SECRET/CLASSIFIED

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SUPERSEDES..

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ALBUM NO: 3

TY Д005 216-75

TECHNICAL RUBBER ITEMS,

SHEETS AND RUBBERS FOR SPECIAL

VEHICLES ANDOTHEIR ENGINES,

Index: 84/0848711-04-TE-40128 T,Д,

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TRANSLATED	SAVITHA		20-11-84	Ordnance Factory Project Hyderabad.
AUTHENTICATED	A.LEBEDEV			
TYPED	P.GIRI KUMAR		4/3/85	
EDITED	S. ... / S. SUMAN		21.3.85 / 20.3.85	APPROVED
	NAME	SIGN	DATE	

TECHNICAL SPECIFICATIONS

TECHNICAL RUBBER ITEMS, SHEETS AND RUBBERS FOR SPECIAL VEHICLES AND THEIR ENGINES.

TY 005.216-75 Superseeded

Ty 38.105.1264-72, Ty38.105D003.73

TECHNICAL SPECIFICATIONS:

Technical rubber items, sheets and rubbers for special vehicles and their engineos.

Ty 005.216-75 superseeded
Ty 38.105-1264-72, Ty 38 105 003-73.
Valid from 1.01.76
Standing validity

Present technical specifications refer to technical rubber items (here in after referred to as rubber items) (Rubber, reinforced Rubber, rubber-fabrics, foams) used for manufacturing special vehiclesand their engines as well as to sheets which are manufactured from rubbers, specified in present technical specifications.

I. TECHNICAL REQUIREMENTS.

1.1 Rubber items and sheets should correspond to the requirements of present technical specifications, drawings of a customer, agreed on with the manufacturer and should be manufactured as per approved process documents.

1.2 The following should be specified in the drawings of rubber items.

Grade of material, from which rubber items should be manufactured;

Number of present technical specifications.

Surfaces, upon which higher requirements are placed (Surface P)

Places and content of marking (when it is necessary);

Apparent density for the rubber items made of foam rubber (when it is necessary) List of test of rubber items (when it is necessary).

1.3 Reinforcement for rubber-metal items should correspond to the drawings and technical requirements (appendix.XI)

1.4 Tolerances for the dimensions of rubber items should correspond to tables 1 to 5.

NOTE: For, earlier manufactured series vehicles and their spare parts, it is allowed to preserve tolerances agreed earlier upon agreement of the parties concerned.

1.4.1 Tolerances for the dimensions of sealing ring are specified in table No.1

Table.1

Diameter		Section (diameter, width, height)		
Nominal	Limit deviation	Nominal	Accuracy class and limit deviation I	II
Upto 5	±0.1	Upto 2.5	±0.1	+0.2 -0.1
Above 5-10	±0.2	Above 2.5-5	+0.2 -0.1	+0.3 -0.1
" 10-20	±0.3	" 5upto 10	±0.2	+0.3 -0.2
" 20-40	±0.4	" 10 " 20	±0.4	+0.6 -0.4
" 40-60	±0.6	" 20 " 50	±0.6	+1.0 -0.6
" 60 -100	±0.8	" 50	±1.2%	±1.5%
" 100-140	±1.0			
" 140-180	±1.2			
" 180-210	±1.5			

Contd...

1	2	3	4	5
Upto 210-250	±2.0			
Above 250	±1.0%			

NOTE: Upon agreement of the parties concerned, it is permitted to revise the plus and minus tolerances provided the tolerance zone and the deformation characteristics of rubber items specified by these technical specifications are preserved. It is recommended to manufacture the sealing rings for movable joints as per accuracy class 1.

1.4.2 Tolerances for the dimension of rubber cups and shaft collars are specified in table 2.

Table 2.

Diameter		Section (Width, Height)	
Nominal	Limit deviation	Nominal	Limit deviation
Upto 15	±0.2	Upto 5	±0.2
Above 15 " 25	±0.3	Above 5 " 10	±0.3
" 25 " 50	±0.4	" 10 " 20	±0.5
" 50 " 100	±0.6	" 20 " 50	±1.0
" 100 " 150	±0.8	" 50	±2.0%
" 150 " 220	±1.00		
" 220 " 300	±1.2		
" 300	±0.6%		

NOTE: Upon agreement of the parties concerned, it is permitted to revise the plus tolerances provided the tolerance zone and deformation characteristics of rubber items specified in present technical specification, are preserved.

1.4.3 Tolerances for dimensions of rubber-metal cup should correspond to GOST 8752-70.

1.4.4 Tolerances for dimensions of rubber-fabric sealings are specified in table 3.

Table.3

MM

Diameter		Section			
		Width		Height	
Nominal	Limit deviation	Nominal	Limit deviation	Nominal	Limit deviation
Upto 30	±0.5	Upto 6	±0.25	Upto 6	±0.5
Above 30 " 60	±0.6	Above 6 " 15	+0.4 -0.3	Above 6 " 10	+0.8 -0.5
" 60 " 220	±0.8	" 15 " 20	+0.7 -0.5	" 10 " 15	+1.5 -0.5
" 220 " 700	±1.0	" 20 " 30	+1.0 -0.7	" 15 " 30	+2.0 -0.5
" 700 " 1500	±1.5	" 30	+5.0% -3.0%	" 30	+7.0% -3.0%
" 1500	±2.0				

1.4.5 Tolerances for dimensions of protective covers are specified in table 4.

Table.4

Overall dimensions				Thickness of wall	
Diameter		Height			
Nominal	Limit deviation	Nominal	L.Deviation	Nominal	Limit deviation
Upto 10	±0.3	Upto 10	±0.3	Upto 2.5	±0.2
above 10 " 25	±0.5	above 10 " 25	±0.5	above 2.5 " 5.0	±0.3
" 25 " 50	±0.8	" 25 " 50	±0.8	" 5.0	±0.5
" 50 " 100	±1.0	" 50 " 100	±1.0		
" 100 " 150	±1.5	" 100	±1.0%		
" 150 " 200	±2.0				
" 200 " 250	±2.5				
" 250	±1.2%				

1.4.6 Tolerances for dimensions of gaskets and plugs are given in table 5.

Table 5

MM

Overall dimensions (length, width)		Section (Width, Height)	
Nominal	Limit deviation	Nominal	Limit deviation
Upto 5	±0.2	Upto 2.5	±0.2
Above 5 " 10	±0.3	Above 2.5 " 5.0	±0.3
" 10 " 25	±0.5	" 5.0 " 10.0	±0.5
" 25 " 50	±0.8	" 10.0 " 25	±0.7
" 50 " 100	±1.0	" 25 " 50	±1.0
" 100 " 150	±1.5	" 50 " 100	±1.5
" 150 " 200	±2.0	" 100 " 150	±2.0
" 200 " 250	±2.5	" 150	±1.5%
" 250	±1.2%		

1.4.7 Tolerances for dimensions of membranes and diaphragms are specified in table 6.

Table .6

MM

Overall dimensions				Thickness	
Diameter		Height		Nominal	Limit deviation
Nominal	Limit deviation	Nominal	Limit deviation		
Upto10	±0.2	Upto10	±0.3	Upto2.5	±0.2
Above 10 " 25	±0.3	Above10 " 25	±0.5	Above.25"5,0	±0.3
" 25 " 50	±0.5	" 25 " 50	±0.7	" 5.0	±0.5
" 50 "100	±1.0	" 50 " 100	±1.0		
" 100 "150	±1.5	" 100	±1.0%		
" 150 "200	±2.0				
" 200 "250	±2.5				
" 250	±1.2%				

1.4.8 Tolerances for dimensions of rubber - metal and rubber shock-absorbers, are fixed as per the agreement of the parties concerned and are specified in drawings.

1.4.9 Tolerances for dimensions of vibration-resistant supports are specified in table 7.

Table 7.

Overall dimensions		Section (Height, thickness)	
Nominal	Limit deviation	Nominal	Limit deviation
Upto 5	±0.3	Above 2.5 Upto 4	±0.4
Above 5 " 10	±0.5	" 4.0 " 6	±0.5
" 10 " 20	±0.6	" 6 " 10	±0.6
" 20 " 40	±0.8	" 10 " 30	±0.8
" 40 " 60	±1.0	" 20 " 40	±1.3
" 60 " 100	±1.3	" 40 " 60	±1.5
" 100 " 150	±1.5	" 60 " 100	±2.0
" 150 " 250	±2.0	" 100 " 150	±2.5
" 250	±1.5%	" 150	±2.0%

NOTE FOR TABLES 3,4,5,6,7

Upon agreement of the parties concerned, it is permitted to revise plus and minus tolerances provided tolerances zone and deformation of characteristics of rubber items, specified in present technical specifications are preserved.

1.4.10 Tolerances for thickness of sheets without fabric linings and for items made from them are specified in table 8.

Table.8

Thickness of sheets and rubber items		Overall dimensions of rubber items (Diameter, Length, Width)	
Nominal	Limit deviation	Nominal	Limit deviation
2.0	±0.3	Upto 10	±0.5
3.4	±0.4	Above 10 " 25	±0.8
5.0	±0.5	" 25 " 50	±1.0
6.0	±0.6	" 50 " 100	±1.5
8.0	±0.8	" 100 " 150	±2.0
10.0	±1.0	" 150 " 200	±3.0
12.0	±1.1	" 250	±1.2%
14.0	±1.2		
16.0	±1.3		
18.0	±1.4		
20.0	±1.5		
25.0	±1.8		
30.0	±2.0		
35.0	±2.2		
40.0;45.0	±2.5		
60.0;55.0;60.0;	±3.0		

NOTE: While blanking rubber items from sheets, taper and drawing of the edges are allowed within the tolerance for dimensions.

1.4.10.1 The sheets are manufactured with a width of 250 to 800mm, with a length from 250 to 1000mm. Tolerance of width and length for all dimensions is ±15mm.

1.4.10.2 Thickness differences of each sheet should not exceed half of the tolerance zone, thickness differences of sheets made from raw rubber should not exceed the tolerances of zone.

1.4.11 Tolerances for thickness of sheets with fabric lining and items made from them are specified in table 9.

Table.9

Thickness of a sheet and a rubber item ~~(thickness, length, width)~~		Overall Dimensions of a rubber item (diameter, length, width)	
Nominal	Limit deviations	Nominal	Limit deviations
Upto 3	±0.4	Upto 10	±0.8
Above 3 " 5	±0.6	Above 10 " 25	±1.0
" 5 " 10	±1.0	" 25 " 50	±1.5
" 10 " 15	±1.2	" 50 " 100	±2.0
" 15 " 20	±1.5	" 100 " 150	±3.0
" 20 " 30	±2.0	" 150 " 250	±3.5
" 30	±3.0	" 250	±1.5%

NOTE: While blanking rubber items from sheets, taper and drawing of the edges are permitted within the tolerances for dimensions.

1.4.11.1 Sheets are manufactured with a width of 25 to 800mm with a length of 250 to 1000mm. Tolerance for width and length for all dimensions is ±15mm.

