UZTM-KARTEX Mining Equipment: Draglines and Electric Rope Shovels

UZTM KARTEX

Matera

UZTM-KARTEX: Introduction

«URALMASHPLANT» PJSC

History of «Uralmashplant» spans for more than 80 years.

During the World War II «Uralmashplant» has been awarded by the Red Challenge Banner of the State Defence Committee 27 times. In the year 1946 «Uralmashplant» has been awarded the Red Challenge Banner permanently.

«Uralmashplant» is the only manufacturer of dragline excavators and belt sintering machines in Russia.

Manufacturing unit is located in Yekaterinburg.

2 146 employees as of October, 2019

«IZ-KARTEX named after P.G. Korobkov» LLC

«IZ-KARTEX» is one of the biggest producers of mining equipment in the former USSR, with a wider range of modern production equipment.

«IZ-KARTEX» has produced more than 3 800 electric rope shovels sinc the start of production in 1957, more than a 1 000 of which are still in operation.

Manufacturing unit is located in Kolpino, Saint-Petersburg.

1 470 employees as of October, 2019

«OMZ-Foundry» LLC

«OMZ-Foundry» is an enterprise of unique technical capabilities in regard to producing large-capacity (up to 150 t) and large-sized castings.

Since 2016, orders from «Uralmashplant» and «IZ-KARTEX» comprise up to 70 of the company's production load.

Prodcution unit is located in Kolpino, Saint-Petersburg.

798 employees as of October, 2019

Product range

Electric rope shovels

Walking draglines

Hydraulic excavators

Mine hoisting machinery

Crushing and milling equipment

Hoisting machinery and equipment for metallurgy

EKG-5A

Parameter	EKG-5A
Bucket capactity, m^3	4,6-6,3
Bucket payload, t	10
Max digging radius, m	14,5
Max digging height, m	10,3
Max loading radius, m	12,65
Max loading height, m	6,7
Cycle time, s	23
Max working angle, deg	12
Main transformer supply, kVA	250
Working weight, t	196
Optimal dump truck capacity, t	**35-50**

EKG-5A is the smallest model among UZTM-KARTEX shovels.
It also has a EKG-5A-US modification (with elongated working equipment) suitable for mining of high faces.

An EKG-5A with serial No. 12 735 was shipped from «Uralmashplant» in 2019. It is the most numerous model in the history of Soviet and Russian heavy earth moving machinery. More than 1 600 of these shovels were exported.

Outside former USSR shovels were supplied to Bulgaria, China, Cuba, Egypt, Germany, Hungary, Guinea, India, Iran, Iraq, Mongolia, Mozambique, Poland, Romania, Syria, Turkey, Vietnam and former Yugoslavia.

EKG-10

Parameter	EKG-10	EKG-5U	EKG-8US
Bucket capacity, m^3	10	5	8
Bucket payload, t	20	10	16
Max digging radius, m	18,4	23,7	19,8
Max digging height, m	13,5	22,2	17,6
Max loading radius, m	16,3	22,1	17,9
Max loading height, m	8,6	17,5	12,5
Cycle time, s	26	30	28
Main transformer supply, kVA	750 кВт	630	630
Working weight, t	410	410	415
Optimal dump truck capacity, t	**75-150**		

EKG-10 equipped with a rope crowd system is a former flagship model of «IZ-KARTEX» electric rope shovels. Apart from the regular EKG-10, t has two modifications:

- EKG-5U with 5 m^3 dipper and an elongated working equipment – desgined for cutting trenches, mining high faces and loading rock onto a transport positioned at higher level
- EKG-8US with 8 m^3 dipper and an elongated working equipment – designed for mining high faces and optimal joint operation wirh railroad transport facilities.

More than **660** EKG-10 shovels has been supplied to customers all over the world since the start of production.

EKG-12A

Parameter	EKG-12A
Bucket capacity, m^3	10-16
Bucket payload, t	30
Max digging radius, m	21
Max digging height, m	15
Max loading radius, m	18,5
Max loading height, m	10,0
Cycle time, s	26
Main transformer supply, kVA	1250
Working weight, t	672
Optimal dump truck capacity, t	**75-150**

EKG-12A is a robust and reliable electric rope shovel equipped with rack-and-pinion crowd system and direct bucket suspension system.

