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Ty6-05-810-76

SHEETS 18

SUPER EDES.

ALBUM NO: 60

TECHNICAL DOCUMENTS

INDEX :

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Ty6-05-810-76.

O.F.P.H.NO: 1452.

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Present technical specifications refer to blanks, which are made of polytetrafluorethylene (PTFE) (GOST 10007-80) by moulding method followed by heat treatment.

Blanks made of PTFE (Teflon) are intended for manufacture of sealing, electrical insulation, anti-frictional, chemically resistant structural elements.

Manufacture of parts from blanks of PTFE is carried out by machining method.

Temperature ranges where blanks are used is from minus 200 to plus 250°C.

#### 1. TECHNICAL REQUIREMENTS:

- 1.1 <sup>purpose</sup> Blanks made of polytetrafluorethylene (PTFE) of ~~general~~ <sup>purpose</sup> should be made in ~~of general~~ <sup>purpose</sup> accordance with the requirements of these technical specifications as per the technical regulations of manufacturing plant, approved in an established <sup>order</sup> on press moulds of the factory consumer, manufactured as per the documents, worked out by the manufacturing plant or agreed with this plant.
- 1.2 Types, dimensions and grades of blanks.
  - 1.2.1 Blanks are made in the form of plates, bars, discs, rods, bushes and other types.
  - 1.2.2 Nominal sizes of blanks should correspond to the basic list <sup>of manufac-</sup> ~~turning~~ plant or to drawings or to specifications which are agreed between the manufacturer and consumer.

1.2.3 Depending as the quality index two qualities of blanks high quality and quality I., blanks of high quality should be manufactured from polymer of high quality should be manufactured from polymer grades PH, O and blanks of 1st quality from polymer of grades. PH, O.T.

1.2.4 The following is indicated in the conventional designation of blanks; type of blanks, name of material from which it is made dimensions of blank grade designation of present technical specifications. Examples of conventional designations:-

- Plate  $\phi$  4 250/250x250 high quality techspec. 6-05-810-76
- Disc  $\phi$  4 250/85 grade I tech. spec 6-05-810-76
- Bar  $\phi$  4 50x390 grade I tech. spec 6-05-810-76
- Bush  $\phi$  4 65x20x40 grade I tech. spec. 6-05-810-76

Numbers designate the following:

Plate: width, length and thickness in MM

Disc : diameter and thickness in MM;

Bar : diameter and length in MM;

Bush : external and internal diameters and length in MM;

1.3 Characteristics (properties)

According to their properties, blanks should meet the requirements and standards, given in the table :

Table:

Description of parameters	Standard for Grade		Test method
	High Grade	Grade I	
Surface of blanks should be as follows:	Appearance of blanks surfaces white colour	from white to grey colour. without cracks and cavities.	As per item 4.2
		Difference in tone of painting is allowed.	

1	2	3	4
<p>Conditions of internal layers of blanks when checked by radiography</p>	<p>surface of blanks may have some unevenness not exceeding the limit deviations from nominal dimensions. Some inclusions, the colour of which is darker than the colour of blank with dimensions more than given below, is not allowed.</p> <p><math>6\text{mm}^2</math> inclusions with dimensions: from 1 to <math>6\text{mm}^2</math></p> <p>for each <math>30\text{cm}^2</math> area of blanks</p>	<p><math>8\text{mm}^2</math> from 3 to <math>8\text{mm}^2</math></p> <p>Should not exceed 2 pcs. for each <math>25\text{cm}^2</math> area of blanks</p> <p>Blanks should not have internal defects, cracks, hollowness inclusions, <del>voids</del> the colour of which is darker <del>or</del> than the colour having dimensions <math>L</math> of blank more than <math>10 \cdot 2</math>, 2 pieces in number are not allowed for each <math>5\text{mm}^2</math> of scanning thickness</p> <p>on the area of <math>3\text{cm}^2</math> on the area of <math>25\text{cm}^2</math></p> <p>Difference in tone in painting is allowed on the area of <math>30\text{cm}^2</math> and <math>25\text{cm}^2</math></p>	<p>as per item 4.2</p>
<p>Condition of internal layers of blanks when checked by radiography</p>	<p>Absence of cracks, holes.</p> <p>Inclusions with dimensions more than <math>0.5\text{mm}</math> are not allowed on an area upto <math>35\text{cm}^2</math></p> <p>Over an area above 35 to <math>200\text{cm}^2</math> 3 and 5 pcs in quantity</p> <p>Over an area above <math>200\text{cm}^2</math> 4 and 7 pieces in quantity</p>	<p>2 as per item 1.4</p> <p>2 and 4 pcs of quality respectively.</p>	

