

in the cold and heat chambers for 1 hour.

After the last cycle lamp holders, lights and caps are extracted from heat chamber and held in normal climatic conditions for 1 hour.

After that the following items are checked:-

- legibility and mechanical strength of marking;
- stamping preservation resistance of electrical contact
- insulation resistance

Lamp holders, lights and caps are considered to have passed the tests, if after tests and exposure in normal climatic conditions.

- corrosion and exfoliation of coating have not been found on metallic parts.;
- marking remained legible and mechanically strong;
- Stamping preservation has been ensured;
- mechanical damages of lamp holders, lights and caps have not been detected,
- resistance of electrical contact corresponds to the requirements of item 2.2.1.3;
- insulation resistance corresponds to the requirements of item 2.2.1.2;

3.3.4.5 Moisture resistance <sup>of</sup> lamp holders, lights and caps (item #2.4.1A) is checked according to GOST 16962-71 by method 207-2 (long term test) and method 208-2 (short-term test).

Before test, resistance of electrical contact, insulation resistance and electrical strength of insulation are checked.

Lamp holders, lights and caps are placed in humidity

chamber in which temperature of about  $+40 \pm 2^{\circ}\text{C}$  ( $313 \pm 2^{\circ}\text{K}$ ) is set .

Holding time of lamp holders, lights and caps in the humidity chamber under short term effect is 4 days, under long term effect 30 days (for usual version) and 56 days (for all climatic version).

At the end of test, without extraction of lamp holders lights and caps from the chamber or within 3 minutes after extraction electric strength ~~and~~ of insulation and insulation resistance are checked.

If ~~dew~~ appears on the surface of lamp holders, lights and caps, after their extraction from chamber it may be removed with filter paper, by blowing off with dry air or any other method which does not cause the heating of lamp holders, lights ~~and~~ or caps.

After extraction of lamp holders, lights and caps from chamber and exposure in normal climatic conditions <sup>for</sup> 1 hour during short term test and 24 hours during long term test, the following items are checked.

- legibility and mechanical strength of <sup>marking</sup> ~~marking~~;
- stamping preservation;
- resistance of electrical contact.

Lamp holders, lights and caps are considered to have passed the tests, if:-

a) while testing, the insulation withstands without breakdown and surface spark over test voltage whose value is shown in item 2.2.1.1.

insulation resistance is not less than the value, shown in item 2.2.1.2

b) After tests and exposure of lamp holders, lights and caps in normal climatic conditions:-

- corrosion and protective coating damage have not been found on metallic parts;
- marking remained legible and mechanically strong;
- stamping preservation was ensured;
- resistance of electric contact corresponds to requirements of item 2.2.1.3.

3.3.4.6 Stability of lamp holders, lights and caps for the effect of hour frost and dew (item 2.4.1c) is checked according to GOST 16962-71 by the method 206-1.

Lamp holders, lights, and caps are extracted from cold chamber and within ~~3 hours~~<sup>3 minutes</sup> after extraction electric voltage, given in table 11 is supplied to them for 15 minutes.

Lamp holders, lights and caps are considered to have passed the tests, if while applying the voltage there is no breakdown and surface sparkover of insulation.

3.3.4.7 Test of lamp holders and lights for the effect of reduced atmospheric pressure is carried out as per GOST 16962-71 by the method 209-1. Lamp holders and lights are placed in pressure chamber, in which air pressure equal to 4mm of mercury is set.

Lamp holders, lights are held in pressure chamber at given condition for 15 minutes, then electric strength of insulation is checked. Test voltage in accordance with item 2.2.1.1. is supplied to electrical contacts.

During test, <sup>a</sup> absence of breakdown and sparkover are visually checked.

Lamp holders, lights are considered to have passed

the tests, if during test, electrical break down and surface spark over of insulation do not take place.

3.3.4.8 Stability of lamp holders, lights and caps against the effect of salt fog (item 2.4.1f) is checked as per GOST 16962-71, method 215-1.

Lamp holders, lights and caps are held in chamber, for 7 days.

After test lamp holders and caps are extracted from the chamber and washed by soft <sup>C</sup>otton wad or any other method with distilled water and dried at temperature of about  $+25 \pm 3^{\circ}C$  for 3 hours.

