

CONTROL CABLES

Cables produced:

КВВГ, КПВГ, КВВГЭ, КВВБ, КПВБ, КВВБГ, КПВБГ, КВБбШв,
KVVG, KPVG, KVVGE, KVVB, KPVB, KVVBG, KPVBG, KVbShv,
КПБбШв, АКВВГ, АКПВГ, АКВВГЭ, АКВВБ, АКПВБ, АКВВБГ,
KPBbShv, AKVVG, AKPVG, AKVVGE, AKVVB, AKPVB, AKVVBG,
АКПВБГ, АКВБбШв, АКПБбШв, КВВГз
AKPVBG, AKVBbShv, AKPBbShv, KVVGz –

acc. to ГОСТ 1508-78 (GOST 1508-78);

КВВГнг(А), КВВГЭнг(А), КВБбШвнг(А), АКВВГнг(А), АКВВГЭнг(А), АКВБбШвнг(А),
KVVGng(A), KVVGEng(A), KVbShvng(A), AKVVGng(A), AKVVGEng(A), AKVBbShvng(A),
КВВГзнг(А), КВБбШвнг(А)-LS, КВВГЭзнг(А), КВБбШвзнг(А), КВВГзнг(А)-LS,
KVVGzng(A), KVPbShvng(A)-LS, KVVGEzng(A), KVbShvzng(A), KVVGzng(A)-LS,
ККВГЭзнг(А)-LS, КВБбШвзнг(А)-LS, АКВБбШвзнг(А)-LS
KKVGEzng(A)-LS, KVbShvzng(A)-LS, AKVBbShvzng(A)-LS –

acc. to ТУ 16.К17-057-2007 (TU 16.К17-057-2007);

КВВГнг(А)-LS, КВВГЭнг(А)-LS – acc. to ТУ 16.К71-310-2001 (TU 16.К71-310-2001);
KVVGng(A)-LS, KVVGEng(A)-LS

КВВГнг(А)-FRLS, КВВГЭнг(А)-FRLS – acc. to ТУ 16.К71-337-2004 (TU 16.К71-337-2004);
KVVGng(A)-FRLS, KVVGEng(A)-FRLS

КППГнг(А)-FRHF, КППГЭнг(А)-FRHF – acc. to ТУ 16.К71-339-2004 (TU 16.К71-339-2004);
KPPGng(A)-FRHF, KPPGEng(A)-FRHF

КППГнг(А)-HF, КППГЭнг(А)-HF, КПБПнг(А)-HF – acc. to ТУ 16.К71-304-2001;
KPPGng(A)-HF, KPPGEng(A)-HF, KPBP(A)-HF

КВВГ-ХЛ, КВВГЭ-ХЛ, КВБбШв-ХЛ, АКВВГ-ХЛ, АКВВГЭ-ХЛ, АКВБбШв-ХЛ,
KVVG-HL, KVVGE-HL, KVbShv-HL, AKVVG-HL, AKVVGE-HL, AKVBbShv-HL,

КВВГнг(А)-ХЛ, КВВГЭнг(А)-ХЛ, КВБбШвнг(А)-ХЛ, АКВВГнг(А)-ХЛ, АКВВГЭнг(А)-ХЛ,
KVVGng(A)-HL, KVVGEng(A)-HL, KVbShvng(A)-HL, AKVVGng(A)-HL, AKVVGEng(A)-HL,

АКВБбШвнг(А)-ХЛ – acc. to ТУ 16.К71-425-2011 (TU 16.К71-425-2011)
AKVBbShvng(A)-HL

Index (A) in cable description means cable category regarding flame non-propagation.

APPLICATION

The cables are designed for fixed connection to electrical devices, apparatus, terminals of electrical switching equipment with nominal voltage up to 660 VAC, frequency up to 100 Hz or voltage 1000 VDC.