1.4 Packing

1.4.1 Blanks made of CFE are packed in wooden boxes (GOST 18573-78) lined with paper which are framed by steel strip GOST 3560-73 or by steel wire GOST 3282-74 packing of blanks of different standard sizes into one box is allowed.

1.4.2 For local consumers it is allowed to pack the blanks <sup>in</sup> polyethelyne (GOST 17811-78), or in paper GOST 2226-75) boxes. It is allowed to pack by some other method as per the agreement of consumer.

1.4.3 Big size blanks can be packed in special wooden boxes, the dimension of which corresponds to dimension of blanks.

1.4.4 <sup>Gross weight</sup> Dimensions of one package of blanks should not exceed 39 kg.

1.4.5 Shipment of blanks in paper laminated bag in railway containers is permitted.

1.5 Marking.

1.5.1 Technological mark is applied on every blank by indian ink or by non washable <sup>paint</sup> part, which indicates grade of polymer. Application of additional marking is allowed.

1.5.2 Marking of shipping container is carried out as per GOST 14192-77 with the following indications:

- a) name or trade mark of plant-manufacturer;
- b) description of products and grade;
- c) batch number;
- d) gross and nett weights;
- e) manufacturing dates;
- f) designation of present technical specifications.

1.5.3 Every batch of blanks made of ~~Resinous~~ is accompanied by document, attesting the quality products or its conformity to the requirements of present technical ~~inspections~~/specifications.

Document is placed in one of the packages. If there are many packages, the package/document should with be marked with words DOCUMENT ENCLOSED".

Document should contain the following:

- or
- a) name of ~~the~~ trade mark of manufacturing plant;
  - b) conventional designation of product;
  - c) batch number;
  - d) number of units of product (packages) in batch;
  - e) nett weight;
  - f) date of manufacture;
  - g) quality parameters of blanks as per the tests, conducted or document which approves the conformity of products to the requirements of these technical specifications.

#### 2. SAFETY REQUIREMENTS:

2.1 At a room temperature blanks made of Teflon are non-explosion hazard, non-combustible, do not show harmful effect on the human body in case of direct contact.

2.2 When the blanks are heated above  $200^{\circ}\text{C}$  there <sup>begins</sup> ~~high~~ thermal oxidizing destruction of Teflon with isolation of perfluoro-isobutylene, hydrogen flouride and carbon monoxide; when permissible concentration of hydrogen flouride, perfluoro-isobutylene exceeds the nor<sup>m</sup>, they irritate mucous membrane and cause inflammable <sup>tion</sup> of respiratory organs; and in high concentrations emphysema.

2.3 Carbon monoxide causes asthma because of the formation of carboxyhaemoglobin; and effects on central nervous system.

Inhalation of highly dispersible particles of the polymer itself and also volatile products giving off from Teflon when heated, causes so called polymer fever, resembling metallic fever (high temperature, shivering irritation irritation of upper respiratory tract, ~~laugh~~ cough and dyspnoea).

2.4 Permissible concentration in the air of working zone of production area:-

Perfluoroisobutylene	- 0.1 mg/m <sup>3</sup>	Danger class
hydrogen fluoride	- 0.05 mg/m <sup>3</sup>	1
teflon	- 10.0 mg/m <sup>3</sup>	3
carbon monoxide	- 20.0 mg/m <sup>3</sup>	4

2.5 Blanks should be manufactured provided with technical devices for checking the atmospheric conditions.

2.6 In the area where operation with blanks are carried out, switching on of opened heating units (hot plates) and units with a temperature of heating surface above 250°C is permitted only in fume hoods and when ventilation is switched on.

