ALROSA GROUP

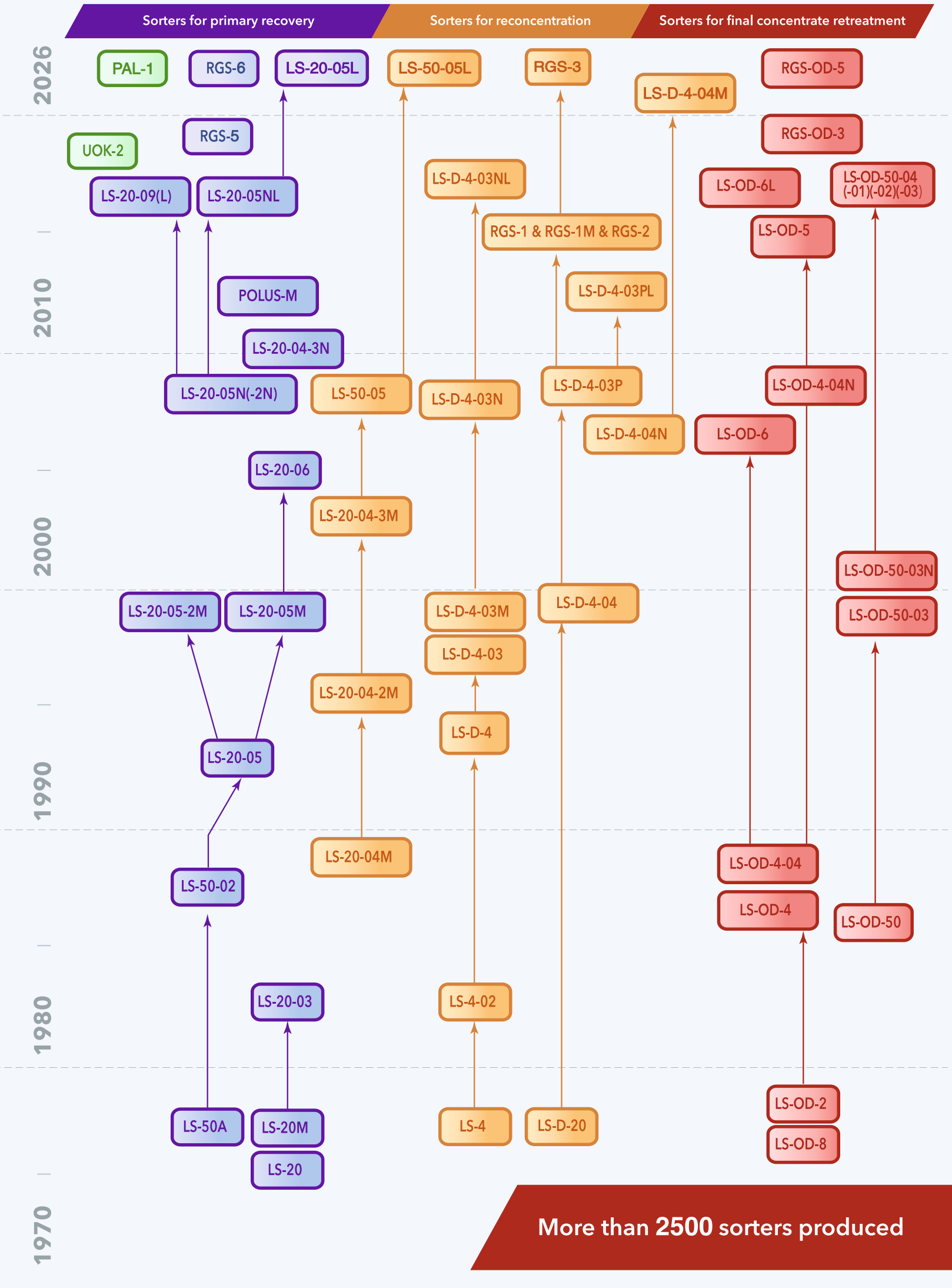
INNOVATION CENTER

BOUREVESTNIK

RESEARCH ✦ DESIGN ✦ PRODUCTION

Equipment for Diamond Recovery and Sorting

Evolution of Bourevestnik sorters



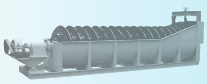
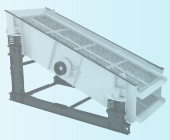
CONTENTS

Process diagram of diamond recovery

ORE PREPARATION

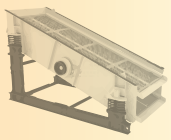
Kimberlite deposit

Milling → Deslurring → Size screening

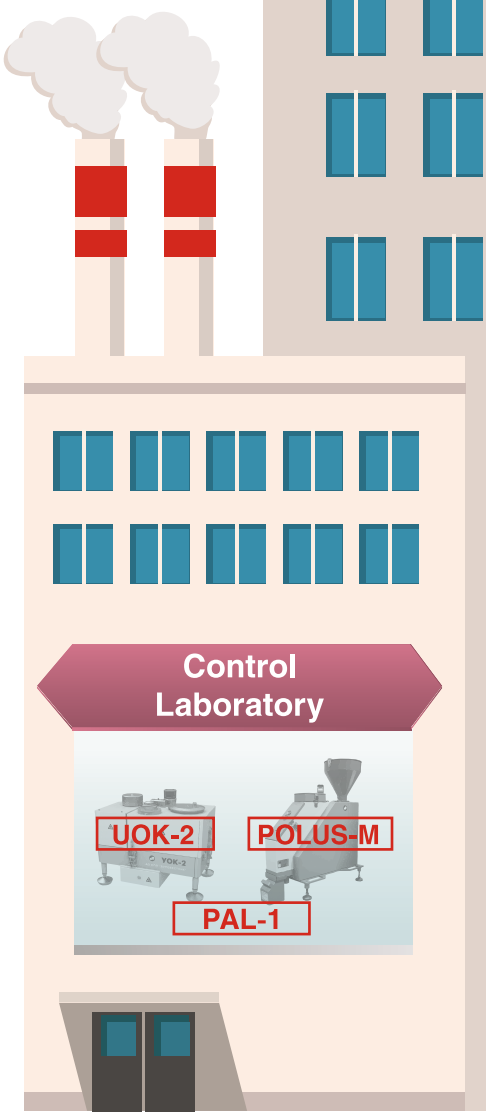




Alluvial deposit

Size screening → Washing




Recovery plant



Coarse material (-50+5mm)	Fine material (-6+1mm)
Primary treatment	
LS-20-09L LS-20-05N LS-20-05NL RGS-5 RGS-6	Dense media separation (DMS)
Concentrate retreatment	
LS-50-05 LS-50-05L	LS-D-4-03N LS-D-4-03NL LS-D-4-03P LS-D-4-03PL
	Concentrate drying
	LS-D-4-04N LS-D-4-04M RGS-3
Final concentrate retreatment	
LS-OD-50-03N LS-OD-50-04-01 LS-OD-20-05-2N LS-OD-50-04-03 RGS-OD-5	LS-OD-6 LS-OD-6L RGS-OD-3
Manual sorting	
Glove box	

Control Laboratory

UOK-2 · POLUS-M · PAL-1

Final concentrate

- Equipment of “Bourevestnik”, JSC

X-ray luminescence sorters for diamond recovery

Sorting equipment is widely applied in diamond production industry by making use of sensor-based sorting methods of diamond-bearing ore. X-ray Luminescence Sorters have mostly found use in a wide range of diamond recovery solutions.

Functional principle of X-ray Luminescence Sorters is based on diamonds physical property to luminesce under X-ray irradiation which is inherently different to the gangue minerals present.

Benefits of X-ray Luminescence Sorters at a glance:

- high recovery;
- effective concentration;
- low operational costs;
- low environmental impact.

Bourevestnik, JSC has a great experience and tradition in the area of design and manufacture of X-ray Luminescence Sorters, starting from supply of the world's first X-ray sorter LS-20 for diamond production industry, back to 1969.

Since then, more than 2500 sorters has been supplied, where 950 of them are in operation.

LS-20-05N

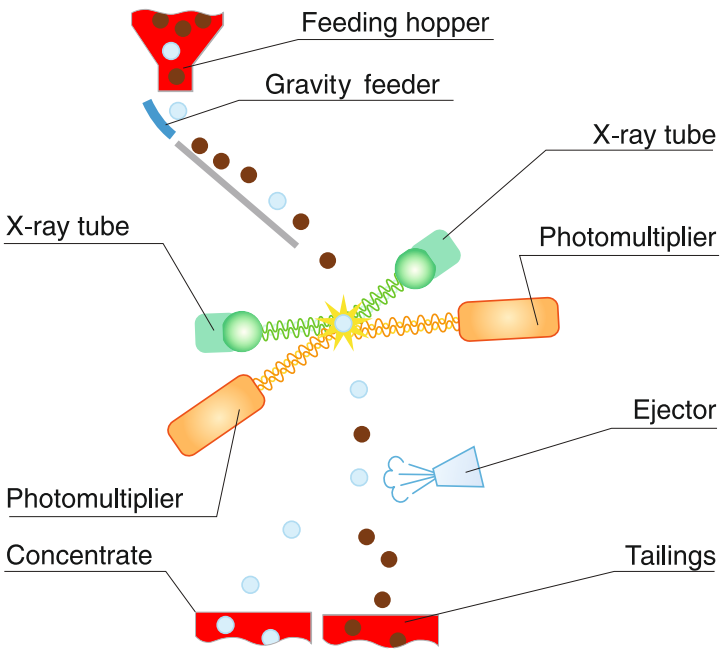
Primary treatment | **-20 +5 mm** | **Legacy product**

X-ray luminescence sorter LS-20-05N is a diamond recovery machine designed for treatment of WET material with size range -20 +5 mm.

Main specification		
Size fraction, mm	-20 +10	-10 +5
Throughput up to, t/h	45	25
Yield per one ejection, kg	1.5	1
Recovery rate, %	98	
Type of material	wet	

Material feeding and detection system	
Material feed	Gravity feeder
Material flow channel	1
X-ray tube	2
Photomultiplier	6

Sorter's supply		
Power consumption, kVA (single phase, 220V/50Hz)		5
Technical water consumption, not less than, l/min		30
Cooling water consumption, not less than, l/min		6
Consumption of compressed air	per 1 ejection, l	0.48
	nominal productivity, l/min	30



	Dimensions, mm	Weight, kg
Sorting machine	2300x750x2300	1400
Automatic control rack	881x603x1952	200

LS-20-05NL

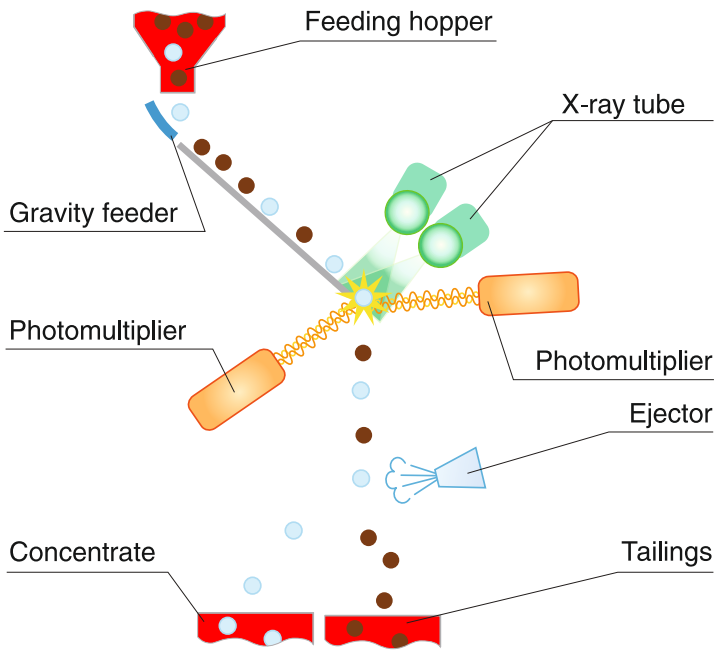
Primary treatment | **-25 +5 mm** | **New product**

X-ray luminescence sorter LS-20-05NL is a diamond recovery machine designed for treatment of WET material with size range -25 +5 mm.

