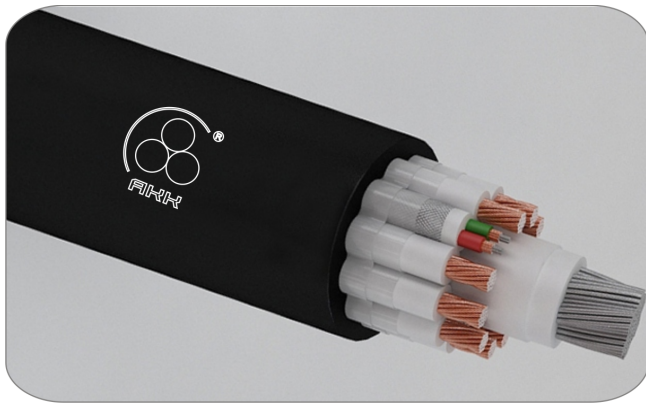




Special-purpose underwater cables in cross-linked polyethylene insulation, in rubber sheath of KESm, KRPM, KSBSu, GVRKm, KSTm, KSTGm, KVTm, KVTGm types



Application

Cables in the cross-linked polyethylene insulation and rubber sheath are used for the electric supply of the units, working under the water, for the telephone and signal communication. Cables keep working capacity in the air temperature span from minus 40°C to plus 60°C, water – from minus 4°C to plus 40°C.

Design

Current-carrying conductors

Circular, copper stranded (4th class) for the cables of KESm, KRPM, KSBSu and GVRKm types, (3rd class) for the cables of KVTGm type. Steel-copper conductors of the cable GVRKm type are twisted of three copper wires, tinned with lead-tin solder and four of steel tinned or galvanized wires. Steel-copper cable conductors of KSTm and KVTm cable types are twisted of seven copper wires tinned with lead-tin solder, above which is lay of 12 steel tinned or galvanized wires.

Steel-copper cable conductors of KSTGm cable type are twisted of one copper conductor in the center and six steel galvanized wires in the lay.

Steel-copper conductors of cable of KVTGm type are made of one bimetallic steel-copper wire.

Sealing compound

Space between copper and steel wires of steel-copper conductors of cable of KSTGm type and spaces between wires of copper conductors

of cable of KVTGm type are filled with sealing compound PIB based

Sealing layer based on rubber compound is applied above the twisted conductors of cable of KVTGm type.

Steel-wire rope

Cables of KESm, KRPM, KSBSu, GVRKm and KVTGm types contain rubber-insulated steel wire-rope. Steel wire rope of cables of KESm, KRPM and KVTGm is twisted of not less than 49 steel tinned or galvanized wires; of cables of GVRKm types — of not less than 259 steel tinned or galvanized wires and cables of KSBSu type — of not less than 75 steel tinned or galvanized wires.

Space among wires and strands of wire rope of cable of KVTGm type is filled with rubber-based sealing compound.

Insulation

Cross-linked polyethylene.

Screen

Above insulation of each conductor of cable of KESm type, of two conductors of cable of KRPM type 6x1,5 in cross-section, above steel-copper twisted conductors of cable of GVRKm type and above the twisted and sealing triads of steel-copper conductors of cable of KVTGm type screen as braid of copper wires tinned with tin-lead solder is applied.

Cable core

Insulated conductors of cables of KESm, KRPM 6x1,5 and KSBSu types are twisted around insulated steel wire rope ((in the cables of KRPM 6x1,5 and KSBSu types free space is filled with cords-fillers). Ten insulated copper conductors and screened pair of steel-copper conductors of the cable of GVRKm type are twisted around insulated steel wire rope.

Insulated conductors of cables of KSTm, KSTGm and KVTm types are twisted between each other.

Insulated copper conductors and screened triads of steel-copper conductors of the cable of KVTGm type are twisted around insulated sealed steel wire rope, space between lays are filled with sealing compound based on rubber compound.

Sheath

Flame retardant sea-water resistant rubber.

Sheath surface of the cables of KSTm and KSTGm types is ribbed.

Cable type	Construction	Primary field of application
KESm	Cable with steel wire rope, with separately screened copper conductors	For the supply of the signaling device, working under water at ac voltage up to 220 V and frequency up to 400 Hz or dc voltage up to 400 V
KRPM	Cable with steel wire rope, with copper conductors	For the supply of the electrical installation, working under water at ac voltage up to 220 V and frequency up to 400 Hz or dc voltage up to 400 V
KSBSu	Cables for the signal buoy with steel wire rope, with copper conductors	For the supply of the signal buoy with ac voltage up to 220 V and frequency up to 400 Hz or dc voltage up to 400 V
GVRKm	Deep-sea cable with steel wire rope, with copper and steel-copper conductors	For the supply of the underwater electrical installation, working under water at ac voltage up to 380 V and frequency up to 50 Hz or dc voltage up to 700 V, and simultaneous providing of loud-speaking telephone communication at ac voltage up to 127V, frequency up to 400 Hz or dc voltage up to 250V
KSTm	Signal telephone cable with steel-copper conductors	For the signal and telephone communication working under water at ac voltage up to 127V, frequency up to 400 Hz or dc voltage up to 250V
KSTGm	Pressurized signal telephone cable with steel copper conductors	For the signal and telephone communication working under water at ac voltage up to 127V, frequency up to 400 Hz or dc voltage up to 250V
KVTm	Diving cable with steel copper conductors	For the telephone communication working under water at ac voltage up to 127V frequency up to 400 Hz or dc voltage up to 250V
KVTGm	Pressurized diving cable with steel wire rope with copper and steel-copper conductors	For the fulfilling of the diving works with these simultaneous providing of loud-speaking telephone communication and equipment control. Copper conductors are intended for the working under ac voltage up to 220V frequency 50 Hz or dc voltage up to 400 V, and steel-copper conductors under ac voltage up to 127V of frequency up to 400 Hz or dc voltage up to 250V.

