GOST 2824-75

TITLE ELECTRICAL GRADE PRESSBOARD

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DATE APRIL 1985

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Date. 7.5.85

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USSR STATE STANDARD

Electrical grade Pressboard

GOST 2824-75

This supersedes GOST 2824-60

The present standard relates to electrical grade pressboard for use in air as medium.

1. GRADES AND DIMENSIONS

1.1. The following grades of pressboard as indicated in Table 1 should be manufactured depending upon its end use and technical parameters.

Table 1

Grade	Purpose
ЭВС (EVS)	For slot insulation in automobile starters and other components of autmobile and tractor equipment.
ЭВП (EVP)	For production of pressboard in film form.
ЭВТ (EVT)	For insulating the components of electrical machines and apparatus.
ЭВ (EV)	For general purpose electrical insulation and for insulation in electrical machines, equipment and apparatus.
ЭВА (EVA)	For production of components of automobile and tractor equipment.

(REVISED EDITION - ISI No. 2, 1978)

1.2. Pressboard of grade EVP, EVT and EVA should be supplied in rolls and pressboard of grades EVS and EV - in rolls and sheets.

Sheet size and roll with for pressboard are mutually agreed upon. Roll width of EVP grale pressboard should be 507 ± 3 mm and of EVA grade - 1020 to 1050 mm.

Deviation limits on the specifed sizes of pressboard sheets and on roll width should not exceed ± 3 mm. Obliquity of pressboard sheet should not exceed 3 mm.

Note. EV grade pressboard of 507 mm thickness is (was) introduced with effect from 01-01.1978.

(REVISED EDITION - ISI No. 2, 1978)

2. TECHNICAL REQUIREMENTS

2.1. Thickness and dersity of pressboard should conform to the norms given in Table 2.

Table 2

Thickness in mm		Minimum density in g/cm^3 for pressboard of grade					
Nominal	Deviation Limits	EVS	EVP	EVT	EV		EVA
					for rolls	for sheets	
0.10	+0.02 -0.01	-	1.25	1.15	1.15	-	-
0.15	±0.02	-	-	1.15	1.15	-	1.2
0.20	±0.02	1.25	1.25	1.15	1.15	-	-
0.25	±0.02	1.25	-	1.15	1.15	-	-
0.30	±0.03	1.25	-	1.15	1.15	-	-
0.35	±0.03	1.25	-	-	1.15	-	-
0.40	±0.03	1.20	-	1.15	1.15	-	-
0.50	±0.05	-	-	1.15	1.15	-	-
1.00	±0.10	-	-	-	-	1.00	-
1.25	±0.10	-	-	-	-	1.00	-
1.50	±0.10	-	-	-	-	1.00	-
1.75	±0.15	-	-	-	-	1.00	-
2.00	±0.20	-	-	-	-	1.00	-
2.50	±0.20	-	-	-	-	0.95	-
3.00	±0.25	-	-	-	-	0.95	-

2.2. Quality parameters of pressboard should conform to the norms given in Table 3.

Table 3

Parameters	Nominal thickness, mm	Norms for press board of grades					Methods of testing
		EVS	EVP	EVT	EV	EVA	
					in roll form	in sheet form	
1. Fibre composition, % of rag fibre or unbleached cotton cellulose, minimum	----	15	20	30	Proportion of rag fibre and cellulose sulphate are not standardised	-	-	As per GOST 7500-75
Unbleached cellulose sulphate of grade EK to GOST 12765-78 or to GOST 5.1689-72, maximum	----	85	80	70		-	100	
Unbleached cellulose sulphate to grade HC-2 (NS-2) to GOST 11208-65	----	--	--	--		100	-	

Table 3 Contd.

Parameters	Nominal thickness, mm	Norms for press board of grades						Methods of testing
		EVS	EVP	EVT	EV		EVA	
					in roll form	in sheet form		
2. Ultimate tensile strength in initial condition, MPa (kgf/mm^2) minimum								As per GOST 13525.1-68 and clause 4.5 of this standard
a) In machine direction	0.1 - 0.2	-	127 (13.0)	-		-	-	
	0.2 - 0.4	127 (13.0)	-	-	-	-	-	
	0.3	-	-	-	-	-	118 (12.0)	
	0.1 - 0.5	-	-	118 (12.0)	98 (10.0)	-	-	
	1.0 - 3.0	-	-	-	-	83 (8.5)	-	
b) In the transverse direction	0.1 - 0.2	-	34 (3.5)	-	-	-	-	
	0.2 - 0.4	34 (3.5)	-	-	-	-	-	
	0.3	-	-	-	-	-	34 (3.5)	
	0.1 - 0.5	-	-	34 (3.2)	-	-	-	
	0.10-0.15	-	-	-	25 (2.5)	-	-	

Table 3 Contd.