Main specification		
Size fraction, mm	-25 +10	-10 +5
Throughput up to, t/h	50	25
Yield per one ejection, kg	1.5	1.0
Recovery rate, %	98.5	
Type of material	wet	

Material feeding and detection system	
Material feed	Gravity feeder
Material flow channel	1
X-ray tube	2
Photomultiplier	8

Sorter's supply		
Power consumption, kVA (single phase, 220V/50Hz)		5
Technical water consumption, not less than, l/min		30
Cooling water consumption, not less than, l/min		6
Consumption of compressed air	per 1 ejection, l	0.48
	nominal productivity, l/min	30



	Dimensions, mm	Weight, kg
Sorting machine	2300x750x2300	1400
Automatic control rack	881x603x1952	200

LS-20-05L

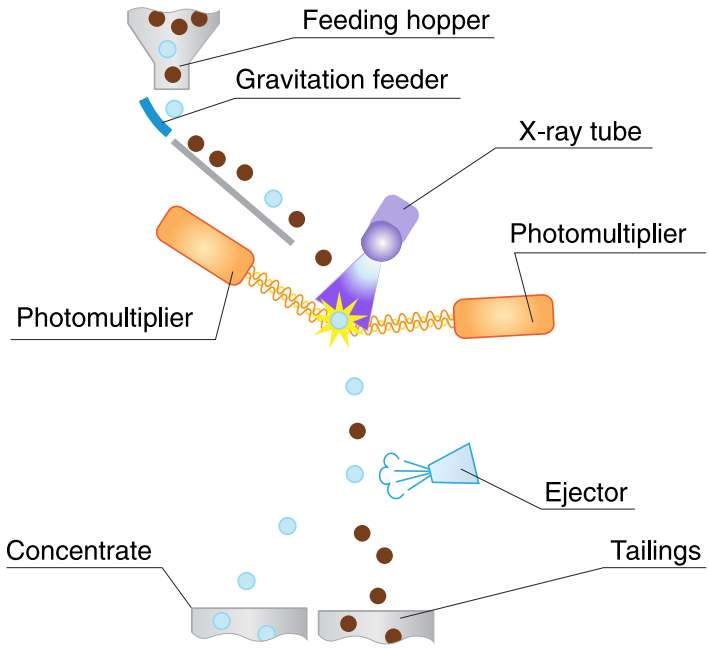
Primary treatment | **-20 +5 mm** | **Legacy product**

X-ray luminescence sorter LS-20-05L is a diamond recovery machine designed for treatment of WET and DRY material with size range -20+5 mm.

Main specification		
Size fraction, mm	-20 +10	-10 +5
Throughput up to, t/h	45	25
Yield per one ejection, kg	0.4	0.2
Recovery rate, %	99	
Type of material	wet/dry	

Material feeding and detection system	
Material feed	Gravity feeder
Material flow channel	1
X-ray tube	1
Photomultiplier	16

Sorter's supply		
Power consumption, kVA (single phase, 220V/50Hz)		6
Technical water consumption, not less than, l/min		30
Cooling water consumption, not less than, l/min		6
Consumption of compressed air	per 1 ejection, l	0.48
	nominal productivity, l/min	30



	Dimensions, mm	Weight, kg
Sorting machine	2350x845x2300	1500
Automatic control rack	881x603x1952	200

LS-20-09L

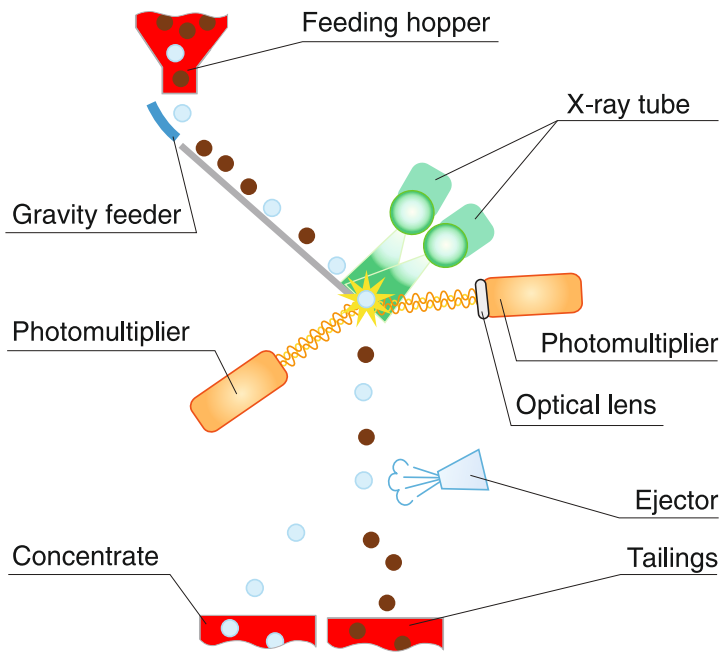
Primary treatment | **-50 +5 mm** | **New product**

X-ray luminescence sorter LS-20-09L is a diamond recovery machine designed for treatment of WET material with size range -50 +5 mm.

Main specification			
Size fraction, mm	-50 +20	-20 +10	-10 +5
Throughput up to, t/h	100	60	30
Yield per one ejection, kg	1	0.65	0.4
Recovery rate, %	98.5	98.5	98.5
Type of material		wet	

Material feeding and detection system	
Material feed	Gravity feeder
Material flow channel	1
X-ray tube	2
Photomultiplier	16

Sorter's supply		
Power consumption, kVA (single phase, 220V/50Hz)		6
Technical water consumption, not less than, l/min		30
Cooling water consumption, not less than, l/min		6
Consumption of compressed air	per 1 ejection, l	1.15
	nominal productivity, l/min	30



	Dimensions, mm	Weight, kg
Sorting machine	2300x845x2300	1100
Automatic control rack	881x603x1952	200

LS-50-05

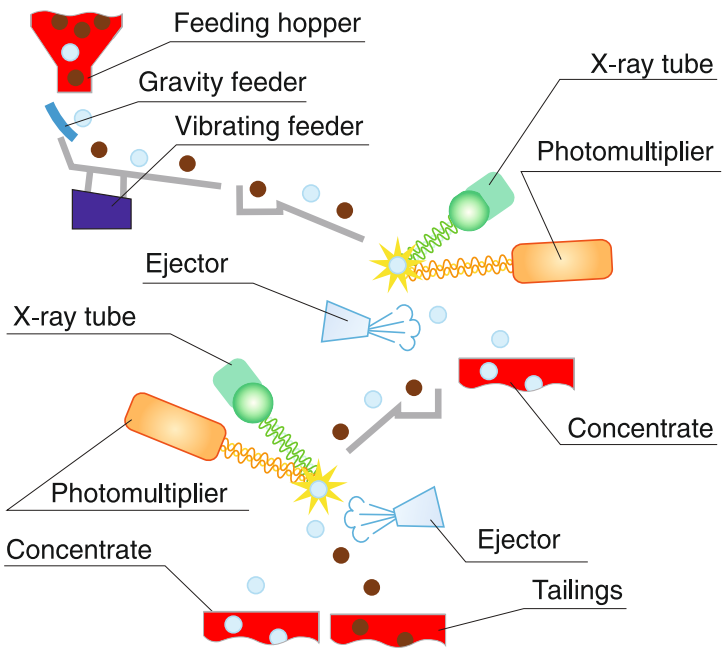
Concentrate retreatment | **-50 +5 mm** | **Legacy product**

X-ray luminescence sorter LS-50-05 is a diamond recovery machine designed for treatment of WET material with size range -50 +5 mm.

Main specification			
Size fraction, mm	-50 +20	-20 +10	-10 +5
Throughput up to, t/h	30	20	9
Yield per one ejection, kg	0.7	0.3	0.1
Recovery rate, %		98	
Type of material		wet	

Material feeding and detection system	
Material feed	Gravity and vibrating feeder
Material flow channel	1, 2, 4
X-ray tube	2
Photomultiplier	8

Sorter's supply		
Power consumption, kVA (single phase, 220V/50Hz)		6
Technical water consumption, not less than, l/min		20
Cooling water consumption, not less than, l/min		12
Consumption of compressed air	per 1 ejection, l	0.92
	nominal productivity, l/min	50



	Dimensions, mm	Weight, kg
Sorting machine	2550x800x2585	1800
Automatic control rack	881x603x1952	200

LS-50-05L

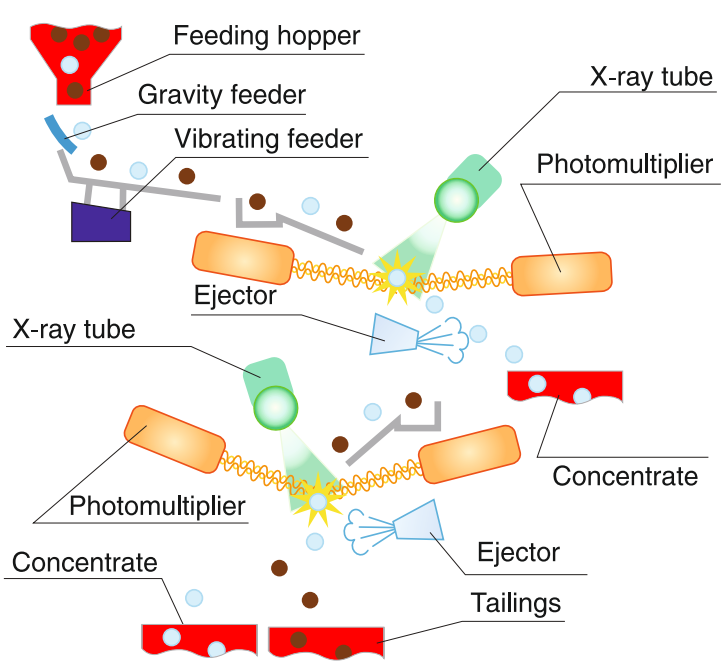
Concentrate retreatment | **-50 +5 mm** | **New product**

X-ray luminescence sorter LS-50-05L is a diamond recovery machine designed for treatment of WET material with size range -50 +5 mm.

Main specification			
Size fraction, mm	-50 +20	-20 +10	-10 +5
Throughput up to, t/h	24	16	7.2
Yield per one ejection, kg	0.7	0.3	0.1
Recovery rate, %		98.5	
Type of material		wet	

Material feeding and detection system	
Material feed	Gravity and vibrating feeder
Material flow channel	1, 2, 4
X-ray tube	2
Photomultiplier	16

Sorter's supply		
Power consumption, kVA (single phase, 220V/50Hz)		6
Technical water consumption, not less than, l/min		20
Cooling water consumption, not less than, l/min		12
Consumption of compressed air	per 1 ejection, l	0.92
	nominal productivity, l/min	50



	Dimensions, mm	Weight, kg
Sorting machine	2550x800x2585	1800
Automatic control rack	881x603x1952	200

LS-OD-50-03N

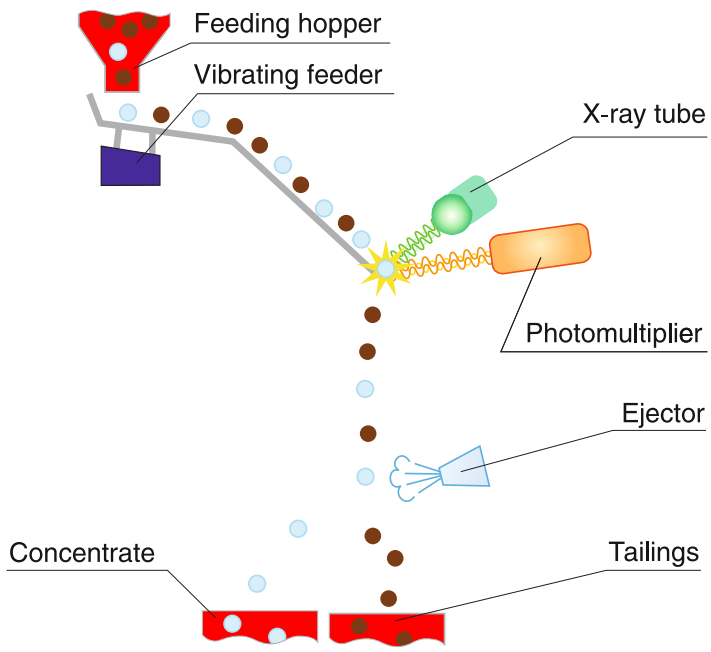
Final concentrate retreatment | **-50 +5 mm** | **Legacy product**

X-ray luminescence sorter LS-OD-50-03N is a diamond recovery machine designed for treatment of WET material with range -50 +5 mm.

Main specification			
Size fraction, mm	-50 +20	-20 +10	-10 +5
Throughput up to, kg/h	2500	500	125
Yield per 10 ejections, grain	15	18	22
Recovery rate, %		99	
Type of material		wet	

Material feeding and detection system	
Material feed	Vibrating feeder
Material flow channel	2
X-ray tube	1
Photomultiplier	2

Sorter's supply		
Power consumption, kVA (single phase, 220V/50Hz)		4
Technical water consumption, not less than, l/min		30
Cooling water consumption, not less than, l/min		6
Consumption of compressed air	per 1 ejection, l	0.46
	nominal productivity, l/min	50



	Dimensions, mm	Weight, kg
Sorting machine	1830x850x1800	1100
Automatic control rack	881x603x1952	200

LS-OD-20-05-2N

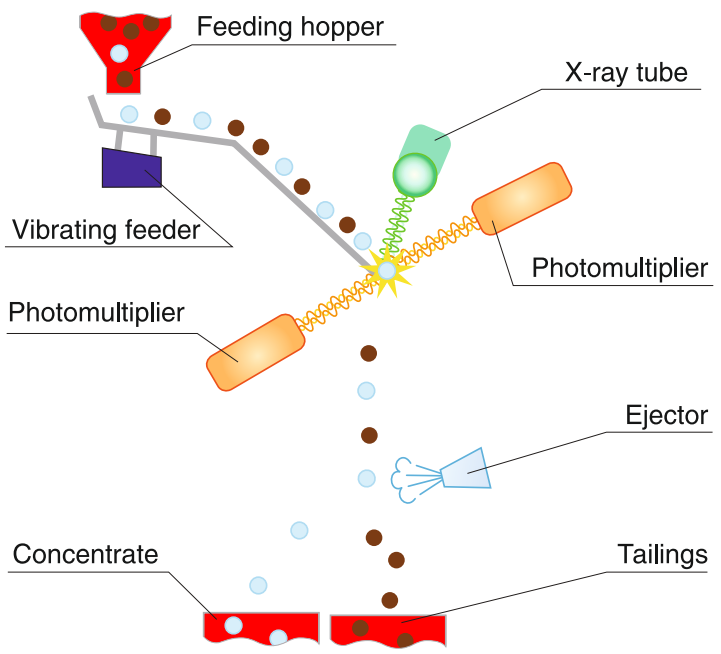
Final concentrate retreatment | **-50 +5mm** | **New product**

X-ray luminescence sorter LS-OD-20-05-2N is a diamond recovery machine designed for treatment of WET material with size range -50 +5 mm.