Smoking is not allowed in the production areas, as Teflon dust falls on cigarette and burns and toxic gases of high concentration may enter in to the lungs of smokers.

2.7 Heating and curing of blanks should be carried out when local exhaust ventilation and general ventilation by dilution are operated.

2.8 Accumulation of charges of static electricity is possible during the operation with blanks made by Teflon. For reducing the accumulation of charges of static electricity, relative humidity at operating places should be not less than 50%.

Steel  
Still sections should be earthed for protecting from the effect of static electricity.

- 2.9 In case of emergencies (overheating<sup>of</sup> furnances, heating units, fire etc.,) the work should be carried out in gas masks.

### 3. ACCEPTANCE RULES:

- 3.1 Blanks made of Teflon are delivered in batches. Number of blanks of one standard size, simulatenously presented which are made of one grade of polymer, accompanied by one document in quality is considered as a batch.
- 3.2 Checking of shape and dimensions, condition of internal layers while checking in transmitting light and by X-ray control is carried out by taking 10% of blanks at random from a batch, but not less than 10 blanks.
- 3.3 Outward appearance of blanks surfaces are determined on 100% of blanks in batch.
- 3.4 Plates and bars with a thickness of 30mm and less are checked in transmitting light:-  
Bushing with wall thickness of 15mm and less;  
Bushings with internal dia meters above 100mm with a wall thickness of upto 30mm;
- 3.5 Blanks with diennsions above 30 to 80mm are subjected to X-ray control:  
Bars with thickness above 30 to 8 mm  
Rods with diameter above 30 upto 80mm;  
Bushings with wall thickness above 30 upto 65mm;

Blanks which are having dimensions above 80mm, horizontal moulding bars, plates and discs with a ratio of length(diameter) to the thickness more than 4 are not subjected to X-ray control.

Blanks without X-ray control are delivered as per the agreement with consumer.

3.6 Marking and packing are determined by taking at random 2% of blanks from batch.

3.7 While checking in transmitting light and by X-ray control if the parameters of inner layers conditions do not meet the requirements of items 2&3 of table, the checking of these parameters should be carried out by taking 100% of blanks.

#### 4. TEST METHODS:

4.1 Dimensions of blanks are determined by any measuring tool with graduation of 0.1mm.

4.2 Exterior appearance of blank surfaces is determined by visual inspection of every blank externally in reflected light. Dimension of inclusions are determined by any measuring tool with graduation 0.1mm.

4.3 Determination of condition of inner layers of blanks in transmitted light.

4.3.1 Devices, equipment.

Electric lamp with power 60W or electronic flaw detector.

Other power of lamp is allowed, which measures sufficient control.

### T E S T I N G

4.3.2 Blank to be checked by inspection in transmitting light is arranged between light sources and the inspector's eye at a distance to 40-30mm from the light source and 150-250mm from inspector's eye. Dimension of inclusions is determined by any measuring tool with a graduations of 1mm.

Difference in tone of painting is determined visually.

4.4 Determination of the condition of inner layers of blanks is done by radiography method.

4.4.1 Equipment, materials.

Rentgen apparatus with type pyn-200-20-S with pipe 1.5 ENM-200, PYN-200-S-1 with pipe 0.7 ENM-3-200 or PYN-150-10-1 with pipe 0.3 ENB-6-150 with focal length 1700mm, with sensitivity of film of 80 return rentgen.

It is allowed to use rentgen-film of another sensitivity in accordance with the change of radiography conditions.

It is allowed to use X-ray unit of other types. ~~work on other types~~ If there are other types of X-rays units, manufacturers work out their instructions which should include the requirements of the given method, and their technical specifications are agreed with the factory-development <sup>or</sup>.

#### 4.4.2 Preparation for testing.

Registration of intensity of the X-rays which are passing through the material is carried out by photographic method.