1.4.11.2 The difference in thickness of sheets should not exceed half of the tolerance zone.

1.4.12 Tolerances for dimensions of foam sheets, items made from them and foam rubber items are specified in table 10.

Table.10

Foam sheets and items made from them				Foam parts	
Thickness of a sheet and rubber item		Overall dimensions (Diameter, length, width)			
Nominal	Limit deviation	Nominal	Limit deviation	Nominal	Limit deviation
3	+1.0 −0.5	Above 3 upto 50	±1.0	Upto 3	±0.5
		" 50 " 100	±2.0	Above 3" 20	±1.0
4-7	±1.0	" 100 " 200	±3.0	" 20 " 100	±2.0
8,10,12,14	+1.5 −1.0	" 200 " 400	±5.0	" 100 " 500	±3.0
16,18,20,22 25,28,30	±1.5	" 400 " 700	±10.0	" 500	±5.0
32,35,38,45, 50	±2.0	" 700 " 1000	±15.0		
55,60,65,70 75	±2.5	" 1000	±25.0		

NOTE: 1. While blanking rubber items from sheets, taper and drawing of the edges are allowed within the tolerances for dimensions.

2. Measuring of thickness of sheets is carried at a distance of not less than 20mm from the edge of the sheet.

1.4.12.1 Sheets with a thickness of 3 to 10mm are manufactured in unglued state and those with thickness of more than 10mm are manufactured both in glued-together state (from several cured sheets) and in unglued state.

1.4.12.2 Length and width of sheet of all thickness may be from 200 to 500mm. Manufacturing of sheets of larger dimensions is allowed.

1.4.12.3 The difference in sheets thickness should not exceed the tolerance zone.

1.4.13 Tolerances for dimension of bushes, inserts for resistance components of couplings and valves are set as per agreement of parties concerned.

1.4.14 Tolerances for dimensions of round, rectangular and square sections, cords, and shaped section cords are given in table 11.

Table.11

Nominal dimensions		Limit deviations
	Upto 2	±0.3
Above 2	" 4	±0.4
" 4	" 6	±0.6
" 6	" 10	±0.8
" 10	" 20	±1.2
" 20	" 30	±2.0
" 30		±2.5

1.4.15.2 Tolerances for dimensions of section of a window tape are given in table 12.

Table.12

MM

Thickness of wall		Width, Height	
Normal	Limit deviation	Nominal	Limit deviation
From Upto 1.5	+0.5 -0.3	From 3 Upto 5	±0.6
" 1.5 " 2.0	±0.5	" 5 " 8	±1.0
" 2.0 " 2.5	±0.8	" 8 " 12	±1.5
" 2.5	±0.9	" 12	±2.0

1.4.16 Tolerances for dimensions of sections of foam strips are given in table .13

Table.13

Nominal dimensions	Limit deviations.
From 2.5 Upto 5	±0.5
" 5 " 10	+1.0 -0.5
" 10 " 20	+1.5 -1.0
" 20 " 30	±2.0
" 30	±10%

1.4.17 Tolerances for dimension of tubes of varios sections and items made from them are given in table.14

Table.14

Inner diameter		Thickness of wall		Pitch for cutting (Height of items)	
Nominal	Limit deviation	Nominal	Limit deviation	Nominal	Limit deviation
From 2to3	$\pm$0.3	From 1.25 to 2.0	From 1.25 to 3$\pm$0.3	Upto 5	$\pm$0.6
" 3 " 6	$\pm$0.5	"1.25 " 3.0 From 1.25 to 3.0	Above 3to 4$\pm$0.4	Above 5 to 20	$\pm$0.8
" 6 " 10	$\pm$0.8	" [illegible].0 "6.0	"4.0to 5.0$\pm$0.5	"20"50	$\pm$1.0
" 10 " 16	$\pm$1.0	"2.0"8.0	"4.0to 5.0$\pm$0.5	"50	$\pm$1.5
" 16 " 24	$\pm$1.5	"3.0"8.0.	"5.0 to		
" 24 " 40	$\pm$1.8	"3.0"8.0	8.0$\pm$0.6		
" 40	$\pm$10%				

NOTE: Tubes with internal diameter above 6 to 10mm and thickness of wall upto 1.9mm; tubes with diameter above 10 up to 16mm and thickness of wall upto 2.9mm; tubes with diameter above 16 upto 40mm and thickness of wall upto 3.9mm, tubes with diameter above 40mm and thickness of wall upto 4.9mm cannot be used for dust and splash protection.

1.4.18 Tolerances for dimension of rolled sheets and items made from rolled sheets are given in table No.15.

Table.15

MM

Nominal thickness			Limit deviation	Quantity of fabric linings, pieces 1 maximum
	Upto	1.5	±0.3	-
Above	1.5 "	2.0	±0.4	-
"	2.0"	3.0	±0.5	1
"	3.0"	6.0	±0.8	2
"	6.0"	8.0	±1.0	3
"	8.0"	10.0	±1.3	4
"	10.0"	15.0	±1.5	4
"	15.0"	20.0	±2.0	4
"	20.0		±3.0	4

NOTE: While blanking rubber items from sheets, taper and drawing of the edges within tolerances for the dimensions are allowed.

1.4.18.1 Sheets are manufactured with a width of 500 to 960mm the tolerances being ±50mm and with a length of 500 to 2500mm the tolerances being ±300mm the nominal dimensions are agreed upon while placing the order.

NOTE: Sheets with a thickness of upto 1.5 mm may be manufactured with a length of upto 12000 Mm.

1.4.18.2 The difference in thickness of sheets should not exceed half of the tolerance zone.

1.4.19 Tolerances for dimensions of rubber items manufactureed from rubber on the basis of raw fluorine rubber are set as per the agreement of the parties and should be specified in drawings.

1.5 Depending on service conditions and purpose of rubber items and sheets they should be manufactured from the rubber grades specified in tables 16,17.

1.6 Physical and mechanical properties of standard rubber samples should correspond to specifications of tables 16,17 and should be guaranteed by the manufacturer.

1.7 The rubber items and sheets for out fitting special vehicles supplied to tropical climatic countries should be manufactured according to the requirements of GOST 15152-69.

1.8 Physical and mechanical properties of rubber(Hardness, cohesion with metal etc,.) determined in case of necessity directly on the rubber items are specified in drawings along with the value of a parameter to be determined.

1.9 Quality check of rubber items as per outward appearance should be carried out in accordance with tables 18,19. To ascertain the defects, the manufacturer, the consumer and the customer's representative may agree upon the standards of outward appearance. Roughness of moulding surface of newly moulds manufactured, which determines surface finish of rubber items should not exceed R_a 0.32 µm as per GOST 2789-73.

Further on quality of a moulding surface should be provided by compliance of rubber items with requirements of tables 18,19 of present technical specifications.

1.10 Marking

1.10.1 Depending on the method of manufacturing, dimensions and purpose, marking of rubber items is carried in the following manner:

1.10.2 By imprinting an engraving of a mould-

Number of a rubber item name of the manufacturer or of a trade mark.

NOTE: Use of colour marking for designation of the quarter and the year of manufacturing of rubber items is allowed as per agreement of the parties concerned.

1.10.3 For rubber items on the surfaces of which it is not possible to make engraving and also for foam and extruded rubber items the number (designation) of the rubber items and of the manufacturer are shown on a label.

1.10.4 Rubber items supplied for exporting to tropical climate countries, should be marked in accordance with GOST 15152-69.

1.10.5 Sheets are marked with water proof paint to indicate the manufacturer or a trade mark. Number of present technical specifications, rubber grades, thickness of a sheet in MM, date of manufacturing (year, quarter) TID serviceability stamp.

NOTE: For foam sheets, marking of moulded sheets is allowed by engraving imprints to specify description or the trade mark of the manufacturer conventional designation date of manufacturing (yearly, quartely) with the TID stamp. It is allowed to mark the sheets with the aid of paper, card board, metal, ply wood on plastic labels.

1.11 Packing

1.11.1 The rubber items should be supplied in packages protecting them from damages, contamination deformation and lost during transportation. Type of containers is to be agreed while placing the order.

1.11.2 Rubber items of the same size and nomenclature should be packed in one container.

Mass of one package should not exceed 50kg.

In case of small sized rubber items and small account of deliveries, it is allowed to pack rubber items of several nomenclatures ~~[illegible]~~ in one container. In this case items of one particular nomenclature should have its own packing.

1.11.3 Rubber items supplied as per the direct export in tropical climate countries, should be packed in accordance with GOST-15152-69.

1.11.4 Moulded sheets are to be packed in plywood or wooden boxes (as per GOST 18573-73, GOST 16501-70 GOST 16536-71, GOST 2991-69 GOST 15841-70). It is allowed to pack, sheets by sewing them up in thick fabric. Mass of one package should not exceed 50kg.

1.11.5 Rolled sheets are made into rolls and are tied in two or three places. Mass of one package should not exceed 50kg.

1.11.6 Each package of rubber items and sheets should have a label with ~~[illegible]~~ the following indications.

Name ~~[illegible]~~ of the manufacturer or its trade mark;
Number of rubber items or designation of sheets;
Number of present technical specifications;
~~[illegible] of [illegible]~~;

Grade of rubber;
Number of batch;
Number of certificate;
Mass or quantity
Date of manufacturing
TID stamp to certify serviceability
Stamp of a customer's representative
(In case it is accepted by a customer's representative)

1.11.7 Each batch of rubber items and sheets is accompanied by a certificate. The form of a certificate is adopted by the manufacturer and should contain:

Description of the manufacturer
Grade of rubber
Number of batch
Net mass
Date of manufacturing
Confirmation of compliance with technical specification
TID stamp to certify serviceability.
Stamp of a customer's representative (In case it is accepted by a customer' representative)
Actual physical and mechanical properties of rubber.

TID and customer's representative stamps should be stamped on the certificate (when it is accepted by a customer's representative). The certificate, protected from damages during transportation, is put inside the packages.

NOTE: While packing sheets, it is allowed to specify in the label, the general mass of the batch, without specify -ing the mass of each seperate package, as per the agreement with a customer's representative.

1.11.8 While despatching the rubber items and sheets, batches consisting of several boxes (packages), the following should be indicated on the label: $\frac{\text{Number of packages}}{\text{Package number}}$

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"Certificate here" is indicated on the lable of the package, where the certificate is kept.

In case of necessity it is allowed to send certificate with accompanying documents or by post.

2. ACCEPTANCE RULES.

2.1 Checking for the quality of rubber items, rubber sheets and rubber mixes as well as for their confirmity with present technical specifications is carried by TID of the manufacturer.

2.2 Rubber items and rubber sheets are submitted to acceptance by batches, with each particular nomenclature being checked separetely.

2.3 The volume of a batch of rubber items depends upon the type of rubber items and should not exceed 5000 pieces. (A batch of rubber items is defined as those items which are manufactured from the same grade of rubber & are of the same nomenclature and size, and which are registered by one certificate.)

2.4 A batch of sheets and non-moulded items, is defined as those items, which are manufactured from the same rubber grade or which are of the same nomenclature and size, which have mass not exceeding 1000kg and which are registered by one certificate.

A batch of rubber sheets is defined as those items, which are manufactured from one and the same rubber grade. The mass of the batch should not exceed 1000kg. The batch should consist of sheets of the same thickness or of different thickness and it should be registered by a certificate with specification of weight of sheets of each thickness.