Lamp holders, lights and caps are considered to have passed the tests, if marking remained legible and protecting coating damage and corrosion on metallic parts are absent.

Change in colour of metallic coating of terminal leads and formation of white or grey deposit salts and oxides of salts of metallic coating is not a sign of rejection.

3.3.4.9 Lamp holders, lights and caps are checked for mould growth (item 2.4.1h) according to GOST 16962-71, method 214.2.

3.3.5 Checking of conformity to the requirements for stability under special effects.

3.3.5.1 Stability of lamp holders, lights and caps against the special factors (item 2.5.1) is checked according to normal HO.005.058 by set methods.

Lamp holders, lights and caps are considered to have passed the tests, if insulation break down, mechanical damage causing the loss of serviceability are not observed, and electrical parameters correspond to the norms, given in item 2.2.4.

3.3.6 Checking of the conformity to the requirements for reliability.

3.3.6.1 Reliability of lamp holders lights and caps (item 2.6) is checked by the following tests:-

- a) for failure free performance
- b) for durability
- c) for keeping quality

3.3.6.1.1 Test for failure free performance [item 2.6] is carried out for 500 hours. Lamp holders, lights are subjected to the tests in the conditions and sequence for effects, given in table 14.

TABLE 14

Working factors and their sequence.	Duration of action	Number of lamps change cycles	Electrical condition
Wear resistance in normal climatic conditions		50	Electrical load according to Table 11.
Increased humidity 95±3% at a temperature +40 ±2°C (313±2°K)	48		De-energized condition.
Normal climatic conditions	2		De-energized condition
Increased temperature +85 ±3°C (358 ± 3°K)	450		Electrical load according to table 11.
Wear resistance in normal climatic conditions		50	Electrical load according to Table 11.

Test for wear resistance is carried out according to item 3.3.1.5.

Before and after the tests in normal climatic conditions, resistance of electrical contact and insulation resistance are checked.

<sup>for</sup>  
Besides after test failure-free performance electrical strength of insulation is checked by voltage, equal to 0.5 of test voltage value for acceptance and supply (item 2.2.1.1

After the effect of increased humidity, without extraction of lamp holders, lights and caps from the chamber or within 3 minutes after extraction of lamp holders, lights and caps from the chamber, insulation resistance is measured.

Lamp holders, lights during test and after the effect of relative humidity and exposure in normal climatic conditions for 2 hours, are subjected to check of resistance of electrical contact.

Lamp holders, lights are considered to have passed the tests, if:

- a) during the test at an electrical load, breaking of electric contact is absent;
- b) during and after test mechanical damages which caused or may cause (as per analysis results) the loss of serviceability) are absent, movement of movable contacts is perfect, resistance of electrical contact, insulation resistance correspond to the norms, set in technical specifications.
- c) after tests, electrical breakdown and surface spark-over of insulation are absent while checking of electrical strength of insulation.

Remark: In substantiated cases, intervals in tests are allowed, but in this case, total duration of tests should not be shortened.

3.3.6.1.2 Test of lamp holders, lights for durability (item 2.6.1) is carried out during the time of minimum operating time (10000 hours).

Test is carried out by cycles, repeating, all the time during tests.

Conditions and sequence of tests within the limits of one cycle is given in table 1.5.

TABLE 15

Working factors and their sequence.	Duration of action	Number of lamps change cycles	Electrical condition
Normal climatic conditions	450	5	Electrical load according to table 11
Increased humidity 95 ± 3% at temperature 40 ± 2°C (313 ± 2°K)	48		Deenergised condition
Normal climatic conditions	2		Deenergized condition
Increased temperature ± 85 ± 3°C (358 ± 3°K)	500		Electrical load according to table 11
Wear resistance in normal climatic conditions		5	the same

Quantity of cycles is 10.

Test for wear resistance is carried out according to item 3.3.1.5.

Before tests and after every cycle of test in normal climatic conditions resistance of electrical contact, insulation resistance are measured, besides after test for durability electric strength of insulation is checked by voltage, equal to 0.5 of test voltage value for acceptance and supply.

After the effect of increased humidity without extraction ~~and~~ of lamp holders, lights and caps from the chamber or within 3 minutes after extraction of lamp holders

lights and caps from the chamber insulation resistance is measured.

