GOST : 23436-79

TITLE : PAPER FOR INSULATING 35kV POWER CABLES

TRANSLATED AND EDITED BY : PVR ASSOCIATES

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USSR STATE STANDARD

Paper for insulating 35 kV power cables

Specifications valid upto 01.01.1985

GOST 23436-79

This supersedes GOST 645 in respect of grades K and KM

1. GRADES AND DIMENSIONS

1.1. Cable paper should be manufactured in the following grades:

K-080; K-120 and K-170 - ordinary;

КМП - 120 and КМП - 170 - multilayer reinforced;
(КМР) (КМР)

КМ - 120 and КМ - 170 - multilayer type.

1.2. The following widths are standardised for paper supplied in rolls: 500, 650, 670, 700, 750 and 1000 mm. Paper may be manufactured in rolls of other widths by mutual consent. The tolerance in roll width should not exceed ± 3 mm.

1.3. The roll diameter should be 450 to 800 mm.

EXAMPLE OF CONVENTIONAL DESIGNATION of multilayer reinforced cable paper of thickness 120 microns, red in colour, in 700 mm wide.

КМП - 120 К 700 GOST 23436-79
(КМР)

2. TECHNICAL REQUIREMENTS

2.1. Cable paper must be manufactured in accordance with the requirements of the present standard.

2.2. Quality parameters of cable paper must conform to the norms listed in the Table.

Parameter	Norms for paper grade			
	K-080	K-120	K-170	КМП-120 (КМР-120)
1. Fibre composition, % of unbleached sulphate cellulose as per standards and technical documentation.	100	100	100	100
of unbleached sulphate cellulose for multilayer cable paper as per GOST-12454-78.	-	-	-	-
2. Thickness, microns	80±5	120±7	170±10	120±7
3. Density, g/cm^3	0.78±0.05	0.78±0.05	0.78±0.05	0.78±0.05
4. Breaking force N (kgf) not less than.				
in the machine direction	83.4 (8.5)	127.5 (13.0)	171.7 (17.5)	152.0 (15.5)
in the transverse direction.	39.2 (4.0)	58.9 (6.0)	83.4 (8.5)	63.8 (6.3)
5. Elongation, %, not less than:				
in the machine direction;	2.2	2.2	2.2	2.8
in the transverse direction	6.6	6.6	6.6	7.0
6. Air permeability, ml/min, not more than	40	40	40	40
7. Ash content, %, not exceeding	1.0	1.0	1.0	0.8
8. pH value of aqueous extract.	7.0-9.5	7.0-9.5	7.0-9.5	7.0-9.5

Parameter	Norms for paper grade КМП-170 (КМР-170)	КМ-120	КМ-170	Method of testing
1. Fibre composition, %: of unbleached sulphate cellulose as per standard and technical documentation.	100	-	-	As per GOST 7500-75
of unbleached sulphate cellulose for multilayer cable paper as per GOST 12454-78	-	100	100	
2. Thickness, microns	170±10	120±7	170±10	As per GOST 13199-67
3. Density, g/cm^3	0.78±0.05	0.78±0.05	0.78±0.05	As per GOST 13199-67
4. Breaking force, N (kgf) not less than				As per GOST 13525.1-79
in the machine direction	196.2 (20.0)	142.2 (14.5)	186.4 (19.0)	
in the transverse direction	93.2 (9.5)	63.8 (6.5)	93.2 (9.5)	
5. Elongation, %, not less than- in the machine direction	2.8	3.2	3.2	As per GOST 13525.1-79
in the transverse direction.	7.0	9.0	9.0	
6. Air permeability, ml/min, not more than	40	40	40	As per GOST 13525.14-79
7. Ash content, % not exceeding	0.8	0.8	0.8	As per GOST 7629-77.
8. pH value of aqueous extract	7.0-9.0	7.0-9.0	7.0-9.0	As per GOST 12523-77 and clause 4.4 of this standard

Parameter	Norms for paper grade			
	K-080	K-120	K-170	KMP-120 (KMП)
9. Conductivity of aqueous extract μS/cm, not more than				
with module 1:50	63	63	63	50
with module 1:20	126	126	126	00
10. Moisture content, %	4-8	4-8	4-8	4-8

Parameter	Norms for paper grade			Method of testing
	KMP-170	KM-120	KM-170	
9. Conductivity of aqueous extract μS/cm not more than				As per GOST 8552-72
with module 1:50	50	50	50	
with module 1:20	100	100	100	
10. Moisture content, %	4-8	4-8	4-8	As per GOST 13525.19-71

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2.3. Paper should be manufactured with smooth machine finish.