2.5 For testing the quality of rubber items, rubber sheets and rubber mixes are subjected to type, periodical and acceptance tests.

2.5.1 Type tests should be carried out ~~____~~ before full scale production starts as well as in case of design, materials and production process changes which affect the quality of rubber items and rubber sheets as per all characteristics of table 20. During acceptance of moulds type tests are to be carried out as per points 1,2,6 of table 20.

2.5.2 Periodical tests are carried out atleast once a month for checking stability of production.

2.5.3 Acceptance tests are carried out for each batch of rubber items and rubber sheets.

2.6 Characterstics, checked during the tests, are specified in table .20.

Characteristics	Methods and means of check	Number specimens to be checked	Kinds of tests: Type test	Periodical Test	Acceptance Test
1. Outward appearance of rubber items and sheets	Visual inspection or comparision with standards	Complete control	x	-	x
2. Dimensions of rubber items and sheets	Vernier callipers thickness guage, template guage mandrel and other measuring instruments.				
a) Dimensions to be checked	-	5% but not less than 3 pieces	x	-	x
b) Dimensions specified in the drawings for complete ~~control~~	-	Complete control	x	-	x

1	2	3	4	5	6
c)Other dimensions	-	Minimum 3 pieces	x	-	x
3.Physical and mechanical characteristics of rubber mixes	As per tables, 16,17				
a)For rubber metal bushings and cups		Minimum 3 fillings	x	x	x Each filling is to be tested for ultimate ~~[illegible]~~ strength relative residual elongation hardness and change of mass in different media for rubber adhesion with metal. Change of mass in media may be guarant -eed by the manufactur -er as per the agree ment with a customer's representa tive.
b)For other items made from monolith rubber	-	Minimum on three fillings	x	x	-
c)For foam rubber items and foam sheets		-d0-	x	x	-

4)

1	2	3	4	5	8
4.Change of mass of rubber items in media (when specified in drawings)	GCST9030-74	0.3% of the batches but minimum 3 pieces	x	-	x
5.Change of mass of sheets, cords, and tubes in media	"	On single sample of each thickness but minimum on 3 samples from each batch. Tests are tobe carried on samples with a thickness not exceeding 3mm, with a mass of 1.0 to 2.0gm	x	-	x
6.Run-out of external diameter of cups	Methods appendix 7	0.5% of a batch, but minimum 10 pieces	x	-	x

NOTES: Sign "x" indicates that the test should be carried out singn "-" indicates that the test should not be carried out.

2- As per point 4 when mass of a rubber item is less than 1gm, the whole quantity of rubber items with overall weight of not less than 1gm is taken as a sample.

One rubber item or one specimen cut out from a rubber item is taken as a specimen when mass of rubber items is of 1 to 150 g.

When meas of rubber items is more than 150 g three s pecimens are to be cut out from each rubber item selected for swelling.

It is allowed to specify the number of rubber items to be tested while specifying drawing.

3. As per point 5. Tests are to be carried out on three specimens cut out according to one specimen from three sheets or three cords or three tubes.

4. As a swelling index an arithmetic mean of characteristics of all specimens is taken. In this case if even only one specimen does not correspond to a set standard then no averaging of characteristics is done and retesting should be carried out. Averaging of characterstics during testing is to be done in the same way.

5. As per agreement with a customer's representative batches of rubber sheets with mass of 60 kgs and less may not be subjected to checking as perpoint 5(change of mass in media) since these batches may be guaranteed as per this characteristic by the manufacturer.

2.7 Hardness check of rubber parts of vibro-resistant supports is to be carried out on 10% of rubber items from one batch.

2.8 Apparent density of foam rubber items, specified in drawings is to be determined not less than on three parts from each batch.

2.9 If the results of the tests are unsatisfactory even for one characteristic, retesting is to be carried out on double number of rubber items as per the deviated characteristic.

If results of re testing are unsatisfactory even for one rubber item all the batch is finally rejected.

It is allowed to conduct complete control test for rubber items as per the characteristics, determination of which does not destroy rubber items (dimensions, hardness).

2.10 A batch of rubber items accepted by a manufacturer TID is submitted along with a notification by a TID to representative to a customer's representatice (in case of acceptance by a customer's representative).

Nomenclature and number of accepted rubber items determined by a customer's representative.

2.11 If results of tests are unsatisfactory even for one characteristic a customer's representative may send back the batch for quality rechecking. The returned batch of rubber items may be submitted by the manufacturer to a customer's representative along with a notification about repeated submitting.

2.12 If results of rechecking are unsatisfactory even for one characteristic, all the batch of rubber items is finally rejected.

2.13 Full analysis of physical and mechanical characteristics of rubber mixes is to be carried out at least on three fillings once a month in order to check the production process.

2.14 If results of checks are not satisfactory for any of the characterstics, then repeated checks are to be carried out on double number of samples of rubber mixes as per the deviated characteristicn.

NOTE: Before repreated test it is allowed to stir up all the filling charges of rubber mixes.

2.15 Even if a single result of the repeated test is unsatisfactory then the filling of rubber mixer is to be rejected.

2.16 Further on a full analysis of each filling of rubber mixes is to be ca rried out till the stable results are obtained on not less than five fillings.

3. TESTING METHODS.

3.1 Physical and mechanical characteristics of rubber should correspond to the standards specified in tables 16,17.

3.2 Type of tests and control methods of rubbers which are to be checked during the test, are specified in table. 21.

Table.21

Type of test	Method and means of check	Remark
1.Outward appearance	Visually	
2.Presence of inclusions	Visual inspection of a surface and a section of rubber items	
3.Breaking strength	GOST 270-64,GOST270-75 from 1.01.78	Specimens type A with a thickness of 2±0.3 mm.
4.Relative elongation during breakage	"	
5.Relative residual elongation after breakage	"	

1	2	3
6.Hardness	GOST 253-53,GOST263-75, GOST 13331-67	
7.Frost resistance coefficient as per elastic restitution after compression.	GOST 13808-68	
8.Brittleness while temperature freezing	GOST 7912-74	Specimens should not have cracks or other destructions visible with nacked eye.
9.Heat-ageing coefficient in air	GOST 9.024-74	
10.Change in mass during effect of standard liquid СИСР-2	GOST 9.030-74	
11.Relative residual deformation during static compression after ageing	GOST 9.029-74 Method Б	
12.Adhesive strength of rubber with metal	GOST 209-62	
13.Adhesive strength of rubber with fabric	GOST 6768-75	
14.Density (theoretical specific weight)	GOST 267-73	
15.Apparent density of foam rubbers	MEthods MC-51-9-90-72	Appendix 2
16.Rigidity of foam rubbers	Methods MC 51-9-109-72	Appendix 3.

Contd...

1	2	3
17. Compressive residual deformation of foam rubbers	Method MC-51-9-110-72	Appendix 4
18. Frost resistance of foam rubbers	Method MC-405-102-72	Appendix 5.

3.3 Rubber items tests.

3.3.1 Tests of rubber items are to be carried out on stands, in simulators or directly in units as per the methods agreed in set order.

3.3.2 Test for the runout of armoured cups is to be carried as per methods of GOST 8752-70 (Appendix 5).

4. TRANSPORTATION AND STORAGE.

4.1 Transportation of rubber items and rubber sheets to be carried out by any means of transport and in any meteorological conditions.

In case of transportation of rubber items and rubber aheets in conditions of sub zero temperature, they are not to be exposed to mechanical effects and before being used in production they should be kept at a temperature of 20 ± 5^{0} for 24 hours.

4.3 Rubber items, sheets and mixes should be stored in dark, store-rooms, protected from the effect of direct sun-rays, at a minimum distance of 1m from heating devices. Heating devices should be sheilded to avoid the effect of heat rays.

4.4 It is not allowed to store rubber items sheets and mixes in the same store-room together with organic solvents, oil products, lubricants, acids, alkalies, oxidizers and other corrosive products destroying rubbery.

4.5 Rubber items and rubber sheets in free state as well as assembled may be stored in a non-heated store room within an ambient temperature range of minus 50 to plus 50°c.

4.6 Rubber items and rubber sheets in free state as well as assemble in units may be stored in heated store rooms at a temperature of not higher than 25°c. It is allowed to store rubber items at a temperature of 26 to 35°c for not more than 80 days totally. Out of these 80 days it is allowed to store rubber items at atemperature of 36-40°c for not more than 15 days totally.

4.7 Rubber-metal items should be stored at air humidity ofnot be morethan 70%.

5. DIRECTIONS FOR INSTALLATION AND USAGE OF RUBBER ITEMS.

5.1 Units design roughness of mating metal surfaces, the right way of installation and usage of rubber items should correspond to effective technical documents standards and should be guaranteed by a consumer of rubber items.

5.1.1 The followings roughness of surfaces which form a mounting seat for rubber items is recommended.

For fixed sealings-from 2.5 upto 0.63

For movable sealings-from 0.63 to upto 0.08

5.2 Rubber items should be cleaned from possible fouling, dust etc., before installation.

5.3 Installation of a rubber item in a mounting seat is to be carried out without cocking and mechanical damages.

5.4 Scratches, dents, notches and other mechanical damages as well as sharp edges are not allowed on units and assemblies surfaces of metal parts which mate with rubber items. Edges of rods, cylinders, bodies should have curved chamfers which facilitate assembly of rubber items (drawing 1)

5.5 If during installation in seats, rubber items pass through grooves, slots, threads, then it is advisable to use mandrels (drg.2) . It is necessary to avoid rings twisting while installing.

5.6 If during installation rubber items are carried along holes, in order to avoid cuttings it is recommended to make circular grooves (drg.3) or to remove sharp edges.

5.7 To preserve rubber items safe during installation it is necessary to lubricate friction surfaces along with rubber items themselves with lubricants or working media.

5.8 It is recommended to instal rubber items (sealing rings) in a horizontal position. In case of verticl installation rubber items should be put with interference along internal or external diameters.

5.9 In order to disassemble or rubber item and to replace it with a new one, the mating part should have surface roughness and dimensions in accordance with the requirements of a drawing or a standard.

5.10 Reinstallation of disassembled rubber items is allowed provided their safeness is preserved with due regard for specific requirements to types of rubber items.

5.11 Recommendations for installation of rubber items refer to new vehicles as well as to repair works.

5.12 After having been stored at sub zero temperatures, rubber items before installation should be kept at a temperature of 20±5°c at least for 24 hours.

5.13 Requirements for installation of sealing rings.

5.13.1 Before assemblying it is necessary to grease parts, along which the rings are to pass with a thin layer of lubricant oil or working medium.

5.13.2 During installation of rings, operating in plane flange joints, these rings are not recommended to be moistened in working medium and greased with lubricant.

5.13.3 Compression ration along the section of assembled rings should be ensured by a design of sealing units or by conditions of installation and should make up for 12 to 25% movable joints, 15 to 40% for fixed edge joints 15 to 28% for radial fixed joints.

NOTE: Compression ratio is to be determined as per the following formula:-

$$\varepsilon = \frac{d_2 - h}{d_2} \cdot 100,$$

Where,

ε = Compression ratio %

d_2 = Diameter of section of around ring or height of rectangular ring MM.

h = Depth of a groove of a mounting seat in an assembled unit, MM.