Cables of non-special version (general industrial purpose) as well as «НГ» and «ХЛ» versions are designed for industrial use, including «ХЛ» and «НГ-ХЛ» versions - for areas with cold climate; versions «НГ-LS», «НГ-FRLS», «НГ-FRHF» and «НГ-HF» - for industrial use and nuclear power plants outside containment area, in nuclear plant systems Class 2 (acc. to ОПБ-88), including «НГ-FRLS» and «НГ-FRHF» versions – for use in electric circuits of safety systems controlling operability in case of fire, «НГ-HF» version - for wiring in office buildings equipped with computer equipment, kindergartens, schools, hospitals, for cable lines of social centers and sports facilities.

The cables with filling of interstices (letter «З» in cable description) are used for electrical devices requiring a cable tightening at enter point.

CLIMATIC CATEGORY, LOCATION CATEGORY, STORAGE AND TRANSPORTATION CONDITIONS ACC. TO GOST 15150-69. OPERATION TEMPERATURE RANGE.

Cable version	Climatic category, location category	Storage and transportation conditions		Operation temperature range
		considering the climatic factors	considering the mechanical impact during transportation acc. to GOST 23216-78	
general industrial purpose	УХЛ, 1-5	ОЖ4	-	from -50 to +50
«НГ», «ЗНГ»	УХЛ, 1-5	ОЖ3	-	
«НГ-LS», «ЗНГ-LS»	УХЛ, 1-5	ОЖ2	-	
«НГ-FRLS»	УХЛ, 1-5	ОЖ2	Ж	
«НГ-FRHF»	В, 5	ОЖ2	Ж	
«НГ-HF»	В, 1-5	ОЖ2	-	
«ХЛ», «НГ-ХЛ»	ХЛ, 1,2,3,5	ОЖ2	-	from -60 to +50

DESIGN

Conductor – single-wire round conductor, Class 1 acc. to GOST 22483, made of soft copper (nominal cross-section from 0,75 to 6,0 mm²) or aluminum (nominal cross-section from 2,5 to 10,0 mm²) wire.

Conductor insulation – insulating PVC compound (in cables KB..., АКВ...), including PVC compound with low cure temperature (in cable versions «ХЛ» and «НГ-ХЛ»), fire-resistant low-smoked PVC compound (in cable versions «НГ-LS» and «НГ-FRLS»), LDPE (in cables КПВ..., АКПВ...), halogen-free polymeric compound (in cable versions «НГ-HF» and «НГ-FRHF»).

Thermal barrier – in cable versions «НГ-FRLS» and «НГ-FRHF» - two mica tapes taped with overlapping min. 40%.

Cable core – insulated conductors are stranded into a cable core. Each layer of general purpose cables and cables of «НГ» version has a pilot pair, insulated conductors of which differ by colour from each other and from other conductors which have the same colour. Other cable versions have all insulated conductors with numerical or colour identification. Interstices between the conductors of cables КВВГз, КВВГзНГ are filled with a filler.

Separating layer (sheath) – a separating layer is applied over the cable core, in armoured cables with coverings Б and БГ – with nominal thickness acc. to GOST 7006, with covering Б6ШБ and shield – with thickness min. 0,5 mm; in cables КВВГ(Э, Б6ШВ)з(НГ, НГ-LS) inner sheath applied with filling of outer interstices between conductors; for general purpose cables – of PVC compound, «НГ» version – of FR PVC compound, «НГ-LS» and «НГ-FRLS» versions – of FRLS PVC compound, «НГ-HF» and «НГ-FRHF» versions – of halogen-free polymeric compound, «ХЛ» version – of PVC compound with low cure temperature, «НГ-ХЛ» version – of FR PVC compound with low cure temperature.

Shield – taping with aluminum foil with nominal thickness 0,1 mm (general purpose cables, «НГ», «НГ-LS», «НГ-HF», «ХЛ» and «НГ-ХЛ» versions) or copper tape with nominal thickness 0,06 mm («НГ-HF», «НГ-FRHF» and «НГ-FRLS» versions), with overlapping securing the shield integrity by allowable cable bending radius. A tinned copper wire with nominal diameter 0,4 mm longitudinally laid under the aluminum foil shield.