14 EKG-12A shovels have been supplied since the start of production in 1996.

EKG-12K

Parameter	EKG-12K	EKG-10US	EKG-6,3U
Bucket capacity, m^3	12	10	6,3
Bucket payload, t	24	20	13
Max digging radius, m	18,6	19,8	23,5
Max digging height, m	15	17,5	22
Max loading radius, m	16,5	18	22
Max loading height, m	9	12,5	17,5
Cycle time, s	26	28	30
Main transformer supply, kVa	1000	1000	1000
Working weight, t	420	420	420
Optimal dump truck capacity, t	**75-150**		

EKG-12K came in 2009 to replace the reliable EKG-10 model – it's a durable and effective machine, one of flagships of UZTM-KARTEX shovel range:
Modifications:

- EKG-6,3U with 5 m^3 dipper and an elongated working equipment – desgined for cutting trenches, mining high faces and loading rock onto a transport positioned at higher level
- EKG-10US with 8 m^3 dipper and an elongated working equipment – designed for mining high faces and optimal joint operation wirh railroad transport facilities.
- UZTM-KARTEX supplied **44** shovels of this type since the beginning of production to customers in former USSR and Mongolia.

EKG-15M

Parameter	EKG-8UM	EKG-12USM	EKG-15M
Bucket capacity, m^3	8	12	8-18
Bucket payload, t	20	25	32,5
Max digging radius, m	34,0	28,0	22,6
Max digging height, m	28,7	20,7	15,8
Max loading radius, m	31,5	25,8	19,5
Max loading height, m	24,0	14,9	9,9
Cycle time, s	35	32	28
Main transformer supply, kVA	1250	1250	1250
Working weight, t	725	720	700
Optional dump truck capacity, t	**120-220**		

EKG-15M is a modernized version of EKG-15 shovel which has been produced since the 1980s. Like most UZTM-KARTEX electric rope shovels, It has two modiciations with elongated working equipment:

- EKG-8UM with 8 m3 dipper and an elongated working equipment – desgined for cutting trenches, mining high faces and loading rock onto a transport positioned at higher level
- EKG-12USM with 8 m3 dipper and an elongated working equipment – designed for mining high faces and optimal joint operation wirh railroad transport facilities.

UZTM-KARTEX has supplied more than 60 shoves of that type over the last 10 years.

EKG-20K

Parameter	EKG-20K	EKG-18R
Bucket capacity, m^3	20	18
Bucket payload, t	40	40
Max digging radius, m	22,6	22,6
Max digging height, m	17,3	16,0
Max loading radius, m	19,4	18,7
Max loading height, m	11,2	10,2
Cycle time, s	27	27
Main transformer supply, kVA	1250	1250
Working weight, t	700	710
Optional dump truck capacity, t	**120-220**	**120-220**

EKG-20K is the first Russian-made shovel which was designed using solely 3D-design technologies. EKG-18R is a modification of EKG-20K with rack-and-pinion crowd system.

Currently **15** units of EKG-20K and EKG-18R shovels has been supplied to "Kareslky Okatysh" and "Lebedinsky" iron ore mines in Russia, as well as to Russian coal giant "Kuzbassrazrezugol" and Uzbekistani gold and copper mining companies "Navoi MMC" and "Almalyk MMC>

EKG-20KM

Parameter	EKG-20KM	EKG-18RM
Bucket capacity, m^3	25	25
Bucket payload, t	50	50
Max digging radius, m	22,5	22,0
Max digging height, m	17,5	16,5
Max loading radius, m	20,5	18,5
Max loading height, m	11,2	10,5
Cycle time, s	27	27
Main transformer supply, kVA	1250	1250
Working weight, t	700	710
Optional dump truck capacity, t	**120-220**	**120-220**

EKG-20KM is a modifed EKG-20K boasting 25% more dipper payload (50 t) due to more poweful and differently designed crowd and hoist drives, making this shovel a great application for excavating heavier rock and allowing to use bigger dippers. As well as its sister model EKG-20K, the 20-KM shovel has a modification with rack and pinion crowd called EKG-18RM.

So far **5** units of EKG-20KM shovel has been supplied to iron ore mines Lebedinsky («Metalloinvest») and Karelsky Okatysh («Severstal»).

EKG-20

Parameter	EKG-20K
Bucket capacity, m^3	20
Bucket payload, t	40
Max digging radius, m	22,2
Max digging height, m	16,4
Max loading radius, m	19,6
Max loading height, m	10,7
Cycle time, s	27
Main transformer supply, kVA	1600
Working weight, t	750
Optional dump truck capacity, t	**120-220**

EKG-20 is a powerful and enduring Uralmashplant-build electric rope shovel with rack-and-pinion crowd system.