Main specification			
Size fraction, mm	-50 +20	-20 +10	-10 +5
Throughput up to, kg/h	2500	500	125
Yield per 10 ejections, grain	15	18	22
Recovery rate, %		99	
Type of material		wet	

Material feeding and detection system	
Material feed	Vibrating feeder
Material flow channel	2
X-ray tube	1
Photomultiplier	4

Sorter's supply		
Power consumption, kVA (single phase, 220V/50Hz)		6
Technical water consumption, not less than, l/min		30
Cooling water consumption, not less than, l/min		6
Consumption of compressed air	per 1 ejection, l	0.46
	nominal productivity, l/min	50



	Dimensions, mm	Weight, kg
Sorting machine	1830x850x1800	1100
Automatic control rack	881x603x1952	200

LS-OD-50-04-01

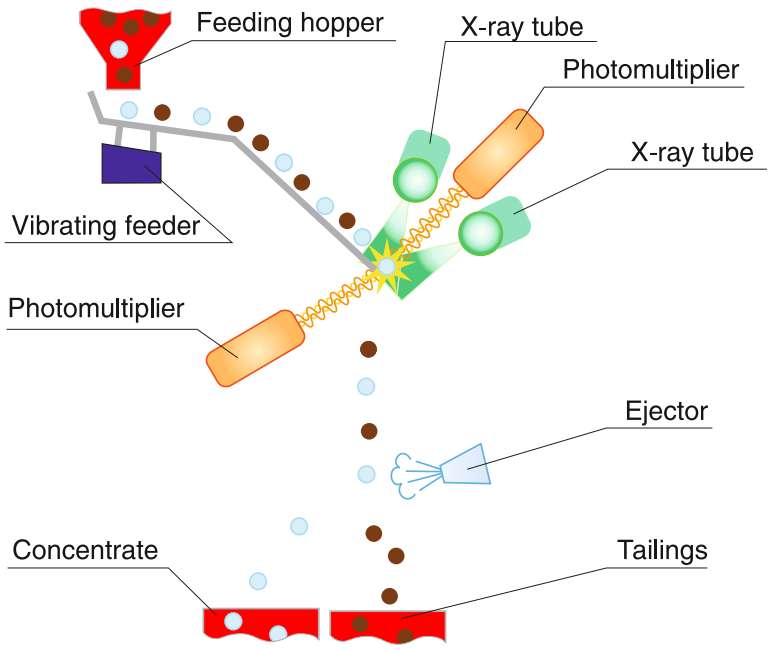
Final concentrate retreatment | **-50 +5mm** | **New product**

X-ray luminescence sorter LS-OD-50-04-01 is a diamond recovery machine designed for treatment of WET material with size range -50 +5 mm.

Main specification			
Size fraction, mm	-50 +20	-20 +10	-10 +5
Throughput up to, kg/h	2500	500	125
Yield per 10 ejections, grain	15	18	22
Recovery rate, %	98.5	98.5	98
Type of material		wet	

Material feeding and detection system	
Material feed	Vibrating feeder
Material flow channel	2
X-ray tube	2
Photomultiplier	4

Sorter's supply		
Power consumption, kVA (single phase, 220V/50Hz)		6
Technical water consumption, not less than, l/min		30
Cooling water consumption, not less than, l/min		6
Consumption of compressed air	per 1 ejection, l	0.46
	nominal productivity, l/min	50



	Dimensions, mm	Weight, kg
Sorting machine	2000x930x2137	1200
Automatic control rack	881x603x1952	200

LS-OD-50-04-03

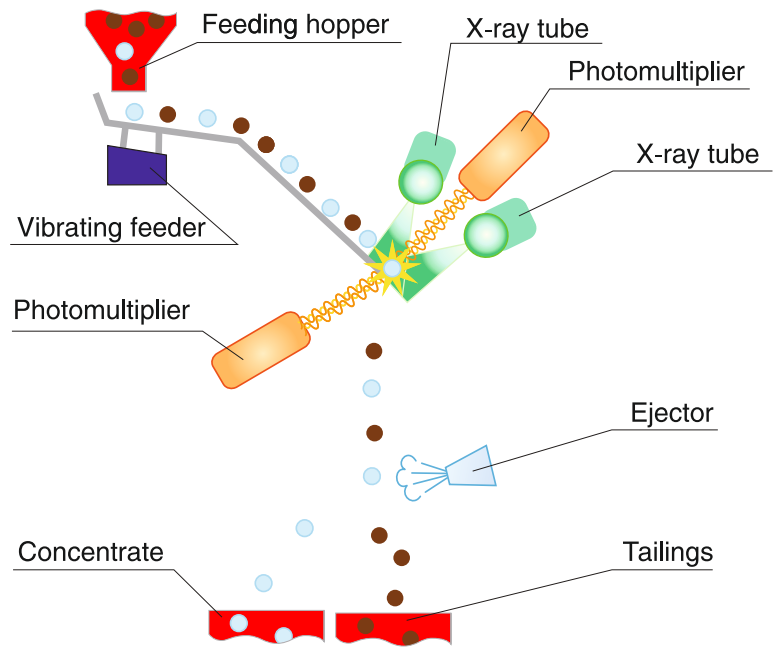
Final concentrate retreatment | **-20 +5 mm** | **New product**

X-ray luminescence sorter LS-OD-50-04-03 is a diamond recovery machine designed for treatment of WET material with size range -20 +5 mm.

Main specification		
Size fraction, mm	-20 +10	-10 +5
Throughput up to, kg/h	1000	250
Yield per 10 ejections, grain	18	22
Recovery rate, %	98.5	
Type of material	wet	

Material feeding and detection system	
Material feed	Vibrating feeder
Material flow channel	4
X-ray tube	2
Photomultiplier	8

Sorter's supply		
Power consumption, kVA (single phase, 220V/50Hz)		6
Technical water consumption, not less than, l/min		20
Cooling water consumption, not less than, l/min		6
Consumption of compressed air	per 1 ejection, l	0.92
	nominal productivity, l/min	80



	Dimensions, mm	Weight, kg
Sorting machine	2000x930x2135	1200
Automatic control rack	881x603x1952	200

LS-D-4-03N

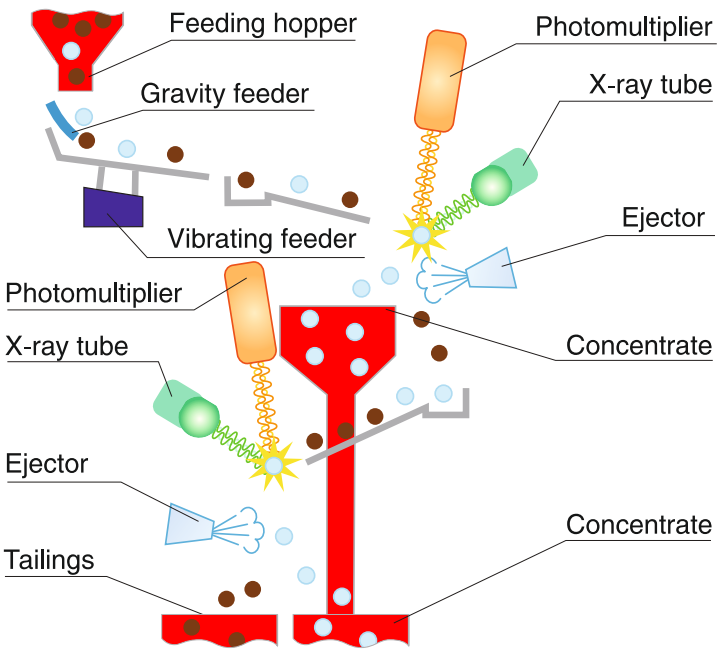
Concentrate retreatment | **-6 +1 mm** | **Legacy product**

X-ray luminescence two-stage sorter LS-D-4-03N is a diamond recovery machine designed for treatment of WET material with size range -6 +1 mm.

Main specification		
Size fraction, mm	-6 +3	-3 +1
Throughput up to, kg/h	5000	1300
Yield per one ejection, g	40	13
Recovery rate, %	98	95
Type of material	wet	

Material feeding and detection system	
Material feed	Gravity/Vibrating feeder
Material flow channel	4
X-ray tube	2
Photomultiplier	8

Sorter's supply		
Power consumption, kVA (single phase, 220V/50Hz)		5
Technical water consumption, not less than, l/min		40
Cooling water consumption, not less than, l/min		6
Consumption of compressed air	per 1 ejection, l	0.7
	nominal productivity, l/min	50



	Dimensions, mm	Weight, kg
Sorting machine	2060x850x2805	1450
Automatic control rack	881x603x1952	200

LS-D-4-03NL

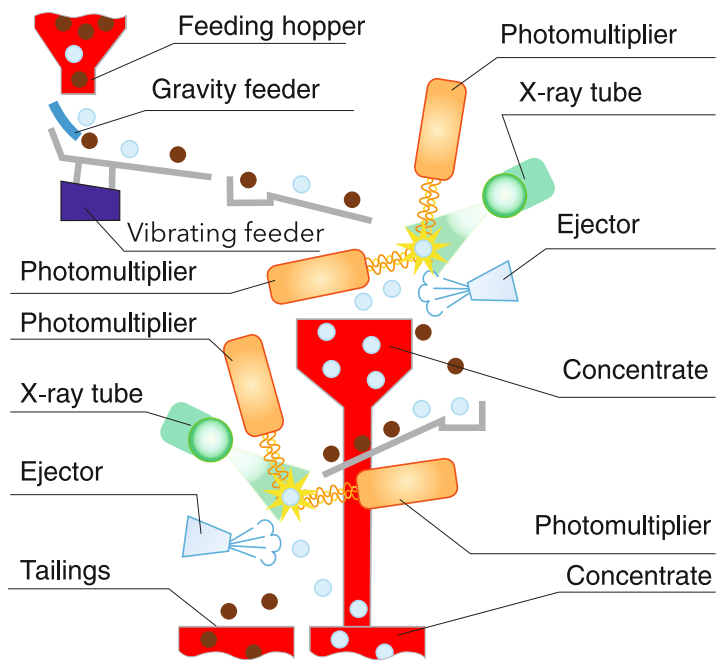
Concentrate retreatment | **-6 +1 mm** | **New product**

X-ray luminescence two-stage sorter LS-D-4-03NL is a diamond recovery machine designed for treatment of WET material with size range -6 +1 mm.

Main specification		
Size fraction, mm	-6 +3	-3 +1
Throughput up to, kg/h	5000	1300
Yield per one ejection, g	40	13
Recovery rate, %	98	95
Type of material	wet	

Material feeding and detection system	
Material feed	Gravity/Vibrating feeder
Material flow channel	4
X-ray tube	2
Photomultiplier	16

Sorter's supply		
Power consumption, kVA (single phase, 220V/50Hz)		5
Technical water consumption, not less than, l/min		40
Cooling water consumption, not less than, l/min		6
Consumption of compressed air	per 1 ejection, l	0.7
	nominal productivity, l/min	50



	Dimensions, mm	Weight, kg
Sorting machine	2060x850x2805	1450
Automatic control rack	881x603x1952	200

LS-D-4-03P

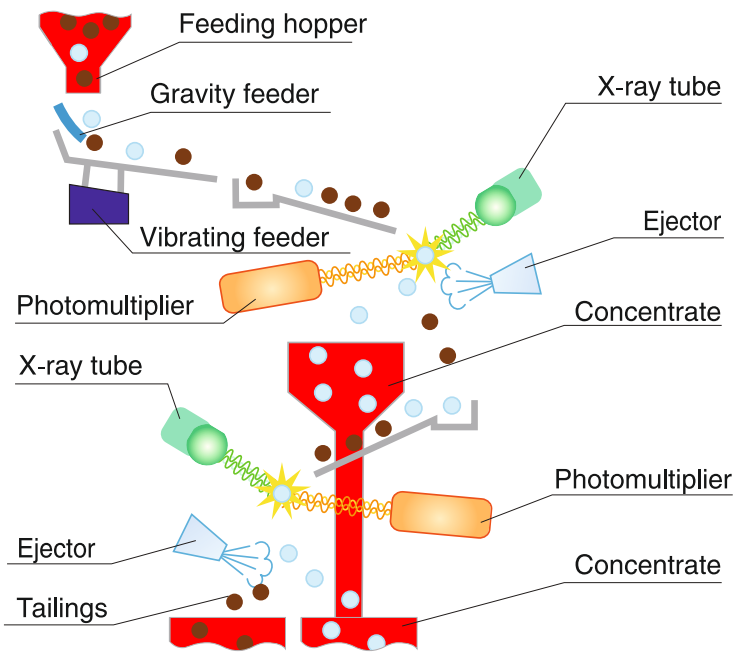
Concentrate retreatment | **-6 +1 mm** | **Legacy product**

X-ray luminescence two-stage sorter LS-D-4-03P is a diamond recovery machine designed for treatment of WET material with size range -6 +1 mm.