For setting operational conditions and sensitivity of method, standard specimen with artificial defects (depressions) of dimensions from 0.2 to 3.0mm, which are given on drawing 1, is used.

Appearance of metallic inclusions are checked on wire standard specimens, which present itself a set of copper wires with a diameter from 0.05mm to 1.00mm which are arranged parallelly on the board. Standard specimens are given on drawing 2.

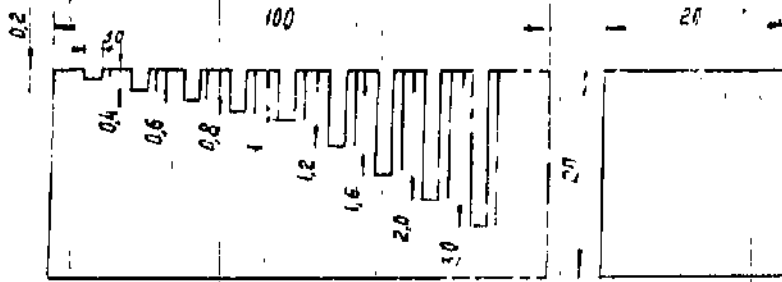
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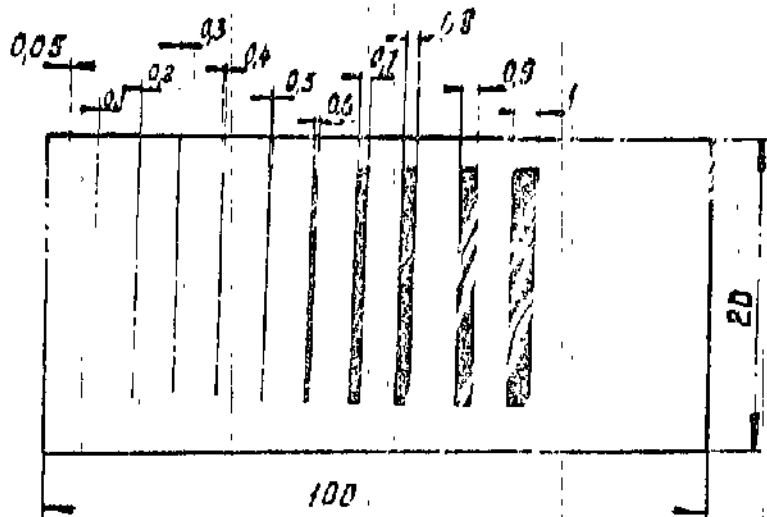
Образец-стандонт с дефектами (1)  
Standard specimen sample with defects



Черт. 1 (2)

Drawing No.1

Образец-стандонт  
STANDARD SPECIMEN

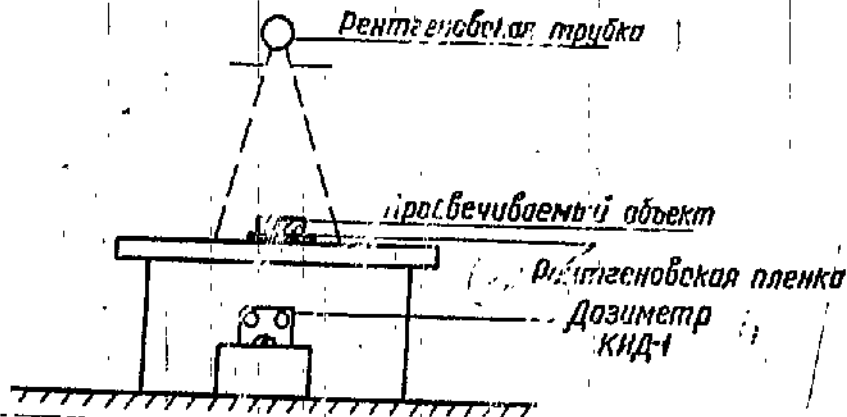


Черт. 2 (1)

DRAWING NO.2

For setting optimum operational condition of X-rays unit (as per degree of darkening of X-rays film) individual dosimeter of type \_\_\_\_\_ and other types of devices which ensure sufficient control are used.