During test and after the effect of relative humidity and exposure of lamp holders, lights and in normal climatic conditions for 2 hours, resistance of electrical contact is measured. Lamp holders lights are considered to have passed the tests, if:

- a) during test, at an electric load, breaking of electrical contact is absent;
- b) during and after test, mechanical damages, which caused or may cause (as per item analysis results) the loss of serviceability, movement of movable contact is perfect, resistance of electrical contact corresponds to the norms, set in technical specifications.
- c) after, test, electrical break-down and surface spark over of insulation are absent while checking the electrical strength of insulation.

Remark: In substantial <sup>top</sup> cases, interval in tests are allowed but in this case, total duration of tests should not be shortened.

3.3.6.1.3 Test for keeping quality of lamp holders, lights and caps (item 2.6.2) is carried out in heated store house and under sheel. Before test, during test, after test the following items are carried out:

- External inspection;
- Checking of insulation resistance;
- Measurement of resistance of electrical contact;
- Checking of movement of moving contacts.

After test for keeping quality in normal climatic conditions, electric strength of insulation is checked by Voltage, equal to 0.6 of the value of test voltage for acceptance

and supply (item 2.2.1.1.)

Lamp holders, lights and Caps are considered to have passed the tests, if:

- during and after test, the mechanical damages, which caused or may cause (as per the analysis results) the loss of serviceability, are absent, and electrical parameters criteria of ~~fitness~~ <sup>fitness</sup> correspond to the standards given in item 2.2.3 of these technical specifications.

3.3.7 Checking of conformity to the requirements for marking

3.3.7.1 Marking quality.

Lamp holders, lights are considered to have passed the tests, if, marking remained legible.

3.3.8 Checking of conformity to the requirements for packing.

3.3.8.1 Packages strength item 2.7.1 is checked by testing the strength at falling down.

3.3.8.2 One shipping container with packed lamp holders, lights or caps is subjected to the test of packages strength at falling <sup>down</sup> shipping container, may be subjected to test if it is filled not to the full.

In this case rest of the volume is filled with multiple ~~pack~~ with analogous substandard articles.

After the tests external inspection of packages is carried out and electric parameters of lamp holders, lights in the volume of approval tests are checked.

Packages are considered to have passed the tests, if after test, mechanical damages of packages causing the loss of protective properties are absent packed articles do not have mechanical damages, and electrical parameters of

of lamp holders and lights correspond to the norms set in technical specifications during acceptance and supply.

3.3.8.3 Packages strength at falling down, <sup>is</sup> tested by throwing the shipping container with packed lamp holders, lights and caps on cement floor or concrete plate from the height of 0.9m. In this case, container is thrown down ~~once~~ by the bottom, cover and two side walls, falling height is ~~carried~~ <sup>counted</sup> ~~off~~ from the lower edge of the container to the floor(plate)

#### 4. TRANSPORTATION AND STORAGE

4.1 Lamp holders, lights and caps may be transported by any type of transport and for any distance in supplier's packages.

Sea transportation may be carried out only in special packages.

Arrangement and fastening of shipping container with packed lamp holders, lights or caps by transportation facilities should ensure the stable position of shipping container and absence of its displacement during transportation.

During transportation, shipping container with packed lamp holders, lights or caps should be protected from atmospheric precipitations.

4.2 Lamp holders, lights and caps are stored in the following manner:-

a) in supplier's packages in all storage places as per GOST B9003-72 (except open area);

b) built in the apparatus as <sup>an</sup> part of vehicle or in the set of SPTA in all storage places.

While storing the lamp holders, lights and caps in not heated store houses under the shed or <sup>in</sup> on the open area,

periods of keeping wuality, depending on the storage places, should be equal to the value shown in table 16.