5.13.4 Extension ratio of rings as per inner diameter should be within the limits of 0.3 to 12%, percent of reduction as per external diameter for butt ends sealings should not exceed 3% (gap is allowed)

NOTE: Extension ratio is to be determined as per the following formula:

$$H_1 = \frac{d_3 - d_1}{d_1} \cdot 100$$

Where,

H_1 = Extension ratio %

d_3 = Inner diameter of a mounting seat MM (drawing 1)

d_1 = Inner diameter of a ring, MM.

2. Percent of reduction is to be determined as per the following formula:

$$H_2 = \frac{(d_1 + 2d_2) - D_1}{d_1 + 2d_2} \cdot 100,$$

Where

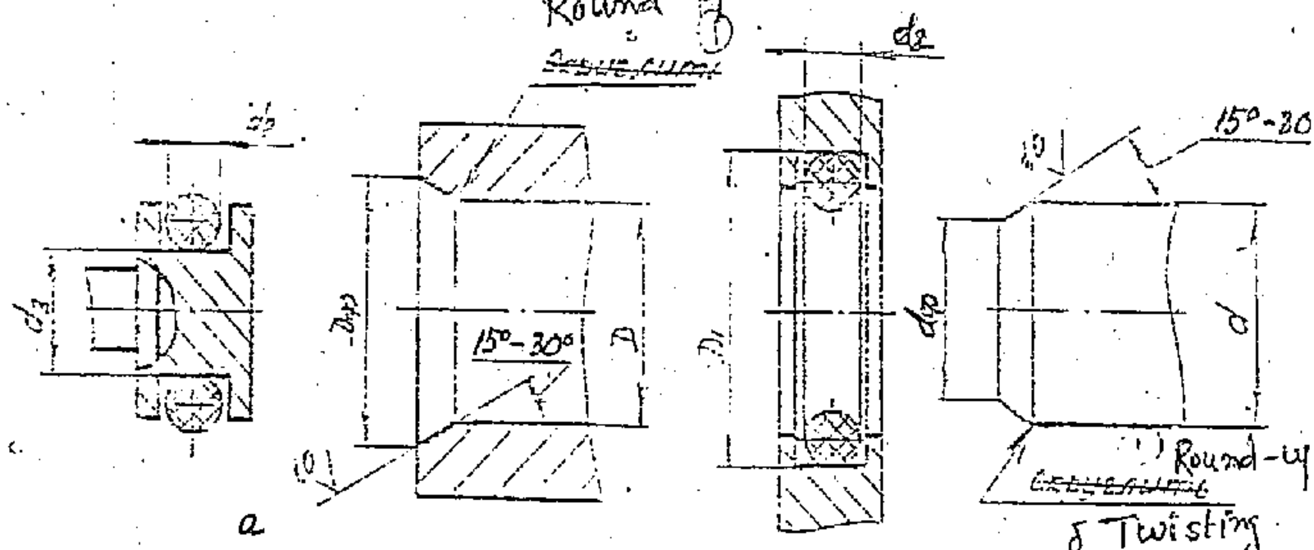
H_2 = Percent of reduction

D_1 = External diameter of a mounting seat, MM (dgr. 1)

d_1 = Inner diameter of a ring, MM.

d_2 = Diameter of a section of a ring, MM.

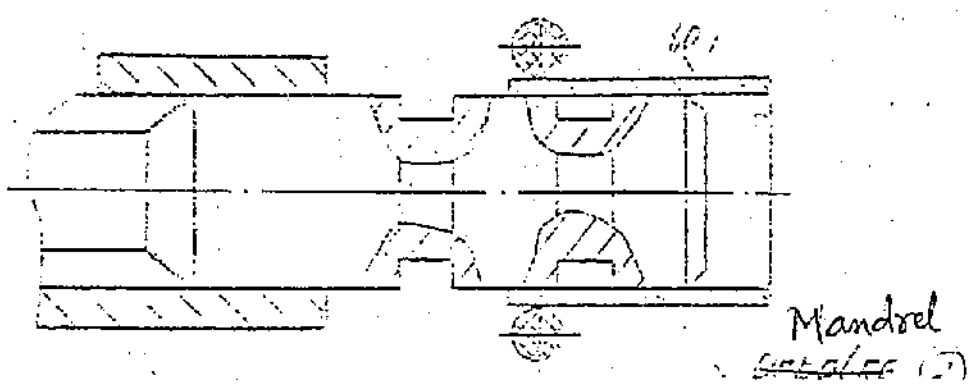
TF 005 216-75



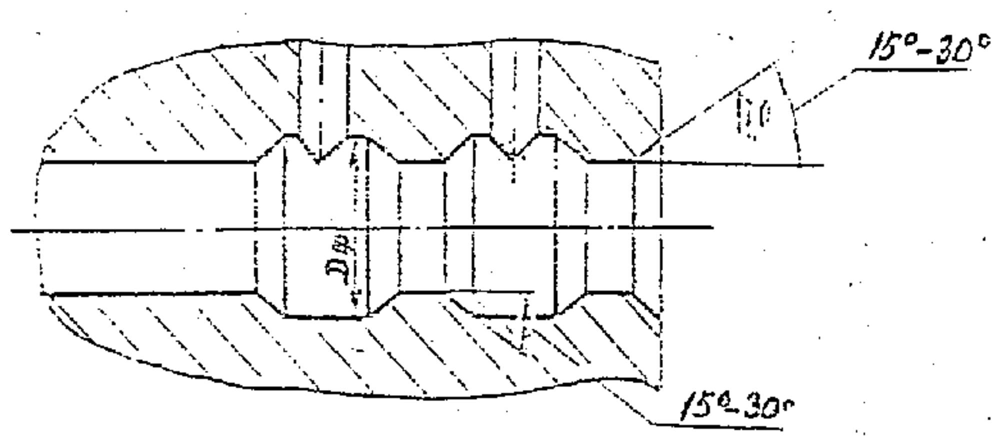
$D_{\varphi} = d_3 + 2d_2 + 1$

$d_{\varphi} = D_1 - 2d_2 - 1$

~~Фиг. 1~~ Figure 1.



~~Фиг. 2~~ Figure 2.



~~Фиг. 3~~ Figure 3.

5.13.5 Volume of a groove should be by 5 to 20% larger than that of a ring.

5.13.6 During installation of rings, in case of necessity, their short time extension upto 30% of the relative elongation value during breakage is allowed (table 16).

5.13.4 Requirements for installation of cups for sealing units performing reciprocating motion:

5.14.1 For rubber cups when the diameters of a cylinders and rods are upto 20MM, grooves in pistons and bodies should be only of an open type when the diameters of a culinder and rods are more than 20mm, grooves may be of open as well as of closed types (drg.4)

5.14.2 For rubber fabric, cups of all dimensions, groove in pistons and bodies should be only of aon open type:

5.15 Requirements for rubber-metal cups for units performing rotation.

5.=5.1 Before pressing the cups on a seat it is necessary to clean the inner mounting surface and the shaft and to grease them with lubricant or with working medium. In this case lubricant may be applied to a spring of a cup too.

5.15.2 While installing a cup with dust-proofing fillers it is necessary to fill with lubricant the inner cavity between a working edge and a dust collector

5.15.3 Pressing of a cup into a seat is done with the help of a press or a special device by uniform pressing as per all the edge surfaces of a cup. While doing that there should be no cocking of a cup and damages of external rubber layer of a cup.

5.15.4 To protect a cup from turning out when pressure differential is more than 0.5 kg/cm2, it is recommended to use a conical stop (drg.5).

5.~~4~~ 5.5 Requirements for mating parts (surface roughness hardness, radial run out, misalignment) should correspond to GOST 8752-70.

5.16 Requirements for installation of pretective covers.

5.16.1 Extension ratio (interference) of assembled covers as per the mounting diameter is ensured by a design of a unit and should be 5 to 20%.

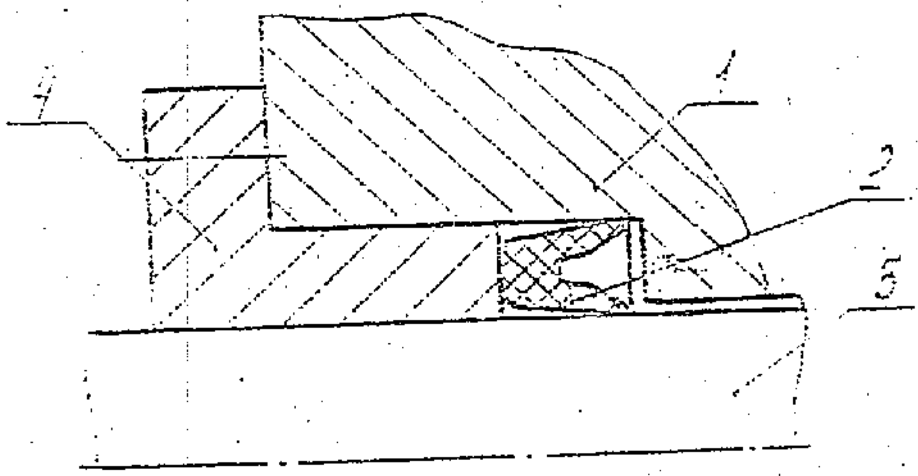
5.16.2 A Short time single extension of a cover is allowed upto 60% of the value of relative elongation during breakage (table.16)

5.17 Requirements for installation and usage. Shock-absorbers and vibration-resistant support's:

5.17,2 Stress due to loadings and overloadings should not exceed stress specified in table .22

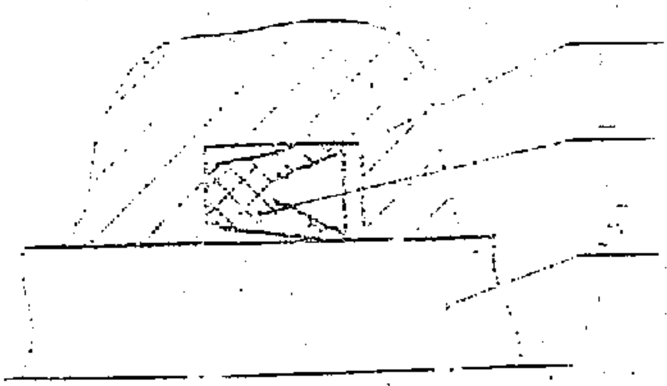
Type of deformation	Permissible stresses		
	Static loading	Impact short-time loading	Long time dynamic loading
Compression	30-50	25-50	10-15
Displacement	10-2C	10-20	3-5

Open type groove
~~канавка открытого типа~~ (A)



1. ~~корпус~~ Body
2. ~~манжета~~ Cup
3. ~~шток~~ Rod
4. ~~крышка~~ Cap

Close type groove
~~канавка закрытого типа~~ (B)



1. ~~корпус~~ Body
2. ~~манжета~~ Cup
3. ~~шток~~ Rod

A

Figure 4

5.17.2 Operation of shocks-absorber is not allowed in resonance zone.

5.17.3 Design of a mounting seat for shock absorbers should exclude contact of deformed rubber with sharp rims and edges.

