companies as their commercial products.

X-ray radiometric separation (RRS)



X-ray radiometric separator SRF

Pre-concentration of ores

Relevance of technology development and preliminary mineral processing due to the problem of depletion of mineral resources, which is acute today in many countries, including Russia. Today, virtually no deposits rich in useful minerals. Modern mining companies are often forced to work on the verge of profitability, processing ore poor, sometimes even at a loss.



Pre-concentration of ores

Technology radiometric separation allows us to derive up to 50%, and in some places and more, from the initial mass of material, further processing is not profitable under these conditions.

Accordingly, the factory, which is often located within a few tens of kilometers from the developed deposit is not received for further processing hundreds of thousands of tons of waste rock.

Concentrating on the redistribution of ore comes with more optimal performance and as a consequence of increasing the efficiency of the recycling process. The important fact here is the improvement of the environment (fewer wet dumps containing hazardous chemicals, and in dry seasons are a source of dust).

Pre-concentration of ores

It should be noted that the old plants during their work a great amount of ore and slag dumps of metallurgical production (man-made deposits), the content of valuable components which often exceeds that for now piloted fields. The material of man-made deposits in the application of operations pre-concentration can again be used to extract valuable components. In addition, when using man-made formations do not require costly operations of extraction and ore crushing, i.e. the processing of such materials is much cheaper than in the original production of crude ore in mines and quarries.



The classical scheme of extraction and primary ore preparation

X-ray radiometric separation (RRS)



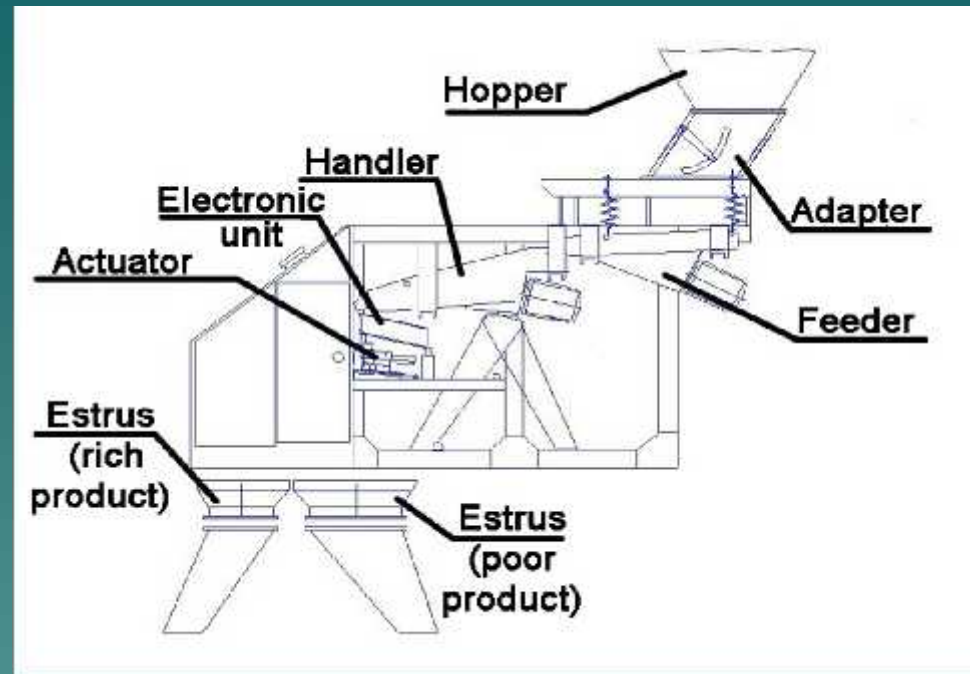
Separation Complex - Ural Mining and Metallurgical Company, Russia

Among other methods of radiometric ore sorting and man-made materials, X-ray radiometric separation stands out for its versatility, it is possible to effectively use pre-concentration variety of minerals, ores of

nonferrous and rare metals, gold and silver, platinum, rare earths, ores, tin, tungsten, manganese, chromium, bauxite, quartzite, magnesite, fluorite, nepheline, sillimanite, apatite, coal, metallurgical wastes (slag, lining), etc.

X-ray radiometric separator SRF

Enrichment of minerals in the separators in the following manner: the ore from the hopper enters the transport system, consisting of a feeder and handler. At the feeder ore expanded in monolayer, and served on the handler, which generates four separate stream. The transport system delivers ore (each piece separately)



to the zone of measurement, where the free fall of each piece is irradiated with a primary X-rays, particles of which knock electrons K and L series, which form the characteristic X-rays, which is detected by counters. According to the analysis, high-speed system, based on industrial computer, makes a decision about operation of the actuator that carries a specific piece of estrus with a rich product (or a failure, then the piece goes into free fall in estrus poor product).