PROTECTIVE COVERINGS:

type Б6ШБ

- armour of two galvanized steel tapes: in cable versions «НГ-HF», «ХЛ» and «НГ-ХЛ» - with thickness 0,2 mm, in other cable versions – with thickness 0,3 mm,
- protective jacket (of material corresponding to the cable version, similar to separating layer);

type Б

- bedding made of two tapes of crepe paper and bitumen,
- armour made of two steel tapes with thickness 0,3 mm,
- outer covering made of bitumen, fiberglass yarn, bitumen, chalk composition;

type БГ

- bedding made of two tapes of crepe paper and bitumen,

- armour made of two steel tapes with thickness 0,3 mm.

Sheath – in cables without protective coverings and shield, a sheath made of material corresponding to the cable version applied over the cable core (the material similar to separating layer).

LAYING

Without protective coverings - indoor, in conduits, tunnels, if there is no mechanical impact on the cable.

With covering **БГ** - indoors, conduits, tunnels, provided that the cable is not affected by considerable tensional forces.

With covering **Б** – in ground (galleries) in aggressive environment and in places affected by earth currents, provided that the cable is not affected by considerable tensional forces.

Shielded cables (with letter **Э**) - indoors, in conduits or tunnels, if there is no mechanical impact on the cable, in aggressive environment and as may be required for protection of electrical circuits from external electric fields.

With covering **ББШВ** - indoors, in conduits or tunnels, in ground (galleries) including aggressive environment and in places affected by earth currents, provided that the cable is not affected by considerable tensional forces.

With filling of interstices (with letter **з**) – used for electrical devices, requiring a cable tightening at enter point.

The cables of all these types can be laid in the open air.

Cable tension by laying and installation shall not create tensional forces in conductors exceeding 4 kgf/mm² for copper and 2 kgf/mm² – for aluminium.

Flame-retardant cables: general industrial purpose, except for cables with covering Б – by single laying, cables of all the other versions – by group laying.

BENDING RADIUS AND ALLOWABLE LAYING TEMPERATURE

Cable version	Bending radius considering cable outer diameter (Do)		Cable laying temperature without preheating, °C, min.	
	armoured	unarmoured	armoured	unarmoured
Cables of all the versions	10 Do	6 Do	- 7	- 15
«ХЛ», «НГ-ХЛ»			-25	-25
general industrial purpose		cable with copper conductors: 3 Do - for Do up to 10 mm, 4 Do - for Do from 10 to 25 mm	-7	0

ELECTRICAL PROPERTIES

Conductor cross-section, nominal, mm ²	Conductor resistance*, Ohm, max.		Insulation resistance*, MOhm, min.		
	conductor material		insulation material		
	copper	aluminum	PVC	PE	halogen-free polymeric compound
0,75	24,5	-	10	300	-
1,0	18,1	-			12,3
1,5	12,1	-			12,0
2,5	7,41	12,1	9		10,1
4,0	4,61	7,41	6		8,7
6,0	3,08	5,11		-	
10,0	-	3,08		-	

* - reduced to cable length 1 km and temperature 20°C

Continuously allowable conductor temperature during operation: max. 70°C.

STORAGE PERIOD AND SERVICE LIFE

Cable version	Storage period, max.			Service life*, min.	Guaranteed service life**, min.
	outdoors	under shelter	indoors		
general industrial use	6 months	5 years	10 years	15/25	3
«НГ», «ЗНГ»				15/25	3
«НГ-LS», «ЗНГ-LS»				30	3
«НГ-FRLS»				30	3
«НГ-FRHF»				40	5
«НГ-HF»				30	3
«ХЛ», «НГ-ХЛ»				30	3

* - provided that the user observes the installation, storage and operation conditions;
 service life by laying indoors, in tunnels or conduits is shown after slash.
 ** - after cable commissioning date, but max. 6 months after manufacturing date.