Parameters	Nominal thickness, mm	Norms for press board of grades						Methods of testing
		EVS	EVP	EVT	EV		EVA	
					in roll forms	in sheet form		
	0.2 - 0.5	-	-	-	34 (3.5)	-	-	
	1.0 - 3.0	-	-	-	-	39 (4.0)	-	
c) After reverse bending								
i) in machine direction	0.1 - 0.2	-	98 (10.0)	-	-	-	-	
	0.2 - 0.4	98 (10.0)	-	-	-	-	-	
	0.3	-	-	-	-	-	78 (8.0)	
	0.1 - 0.5	-	-	78 (8.0)	78 (8.0)	-	-	
ii) in the transverse direction	0.1 - 0.2	-	25 (2.5)	-	-	-	-	
	0.2 - 0.4	29 (3.0)	-	-	-	-	-	
	0.3	-	-	-	-	-	29 (3.0)	
	0.1 - 0.5	-	-	25 (2.5)	25 (2.5)	-	-	
3. Dielectric strength in k V/mm after drying, minimum:								As per G 64333-71 cl. 4.6 of standard

Table 3 Contd.

Parameter	Nominal thickness, mm	Norms for press board of grades						Methods of testing
		EVS	EVP	EVT	EV		EVA	
					in roll forms	in sheet form		
a) in flat condition	0.10 - 0.15	-	12.0	13.0	12.0	-	-	
	0.20 - 0.25	12.0	12.0	13.0	11.0	-	-	
	0.3	-	-	-	-	-	11.0	
	0.30 - 0.40	12.0	-	12.0	11.0	-	-	
	0.5	-	-	12.0	10.0	-	-	
	1.0 - 2.0	-	-	-	-	10.8	-	
	2.5 - 3.0	-	-	-	-	8.0	-	
b) along the lines of reverse bending, average of readings in two directions	0.10 - 0.25	-	9.0	10.0	-	-	-	
	0.3 - 0.4	-	-	9.0	-	-	8.0	
	0.2 - 0.4	10.0	-	-	-	-	-	
	0.1 - 0.5	-	-	-	8.0	-	-	
4. Bending stiffness in machine and transverse directions conventional units	0.1 - 0.5	Permissible limits of stiffness depending upon the thickness (S) see drg . 1						As per GOST 9582-75 and clause 4.7 of this standard
5. Ash content, %, maximum	0.1 - 3.0	1.2	1.2	1.2	1.2	1.2 1.1*	1.2	As per GOST 7629-77
6. Moisture content, % as supplied	0.1 - 3.0	8±2	8±2	8±2	8±2	8±2	8±2	As per GOST 13525.19-71

* For pressboard with state quality Mark.

2.3. Processing of pressboard should include calendering with the edges neatly and unifbrmly trimmed.

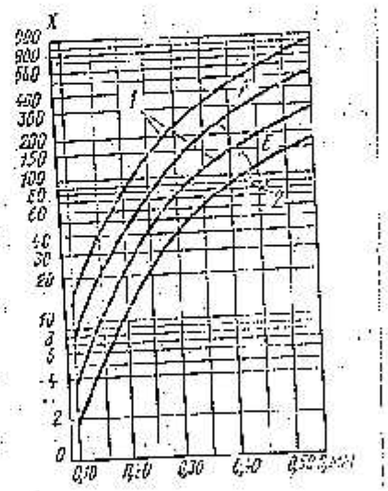
2.4. Texture of press board should be uniform and compact without holes or pores visible to the baked eye and without foreign inclusions.

Pressboard surface should be smooth and clean and free from warping, dents and peeling of the elementary layer.

2.5. Pressboard should not split into layers when it is cut, stamped or bent at 90° Page 7

2.6. EVS grade pressboard should be dyed dark-brown, pressboard of other grades should be given natural fibre colour or the colour agreed upon with the customer.