Main specification		
Size fraction, mm	-6 +3	-3 +1
Throughput up to, kg/h	400	170
Yield per one ejection, g	1	0.5
Recovery rate, %	99	95
Type of material	wet	

Material feeding and detection system	
Material feed	Gravity/Vibrating feeder
Material flow channel	4
X-ray tube	2
Photomultiplier	8

Sorter's supply		
Power consumption, kVA (single phase, 220V/50Hz)		4
Technical water consumption, not less than, l/min		40
Cooling water consumption, not less than, l/min		12
Consumption of compressed air	per 1 ejection, l	0.16
	nominal productivity, l/min	15



	Dimensions, mm	Weight, kg
Sorting machine	1329x815x2492	800
Automatic control rack	881x603x1952	200

LS-D-4-03PL

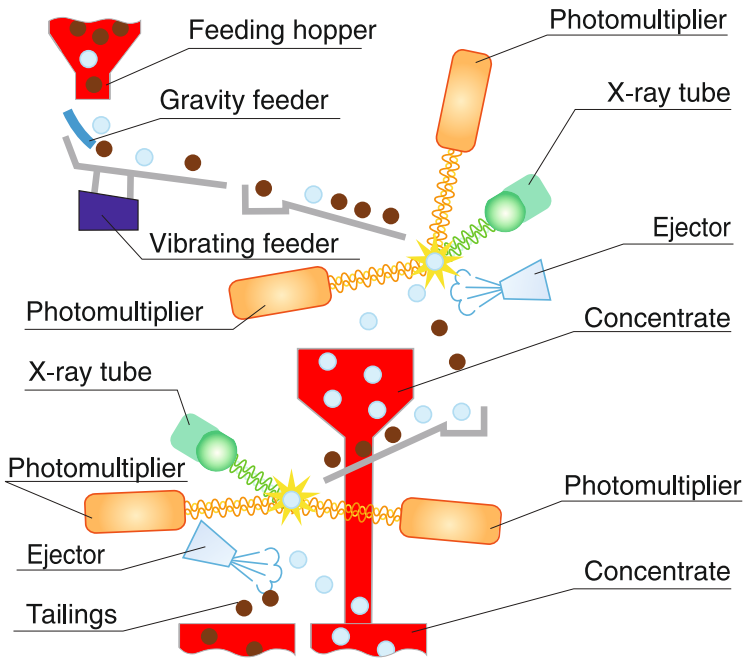
Concentrate retreatment | **-6 +1 mm** | **New product**

X-ray luminescence two-stage sorter LS-D-4-03PL is a diamond recovery machine designed for reconcentration of WET material with size range -6 +1.

Main specification		
Size fraction, mm	-6 +3	-3 +1
Throughput up to, kg/h	400	170
Yield per one ejection, g	1	0.5
Recovery rate, %	99	95
Type of material	wet	

Material feeding and detection system	
Material feed	Gravity/Vibrating feeder
Material flow channel	4
X-ray tube	2
Photomultiplier	16

Sorter's supply		
Power consumption, kVA (single phase, 220V/50Hz)		4
Technical water consumption, not less than, l/min		40
Cooling water consumption, not less than, l/min		12
Consumption of compressed air	per 1 ejection, l	0.16
	nominal productivity, l/min	15



	Dimensions, mm	Weight, kg
Sorting machine	1329x815x2492	900
Automatic control rack	881x603x1952	200

LS-D-4-04N

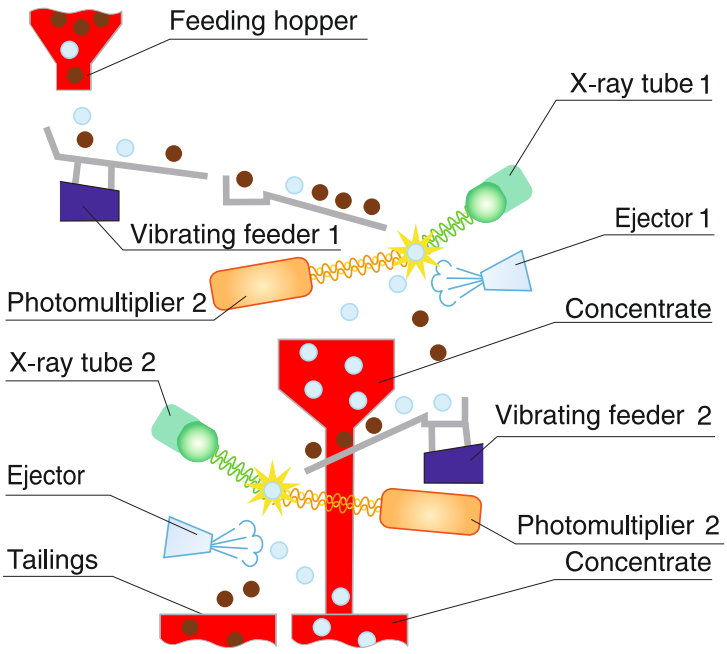
Concentrate retreatment | **-6 +1 mm** | **Legacy product**

X-ray luminescence two-stage sorter LS-D-4-04N is a diamond recovery machine designed for reconcentration of DRY material -6 +1.

Main specification		
Size fraction, mm	-6 +3	-3 +1
Throughput up to, kg/h	600	300
Yield per one ejection, g	2	1
Recovery rate, %	98	
Type of material	dry	

Material feeding and detection system	
Material feed	Vibrating feeder
Material flow channel	4
X-ray tube	2
Photomultiplier	8

Sorter's supply		
Power consumption, kVA (single phase, 220V/50Hz)		5
Technical water consumption, not less than, l/min		-
Cooling water consumption, not less than, l/min		6
Consumption of compressed air	per 1 ejection, l	0.16
	nominal productivity, l/min	15



	Dimensions, mm	Weight, kg
Sorting machine	1000x670x1970	600
Automatic control rack	883x603x1952	200

LS-D-4-04M

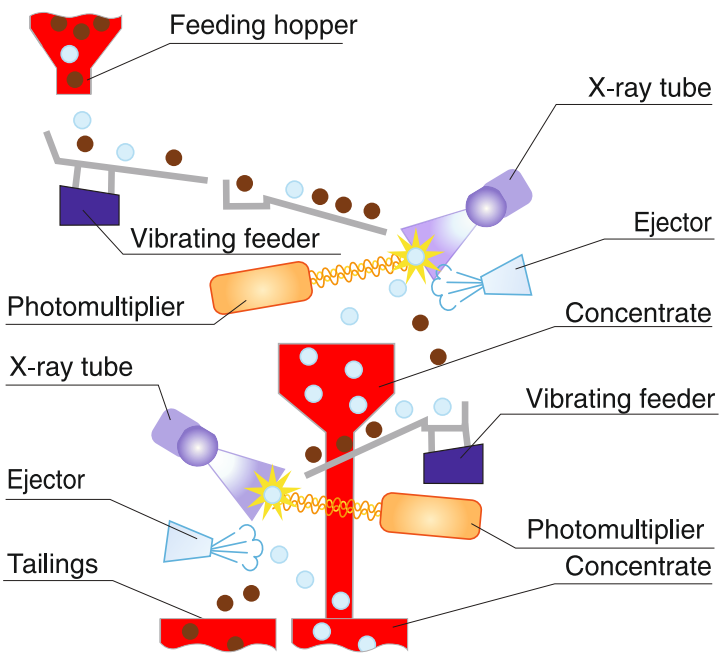
Concentrate retreatment | **-6 +1 mm** | **New product**

X-ray luminescence two-stage sorter LS-D-4-04M is a diamond recovery machine designed for reconcentration of DRY material -6 +1.

Main specification		
Size fraction, mm	-6 +3	-3 +1
Throughput up to, kg/h	900	450
Yield per one ejection, g	2	1
Recovery rate, %	98	
Type of material	dry	

Material feeding and detection system	
Material feed	Gravity/Vibrating feeder
Material flow channel	6
X-ray tube	2
Photomultiplier	12

Sorter's supply	
Power consumption, kVA (single phase, 220V/50Hz)	5
Technical water consumption, not less than, l/min	-
Cooling water consumption, not less than, l/min	6



	Dimensions, mm	Weight, kg
Sorting machine	1170x760x1970	760
Automatic control rack	883x603x1952	200

LS-OD-6

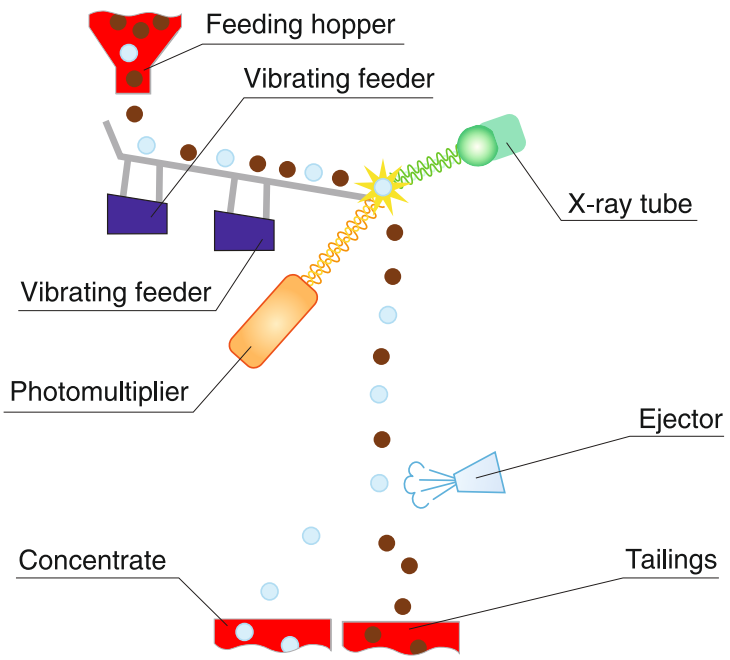
Final concentrate retreatment | **-6 +0.5 mm** | **Legacy product**

X-ray luminescence sorter LS-OD-6 is a diamond recovery machine designed for final concentrate treatment of DRY material -6 +0.5 mm.

Main specification			
Size fraction, mm	-6 +3	-3 +1	-1 +0.5
Throughput up to, kg/h	50	12.5	2
Yield per 10 ejections, grain	30	45	45
Recovery rate, %	98	96	90
Type of material		dry	

Material feeding and detection system	
Material feed	Double vibrating feeder
Material flow channel	4
X-ray tube	1
Photomultiplier	4

Sorter's supply		
Power consumption, kVA (single phase, 220V/50Hz)		3.5
Technical water consumption, not more than, l/min		-
Cooling water consumption, not less than, l/min		6
Consumption of compressed air	per 1 ejection, l	0.12
	nominal productivity, l/min	15



	Dimensions, mm	Weight, kg
Sorting machine	1300x790x1900	700
Automatic control rack	881x603x1952	200

LS-OD-6L

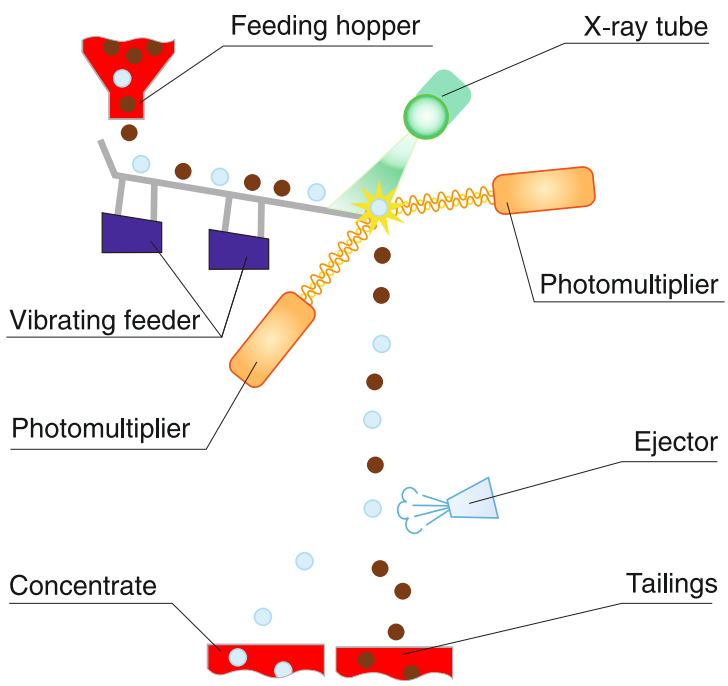
Final concentrate retreatment | **-6 +0.5 mm** | **New product**

X-ray luminescence sorter LS-OD-6L is a diamond recovery machine designed for final concentrate treatment of DRY material -6 +0.5 mm.