Diagram for use of individual dosimeter is shown on drawing No.3



1. X-ray tube  
2. Object for radiation  
3. X-ray film  
4. Dosimeter

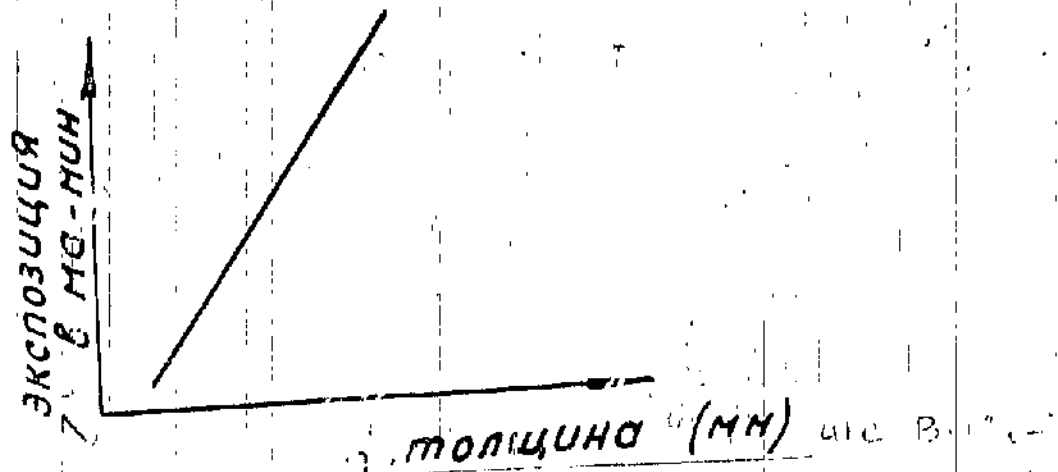
DRG. 3.

Operational condition of X-ray unit is selected in such a way that in case of different thickness of blanks under check. The reading of individual dosimeter should be equal to 1.5 optical units corresponding to the degree of darkening of X-ray film.

Development of film is carried out in accordance with the standard-technical document on film.

Graph is drawn on the basis of obtained data, which shows the exposure as a function of thickness of blank at constant voltage. This is shown in drawing no 4

Graph showing the exposures related to thickness of blank



(2) Thickness (mm)

Drawing.4

While using the film of other sensitivity, new graph is drawn or exposure is calculated as per the following formula:

$$t_2 = t_1 \cdot \frac{\xi_1}{\xi_2}$$

where:

- $t_2$  -time of exposure of new film, in minutes;
- $t_1$  -time of exposure of film, for which graph is drawn in minutes;
- $\xi_1$  -film sensitivity for which graph is drawn;
- $\xi_2$  -sensitivity of new film.

In case of change in the focal length exposure is determined as per the following formula:

$$t_2 = t_1 \cdot \frac{f_2^2}{f_1^2}$$

where

- $t_2$  -time of exposure for focal length  $f_2$ , in minutes;

$t_1$  - time of exposure for focal length,  $f_1$  - in minutes  
 $F_1$  and  $F_2$  - focal lengths, in mm

Putting the above specified standard-specimens on blanks of different thickness and using the selected conditions, it is drawn-up table 3, which gives the dependance of detect<sup>ion</sup> of defects and thickness of blanks.

Table:3

Thickness in mm	Minimum depth of cracks, in mm (detected)	Minimum diameter of wire, in mm (detected)
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Accuracy of operational conditions of X-ray unit is checked periodically by means of exposition of standard sample (without applying or <sup>by</sup> applying on blanks of different thicknesses). Obtained results are compared with the data given in table 3.

#### 4.4.3 Testing

##### 4.4.3.1 Preparation of blanks for testing and marking.

Before tests, blanks are checked by visual inspection for presence of defects (inclusions and cracks). Blanks, having defects, are not allowed for X-ray checking.

Blanks are rubbed by clean rag, which dipped in spirit (GOST 17299-78) and are marked (serial number is applied on every batch). While testing two or more drawing number batches of blanks of one and the same drawing number, there should be used through numbering for marking of blanks. While X-raying the blanks in trays there should be marked <sup>the</sup> first and the last blanks in every tray. Blanks are kept in the trays till the end of sorting.