TABLE 16

Storage place	Period of keeping quality of lights and caps, in supplier's packages	years	lamp holders, built-in the apparatus (as a part of protected object).
<del>The</del> <sup>Un</sup> heated storage	6		6
Under shed	6		6
on the open area	Storage is not allowed.		6

### 5. INSTRUCTIONS FOR USE AND OPERATION

- 5.1 While mounting the lamp holders and lights on apparatus after two years of storage it is necessary to carryout hot-dip tinning in soldered points.
- 5.2 While assembling it is necessary to make sure that there are no dust, moisture, and other foreign parts inside the lamp holders, lights or caps.
- 5.3 Lamp holders, lights should not get damaged while soldering. Distance from body to soldering points should not be less than 2mm, and soldering duration should be within the limits of about 5/10 seconds.
- 5.4 While mounting the lamp holders, lights and caps ~~nut~~ is secured with paint HIO.018.001. Paint is applied in 3 parts at an angle of 120°.
- 5.5 Mounting to moving contacts is carried out with flexible wire.
- 5.6 Lamp for mounting in the lapp-holders and lights are

selected in accordance with Appendix 2.

5.7 95% of service life of lamp holders, lights and caps in models and conditions, permitted by item 3.3.6.1.2 is equal to 15000 hours with 150-fold change of the lamps.

5.8 Lights, lamp holders and caps may operate in the conditions of increased air humidity of upto 95% at temperature of about  $+40^{\circ}\text{C}$  ( $313^{\circ}\text{K}$ ).

5.9 For soldering the terminals of articles, it is recommended to use solder, containing 40 to 60% of tin, having melting point of about  $230^{\circ}\text{C}$ , with calphony.

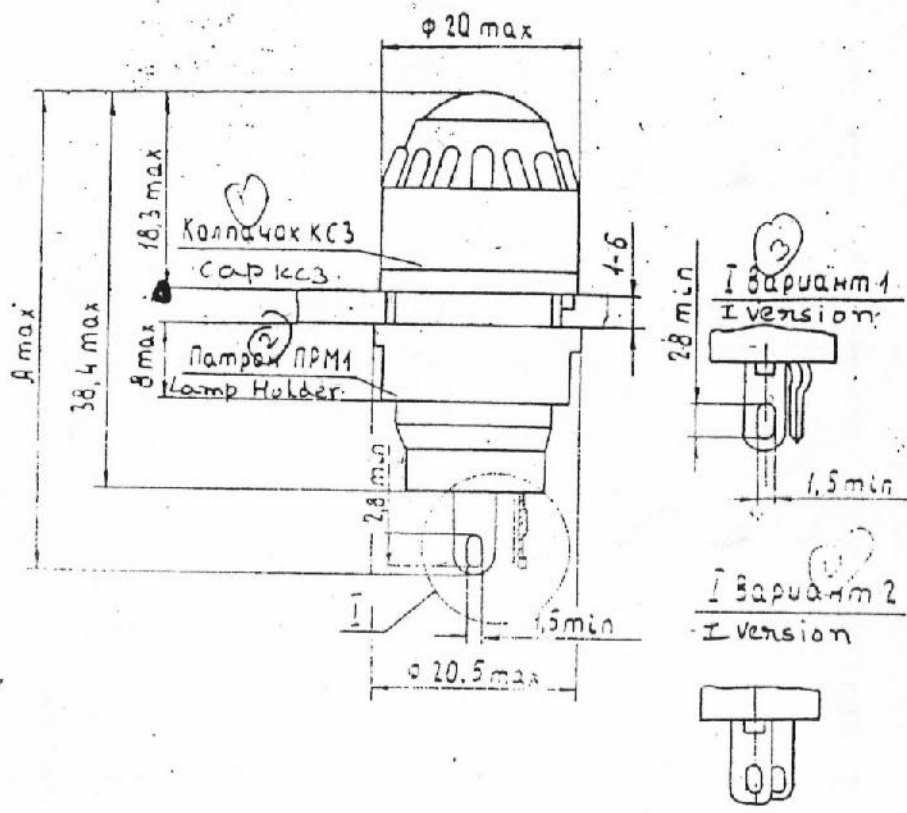


Рис. 13 фонарь ФРМ1  
Fig 13 Lights ФРМ1

Размеры в мм

Обозначение	Цвет свето-фильтра кол-пачка	Обозначение конструктивной документации	Лампа		Масса не более
			с лампы	без лампы	
ФРМ1-Б ФРМ1-БВ	Бесцветный	1	51,2	47,2	12
ФРМ1-Ж ФРМ1-ЖЗ	Желтый	2			
ФРМ1-К ФРМ1-КВ	Красный	3	51,2	47,2	12
ФРМ1-З ФРМ1-ЗВ	Зеленый	4			
ФРМ1-С ФРМ1-СВ	Синий	5			