The advantages of technology X-ray radiometric separation

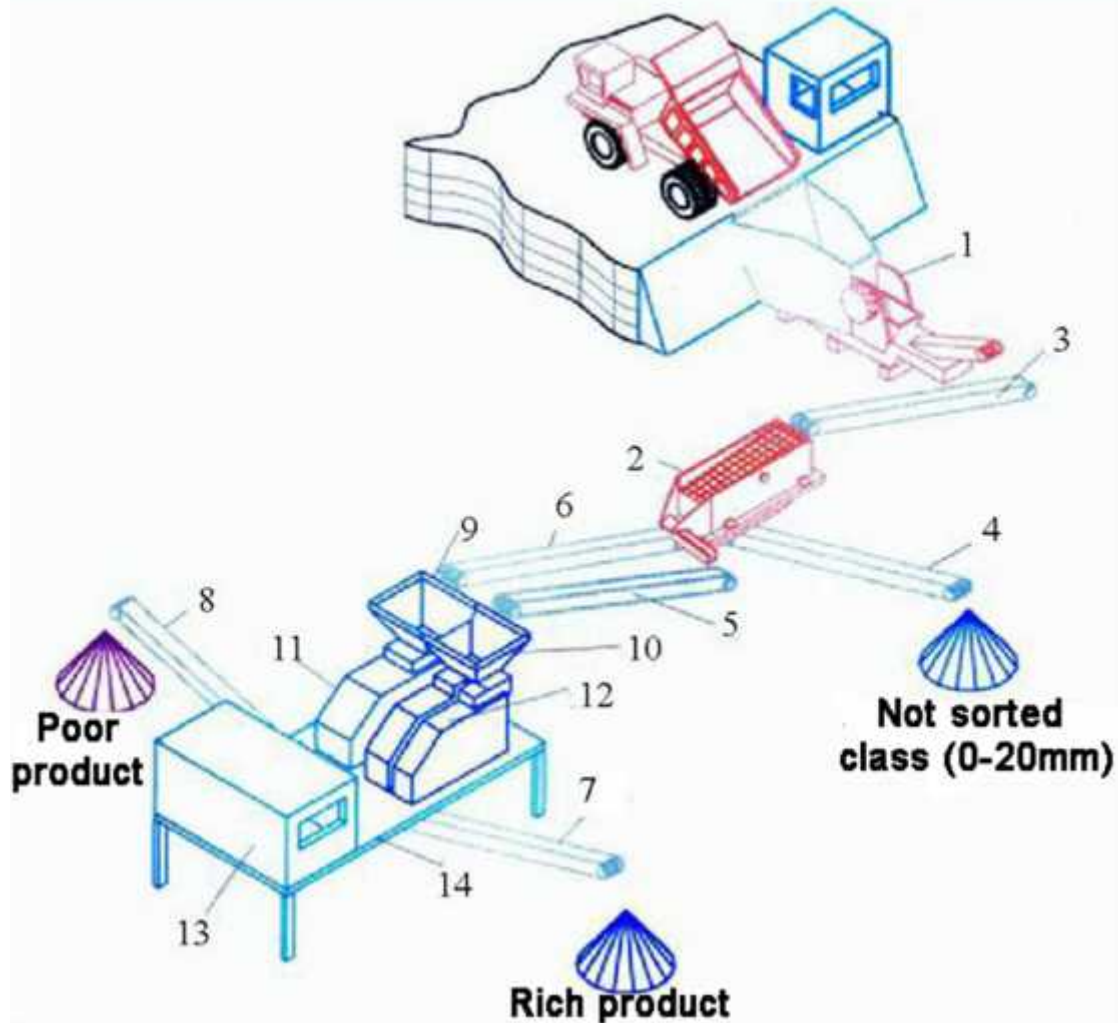
The main advantages of RRS technology are:

- The relative cheapness of implementation in mining enterprises;
- No interference with an established cycle of production (separation is carried out immediately after extraction of ore from the depths, before its arrival at the processing plant);
- No need to devote more production space (separators are capable of working outdoors);
- Relatively low power consumption;
- Low operating costs;
- Ecological safety of the process;
- No need to create a "wet tailings" (dry process);
- Ease of development and management process;
- The use of sources (X-ray tubes) with a "soft" X-ray radiation (safety of the staff).