2.7. Pressboard should be rolled compactly, the ends being uniform.



1. upper limit; 2. lower limit

Drg. 1

2.8. No more than three peices are allowed in a roll of pressboard other than grade EVP. No outs, (discontinuity) are allowed in a roll of EVP grade pressboard.

2.9. Peeling is allowed at no more than four places in a roll of EVP grade pressboard. The affected portion should not be more than 150 mm long measured along the fabric. The point of maximum depth

of peeling should not be more than 100 mm along the width of the roll. Locations where peeling has taken place should be marked on the face of the roll with coloured paper flags.

3. ACCEPTANCE RULES

3.1. Batch and sample size are defined in GOST 8047-64.

3.2. If unsatisfactory test results are obtained against even a single parameter, the particular test is repeated on double the number of samples taken from the same batch.

Results of retesting are applicable to the whole batch.

4. METHODS OF TESTING

4.1. GOST 8047-64 defines the procedure for selecting specimens and preparing them for testing.

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4.2. Thickness and unit weight are determined as in GOST 12432-77.

4.3. Obliquity in pressboard sheet is determined as in GOST 13648.8-73.

4.4. Methods of testing are as set out in clause 2.2 and in the additional stipulations made in clauses 4.4.1 and 4.4.2.

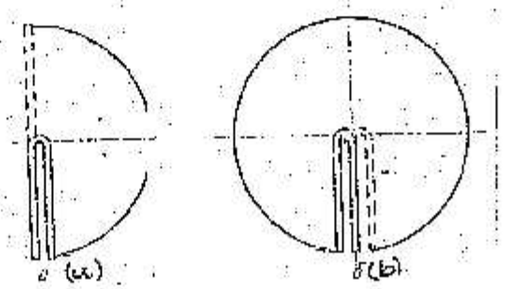
4.4.1. Conditioning of specimens before testing and the testing itself are carried out as per GOST 13523-68 at a relative humidity of 65 ± 2 % and a temperature of 20 ± 2°C for 24 hours for pressboard of thickness 0.1 - 0.5 mm and for 48 hours for pressboard of thickness 1.0 - 3.0 mm.

4.4.2. While determining dielectric strength, the specimens should first be dried at a temperature of 105 ± 2°C till they attain constant weight and then cooled down in a desiccator or in a polyethelene bag in air to the test temperature.

4.5. The following preliminary operations are performed on specimens of thickness 0.1 - 0.5 mm for determining tensile strength

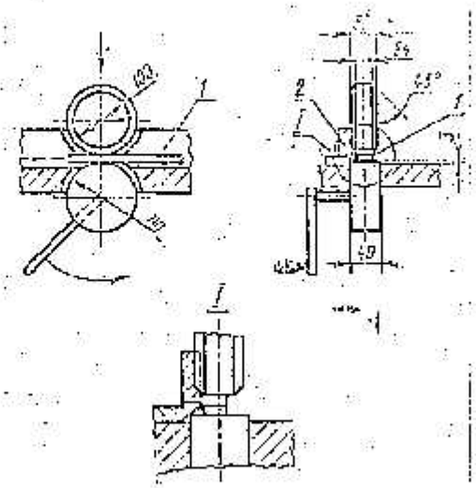
after they have gone through the bend test. Strips of width 15 ± 0.1 mm intended for testing are bent manualy over an angle of 180°C at the middle of their length after conditioning (drg.2a). The line of reverse bending should be perpendicular to the longtudinal edge The bent strips are passed between the rollers of the rolling device (drg. 3). The top roller which can be moved in the vertical direction presses on the bent specimen with a force of 147 netwons (15 kgf). The rotating bottom roller draws and passes the specimens through the rolling device. The strips are then bent as shown in drg. 2b, and again passed between the rollers of the device. Tensile strength is determined in the machine direction and in the transverse direction on five samples each after reverse bending.