Main specification			
Size fraction, mm	-6 +3	-3 +1	-1 +0.5
Throughput up to, kg/h	50	12.5	2
Yield per 10 ejections, grain	30	45	45
Recovery rate, %	98	96	90
Type of material		dry	

Material feeding and detection system	
Material feed	Double vibrating feeder
Material flow channel	4
X-ray tube	1
Photomultiplier	8

Sorter's supply		
Power consumption, kVA (single phase, 220V/50Hz)		3.5
Technical water consumption, not more than, l/min		-
Cooling water consumption, not less than, l/min		6
Consumption of compressed air	per 1 ejection, l	0.12
	nominal productivity, l/min	15

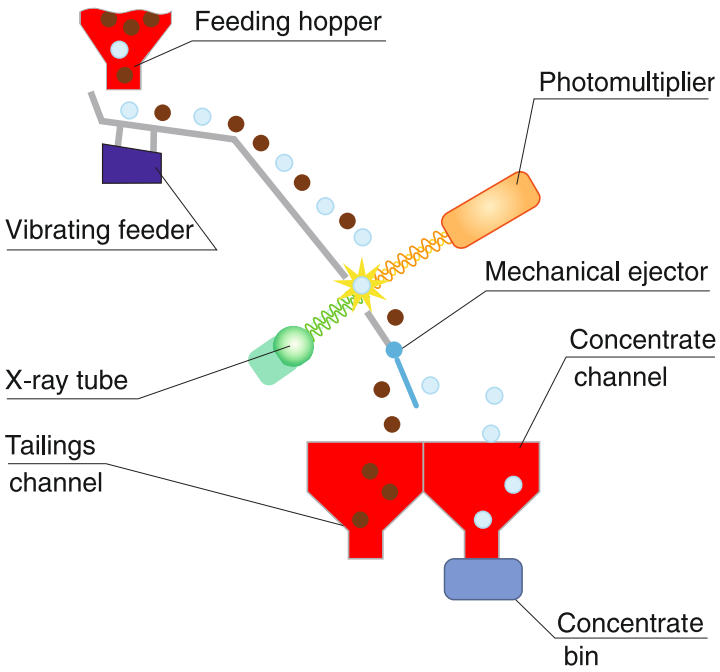


	Dimensions, mm	Weight, kg
Sorting machine	1300x790x1900	800
Automatic control rack	881x603x1952	200

POLUS-M

Portable sorter | **-8 +0.5 mm** | **Legacy product**

POLUS-M is specially designed portable sorter for geological exploration of diamond deposits and also enrichment of dry diamond bearing concentrates in field conditions.



The sorter consists of the sorting machine and the control unit.

The registration unit and the X-ray source are placed on opposite sides of the material flow.

Access to the transport channel is through the removable doors. It allows operation in field conditions. Neither water nor compressed air is required.

Technical specifications

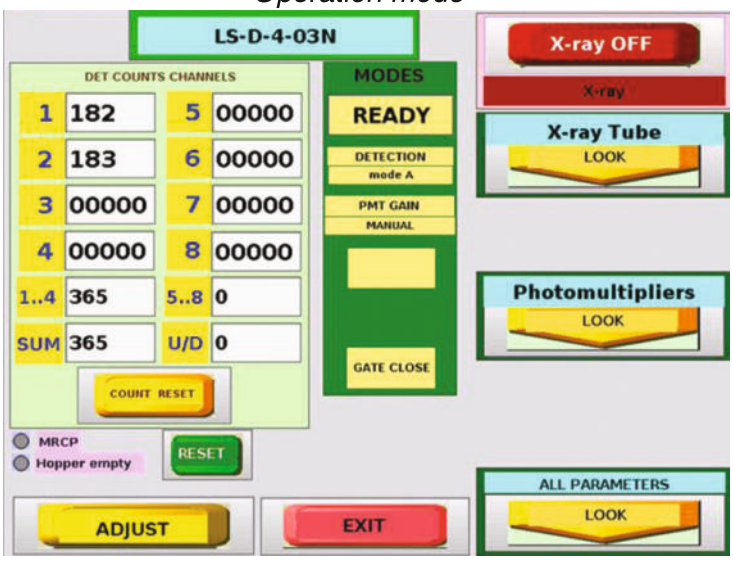
Size of fraction, mm	– 8 + 5	– 5 + 2	– 2 + 1	-1 +0.5
Throughput up to, kg/h	100	50	30	15
Yield per one ejection, not more than, g	2.2	1.7	1	0.5
Recovery rate, not less than %	98			

	Sorting machine	Control unit
Overall dimensions (LxWxH), mm	635x300x590	490x440x290
Net weight, kg (without packaging)	36.5	18
Power consumption, VA (single phase, 220 V/50 Hz)	300	
Operating temperature range, C°	+5..+45 with the relative humidity up to 80%	

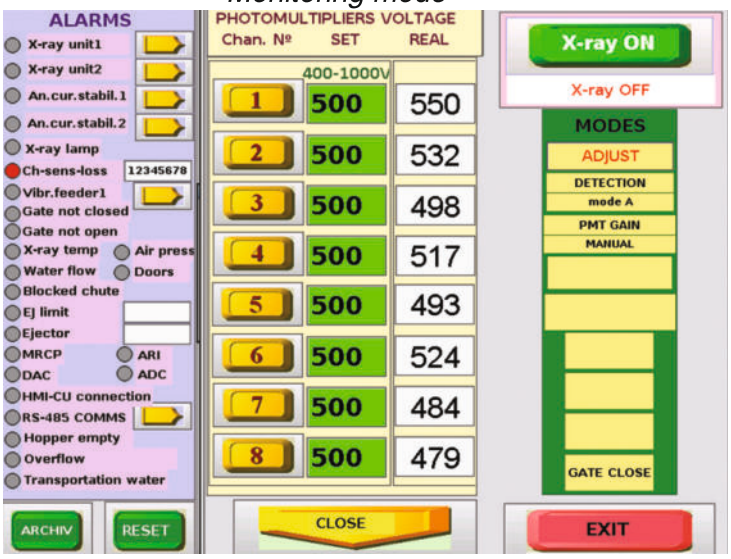
Specially designed construction of the sorter totally protects against the X-ray. Each unit is being tested for safety.

Software interface of X-ray luminescence sorters

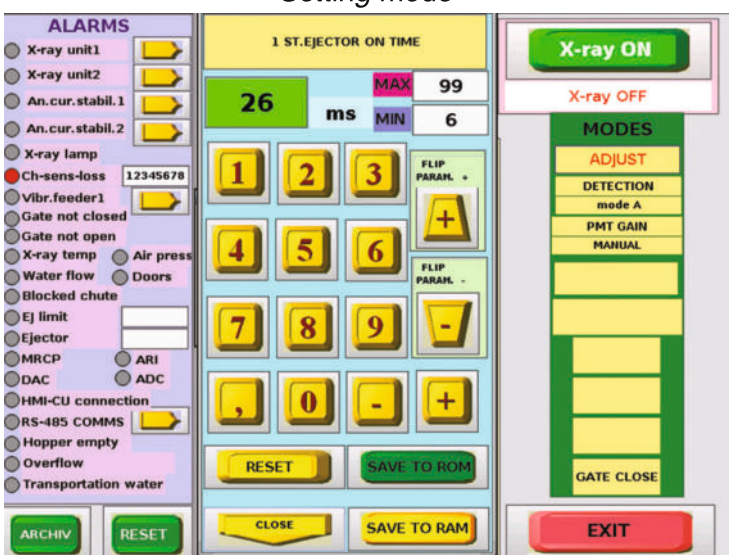
Operation mode



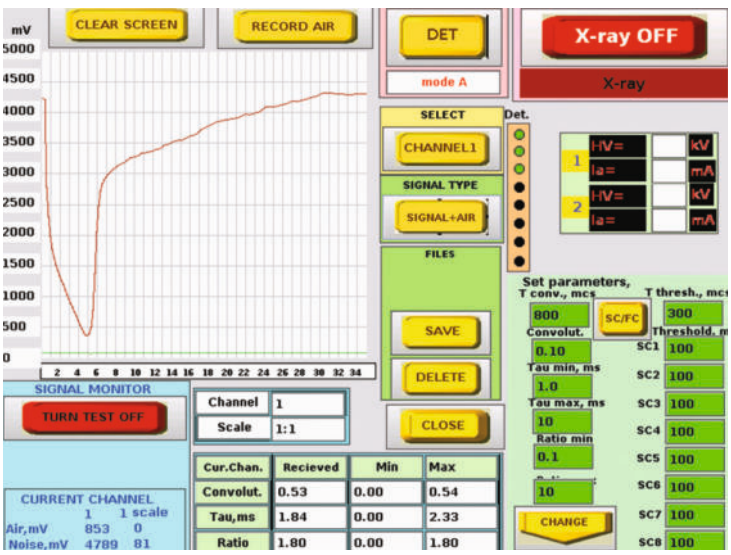
Monitoring mode



Setting mode

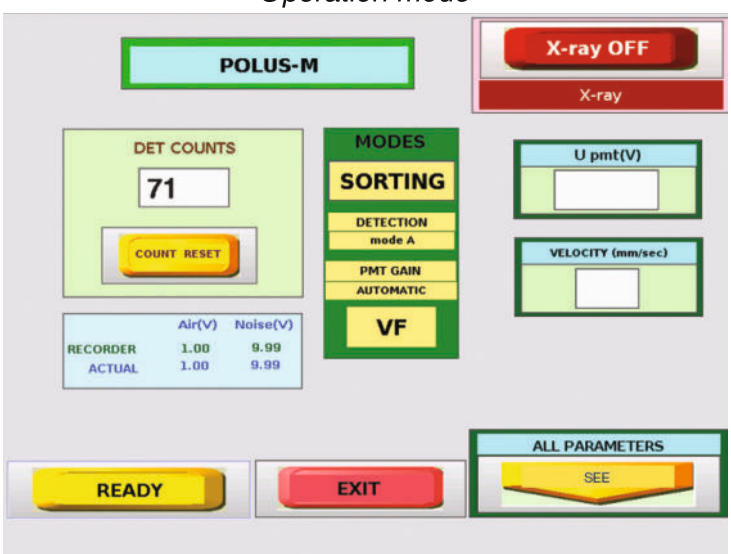


Test mode

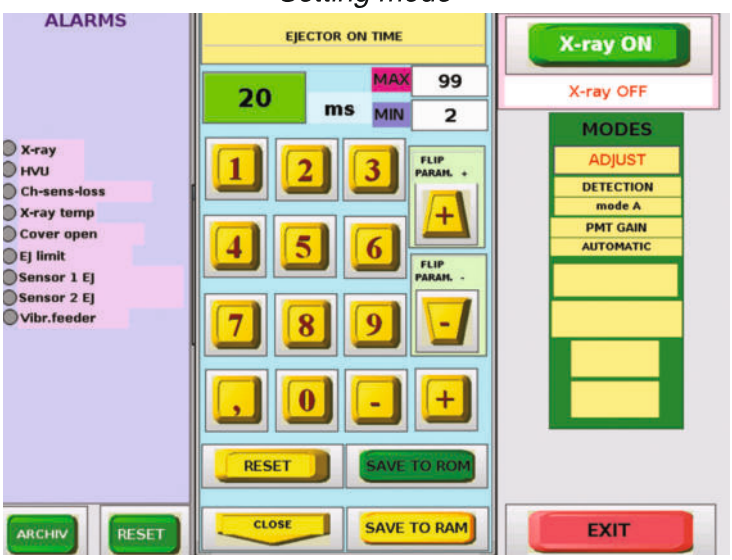


Software interface of POLUS-M

Operation mode



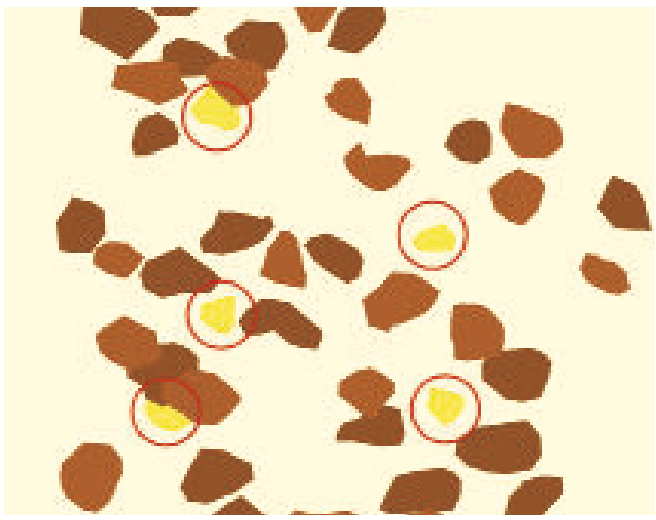
Setting mode



X-ray transmission sorters for diamond recovery

X-ray transmission (XRT) sorters, as well as luminescence sorters, are radiometric sorters used for treatment of diamond-bearing ore.