Specifications of separators such as SRF

Type separator	SRF-4-50	SRF-4-150	SRF-3-300
1. Grain size classes sorted ore, mm	10-60	30-50	60-300
2. Class size ranges,	10-40; 20-40; 20-50; 20-60.	30-80; 30-100; 40-120; 40-150.	60-200; 80-250; 100-250; 150-300.
3. Capacity t / h * (Depending on the range)	3-8	10-25	20-50
4. Source of primary x-ray	Special portable x-ray machines		
5. X-ray detectors	Based on detection of blocks proportional gas counters		
6. Actuators type (operating frequency, Hz)	Fast electromagnetic gate devices		
	MI 30(15-20) MI 80 (10-12)	MI 400 (6-8)	MI 2 (3-4)
7. Number of channels sorting pieces , .	4	4	3
8. Power supply voltage for AC 50 ± 1 Hz	220/380	220/380	220/380
9. Power consumption, kW, not more than	3,0	5,0	5,0
10. Dimensions, mm 1) sorting machines (Length x width x height) 2) The operator's console (Width x depth x height)	3520 1200 3150 600 830 1300	5040 1500 3250 600 830 1300	5830 1500 3250 600 830 1300
11. Weight, kg, not more 1) sorting machines 2) The operator's console	1600 60	3900 60	4100 60

Examples of technology X-Ray Separation



Equipment list

1 - crusher SMD-186
(witch grate);

2 - classifier size SMD-
174 ;

3, 4, 5, 6, 7, 8 -
conveyors;

9, 10 - bunkers
machine classes
(50-150 and 20-
50mm);

11 - X-Ray Separator
SRF4-150 (1);

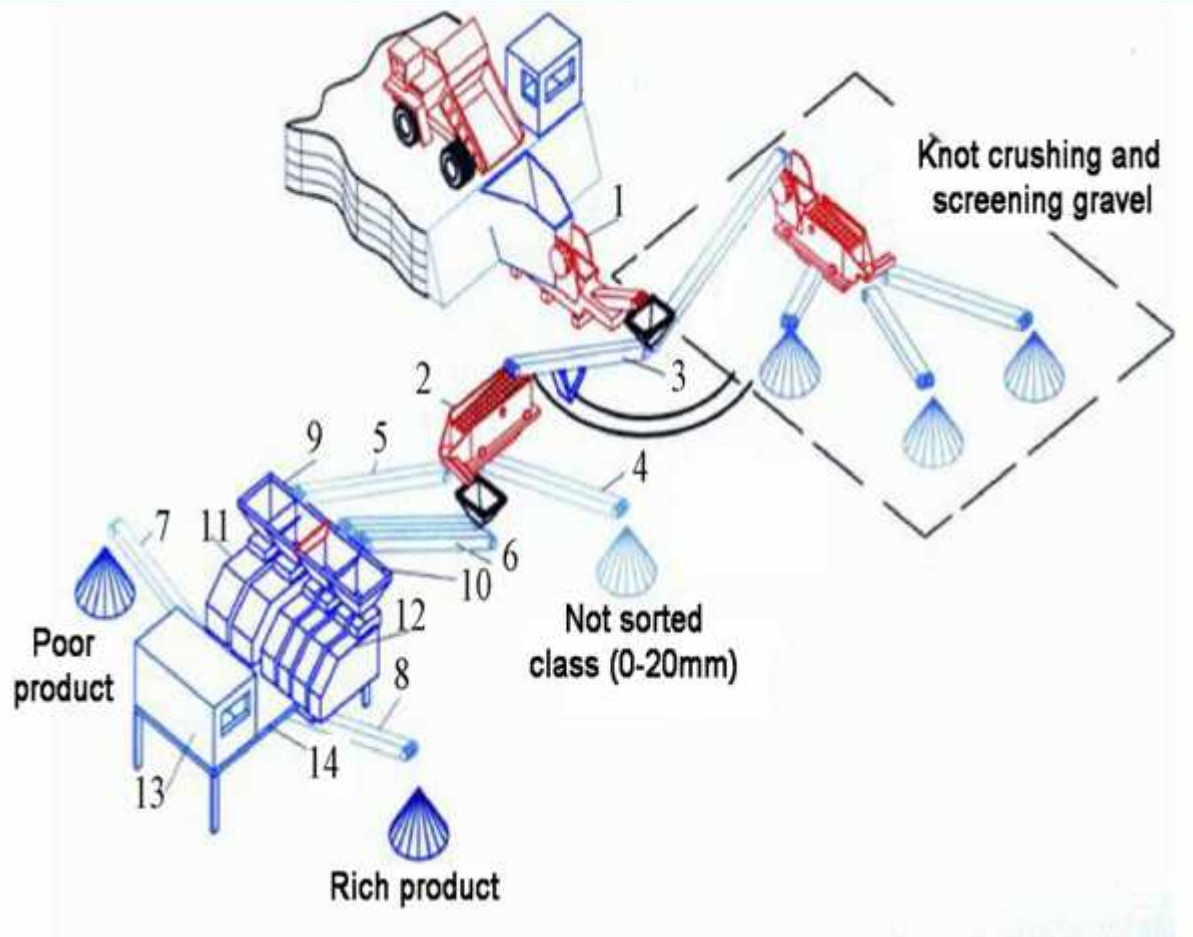
12 - X-Ray Separator
SRF4-50 (2);