5.17.4 Pre deformation of compression should not exceed 40%.

5.17.5 When shock-absorbers and vibration resistant supports are installed in places, not protected from the effect of sun rays, it is recommended to cover the rubber with light ozone resistant coatings of paraffin petrolatum alloy type as per GOST 4096-62 in the ratio of 1:1 or by a dense cover.

5.18 Requirements for installation and usage of rubber and rubber-metal bushing.

5.18.1 Pressing of bushings should be done with the help of a device (drawing) with a special lubricant being used.

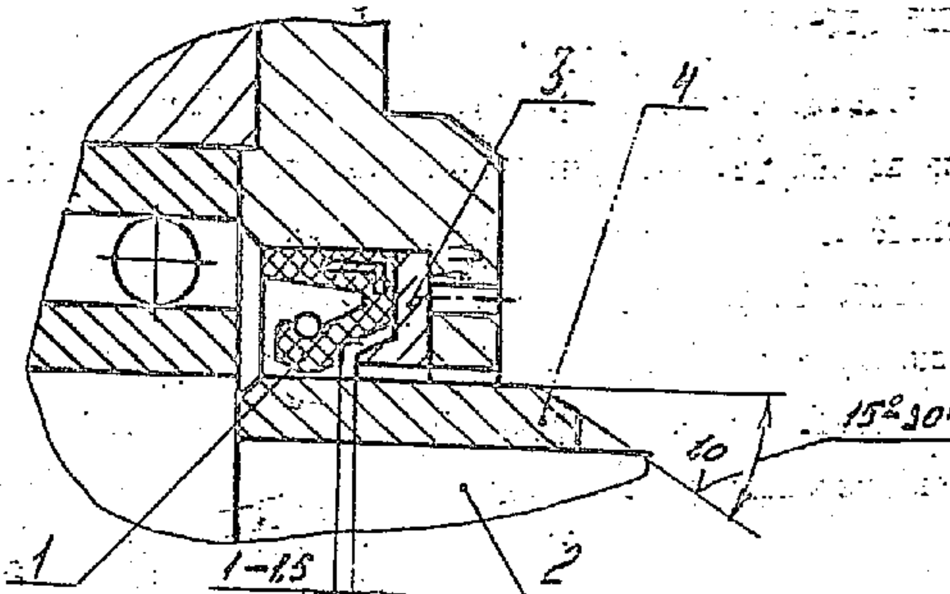
5.18.2 Cuts, breakages, turnings in of bushings are not allowed during the pressing, cocking and projection of rubbers over the edges of reinforcement should not exceed 0.5MM.

5.18.3 Value of radial compression of pressed bushings should be the following:

- in assembled hinges-30 to 40%
- in combined hinges-25 to 35%

5.19 Requirements for installation and usage of rubber items for sealing hatches, doors etc.,

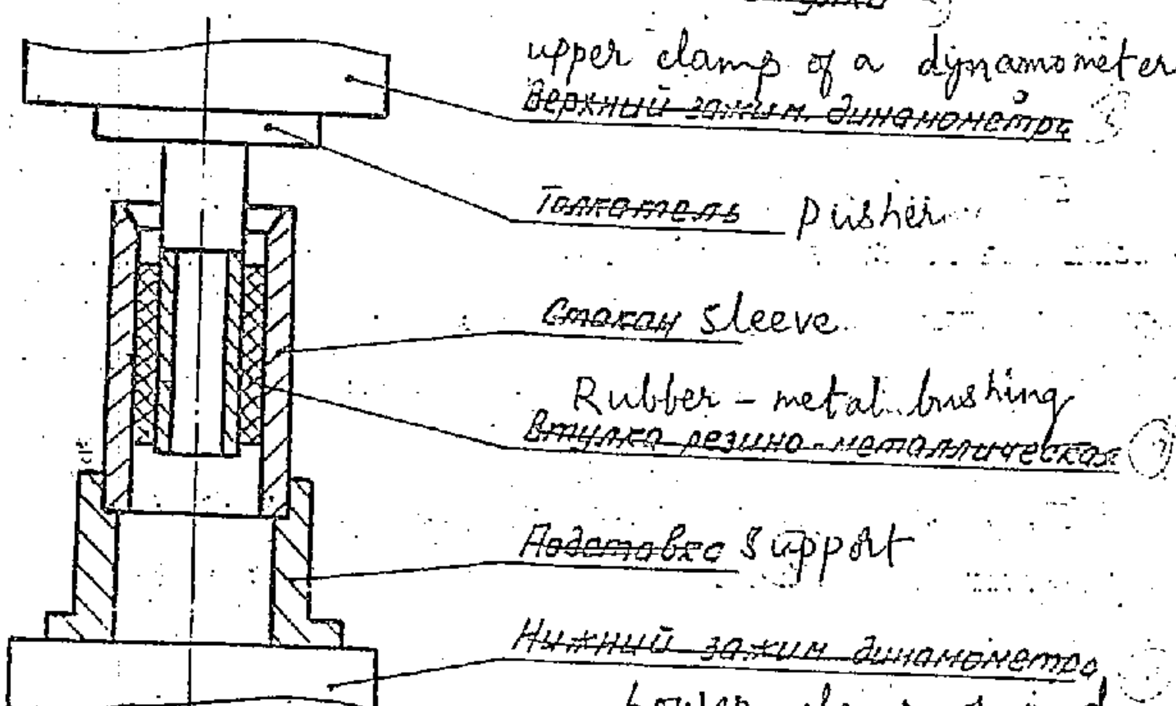
5.19.1



1. ~~манжета~~; 2- ~~вал~~; 3- ~~упор~~; 4- ~~втулка~~ Bushing
Cup Shaft Stop

~~Рис.5~~ Figure 5

Diagram of Pressing and releasing of a rubber metallic bushing.
~~Схема запрессовки выпрессовки резино-металлической втулки~~



~~Рис. 6~~ Figure 6

5.19.1 Rubber items for detachable joints.

Operating under periodical removal of compression loads are fixed in mounting seats with adhesive (grade of adhesion shown in drawings) or by a mechanical method.

5.19.2 Contours of mounting seats to install rubber items should have the following rounding-off radius:
For rubber items with a section of upto 10MM
-minimum 50 mm.
For rubber items with a section of 10 to 20mm
-minimum 150 mm,
For rubber items with a section of more than 20mm
-minimum 600mm.

5.19.3 Compression ratio of assembled rubber items should be ensured by a design of a mounting seat or by installation conditions. Compression ratio should make up:

- 8to35% for rubber cords;
- 15to50% for tubes of various shapes:
- 25 to 50% for foam sections meant for sealing;
- 5 to 60% for foam sections meant for cushioning of impacts.

5.20 Conditions for installation of membranes and diaphragms are specified in the drawings for rubber items.

PHYSICAL, MECHANICAL AND TECHNOLOGICAL PROPERTIES OF RUBBERS.

Grade of rubber	Type of raw-rubber	Mode of vulcanization and thermostating (T). Temperature, °C	Mode of vulcanization and thermostating (T). Time, min.	Ultimate strength during breakage kgf/cm2 minimum.	Relative elongation during breakage, % minimum	Relative residual elongation after breakage % maximum	Hardness as per device ТИР (ТМ-2), arbitrary units, within limits	Frost-resistance coefficient as per elastic restitution, minimum. Tempera ture, °C	Frost-resistance coefficient as per elastic restitution, minimum. Value of coefficient	Brittleness temperature while freezing, °C, minimum	Heat ageing in air. Temperature, °C	Heat ageing in air. Time, Hour	Heat ageing in air. Ageing coefficient as per relative elongation, minimum	Heat ageing in air. Value of relative residual deformation (compression 20%), % maximum	Change of mass on exposure of media, %, maximum. Standard liquids СЖР-2 for 72 hours at a temperature of 100°C % within limits	Change of mass on exposure of media, %, maximum. 75 parts by weight of rubber solvent and +25 parts by weight*	Co-efficient of acid-alkali resistance for 24 hours at a temperature of 15 to 25°C as per strength. 20% solution of sulphuric acid or hydrochloric acid, minimum	Co-efficient of acid-alkali resistance for 24 hours at a temperature of 15 to 25°C as per strength. 20% NaOH or KOH soultion, minimum	Density, g/cm3 (with limit deviations of ±0.05) *of benzene GOST 443-56 at a temperature of 15° to 25°C for ...
B-I4	CKH-I8	I5I±3 I43±3	20 40	90	I60	8	70-80	~~минус~~ Minus 45	0,I5	~~минус~~ Minus 50	90 70	96 I44	0,60	-	from minus ~~от минус~~ 3 ~~до~~ to 7	-	-	-	I,28
B-I4-I	CKH-I8	I5I±3 I43±3	20 40	I20	I40	8	76-84	~~минус~~ Minus 45	0,I5	~~минус~~ Minus 50	90 70	96 I44	0,60	-	from minus I to I0	-	-	-	I,28
4-I6	HK	I5I±3	40	I25	300	25	64-75	-	-	~~минус~~ Minus 40	70	I44	0,60	-	-	-	-	-	I,2I
93	HK	I5I±3	40	I70	300	45	70-85	-	-	~~минус~~ Minus 35	70	I44	0,50	-	-	-	-	-	I,38
98-I	CKH-I8	I43±3	30	50	I60	8	50-65	-	-	~~минус~~ Minus 60	70	I44	0,60	-	-	35,0	-	-	I,I6
3I0	CKH-26	I43±3	25	50	500	40	35-50	-	-	-	70	96	0,60	-	-	-	-	-	I,22
343	CKMC-30 APKM-I5	I43±3	30	45	250	25	45-65	-	-	-	70	96	0,80	-	-	-	0,80	0,80	I,32
360	CKMC-30 APKM-I5	I43±3	30	45	250	35	45-65	-	-	-	70	96	0,70	-	-	-	0,75	0,75	I,28
633	naihit	I43±3	30	II0	400	35	50-65	-	-	-	70	96	0,70	-	-	40,0	-	-	I,30
637	Naihit CKMC-30 APKM-I5	I43±3	40	45	250	35	45-65	-	-	-	70	96	0,70	-	-	-	0,75	0,75	I,35
640	Naihit CKH-I8	I43±3	I5	I00	350	25	50-65	-	-	-	70	96	0,60	-	-	40,0	-	-	I,27
648	naihit	I43±3	40	80	500	60	50-65	-	-	-	70	I44	0,70	-	-	30,0^{x}	-	-	I,5I

x ... GOST 443-56 at a ... temperature ... for 24 ...