Principle of operation of X-ray transmission sorters is based on the property of materials to absorb X-ray radiation. A diamond consisting of carbon, which is light element with atomic number 6, absorbs less X-ray radiation comparing to ancillary minerals, which contain heavier elements such as silicon, calcium, magnesium, oxygen, iron, etc.



Example of transmission image with rock particles and diamonds (marked with the circle)

In case of X-ray transmission sorters X-ray radiation is being measured by special sensors after it passes through the particle of mineral. Depending on the intensity of the radiation passed through the particle of mineral we can make conclusion about atomic number of elements contained in the analyzed mineral. Since a diamond consists of light element carbon, the intensity of radiation passed through it will be higher, comparing to the radiation intensity passed through the particle of ancillary mineral (in case of the same thickness of the particles).

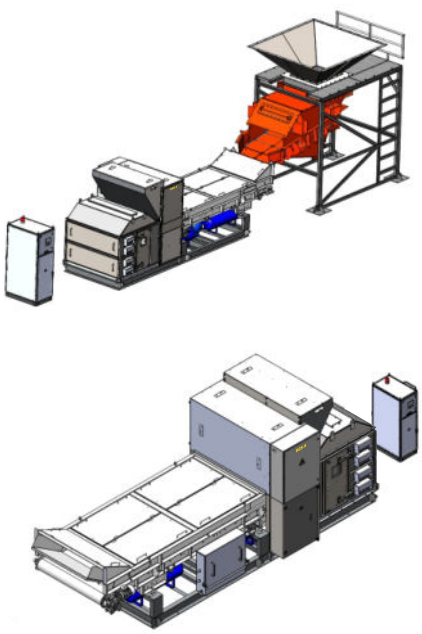
In order to avoid the influence of different thicknesses of the particles to the measurements' result, we perform consistent measurements for two different values of X-ray radiation energies.

Currently Bourevestnik, JSC offers wide range of X-ray transmission sorters for the enrichment of wet or dry diamond-bearing material with size fractions from +1mm up to -100mm

- primary treatment sorter RGS-6;
- concentrate retreatment sorter RGS-3;
- final concentrate retreatment RGS-OD-3 and RGS-OD-5.

RGS-6

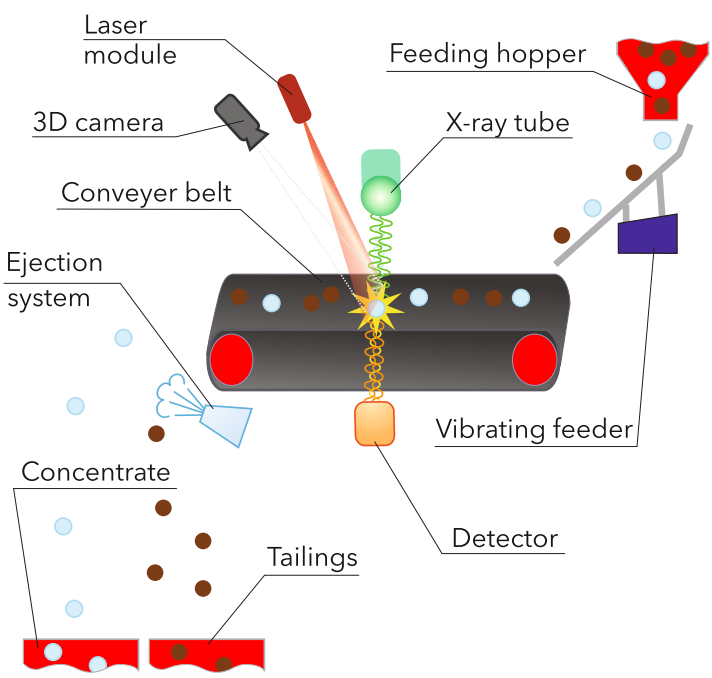
Primary sorting | **-100 +6 mm** | **New product**



X-ray transmission (XRT) sorter RGS-6 is a diamond recovery machine designed for primary treatment of DRY or DAMP material with size range -100 +6 mm.

Main specification				
Size fraction, mm	-100 +50	-50 +25	-25 +12	-12 +6
Throughput, t/h	up to 186*	up to 93*	up to 47*	up to 33*
Type of material	dry/damp*			
Material feeding and detection system**				
Material feed	Vibrating feeder and belt			
Operational width, mm	1200			
X-ray tube	1			
Detector	1			
Laser triangulation system	1			
Sorter's supply				
Electric Power, kVA (3 phase, 220V/50Hz), not less than	8			
Cooling water consumption, l/min, not less than	4,5			

	Dimensions, mm	**Mass, kg**
Sorting machine (SM), max	6180x2190x2480	4700*
Automatic control rack (ACR), max	1090x905x2055	335*



* Preliminary information
** Multi-channel pneumatic ejector system with local or group ejection

RGS-5

Primary sorting | **-50 +10 mm** | **New product***

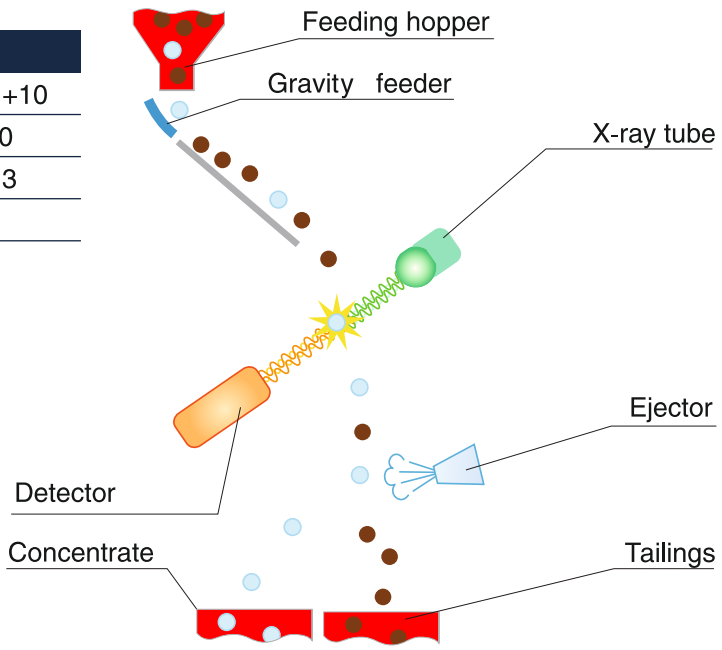
X-ray transmission (XRT) sorter RGS-5 is a diamond recovery machine designed for treatment of DRY or WET material with size range -50 +10 mm.

Main specification				
Size fraction, mm	-50 +30	-30 +20	-20 +15	-15 +10
Throughput up to, t/h	60	45	30	20
Yield per one ejection, kg	0.8	0.6	0.4	0.3
Type of material	dry/wet			

Material feeding and detection system	
Material feed	Gravity feeder
Material flow channel	1
X-ray tube	1
Detector	1

Sorter's supply		
Power consumption, kVA (single phase, 220V/50Hz)		5
Cooling water consumption, not less than, l/min		6
Consumption of	per 1 ejection, l	1.15
Compressed air	nominal productivity, l/min	30

* Preliminary information



	Dimensions, mm	Weight, kg
Sorting machine	2350x885x2330	1400
Automatic control rack	881x603x1952	200

RGS-OD-5

Final concentrate retreatment | **-50 +10 mm** | **New product***

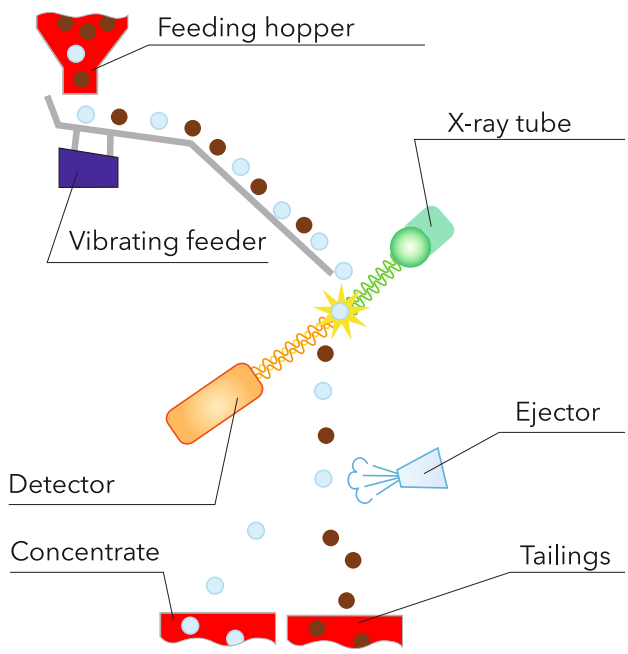
X-ray transmission (XRT) sorter RGS-OD-5 is a diamond recovery machine designed for treatment of DRY or WET material with size range -50 +10 mm.

Main specification				
Size fraction, mm	-50 +30	-30 +20	-20 +15	-15 +10
Throughput up to, kg/h	2500	2000	500	300
Yield per 10 ejections, grain	15	16	18	20
Recovery rate, %	99	99	96	96
Type of material	dry/wet			

Material feeding and detection system	
Material feed	Gravity feeder
Material flow channel	2
X-ray tube	1
Detector	1

Sorter's supply		
Power consumption, kVA (single phase, 220V/50Hz)		6
Technical water consumption, not less than, l/min		30
Cooling water consumption, not less than, l/min		6
Consumption of	per 1 ejection, l	5
Compressed air	nominal productivity, l/min	50

* Preliminary information



	Dimensions, mm	Weight, kg
Sorting machine	2000x930x2135	1100
Automatic control rack	881x603x1952	200

RGS-3

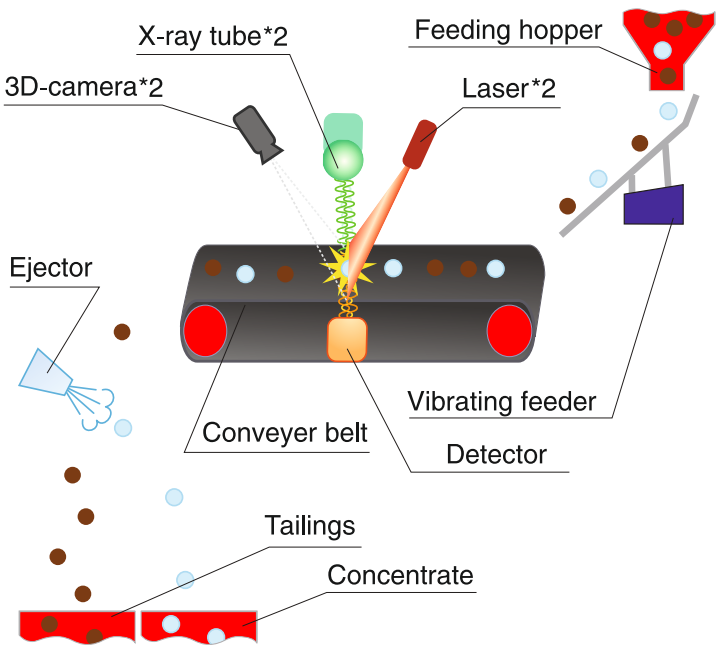
Concentrate retreatment | **-6 +1 mm** | **New product**

X-ray transmission (XRT) sorter RGS-3 is a diamond recovery machine designed for concentrate retreatment of DRY material with size range -6 +1 mm.

Main specification		
Size fraction, mm	-6 +3	-3 +1
Throughput up to, kg/h	900	600
Recovery rate, %	98	96
Type of material	dry	

Material feeding and detection system	
Material feed	Vibrating feeder and belt
Material flow channel	2
X-ray tube	2
Detector	2
Laser and 3D-camera	2

Sorter's supply		
Power consumption, kVA (single phase, 220V/50Hz)		10
Cooling water consumption, not less than, l/min		12
Consumption of	per 1 ejection, l	0,0135
Compressed air	nominal productivity, l/min	0,05



	Dimensions, mm	Weight, kg
Sorting machine	3100x1001x2021	1200
Automatic control rack	900x910x2065	340

RGS-OD-3

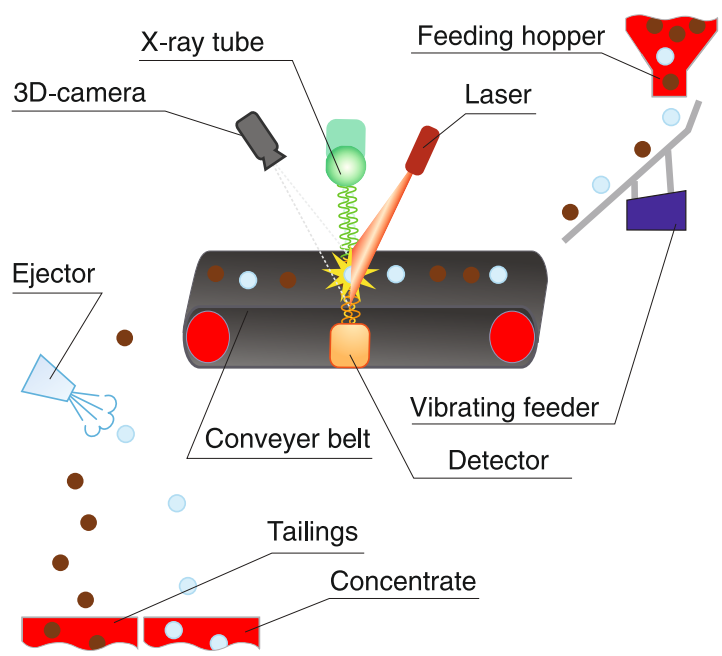
Final concentrate retreatment | **-6 +1 mm** | **New product**

X-ray transmission (XRT) sorter RGS-OD-3 is a diamond recovery machine designed for final concentrate retreatment of DRY material with size range -6 +1 mm.