2.4. Translucence of paper should conform to the specimen, approved in the established manner.

2.5. Edges should be trimmed uniformly and without rupture.

2.6. Folds, wrinkles, specs, punctures, metallic and mineral inclusions, visible to the naked eyes must not be present in the paper.

Barely visible folds, wrinkles and spots of fibrous origin and of area upto 10 mm^2, which can not be detected during rewinding, are allowed if the parameter of these defects, determined as per GOST 13525.5-68, does not exceed 2%.

2.7. Paper should be wound tightly and uniformly along the whole width.

2.8. Paper of grades K and KMP should be manufactured in natural fibre colour or dyed red, green and blue, and grade KM in natural fibre colour.

2.9. The number of breaks in a roll of diameter upto 750 mm inclusive should not be more than 2 and in rolls of diameter over 750 mm not more than 3.

2.10. The ends of paper fabric at the breaks should be marked with coloured flags, visible from the side of the roll.

3. ACCEPTANCE RULES

3.1. GOST 8047-78 defines the batch and the sampling scale.

3.2. If unsatisfactory test results are obtained in respect of even one of the parameters, the particular test is repeated on twice the number of specimens.

Results of the repeat tests are applicable to the whole batch.

4. METHODS OF TESTING

4.1. Sampling and preparation for testing are as per GOST 8047-78.

4.2. Conditioning of paper specimens before testing and the testing itself should be carried out as per GOST 13523-78 at a temperature of 20 ± 2°C and a relative humidity of 65 ± 2%.

Conditioning period for paper of grade K-080 and K-120 is not less than 4 hours, for paper of grade K-170 it is not less than 6 hours, for paper of grade КМП -120 (КМР-120) and КП-120 it is not less than 8 hours and for paper of grade КМП -170 (КМР-170) and КП-170 it is not less than 10 hours.

4.3. Roll width is determined as per GOST 21102-75.

4.4. Hot extraction should be used while preparing aqueous extract for determining pH value.

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5. PACKING, MARKING, TRANSPORT AND STORAGE

5.1. Packing and marking of paper are done as per GOST 1641-75 with the following additional stipulation: metallic and plastic stoppers as per standards and technical documentation may be used.

5.2. Paper in packed form may be transported in any type of clean covered vehicle.

5.3. Paper should be stored in enclosed stores and protected from atmospheric precipitations and subsoil moisture.

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BASE SI UNITS

Quantity	Unit		
	Name	Russian symbol	International symbol
Length	metre	м	m
Weight (Mass)	Kilogram	кг	kg
Time	second	с	s
Current	ampere	А	A
Thermodynamic temperature	kelvin	К	K
Amount of substance	mole	моль	mol
Intensity of light	candela	кд	cd

SUPPLEMENTARY SI UNITS

Plane angle	radian	рад	rad
Solid angle	steradian	ср	sr

DERIVED SI UNITS WITH PROPRIETORY NAMES

Quantity	Unit		Expression for derived unit	
	Name	Symbol	using other units	using base SI units
Frequency	hertz	Hz	-	s^{-1}
Force	newton	N	-	$m, kg. s^{-2}$
Pressure	pascal	Pa	N/m^2	$m^{-1}, kg. s^{-2}$
Energy, work, heat	joule	J	N.m	$m^2, kg. s^{-2}$
Power, energy, flow	watt	W	J/c	$m^2, kg. s^{-3}$
Quantity of electricity, electric charge	coulomb	C	A.s	s.A
Electric potential	volt	V	W/A	$m^2, kg. s^{-3}.A^{-1}$
Electric capacitance	farad	F	c/V	$m^{-2}, kg^{-1}. s^4.A^2$
Electric resistance	ohm		V/A	$m^2, kg. s^{-3}.A^2$
Conductance	siemens	S	A/V	$m^{-2}, kg^{-1}. s^3.A^{-2}$
Magnetic flux	weber	Wb	V.s	$m^2, kg. s^{-2}.A^{-1}$
Magnetic induction	tesla	T	Wb/m^2	$kg. s^{-2}.A^{-1}$
Inductance	henry	H	Wb/A	$m^2, kg. s^{-2}.A^{-2}$
Luminous flux	lumen	lm	-	cd.sr. *
Illumination	lux	lx	-	$m^{-2}.cd.sr.$ *
Nucleid activity	beckerel	bk	-	s^{-1}
Radiation dosage	grey	gr	-	$m^2. s^{-2}$

* The supplementary unit steradian figures along with base SI units in these two expressions.