Grade of rubber	Type of raw-rubber	Mode of vulcanization and thermostating (T): Temperature, °C	Time, min	Ultimate strength during breakage kgf/cm2 minimum	Relative elongation during breakage % minimum	Relative residual elongation after breakage, % maximum	Hardness as per device ТИР (ТМ 2) arbitrary units, within limits	Frost-resistance coefficient as per elastic restitution minimum: Temperature, °C	Value of coefficient	Brittleness temperature while freezing, °C, minimum	Heat ageing in a ir: Temperature, °C	Time, hour	Ageing coefficient as per relative elongation, minimum	Value of relative residual deformation (compression 20%), % maximum	Change of mass on exposure of media, % maximum: Standard liquids group-2 for 72 hours at a temperature of 100 °C % within limits	75 parts by weight of rubber solvent +25 parts by weight**	Co-efficient of acid-alkali resistance for 24hrs at a temperature of 15 to 25 °C as per strength: 20% solution of sulphuric acid or hydrochloric acid, minimum	20% NaOH or KOH solution, minimum	Density g/cm3 (with limit deviations of ±0.05)
649	Nairit ~~[illegible]~~ СКН-40	143±3	20	55	300	40	35-55	-	-	-	70	96	0,60	-	-	X	X	X	I,38
783-2	СКН-18 СКН-26	143±3	30	125	250	10	65-80	minus 25	0,I	minus 37	90 70	96 144	0,70	-	from 3 to 13	-	-	-	I,2I
1847	НК	151±3	15	150	600	32	35-50	-	-	minus 50	70	144	0,75	-	-	-	-	-	I,05
2462	НК	143±5	20	100	300	30	60-75	-	-	minus 50	70	144	0,60	-	-	-	-	-	I,40
2959	НК	143±3	20	160	500	32	45-60	-	-	minus 52	70	144	0,70	-	-	-	-	-	I,I8
3311	НК	143±3	10	150	700	25	30-45	-	-	minus 55	70	144	0,75	-	-	-	-	-	0,98
3824	СКН-26	143±3	50	65	320	20	40-55	-	-	minus 45	70	144	0,50	-	-	minus 8,0 to 5,0	-	-	I,I9
3825	СКН-40	143±3	30	100	120	10	80-95	-	-	minus 30	70	144	0,60	-	-	15,0	-	-	I,3I
4326-I	СКН-18	143±3	20	80	170	12	65-80	-	-	minus 50	70	144	0,65	-	-	35,0	-	-	I,26
5168	СКБ	143±3	20	35	200	35	50-65	-	-	-	70	96	0,65	-	-	-	-	-	I,26
7842	НК	143±3	30	175	450	27	55-65	-	-	minus 45	70	96	0,65	-	-	-	-	-	I,I3
8797	СКМС-30	143±3	20	60	300	20	45-65	-	-	minus 50	70	96	0,65	-	-	-	-	-	I,I5
ИРП-1316	СКН-26	151±3 T200±5	30 2 ч	160	65	5	76-88	-	-	-	200	24		45	-	-	-	-	I,95
ИРП-1266	СКТВ-I	151±3 T200±5	20 6 ч	25	100	-	35-55	minus 50	0,60	minus 65	200	24		45	-	-	-	-	I,I9

**(of benzol GOST 443-56 at a temperature of 15° to 25° c for 24 hours.)

Grade of rubber	Type of raw- rubber	Mode of volcanigation and thermostating (T): Temperature, °C	Mode of volcanigation and thermostating (T): Time, minimum	Ultimate strength during breakage kgf/cm2 minimum	Relative elongation during breakage % minimum	Relative residual elongation after breakage, maximum	THP (TM2) Hardness as per device, arbitrary units, within limits	Frost-resistance coefficient as per elastic restitution, minimum: Temperature, °C	Frost-resistance coefficient as per elastic restitution, minimum: Value of coefficient	Brittleness temperature while freezing °c, minimum	Heat ageing in air: Temperature, °C	Heat ageing in air: Time, Hour	Heat ageing in air: Ageing coefficient as per relative elongation, minimum	Heat ageing in air: Value of relative residual deformation (compression 20%), % maximum	Change of mass of exposure of madia, %, maximum: Standard liquids CЖP-2 for 72 hours at a temperature of 100°c, % within limits	Change of mass of exposure of madia, %, maximum: 75 parts of weight of rubber solvent + 25 parts by weight*"	[illegible] of [illegible] resistance for 24hrs at a temperature of 15 to 25°c as per strength: 20% solution of sulphuric acid or hydrochloric acid, minimum	[illegible] of [illegible] resistance for 24hrs at a temperature of 15 to 25°c as per strength: 20% NaOH or KOH solution, minimum	Density, g/cm3 (with limit deviations of ±0.02)
5I-I435	CKΦ-26	I5I±3 T200±5	30 24ч	I3[illegible]	8[illegible]	I0	80-90	–	–	–	I80	24		50	–	–	–	–	2,27
5I-3029	CKH-I8 CKH-26	I5I±3	20	I00	I40	6	72-82	~~[illegible]~~ minus 40	0,50	–	90	96	0,50	–	from minus 4 to 4	–	–	–	I,33
983I	CKH-26	I43±3	20	I00	300	20	55-70	~~[illegible]~~ minus 25	0,20	~~[illegible]~~ minus 30	70	I44	0,70	–	from minus 2 to 18	–	–	–	I,I8
H0-68-I	CKH-I8 Nairit	I5I±3 I43±3	20 30	90	250	I2	55-70	~~[illegible]~~ minus 50	0,I5	~~[illegible]~~ minus 55	70	I44	0,70	–	from 6 to I6	–	–	–	I,24
ИРП-I287	CKΦ-26	I5I±3 T200±5	30 24ч	I20	I20	I0	70-82	–	–	–	200	24	–	45	–	–	–	–	2,I0
ИРП-3032	CKΦ-32	I5I±3	40	I00	350	25	50-65	~~[illegible]~~ minus 40	0,20	–	I50	24	–	60	–	–	–	–	I,68
6I0	Nairit	I43±3	40	80	200	25	65-85	–	–	–	70	95	0,60	–	–	30,0x	–	–	I,4I

Notes: ① Reference mark "x" is to be determined in case of the ratio of 95 parts by weight of rubber solvent + 5 parts by weight of benzol.

② Compounding for rubber ИРП-1266 gaurantees the following characteristics: electrical strength of at least 15 KV/mm, volume resistivity of about 10 13 Ohm·cm.

③ The loss of tangent of a dielectric is 0.07. Adhesiv strength of Rubber 783-2 with metal is of at least 35 Kgf /cm².

*" of benzol GOST 043-56 at a temperature of 15° to 25°c for 24 hours.

I 2919

Table:17

PHYSICAL AND MECHANICAL PROPERTIES OF FOAM RUBBER
(STANDARD SPECIMENS)

Code Number of rubber	Type of raw material	Mode of vulcanization		Physical and mechanical characteristics of foam rubber						
		Temperature °C	Time/min	Apparent density g/cm3	Rigidity during compression by 50% kg/cm2	Residual deformation during compression by 50% max		frost-resistance		
						20°c 22hrs	70°c 22hrs	Brittleness temperature °c max	Elastic restitution coefficient minimum at a temperature °C Minus 45	Elastic restitution coefficient minimum at a temperature °C Minus 50
CB-105	HK, CKB	164±3	20	0.50-0.80	1.5-3.0	30	70	Minus 45	-	0.20

Table:18

NORMS FOR INSPECTION OF RUBBER ITEMS AS PER OUTWARD CHARACTERISTICS.

MOULDED RUBBER ITEMS.

Type of defects	Description of rubber items											
	Round rectan-gular and shaped seal-ing rings	Rubber-and rubber metal cups and collars	Rubber-fabric sealing	Protective covers	Rubber gaskets plugs	Membranes and diaphagms/blanks from membr-ane cloth	Rubber and rubber-metalshock absorber. Rubbers inserts for elas-tic elements of couplings and valves	Vibration resistance support	Rubber and rubber metal bushings	Technical sheets without fabric linings and items made fromthem	Technical sheets with fabric linings and items made from them	Foam sheets and items made from them	Foam parts
Marks, 1.Incentations, elevations, depressions, mould incents	For P, P^x should not exceed 0.1 mm for HP should not exceed 0.2mm at a thickness upto 3.0mm shouldnot exceed 0.3mm at a thickness above 3.0mm For HP^x should not exceed 0.2 mm in height (depth) at a thickness upto 5.0mm and should not exceed 0.3mm in height (depth) at a thickness above 5.0mm	For P, P^x are not allowed. For HP, HP^x should not exceed 2.5mm in depth and height.	Should not exceed 0.3mm in depth and height	Should not exceed 0.2 mm in depth and height For X. should not exceed 0.3mm in depth and height	Should not exceed 0.1mm at a thickness upto 2.5mm should not exceed 0.2mm at a thickness of 2.5 to 8.0mm should not exceed 0.3mm at a thickness above 2.0mm ForX-"	Should not exceed 0.1 mm in depth 0.2mm in height at a thickness upto 2.0mm should not exceed 0.1 mm in depth 0.2mm in height at a thickness above 2.0mm	Should not exceed 0.5 mm for valves should be specified in drawings	Should not exceed 1.0 mm	Should not exceed 0.5mm	Should not exceed 0.5 mm at a thickness upto 2.5mm should not exceed 0.5 mm at a thickness above 2.5 mms	Should not exceed 0.5mm in height and depth	Should not exceed 1.0mm at a thickness upto 3.0mm should not exceed 2.0 mm at a thickness above 3mm.	Should not exceed 1.0mm
2.Inclusions and traces of fallen out imputities	Ditto	~~xxxxxxx~~ Ditto	For P-are not allowed For HP-should not exceed 0.3mm in depth and 1.0mm in diameter at a thickness upto 5.0mm	Should not exceed 0.3 mm in size For x- "	For P P^x should not exceed 0.2mm at a thickness upto 5.0mm should not exceed	For P-are not allowed ForHP-should not exceed 0.1 mm in depth and 0.1mm in diameter	Should not exceed 0.3 mm.	Should not exceed 0.5 mm in depth and 0.1 mm in diameter.	Should not exceed 0.3mm in size	Should not exceed 0.5 mm in depth and 1.0mm in diameter	Should not exceed 1,0 mm at a thickness upto 3.0 mm should not exceed 2.0mm at a thickness above 3.0mm		should not e[illegible] 0.1mm in dep[illegible] a thickness [illegible] 15.0mm and [illegible] not exceed 0.[illegible] at a thick[illegible] above 15.[illegible]

1	2	3	4	5	6	7	8	9	10	11	12	13	14
			should not exceed 0.5mm in depth and 1.0mm in diameter at a thickness above 5.0mm		exceed 5.0mm at a thickness above 5.0 mm. ForHP, HP^x should not exceed 0.3mm at a thickness upto 5.0mm and should not exceed 0.5 mm at a thickness above 5.0 mm								
Moulding flaws, cavities, dents	ForP, P^x are not allowed For HP, HP^x should not exceed 0.3 mm in depth and height	For P, P^x are not allowed For HP, HP^x should not exceed 0.3mm in depth and height	For P are not allowed. Eor HP should not exceed (in area) 0.5cm2) 0.5 mm in height and depth.	Should not exceed 0.3 mm in size For x-ditto	Should not exceed 0.1 mm at a thickness upto 2.5mm should not exceed 0.2 mm at a thickness of 2.5mm upto 8.0 mm should not exceed 0.3mm at a thickness above 8.0mm For x- "	For P-are not allowed ForHp- as per agreement of the parties	For P-are not allowed. For Hp- should not exceed 0.5 mm when diameter exceeds 50mm	For P-are not allowed. For H^P- should not exceed 0.5 mm	Not allowed	Items: For P-see rubber gaskets For sheets and HP items: should not exceed 0.5mm at a thickness upto 2.5mm should not exceed 1.0 mm at a thickness above 2.5mm For x- "	Not allowed along sheet perimeter at a distance exceeding 20mm from edges	Should not exceed 2.0mm in depth and 100mm in length	Should not exceed 2.0mm in depth