Performance Specifications

Type of cable	Number of the conductors		Rated cross-section of the copper conductors, mm ²	Rated cross-section of the copper conductors, mm ²
	Copper	steel-copper		
KESm	6	-	1,50	-
KRpm	6, 12	-	1,50	-
KSBSu	6	-	0,75	-
GVRKm	10	2	2,50	0,63
KSTm	-	4	-	1,34
KSTGm	-	4	-	0,56
KVTm	-	3	-	1,34
KVTGm	4	6	2,50	0,35

Electrical resistance of insulation counted for the temperature 20°C and length of 1 km must be not less than:

- at acceptance and supply – 500 megao hm;
- during operation period and storage – 50 megaohm.

Breaking tension of the cables is not less than:

- 4,9 kN— for the cables of KESm, KRpm and KVTGm types;
- 6,9 kN — for the cables of KSBSu type;
- 24,3 kN — for the cables GVRKm type.

Breaking tension of some steel-copper conductors of KSTm and KVTm types must be not less than 1,0 kN.

Breaking tension of the cable of KSTGm type must be not less than 3,0 kN.

Cables of KESm, KRpm 6x1,5, KSBSu, KSTm, KSTGm, KVTm types must stand not less than 70 and cable of KRpm 12x1,5 types not less than 20 bends on the angle of +/- 180° at the cylinder not less than five outer cable diameters in diameter in normal climatic conditions.

Cables of GVRKm, and KVTGm types must stand under normal climate conditions not less than 20 bends on the angle of +/- 180° over the cylinder not less than eight outer cable diameters

Cables of all types except cables of KSTGm and KVTGm types under normal climatic conditions must stand not less than 300 cycles of winding over the reel (roller) not more than 20 outer cable diameters in diameter.

Cable of KSTGm type must stand not less than 1000 cycles of rewinding over the system of three rollers 500, 150 and 50 mm in diameter.

Cable of KVTGm type must stand not less than 1000 cycles of rewinding over the reel (roller) not more than 650mm in diameter under the tensile load not more than 2,0 kN. Cables of all types under normal climatic conditions must stand 20 cycles of axial twists on the angle +/- 90°C on the length from 1000 to 1100mm.

Cables of all types under normal climatic conditions must be sealed in radial direction under the influence on it of external hydrostatic pressure:

- up to 6,0 MPa — for the cables of KESm, KRpm, KSBSu, GVRKm, KVTm, and KVTGm types;
- up to 3,0 MPa — for the cables of KSTm type;
- up to 1,2 MPa — for the cables of KSTGm type.

Insulated conductors of cable of KSTGm type must be sealed in the longitudinal direction under the influence of external hydrostatic pressure 1,2 MPa.

Cable of KVTGm must be sealed in the longitudinal direction under the influence of external hydrostatic pressure up to 6,0 MPa.

Cables are resistant to the following factors:

- sinusoidal vibrations (frequency span is from 1 to 80 Hz, acceleration amplitude – 50m/c²);
- acoustic noise (frequency span is from 50 to 10000 H z, acoustic pressure level – 160 dB);
- mechanical shock of the single action (peak impact is 5000 m/c², duration is 1-2 ms);
- mechanical shock of repeated action (peak impact is 150 m/c² duration is 2-15 ms);
- linear acceleration 5000 m/c²;
- high working temperature of the medium is 70°C;
- low working temperature of the medium:
 - under the conditions of stationary laying for the operation period and storage - minus 40°C;
 - under the conditions of influence of the mounting and operation bends (for the cables of all types except cables of GVRKm type to the radius not less than 15 cable diameters – minus 30°C
- temperature change from minus 40°C to plus 70°C;
- high relative air humidity up to 98% at the temperature of 35°C;
- atmospheric precipitates (hoarfrost, dew);
- salt (sea) fog;
- solar radiation;
- mold funguses;
- sea water;
- lubricating oils and diesel fuels.

Cables are flame retardant at individual laying.

Factory lengths of the cables are as specified in the table:

Type of cable	Factory length, m	Type of cable	Factory length, m
KESm	200±10	KSTm	100±5
KRpm	230±20	KSTGm	100±5
KSBSu	250±20; 365±25; 510±40	KVTm	320±25
GVRKm	490±40	KVTGm	190±10; 290±20; 390±25; 490±40
KSTm	-	-	1,34
KSTGm	-	-	0,56
KVTm	-	-	1,34
KVTGm	4	2,50	0,35

It is admissible to supply cables of any length by parties agreement.

Service life of the cables:

- of all cable types except GVRKm is 10 years;
- service life of the cable of GVRKm type is 5 years.