Dimensions in mm

Designation	Color of Light Filter of cap	Designation of design documentation	Lamp		mass not more than
			with lamp	without lamp	
ФРМ1-Б ФРМ1-БВ	colourless		51.2	47.2	12
ФРМ1-Ж ФРМ1-ЖЗ	Yellow				
ФРМ1-К ФРМ1-КВ	Red		51.2	47.2	12
ФРМ1-З ФРМ1-ЗВ	Green				
ФРМ1-С ФРМ1-СВ	Blue				

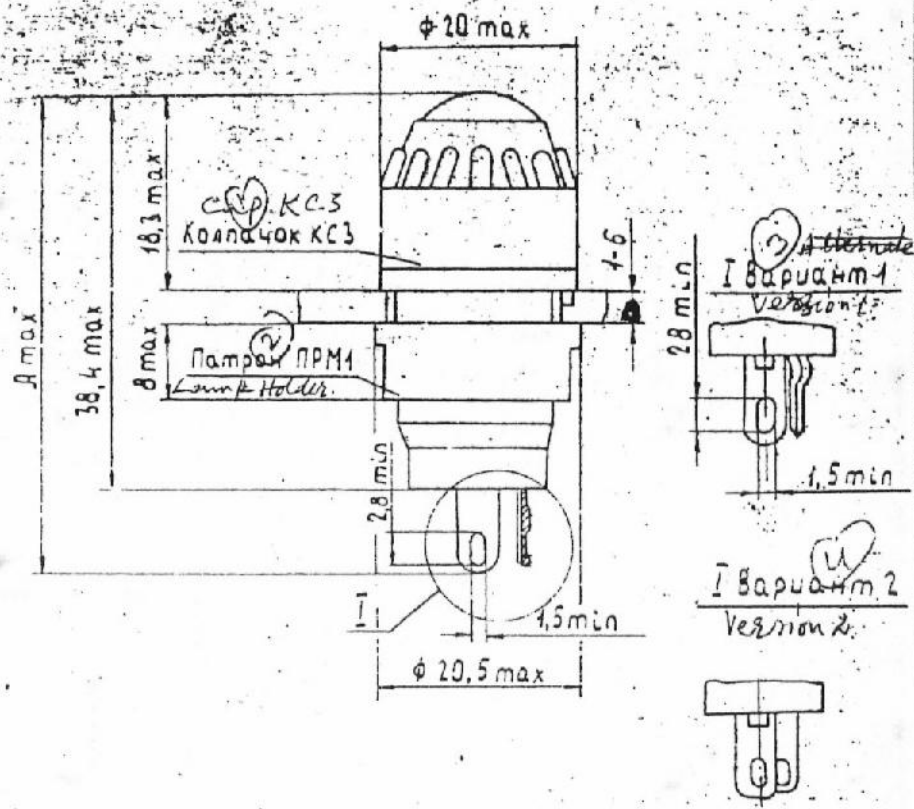


Рис. 13 фонарь ФРМ1  
Fig 13. Lights ФРМ1

Размеры в мм

Обозначение	Цвет свето- фильтра кол- пачка	Обозначение конструкторской документации	Размеры 'A' max		Масса не более
			with lamp	without lamp	
ФРМ1-б ФРМ1-бВ	Бесцветный	1			
ФРМ1-ж ФРМ1-жЗ	Желтый	2			
ФРМ1-к ФРМ1-кВ	Красный	3	51.2	47.2	12
ФРМ1-з ФРМ1-зВ	Зеленый	4			
ФРМ1-с ФРМ1-сВ	Синий	5			

Dimensions in mm

Designation	Colour of light filter of cap latter	Designation of design docu- mentation.	'A' max		mass g not more than.
			with lamp	without lamp	
ФРМ1-б ФРМ1-бВ	Colour less				
ФРМ1-ж ФРМ1-жЗ	Yellow				
ФРМ1-к ФРМ1-кВ	Red		51.2	47.2	12
ФРМ1-з ФРМ1-зВ	Green				
ФРМ1-с ФРМ1-сВ	Blue				