1	2	3	4	5	6	7	8	9	10	11	12	13	14
Thickness difference, facetness and ellipticity of holes	Should not exceed half of the tolerance zone For X-within tolerances.	Should not exceed half of the tolerance zone. For X-within tolerances.	should not exceed half of the tolerance zone	should not exceed half of the tolerance zone For x-within tolerances	should not exceed half of the tolerance zone For X-within tolerances.	should not half of the tolerance zone	should not exceed half of the toerance zone within tolerances	Within tolerances	within roleran ces	within tolerances	within tolerances	within toleran ces	within toleran ces
Projecting and embded burrs, traces of cut off gates	should not exceed 0.1 mm at a thickness upto 5.0mm and should not exceed 0.3mm at a thickness over 5.0mm For X-ditto for flouride rubber rings no embded burrs are allowed	For P, P^X-not allowed For HP, HP^X- should not exceed 0.2 mm at a thickness upto 0.5 mm and should not exceed 0.5 mm at a thickness over 5.0mm	Should not exceed 0.7 mm in height	Should not exceed 0.1mm in height and 0.2mm in depth For X- "	Should not exceed 0.2 mm at a thickness upto 3.0mm should not exceed 0.5 mm at a thickness over 3.0mm For X-should not exceed 0.5mm	should not exceed 0.1mm in height 0.1 mm in depth	For shock absorbers should not exceed 0.5 mm and 0.3 mm in dpeth For inserts should not exceed 0.5mm	Burrs should not exceed 1.0 mm in height 2.0mm in depth; traces of gates should not exceed 1.0mm in height and 2.0mm in depth	Should not exceed 0.5mm in thickness and height along external diameter	-	-	-	Should not exceed 1.0mm
Cutting Tools and polishing traces	Polishing along the parting line of a mould within half of a tolerance zone per section of a ring is allowed	Should be within half of a tolerance zone For X-ditto	Flashes; cutting traces and flashes polishing traces are allowed	Polishing along the parting line of a mould is allowed For X- "	Should be within tolerances For X- "	Polishing along the parting line of a mould is allowed	should be within tolerances	should be within tolerances	should be within tolerances	should be within tolerances For X-"	should be within tolerances	Are allowed	Are allowed.
Bluntness of uncut faces	should not exceed 0.3 mm in radius For X- "	For P, P^X are not allowed For HP, HP^X should not exceed 0.5 mm in radius	Allowed	should not exceed 0.3mm in radius For X- "	should not exceed 0.3 mm in radius For X- "	shouldnot exceed 0.3 mm in radius	Allowed	Allowed	Allowed	Allowed on sheets ForX- 2	Allowed on sheets	-	Should not exceed 1.0mm in radius.

1	2	3	4	5	6	7	8	9	10	11	12	13	14
Cuts, tears scrat- ches	not allowed For X-should not exceed0.2 mm at a thick ness upto 5.0 mm and are not allowed upto 0.5mm at a thickness over 5.0mm	For P,P^x-not allowed ForHP-should not exceed0.3 mm For HP^x- should not exceed 0.5 mm	For P-not allowed For HP-should not exceed (in depth) 0.3mm and 10% along the perimeter in length	Should not exceed 0.3 mm at a thickness upto 3.0mm, should not exceed 0.5 mm at a thickness over 3.0mm.	ForP-not allowed ForHP- should not exceed 0.1 mm at a thickness upto 5.0mm should not exceed 0.3 mm at thick ness over 5.0mm ForX-should not exceed 0.3mm at a thickness upto 5.0mm should not exceed 0.5 mm at a thickness over 5.0mm	Should not exceed 0.1 mm along the peri- meter	should not exceed 0.3 mm	should not exceed 1.0 mm	should not exceed 0.3 mm	Items: For P- not allowed sheets:- should not exc eed 0.3 mm at a thickness over 2.5mm should not exceed 0.5 mm at a thickness over 2.5mm For X- "	should not exc eed 1.0 mm	should not exceed 1.0mm	Should not exceed 1.0 mm in depth
ir epres- ion	For P,P^x-are not allowed For HP,HP^x should not exceed 0.1 cm2 in area should not exceed 0.2 mm in depth	For P,P^x- are not allowed For HP,HP^x- should not exceed 0.2 cm2 in area should not exceed 0.2 mm in depth		For P, P^x are not allowed For HP, HP^x are not allowed	For P, P^x are not allowed For HP, HP^x are allowed.	not allowed	not allowed	not allowed	not allowed	~~allowed~~ should not exceed 5% of total area	~~allowed~~ should not exceed 5% of total area	allowed	allowed
Difier ce in s (pa tern) ire llness lustre esence fading gredints produ s of eir in raction/ pregnat sp s	allowed	Allowed. for P P^x dullness of lustre is not allowed	allowed	allowed	allowed	allowed	Deposit of Sulphur is not allowed	Allowed as per agree ment of the parties	Deposit of sulphur is not allowed	allowed	allowed	allowed	allowed

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	1	2	3	4	5	6	7	8	9	10	11	12	13	14
11.	Local bareness of reinforcement	-	Bare reinforcement in attaching points to moulds is allowed	-	-	-	-	Allowed as per agreement between the parties	Allowed as per the agreement between the parties	not allowed	-	-	-	-
12.	Rubber grow over reinforcement	-	allowed	-	-	-	-	Allowed as per agreement between parties	should not exceed 5.0mm in thickness on vertical surfaces of shaft sides	should not exceed 1.0 mm in thickness on external surface of reinforcement are not allowed in inner surface	-	-	-	-
13.	Vulcanized inside wrinkles	-	-	For P -are not allowed For HP-are not allowed without lamination	-	-	-	-	-	-	-	-	shouldnot exceed2.0 mm in depth and 100mm in length there should be not more than 5 defects per 1m2 of sheet area.	Should not excee 1.0mm in dpeth
14.	Roughness and porosity non-uniformity	not allowed	not allowed	roughness is allowed as per agreement between the parties	not allowed	not allowed	not allowed	-	-	-	For X-allowed within tolerances	Roughness is allowed as per agreement between the parties	Should not exceed 3.0mm in depth (on end faces of sheets). 10mm2 in area for sheets witha thickness upto 10mm2; should not exceed 5.0 mm in depth 10mm2 in area for sheets with a thickness over 10.0mm.	allowed

1	2	3	4	5	6	7	8	9	10	11	12	13	14
15. Imprints of fabric texture	–	–	allowed	–	–	allowed	–	–	–	–	small traces are allowed	should not exceed 0.6 mm in depth	–
16. Traces of rubber fouling in a mould	For P, P^x are not allowed For HP, HP^x are allowed	For P, P^x are not allowed For HP, HP^x are allowed	For P-are not allowed	not allowed	For P, P^x are not allowed For HP, HP^x are allowed	not allowed ~~not~~	not allowed	allowed	not allowed	allowed	small traces are allowed	allowed	allowed
17. Glue traces	–	Are allowed at attaching points to a mould, Some times, when it is subst antiated and agreed upon between the parties these defects are allowed in other places, specified in the drawings	–	–	–	–	allowed	allowed	allowed	allowed	–	allowed	allowed
18. Displa cement along the parting line of moulds	should be with in tole rances for a section but not exceeding 0.2mm. For X-"	Within half of a toler ance zone	within tolerances	within tolerances For X-"	within toleran ces. For X-"	within tolerances	allowed for shock-absor bers as per the agree ment between the parties should not exceed 0.5 mm for rubber inserts	should not exceed 1.0 mm	should not exceed 0.5mm	–	–	–	Within tolerances for dimen- sions.
19. Mis match ing of profil es alon g the joint places (while putting blanks in a mould)	–	–	–	–	–	–	–	–	–	–	–	~~allowed~~ –	A step sho[uld] not exceed [..] in depth.
...ation on all the ...es of sheets.	–	–	–	–	–	–	–	–	–	–	–	allowed	–

1.	2	3	4	5	6	7	8	9	10	11	12	13	14
Air blows "tears"	-	-	not allowed	-	-	not allowed	-	-	-	should not exceed 5% of total area	should not exceed 5% of total area	should not exceed 1[illegible]mm2 in area and not more than 15 defects per 1.0m2 of surface of sheets	should not exceed 30mm2 in area, in case linear dimension of the defect should not exceed ¼ of area of the place the defect is situated on.
Traces of joints	allowed without lamination	allowed without lamination	~~allowed~~ —	allowed without lamination	allowed without lamination	-		-	-	-	-	allowed	allowed

NOTES:

1. "P" designates surfaces of rubber items on which higher requirements are placed.
2. "HP" designates the rest of surfaces of rubber items
3. "χ" refers to rubber items made from rubber on the basis of fluoroelastomer.
4. If sheets from which gaskets are intended to be cut out ha ve surfaces in the defects slightly exceeding requirements for rubber gaskets these surfaces should be marked with a crayon.
5. Deviation from norms is allowed without change of section χ of rubber items which are subjected for thermostating.
6. There should be not more than four defects on one part.

NORMS FOR THE INSPECTION OF RUBBER ITEMS AS PER OUTWARD CHARACTERISTICS.

Non- moulded rubber items.

Type of defects	Descriptions of rubber items: Round rectangular square and shapxed cords and items made from them, Window tapes	Foam sections and items made from them	Tubes of different shapes and items made from them	Technical sheets in rolls without fabric linings sheets in rolls without fabric linings.
Cracks and mechanical damages				
1.	not allowed	not allowed	not allowed	not allowed
2. Depressions/caused by long lying	should not exc ed 1/8 of the perimeter of a section	al owed	should not exceed 1/8 of the perimeter of a section.	-
3. Bluntness of the edges of a profile	allowed	allowed	allowed	-
4. Longitudinal marks and projections	should notexceed 0.2mm	allowed	should not exceed 0.2mm	-
5. Depressions and projections on surfaces, inclusions, clotted ingredients	should not exceed 0.3mm for nominal section upto 3mm; should not exceed 0.5mm for section of 3 upto 10mm; should not exceed 0.7mm for section over 1 0mm	within tolerances	should notexceed 0.3mm for nominal section upto 3mm; should notexceed 0.5mm for section of 3 upto 10mm, should notexceed 0.7 mm for section over 10mm	should not exceed 0.3mm for nominal section upto 3mm; should not exceed 0.5mm for section of 3 upto 10mm, should not exceed 0.7 mm for section over 10mm.
6. Ovality, wall thickness deference	allowed within tolerances for dimensions	allowed within tolerances for dimensions	Allowed as per GOST 5496-67	-
7. Pores, clotted ingredients, foreign inclusions along profiles section	small seperate pores are allowed. Ingredients particles and traces of their fall out should notexceed 0.3mm	should not exceed 2.0mm on surface	small seperate pores are allowed. Ingredients particles and traces of their fall out should not exceed 0.3mm	concentrated defects should not exceed 0.3mm in size.
8. Deposit of powdering material and foding ingredients, vapour effect traces, hues difference.	allowed	allowed	allowed	allowed
9 Insignificant waviness (curvature)	allowed	allowed	allowed	allowed
10. Polishing traces	allowed within tolerances for dimensions	-	allowed within tolerances for dimensions	allowed within tolerances for dimensions.
11. Convexity and concavity of sides of profiles parts of rectangular section	"	allowed within tolerances for dimensions	"	-