REVERSE BENDING OF STRIPS AS A PRELIMINARY OPERATION



Drg. 2

DEVICE FOR CRUSHING OF STRIPS AS A PRELIMINARY OPERATION



1. strip; 2. support

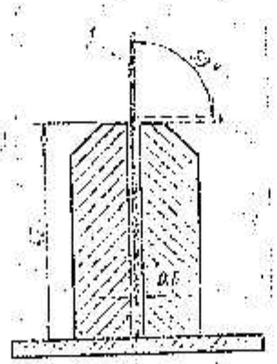
Drg. 3

4.6. Brass electrodes conforming to GOST 6433.3-71 and having diameter 30 mm and rounding off radius of corners 2.5 mm should be used for determining dielectric strength of pressboard. The voltage should be raised gradually. Specimens of size 300 x 300 mm prepared as per clause 4.4 2 are subjected to this test. Pressboard specimens of thickness 1.0 - 3.0 mm are tested only in the flat condition and after reverse bending. The procedure is as follows.

The specimen of pressboard of thickness 0.1 - 0.5 mm is inserted in the slit of device (drg. 4) for bending and is bent over an angle of 90°0 at a distance of 40 mm form the bottom edge. The pressboard is removed from the fixture and further bent over an angle of 90° manually. The bent portion of the specimen is passed between the two rollers of the device as shown in drg. 5. The force exerted by the top roller on the botton roller is 147 newtons (15 kgf). The specimen is now bent manually in the reverse direction by 360° at the same place and fed into the device. Such double reverse bending is done simultaneously on all the four edges of the specimen. There should not be any cracks at the bending lines in the machine direction or in the transverse direction.

The specimens are straightened and tested for dielectric strength as follows:

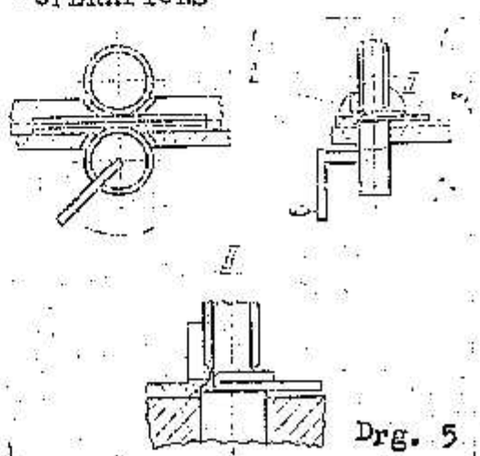
FIXTURE FOR BENDING PRESSBOARD SPECIMENS BEFORE TESTING FOR DIELECTRIC STRENGTH



1-specimen

Drg. 4

DEVICE FOR ROLLING OF BENT SHEETS FOR PRELIMINARY OPERATIONS



1-sheet; 2-support

Drg. 5

On the flat portion of specimen at five points. The arithmetic mean of five results is taken as the test result;

On bending lines along the machine direction and transverse direction at five points for each direction. The arithmetic mean of results in both directions is taken as the test result.

Minimum value of electrical strength at individual points should not be less than 80 % of the values given in Table 3.

(REVISED EDITION - ISI No. 2, 1978)

4.7. Permissible limits of stiffness are determined as per graphs (see drg. 1) for machine (A) and transverse (Б) (B) directions which are plotted as (X) versus thickness (S) of tested specimens.

The arithmetic mean of results calculated separately for machine and transverse directions determines the thickness of the tested specimens. Thickness of each specimen is measured at two places.

5. PACKING, MARKING, TRANSPORT AND STORAGE

5.1. Packing and marking of pressboard are done as per GOST 7691-75 with the following supplements:

5.1.1. Pressboard sheets should be packed in planks, frames or steel tape or bound with wire. Pressboard may be packed in stacks of size upto 65 x 55 cm and bound by steel tape once along and once at right angles to the stack.

5.1.2. Before packing the pressboard rolls in wrapping paper, the rolls are wrapped in at least two layers of paraffin or water-proof paper to GOST 8828-75.

5.1.3. Weight of rolls should be from 300 to 500 kg if the roll diameter is from 500 to 800 mm. Rolls of 100 ± 10 kg may be supplied by agreement with the customer. Cardboard of grade Э ВП and (EVP)

thickness 507 mm should weigh 50±5 kg.

5.2. Pressboard should be carried in covered vehicles and protected from moisture.

5.3. Pressboard should be stored in covered godowns and protected from the action of atmospheric precipitations and moisture from the ground.

5.4. A facsimile of the state quality mark must be reproduced as per GOST 1.9-67 on the packed bales and on the document accompanying cardboard sheets which have been awarded stste quality mark.

(ADDED, ISI No. 2, 1973)

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