Main specification		
Size fraction, mm	-6 +3	-3 +1
Throughput up to, kg/h	120	50
Yield per one ejection, g	0.2	0.05
Recovery rate, %	98	96
Type of material	dry	

Material feeding and detection system	
Material feed	Vibrating feeder and belt
Material flow channel	1
X-ray tube	1
Detector	1
Laser and 3D-camera	1

Sorter's supply	
Power consumption, kVA (single phase, 220V/50Hz)	3.5
Cooling water consumption, not less than, l/min	5-6
Consumption of compressed air per 1 ejection, l	0.03



	Dimensions, mm	Weight, kg
Sorting machine	2100x900x1800	900
Automatic control rack	940x6050x2300	240

Diamonds sorting and analysis

Bourevestnik JSC develops and supplies automatic sorting machines for rough diamonds and other gemstones that classify each particle by color, shape and quality in a fully automated way. These solutions complement the company's well-known X-ray recovery equipment and form a complete technology chain from primary recovery to final sorting.

The ASA family of machines produced by Bourevestnik JSC provides high-precision sorting of diamonds in the size range from approximately 4.5 to +1.8 mm into up to 10–12 classified positions by quality, color or shape. Each crystal is fed individually into the registration zone, captured by multiple video cameras, analyzed by a classifier program and then automatically directed to the corresponding bin according to its assigned class.

These automated systems are used at diamond mining and processing plants for final sorting, box completion and preparation of stones for cutting, enabling customers of Bourevestnik JSC to increase the yield of valuable fractions, stabilize product quality and reduce dependence on manual labor.

Diamond color sorting

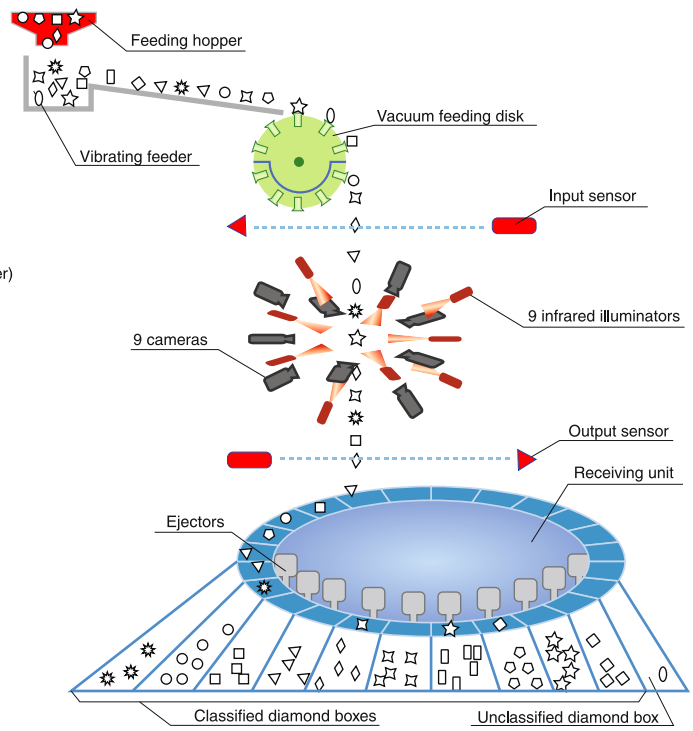
ASA-2F

Diamond shape sorting machine

New product

Diamond sorting machine ASA-2F is designed for automatic diamonds classification by shape and its sorting in 12 groups.

Technical data	
Size fraction, mm	-4.5 +1.8
Size tolerance for each fraction, mm	0.3
Average throughput, particles per second	5
Number of boxes for diamond sorting:	
- classified diamonds	12 (actual number is determined by classifier)
- unclassified diamonds	1
Composition of each sorted position:	
- main position, not less than, %	90
- diamonds not related to this position, not more than, %	10
Probability of mechanical ejection of diamonds into the corresponding box bank according to the signal from the detection, not less than, %	99
Compressed air consumption, l/min, no more than	200
Overall dimensions (LxWxH), mm	1200x900x1500
Weight, kg	250
Power consumption, VA (single-phase, 220V/50Hz)	1000



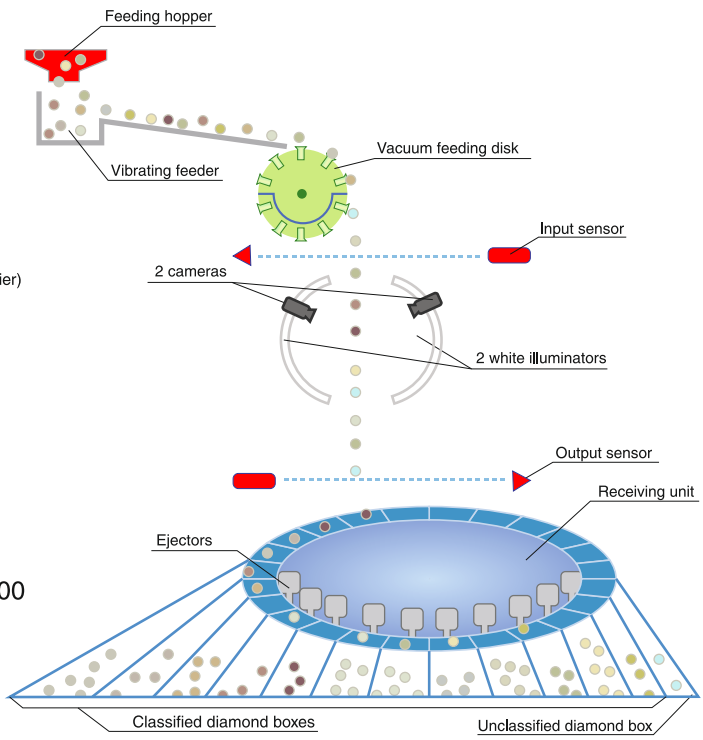
ASA-1C

Diamond color sorting machine

New product

Diamond sorting machine ASA-1C is designed for automatic diamonds classification by color and its sorting in 12 groups.

Technical data	
Size fraction, mm	-4.5 +1.8
Size tolerance for each fraction, mm	0.3
Average throughput, particles per second	5
Number of boxes for diamond sorting:	
- classified diamonds	12 (actual number is determined by classifier)
- unclassified diamonds	1
Composition of each sorted position:	
- main position, not less than, %	90
- diamonds not related to this position, not more than, %	10
Probability of mechanical ejection of diamonds into the corresponding box bank according to the signal from the detection, not less than, %	99
Compressed air consumption, no more than, l/min	200
Overall dimensions (LxWxH), mm	1200x900x1500
Weight, kg	250
Power consumption, VA (single-phase, 220V/50Hz)	1000



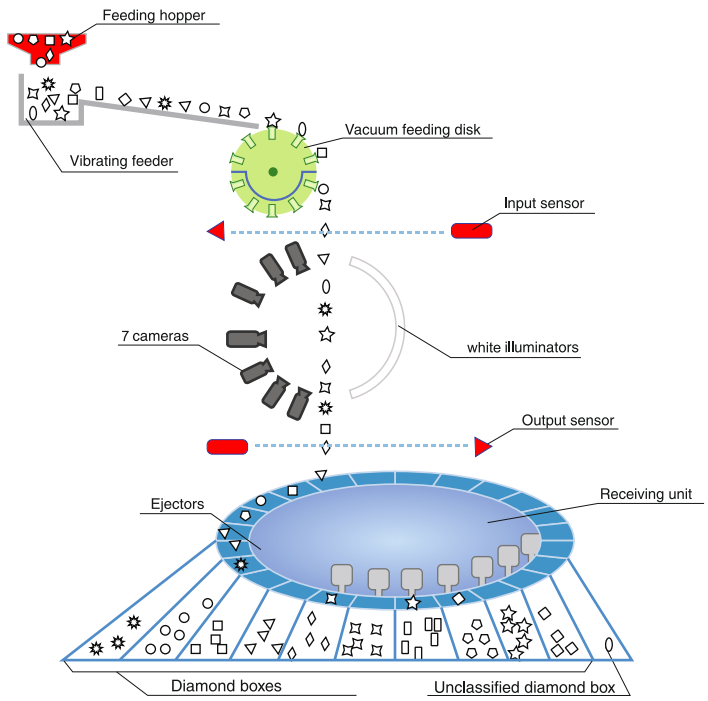
ASA-1K

Diamond purity sorting machine

New product

Diamond purity sorting machine ASA-1K is designed for automatic diamonds classification by impurity and its sorting in 12 groups.

Technical data	
Size fraction, mm	-4.5 +1.8
Size tolerance for each fraction, mm	0.3
Average throughput, particles per second	5
Number of boxes for diamond sorting: - classified diamonds	12 (actual number is determined by classifier)
- unclassified diamonds	1
Composition of each sorted position: - main position, not less than, % - diamonds not related to this position, not more than, %	90 10
Probability of mechanical ejection of diamonds into the corresponding box according to the signal from the detection, not less then, %	99
Compressed air consumption, no more than, l/min	200
Overall dimensions (LxWxH), mm	1200x900x1500
Weight, kg	250
Power consumption, VA (single-phase, 220V/50Hz)	1000



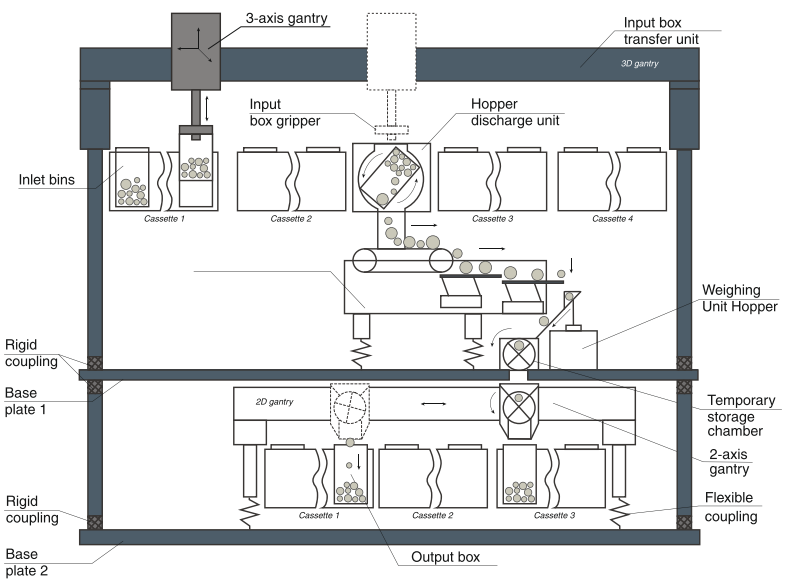
AKB-1

Lot Assembly Machine

New product

Lot Assembly Machine AKB-1 is designed for the automated distribution of diamonds and other precious stones into output boxes, balancing them by weight and classification characteristics. It is intended for use at enterprises engaged in the sorting and graiding of precious stones.

Technical data	
Size and weight groups for lot assembly: -from 4 grainers to 6 grainers (from 0.896 cts to 1.7955 cts); -from 8 grainers to 4 grainers (from 1.796 cts to 4.7955 cts); -from 5 grainers to 10 grainers (from 4.796 cts to 10.7955 cts).	
Number of inlet bins, pcs	128
Number of cassettes for inlet bins, pcs	4
Number of inlet bins in each cassette, pcs	32
Volume of the inlet bins, not less than, cts	200
Number of output bins, pcs	128
Number of cassettes for outlet bins, pcs	4
Number of outlet bins in each cassette, pcs	32
Volume of the output bin, not less than, cts	1000
Overall dimensions (without control unit) (LxWxH), mm	1565x860x2010
Weight of the machine (without control unit), not more than, kg	540



Throughput with a fully loaded transport system, not less than:

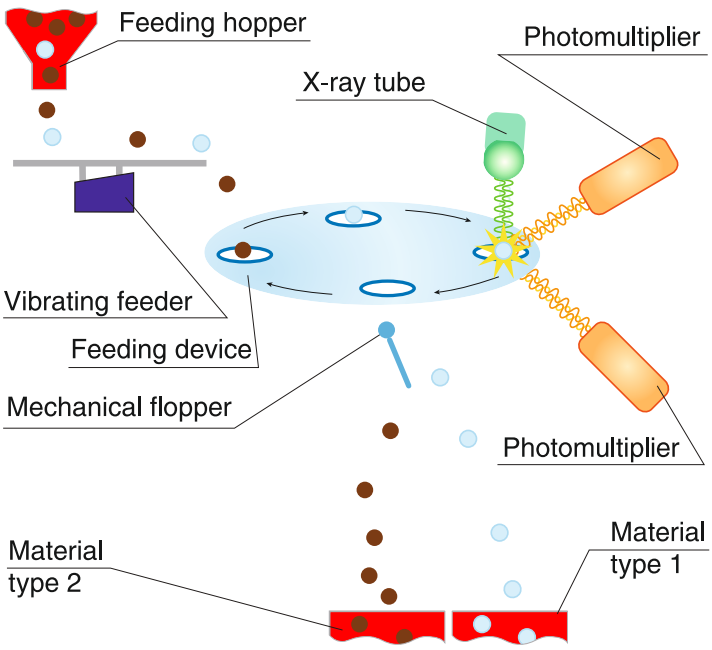
- from 4 grainers to 6 grainers (from 0.896 cts to 1.7955 cts) - 1 crystal in 5 sec;
- from 8 grainers to 4 grainers (from 1.796 cts to 4.7955 cts) - 1 crystal in 6 sec;
- from 5 grainers to 10 grainers (from 4.796 cts to 10.7955 cts) - 1 crystal in 8 sec.