33 shovels has been supplied between 2011 and 2018. Most notable customers include iron ore mines “Lebedinsky” and “Kovdorsky”, coal mining companies “Yakutugol”, “Stroyservis”, “Kuzbassrazrezugol”, “Eastern Mining Company” and gold mining projects of “Polyus” JSC.

ESH 11.75 walking dragline

Parameter	ESH 11.75
Bucket capacity, m^3	11
Boom length, m	75
Maximum digging depth, m	38
Maximum loading radius, m	71,4
Working weight, t	840
Manufactured since 2002, 6 units supplied.	

Customers: "Polyus Gold", "Russian Coal", "Vostok Coal" and others

Design features:

- The boom is a triangular three-dimensional construction made of tubular elements. Top dragline boom chord is preliminary compressed, exceeding the tension caused by working loads, which greatly increases the durability of the structure.
- Four-bar crank and rocker walking mechanism with DC electric drive;
- Swing mechanism with two planetary gearboxes;
- Information and diagnostics system allowing to control productivity of the dragline, enery consumption, condition and working parameters of the main drives and control system, as well as temperature of bearings and field coils.
- Drives and control system engineered and built specifically for the unique working conditions of the dragline excavators.

ESH 20.90 Walking dragline

Parameter	ESH 20.90
Bucket capacity, m^3	20
Boom length, m	90
Maximum digging depth, m	42,5
Maximum loading radius, m	83
Working weight, t	1690
67 units supplied since 1980	

Customers: "Polyus Gold" (gold), "Kuzbassrazrezugol', "Vostsibugol'" and other coal mines of Russia, "Enefit Kaevandused" (oil shale, Estonia), "Northern Coalfields Limited" (coal, India), "Baganuur" (coal, Mongolia).

Design features:

- The hydraulic walking mechanism provides smooth moving and high maneuverability of the machine. Depending on the model the walking mechanism may be provided with two or four walking shoes
- The main units are driven by DC motors of a «Motor-Generator» system with thyristor converter excitation control. A modification with a compact IGBT-based AC drive (frequency converter – induction motor system) is also possible;;
- Information and diagnostics system allowing to control productivity of the dragline, enery consumption, condition and working parameters of the main drives and control system, temperature of bearings and field coils and the condition of hydraulic units.

ESH 40.100 walking dragline

Modifications with smaller buckets of 30 and 25 m^3 are also available.

Parameter	ESH 40.100
Bucket capacity, m^3	40
Boom length, m	100
Maximum digging depth, m	47
Maximum loading radius, m	94,8
Working weight, t	3320

5 units supplied since 1967.

Customers: "Vostsibugol", "Krasnoyarsk Coal"

Design features:

- Gearless drive of swinging mechanism with 4, 6 or 8 low-speed electric motors;.
- Roller circle with tapered rollers and forged railsболее плавному и быстрому вращению поворотной части экскаватора.
- The main units are driven by DC motors of a «Motor-Generator» system with thyristor converter excitation control. A modification with a compact IGBT-based AC drive (frequency converter – induction motor system) is also possible;;
- . Information and diagnostics system allowing to control productivity of the dragline, enery consumption, condition and working parameters of the main drives and control system, temperature of bearings and field coils and the condition of hydraulic units

Crawler-mounted dragline excavator

Mobile equipment built on the base of EKG-5A and EKG-12A electric shovels.

Parameter	EDG-3,2.30	EDG-4.25	EDG-8,55
Bucket capacity, m^3	3,2	4	8
Boom length, m	30	25	55
Max digging depth, m	15	15	27,5
Maximum loading radius, m	28,9	24,5	51,6
Crawler belt width, mm	1110	1100	1800
Ground pressure while moving, kPa	154	154	225
Working weight, t	186-196	186-196	630

Crawler mounted draglines can be used in any small quarry for extraction of soft materials (clay, sand, marl), for stripping overburden, for opencast extraction of coal and construction materials, as well as for cutting trenches, reclamation works, works during construction of channels and dams or slag processing.

- **Design features:**
- Main bearing structures (boom, revolving frame, lower frame) are made of rolled alloy steel, ensuring the reliable operation of the machine in any conditions.
- Bucket geometry assures improved filling and emptying of the bucket. The bucket elements (lip and teeth) are made of manganese steel, ensuring the wear resistance and increasing the lifetime.
- Digital control system of the equipment is available.
- Design of the fairlead sheaves and boom point sheaves prevent rope run-off and wear.

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Thank you for your attention!