13 - control room;

14 - overpass.

Option scheme of the complex chain of devices Pre-concentration, based on one type of separator SRF4-150 and 2-type separators SRF4-50.

Examples of technology X-Ray Separation



Option scheme of the complex chain of devices Pre-concentration, based on 2-type of separator SRF4-150 and 2-type separators SRF4-50 (with a knot crushing and screening gravel).

Equipment list

- 1 - crusher SMD-186 (with grate);
- 2 - classifier size SMD-174 ;
- 3, 4, 5, 6, 7, 8 - conveyors ;
- 9, 10 - bunkers machine classes (50-150 and 20-50mm);
- 11 - X-Ray Separator SRF4-150 (2);
- 12 - X-Ray Separator SRF4-50 (4);
- 13 - control room ;
- 14 - overpass.

Metal Detektors



Complex pipeline protective CPP-1
(metal detector)

Metal Detectors

Complex pipeline protective CPP-1 (metal detector) is designed to detect metallic foreign matters (including items from manganese steel) in the transported material conveyor means, to protect technological machinery and equipment.



Jaw crusher with a simple swing of the cheek



The boot fall,
(appearance to the
cheeks crusher)



Cone Crusher **KSD-1750**

Complex pipeline protective CPP-1 (metal detector)

The system is mounted on conveyor belts, transporting body with rubber-based tape. They can forget about the damage crushers and other processing equipment.

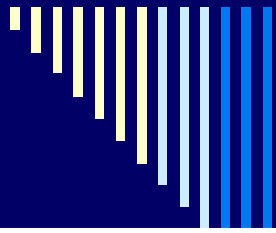


The advantages of Complex pipeline protective CPP-1 :

- easily and quickly installed in the production chain, in places of loading, transport or release of the product;
- reliably detect metallic inclusions of various sizes;
- quickly pay for themselves, because prevent damage to the expensive equipment and loss of time for its repair;

Special features:

- lack of setting and adjustment of elements within the receiver, transmitter and microprocessor units.
- automatic.
- manual adjustment of established parameters.
- automatic detection thresholds for the transported material and the clogging of metal.
- manual adjustment of parameters can be adjusted to a particular conveyor and positioning.
- ability to set the control unit at a considerable distance from the pipeline.
- easy installation transmitting and receiving units. Installation does not require modification of the conveyor.
- work on ores with high conductivity and high iron content.



Technical Parameters of the Metal Detector CCP-1

Rated voltage, V	220 ±10-15%
Rated frequency, Hz	50 ±1%
Operating temperature range, ° C	-10 +40
Power consumption, kW	not more than 0,5
Conveyor speed, m / sec	from 0.5 to 3.0
The height of the layer of transported material, mm.	450
Lifetime, years	no less than 5
Sizes determined by the width of conveyor belt	
Work on materials and ore containing magnetite and pyrrhotite with Fe content up to 50%	

Production

Enterprise Ltd "TEHNOROS" has its own manufacturing base, placed in a three-storey building, highly skilled engineering and production personnel can carry out release of any complexity and partionnosti, from single items to medium series. A broad range of diverse technological equipment allows for a closed cycle of engineering details to the finished product.



Production

Also, the company started to produce precision parts for a complete fiber optic systems, equipment inspection wells, non-standard measuring stands for metallurgists, different problem of spare parts for imported equipment of high-alloy steels and hard alloys. Available in laboratory planetary mill of its own design. Most of the products protected by patents.



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