UOK-2

Analyzer of minerals luminescence kinetics | **-20 +1 mm** | **Legacy product**

UOK-2 is specially designed for measuring numerical kinetic parameters of luminescence of diamonds and associated minerals. Obtained data are used for calibration of the Bourevestnik sorters.

UOK-2 is based on property of diamonds to luminesce under the X-ray. Analyzer distinguishes diamonds from other associated luminescent minerals and also can measure characteristics with registration of luminescence of an object from both sides: irradiation and opposite. Bourevestnik in the separation of diamonds and associated luminescent minerals



Main specification

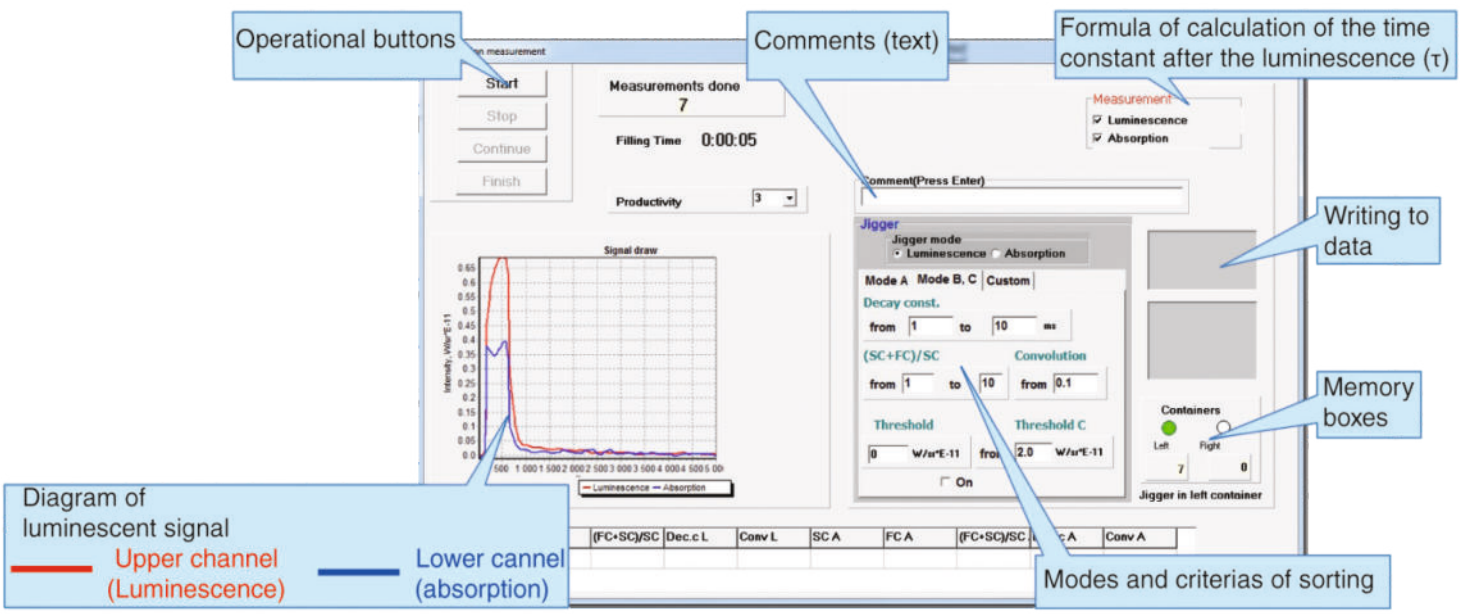
	In automatic feed mode		In manual feed mode
Size fraction, mm	– 6 +3	– 3 + 1	– 20
Throughput	up to 1200 samples per hour		
Sampling	by particles, measuring by 12 parameters		
Type of material	dry		

Supply

Power consumption, VA (single phase, 220 V / 50 Hz)	300
Operating temperature range	+10..+35°C with the relative humidity up to 80%

	Dimensions, mm	Weight, kg
Sorting machine	510x410x570	75
Control unit	480x500x220	30

Software interface



PAL-1

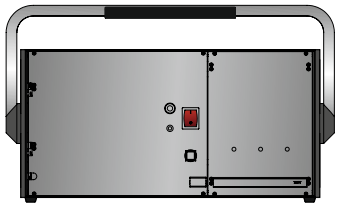
Portable luminescence analyzer

-32 + 2 mm

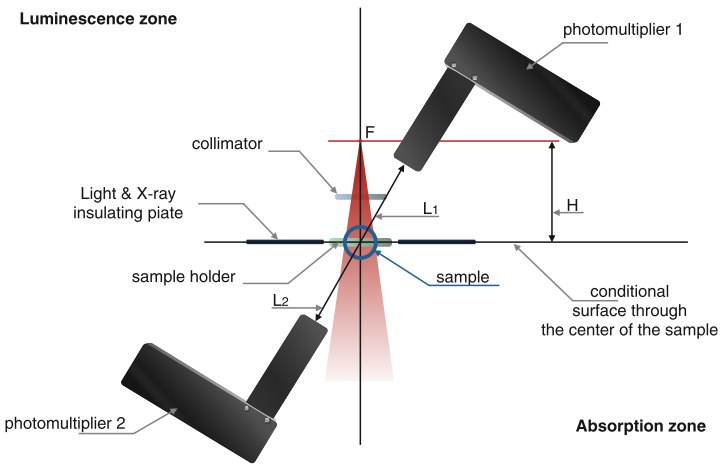
New product

The PAL-1 portable luminescence analyzer is designed to determine the kinetic values of the luminescence signals. These signals are obtained in X-ray luminescence sorters manufactured by Bourevestnik when processing the diamonds bearing ore and associated luminescent minerals.

The analyzer performs the following functions: accumulation, archiving, analysis, and displaying the obtained data. These characteristics can be used to analyze the enrichability of diamond-bearing materials during exploration of deposits and in the process of developing specific deposits. The analyzer finds application in final concentrate sort houses and quality control departments at plants, drags, and seasonal mobile modules, as well as in the departments of chief metallurgy. In these settings, the analyzer facilitates the optimal selection of separation characteristics to be laid down in sorters.



The analyzer operates using the luminescence properties of minerals under X-ray radiation (X-ray luminescence). The luminescence of the samples is recorded from two sides: the irradiation side (referred to as the luminescence mode) and the opposite side of the samples (referred to as the absorption mode).

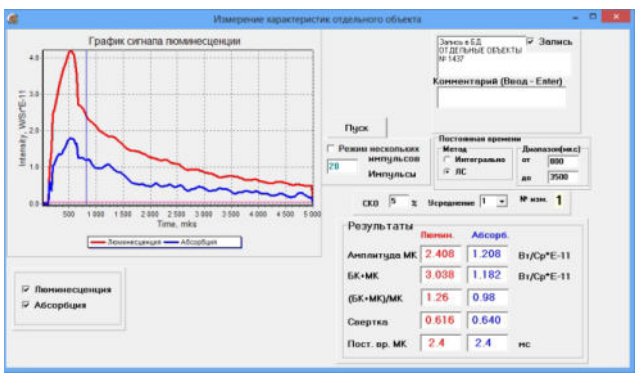


X-ray optical diagram of the analyzer.

Main parameters	
Size fraction, mm	manual feeding -32 +2
Throughput	up to 60 samples per hour when using samples of the same class
Sampling	by particles, sorted by 5 parameters
Type of material	dry
Interface requirements	
Power consumption, kVA (single phase, 220V / 50Hz)	not more than 200
Operating temperature range	+10°...+35°C with the relative humidity up to 80%

	Dimensions (mm) and mass (kg)	
Measuring unit	350x480x415	50
Control unit	445x490x290	16

Software interface



Tracers for X-ray luminescence (XRL) sorters

Tracer 2 mm:	Color	Shape	Magnetic	Luminescence intensity (W/Sr)/(R/S)x10^{-12}	X-ray transparent
Tracer 2-NW-0.005	White	Ball	No	2,5	No
Tracer 2-NB-0.1	Blue	Ball	No	50	No
Tracer 3 mm:					
Tracer 3-MY-0.1	Yellow	Ball	Yes	50	No
Tracer 5 mm:					
Tracer 5-NW-0.005	White	Ball	No	2,5	No
Tracer 5-NB-0.1	Blue	Ball	No	50	No
Tracer 6 mm:					
Tracer 6-MY-0.1	Yellow	Ball	Yes	50	No
Tracer 6-NW-0.001	White	Ball	No	0,5	No
Tracer 10 mm:					
Tracer 10-NW-0.02	White	Ball	No	10	No
Tracer 10-NB-0.2	Blue	Ball	No	100	No
Tracer 10-MY-0.2	Yellow	Ball	Yes	100	No
Tracer 10-TSP-0.3	Colorless	Cube	No	160	Yes
Tracer 10-MA-0.3	Colorless	Ball	Yes	160	Yes
Tracer 10-TSP-1.6	Colorless	Cube	No	870	Yes
Tracer 16 mm:					
Tracer 16-NB-0.2	Blue	Ball	No	100	No
Tracer 16-NW-0.04	White	Ball	No	20	No
Tracer 16-MY-0.2	Yellow	Ball	Yes	100	No
Tracer 20 mm:					
Tracer 20-TSP-0.3	Colorless	Cube	No	170	Yes
Tracer 20-TSP-1.2	Colorless	Cube	No	640	Yes
Tracer 30 mm:					
Tracer 30-NW-0.04	White	Ball	No	20	No
Tracer 30-NB-0.2	Blue	Ball	No	100	No
Tracer 30-MY-0.2	Yellow	Ball	Yes	100	No

Tracers for X-ray transmission (XRT) sorters

Tracer 10 mm:	Color	Shape
Tracer 210.002.40.00	Vary	Cube
Tracer 20 mm:		
Tracer 210.002.40.00-1	Vary	Cube
Tracer 30 mm:		
Tracer 210.002.40.00-2	Vary	Cube

QUESTIONNAIRE

for the X-ray transmission (XRT) / X-ray luminescence (XRL) diamond enrichment project

To customize an optimal solution , we ask you to provide the following information:

1. Contact details:

Company name: _____

Contact person: _____

Telephone: _____

E- mail: _____

2. Information about the deposit / processing plant:

Country: _____ City: _____

Name: _____

Running project ☐ In design, construction ☐ Feasibility assessment ☐

3. Do you have any experience in working with X-Ray Sorters?

Produced by Bourevestnik, JSC ☐

Produced by other manufacturers ☐

Don't have any experience ☐

If you have worked with X-Ray Sorters, produced by other manufacturers, please specify the brand:

_____

_____

4. Sieve characteristics of the enrichment object (ore):

Size Fractions	Max., mm	Min., mm	% of all fractions	Throughput, t/h
Fraction 1				
Fraction 2				
Fraction 3				
Fraction 4				
Fraction 5				
		Total:	100%	

EXAMPLE BELOW:

Fraction	*Max., mm*	*Max., mm*	*% of all fractions*	*Required capacity, t/h*
Fraction 1	*-50*	*+20*	*40%*	*40 t/h*
Fraction 2	*-20*	*+10*	*60%*	*60 t/h*
		Total:	*100%*	*100 t/h*

5. Target recovery indicators and material chellenges to be expected:

Recovery rate (%)	
Type of diamonds to be recovered (Type I, Type II, etc.)	

6. Additional information or comments:

INNOVATION CENTER
BOUREVESTNIK
RESEARCH ✦ DESIGN ✦ PRODUCTION

3, Bld.1, Lyotchika Parshina St.,Saint-Petersburg, 197375 , Russia

Marketing, Advertisement and Sales Department
Tel.: +7 (812) 327-92-41, 331-34-10
E-mail: marketing.bv@alrosa.ru

Aftersales Service
Tel./Fax: +7 (812) 329-55-07
E-mail: service.bv@alrosa.ru

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www.bourevestnik.com