BASIC RANGE OF PRODUCTS

Cable type (version)	Conductor cross-section, nominal, mm ²							
	0,75	1,0	1,5	2,5	4,0	6,0	10,0	
Number of conductors*								
with copper conductors								
Cables of non-special version (general industrial purpose)								
GOST 1508-78	КВВГ, КПВГ, КВВГЭ, КВВБ, КПВБ, КВВБГ, КПВБГ, КВББШВ, КПББШВ	4-61	4-61	4-61	4-37	4-10	4-10	-
	КВВГз	4; 5						-
Flame-Retardant cables								
TU 16.K17-057-2007	КВВГнг(А), КВВГЭнг(А) КВББШВнг(А), КВББШВнг(А)-LS, КВВГзнг(А), КВВГЭзнг(А), КВББШВзнг(А), КВВГзнг(А)-LS, КВВГЭзнг(А)-LS, КВББШВзнг(А)-LS	4-61	4-61	4-61	4-37	4-10	4-10	-
Flame-Retardant Low Smoked cables								
TU 16.K71-310-2001 Products are manufactured acc. to licence agreement (patent holder is ОАО «ВНИИКР»)	КВВГнг(А)-LS, КВВГЭнг(А)-LS	4-61	4-61	4-61	4-37	4-10	4-10	-
Fire-Resistant Flame-Retardant Low Smoked cables								
TU 16.K71-337-2004	КВВГнг(А)-FRLS, КВВГЭнг(А)-FRLS	4-61	4-61	4-61	4-37	4-10	4-10	-
Fire-Resistant Flame-Retardant cables with insulation and sheath of halogen-free polymeric compounds								
TU 16.K71-339-2004	КППГнг(А)-FRHF, КППГЭнг(А)-FRHF	-	4-52	4-52	4-52	4-10	4-10	-
Flame-Retardant cables with insulation and sheath of halogen-free polymeric compounds								
TU 16.K71-304-2001	КППГнг(А)-HF, КППГЭнг(А)-HF, КПБПнг(А)-HF	-	4-52	4-52	4-52	4-10	4-10	-
Cables for areas with cold climate								
TU 16.K71-425-2011	КВВГ-ХЛ, КВВГнг(А)-ХЛ КВВГЭ-ХЛ, КВВГЭнг(А)-ХЛ КВББШВ-ХЛ, КВББШВнг(А)-ХЛ	-	-	-	4-37	4-10	4-10	4-10
with aluminum conductors								
Cables of non-special version (general industrial purpose)								
GOST 1508-78	АКВВГ, АКПВГ, АКВВГЭ, АКВВБ, АКПВБ, АКВВБГ, АКПВБГ, АКВББШВ, АКПББШВ	-	-	-	4-37	4-10	4-10	4-10
Flame-Retardant cables								
TU 16.K17-057-2007	АКВВГнг(А), АКВВГЭнг(А), АКВББШВнг(А), АКВББШВнг(А)-LS	-	-	-	4-37	4-10	4-10	4-10
Cables for areas with cold climate								
TU 16.K71-425-2011	АКВВГ-ХЛ, АКВВГнг(А)-ХЛ АКВВГЭ-ХЛ, АКВВГЭнг(А)-ХЛ АКВББШВ-ХЛ, АКВББШВнг(А)-ХЛ	-	-	-	4-37	4-10	4-10	4-10
* - conductors number in cables with cross-section (0,75-2,5) mm ² - 4, 5, 7, 10, 14, 19, 27, 37, 52, 61, with cross-section (4,0-10,0) mm ² - 4, 7, 10.								
Note – The following cables can be manufactured on customer request: - with shield of copper tape instead of aluminum tape (or vice-versa); - with numerical or colour identification of all the conductors in core; - with number and cross-sections combinations of conductors in core not listed above.								

DELIVERY

The cables are delivered on wooden drums acc. to GOST 5151-79 in factory lengths min. 150 m.
 Drum packing can be fully closed (wooden), closed with gaps (wooden) or closed with pads made of fiberboard.