4.4.3.2 Arrangements of blanks during exposure.

While exposure, blanks should be arranged in such a way that direction of their pressing should be perpendicular to the direction of X-rays cube rays. Maximum permissible thickness of blanks to be exposed should not exceed 80µ. It is recommended to use special trays made of aluminium with a thickness of 1/16" for arrangement of blanks of small dimensions. External dimensions of trays should not exceed the dimensions of X-rays film.

Blanks to be exposed should be located at a certain distance from the edges of film. Blanks of small size during exposure are placed at certain distance from the film edges in trays or directly in envelope in a definite order as per the numbers given in drawing 5.

Arrangement of blanks as per numbers in drawing 5.

1	10	19
2	11	20
3	12	21
4	13	22
5	14	23
6	15	24
7	16	25
8	17	26
9	18	27

Drawing No. 5

Blanks are marked in succession from top to bottom and from left to right. Special numerator with indication of film number is put on the envelope with film before exposure.

Drawing serial numbers of blanks, batch number and film number are registered in special register.

Additional numeration is allowed as per the discretion of blank manufacturer.

#### 4.4.3.3 Exposure.

During operation on X-ray unit, it must be guided by the instructions attached to apparatus.

#### 4.4.3.4 Photo processing.

X-rays film is processed in accordance with the instructions; attached to it. Compositions of developer and fixer should correspond to the formula given on the box with X-ray film.

It is allowed to use other compositions of developers for better detection of defects.

#### 4.4.3.5 Checking and analysis of X-rays photograph. [X-ray photograph is examined in transmitting light with sufficient brightness.]

For scanning X-rays photographs, negatoscopes are used (twice for checking negative films). Registration of defects is done by pencil on the film with evaluation of their dimensions and types of defects.

Results of analysis are entered into protocol with the indications of kind and ~~range~~ number of defects. If necessary repeated X-raying of blanks is allowed.

#### 4.4.3.6 During operation it must be guided by rules as per safety precautions established for operations of X-rays units.

5. TRANSPORTATION AND STORAGE:

5.1 Blanks, which are packed in accordance with item no.1.4 are transported by all means of transport in covered transportation means in accordance with rules, affecting on the given means of transport.

5.2 Blanks, which are packed as per item 1.4 are stored in closed warehouse premises, in the conditions, ensuring their preservation.

6. MANUFACTURER'S GUARANTEE (SUPPLIER)

6.1 Manufacturer's guarantee conformity of all delivering products the requirements of these technical specifications, provided that the consumer follows the conditions of transportation and storage, specified in technical specifications.

Guarantee period of blanks storage is set for 20 years from the date of manufacture.

Date: 14.05.87

NOTIFICATION OF AMENDMENTS TO SPECIFICATIONS

The following Corrections/Amendments are now required to be carried out in the documents as below:

Documents details : TY6-05-810-76

OFPM Regn.No. : I 1452

Details of amendments:-

<u>Sl.No.</u>	<u>Details</u>
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1.	Ref : page No.4 , 1.4.4
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	Delete : '39'kgs
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	Add : '80 kgs' to read as & 'Gross weight of one package of blanks should not exceed 80kgs'
--	---

2.	Ref : page No.6, 2.6 - second para, second line
----	---

	Delete : 'burns'
--	------------------

	Add : 'burns'
--	---------------

3.	Ref : page No.9, 4.4.1
----	------------------------

a)	Delete : Rentgen apparatus tith type
----	--------------------------------------

	Add : X-ray unit
--	------------------

b)	Delete : <del>Re</del> Rentgeen film
----	--------------------------------------

	Add : X-ray film
--	------------------

4.	Ref : page No.10, 4.4.2, para 2nd, last line
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	Delete : 'sused'
--	------------------

	Add : 'used'
--	--------------

'Thro AWM/PDO'

AF/P.D.O

AWM/DS

Copy to/ CI, ICV.