1	2	3	4	5
12. Insignificant roughness	allowed	allowed	allowed	allowed
13. Imprints of fabric on outer surface and imprints of core and talc on inner surface of tubes	allowed	-	allowed	allowed
14. Cuts on butt ends	should not exceed 0.2mm for items	-	should not exceed 0.2mm for items	-
15. Waviness on butt ends caused by cutting on a lathe (stepped surface)	should not exceed 0.1mm		should not exceed 0.1mm.	-
16. Lamination of rubber layer in section along the edges of sheets	-	-	-	should not exceed 2.0mm in length 0.5mm in width
17. Depressions caused by air blows and "tears".	-	-	-	should not exceed 1.5x6mm2 in area and there should be not more that 6 defects per 1 running meter of a sheet
18. Folds on sheet surfaceb	-		-	should not exceed 40mm in length 2.0mm in width and there should be not more than 3 defects per 1 running meter of a sheet.
19. Cavities blisters on rubber items surfaces	-	should not sceed 2.0mm	-	should not exceed 0.5mm at a thickness of sheet upto 3.0mm should not exceed 1.0mm at a thickness of a sheet over 3.0mm but there should be not more than 6 defects on 1m2 at sheet surface.
20. Chocking, twist, mismatching of edges, inclined walls	allowed without sticking	-	-	-
21. Swelling due to joints of a fabric gasket	-	-	-	allowed within tolerances for thickness.

Appendix 1

INSTRUCTIONS FOR SUPPLY AND ACCEPTANCE FOR REINFORCEMENT FOR RUBBER-METAL PARTS.

1. TECHNICAL REQUIREMENTS.

1.1 Reinforcement should correspond to the drawings agreed upon between the parties and to requirements of these instructions.

1.2 Surface of reinforcement should not have burrs and sharp cuttings edges.

1.3 Surface of reinforcement should be clean and monochrome. There should not be scales, corrosion, traces of oil. paints alkali cracks foreign inclusions or other substances which reduce adhesive strength of rubber to metal. Supply of roughed reinforcement is allowed as per the agreement between the parties.

NOTES: 1. Slight deposit of rust, which formed during transportation and which can be removed without damaging the dimensions of reinforcement is allowed on reinforcement surfaces.

2. Processing by sodium nitrates is not allowed during fixation of reinforcement to rubber with the help of adhesive.

1.4 Each batch of reinforcement for rubber items which have the adhesive strength of rubber with reinforcement as an acceptance characteristic are to be stocked with "mushrooms" in amount of 1% of the reinforcement batch, but not more than 10 pieces.

NOTE: Number of "mush rooms" may be reduced as per agreement between the parties.

1 5 Metal 'mushrooms" as per the design, dimensions and surface roughness should correspond to the drawing below.

1.5.1 Dimensions without tolerances are to be made as per accuracy class 7.

1.5.2 Surface roughness characteristic of "mushrooms" should not be lower than that of a working blank of a part before this part was sand blasted or shot blasted.

2. ACCEPTANCE RULES.

2.1 Reinforcement is to be supplied in batches as per order size.

2.2 100% of reinforcement should be checked by a manufacturing plant for outward appearance and compliance with drawings.

2.3 Routine check of outward appearance, dimensions and absence of alkalies on surfaces of reinforcement is to be carried out by a consumer on 10% of reinforcement from a supplied batch.

2.4 In case of detection of reinforcement which does not correspond to the drawings and the present instructions, the batch is to be rejected and returned to the supplier along with consumers' statement within the time stipulated by a contract.

3. TESTING METHODS.

3.1 Dimensions of reinforcement accessories are to be checked with the help of universal or special measuring tools or templates, ensuring the required measuring accuracy.

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3.2 Conformity of reinforcement materials with that, designated in drawings, is to be checked by way of comparison between the grade of material, specified in reinforcement procurement documents and the grades, specified in drawings.

3.3 Presence of alkali on the surface of reinforcement is to be determined in the following manner:

Not less than 10 drops of phenolphthalein solution prepared on the same day when the test is carried out should be put with the help of a pipette on dry and clean surface of reinforcement. The solution should be prepared by adding 20 to 25 drops of 1%

Phenolphtalein solution in ethyl alchol to 50 ml of distilled water. Presence of alkali is determined by appearance of pink colour of the indicator.

If no pink colour of indicator occurs within one minute the reinforcement is considered to have passed the test.

Test for presence of alkali on surface of reinforcement should be carried out at a room temperature, the temperature of a tested sample should be brought upto room temperature.

4. MARKING AND PACKING.

4.1 Reinforcement accepted by TID and by a customer's representative in case of acceptance by customer representative should be marked with a stamp of the manufacturing plant and a stamp ofa customer's representative.

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4.2 Reinforcement is allowed to have markings and stamps, such as Number of parts, interplant stamps etc., which are needed for manufacturing purposes and which are not specified in these instructions. These markings and stamps may be applied over surfaces specified in drawings or over places intended for further mechanical processing or over moulded surfaces not intended for processing.

4.3 "Mushrooms" are marked in accordance with symbols "M" and "MY" designated in drawings with specifications of grades of material. For expample -CT-25. Marking is made by a punching method by an electric spark method.

4.4 Reinforcemnt and "mushrooms" are supplied in containers which provide safety of items surfaces. Each package should have a label with a TID stamp, a customer's representative stamp (in case of acceptance by a customer's representative) number of reinforcement and quantity.

4.5 Reinforcement and "mushrooms" wrapped in paper or put in packets are packed in strong wooden boxes, protecting the reinforcemt from damages.

Packed boxes are sealed by a TID seal and by a customer's representative seal (in case of acceptance by a customer's representative).

4.6 Each batch of reinforcement along with "mushrooms" is accompanied by a certificates containing conclusion of TID and a customer's representative.

(In case of acceptance by a customer's representative at the manufacturing plant) on conformity of reinforcement and "mushrooms" with present instructions.

The certifica te is to be put in a package and "certificate here"inscription is to be made.

Appendix : 2

METHOD MC -51-9-90-72; DETERMINATION OF APPARENT DENSITY OF POROUS RUBBER.

Method is based on hydrostatic weighing of porous (foam) rubber samples and is meant for evaluation of a pparent density of foam rubber and items.

I. SPECIMENS FOR TEST.

1.1 Specimens of foam rubber of any shape specially vulcanized or cut out from ready items are to be taken for testing

1.2 A specimen should be of mass of minimum 1 gm or of dimension of minimum 20x20mm.

1.3 There should be atleast two specimens for testing.

2. EQUIPMENT AND DEVICES.

2.1 Device for hydrostatic weighing which consists of a counter balance making it possible to weigh with an accura cy upto 0.01gm,. To the left pan of the counter balance there should be firmly attached a needle to pin the specimens. The device for hydrostatic weighing should also include a glass with distilled water.

2.2 Diagram for one of possible variants of a device is described inthe drawing.

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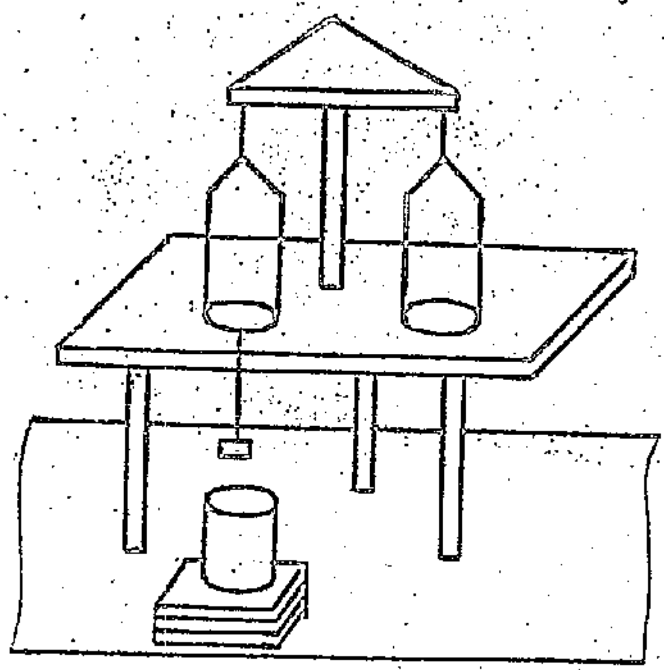

A. Diagram of a device.

3. TEST PROCEDURE.

3.1 Determine weight of sample in air (P_o)

3.2 Raise a little (the pan of the balace) pin the specimen to the needle, submerge the specimen into the glass with distilled water. There should be no air bubbles- neither on the surface of the submerged specimen, nor on the wire.

NOTE: Small air bubbles, commesurable with the sizes of pores, are allowed along surfaces of a specimen cut.

3.3 Determine the load (P_1) which is needed to counter poise the balance. As this takes place the specimen should be below the level of water approximately by 1 cm.

3.4 While testing use safety precuations instructions accepted at the plant concerned.

4. CALCULATION OF TEST RESULTS.

4.1 Apparent density of porous rubber is calculated as per the following formula:

$$P_K = \frac{P_0}{P_0 + P_1} \cdot \gamma ,$$

where,

P_K = is apparent density gm/cm3

P_0 = is weight of the specimen in air, g.

P_1 = is load needed to counterpoise the balance while the specimen is submerged into water.

P_1 is to be taken with "sign""+" if a counterpoise is put on the left pan of the balance(apparent density of specimen is less than 1g/cm3) and it is to be taken with "-" sign if a counterpoise is put on the right pan of the balance (apparent density of specimen is more than 1 g/cm3).

γ —Density of water g/cm3.

4.2 Arithmatic mean of two measurements is taken as a test result.

4.3 Test results are recorded in the following manner:

Date of testing	Code of mix	Number of specimen	P_0, g	P_1, g A B	P_K, g/cm3	P_K mean, g/cm3.

Appendix : 3

METHOD MC-51-9-109-72

DETERMINATION OF RIGIDITY OF FOAM RUBBERS:

This method consists in compression of specimens of foam rubbers and in determination of unit load, necessary for compression of a specimen by 50% of initial height. This method is meant for estimation of basic properties of foam-rubber-their capacity to deform under applied forces.

1. SPECIMEN FOR TESTING.

1.1 Three types of standard specimens are used for testing.

1.1.1 Cylindrical specimens with a diameter of 19 ± 1.0mm and a height of 10 ± 2mm, cut out from sheets with the help of a cylindrical knife on a drilling machine or on a blanking press, are used for foam rubber sheets.

NOTE: It is allowed to conduct a test on sheets of large or smaller heights but minimum of 6mm height. Sheet thinner than 6mm are to be tested glued together.

1.1.2 Specially vulcanized cylindrical specimens with a diameter of a base of 19 ± 1.0mm and with a height of $20^{+0.5}_{-1.5}$ are used for moulded foam rubber specimens are to be vulcanized in a mould with seat diameter of 19 ± 1.0mm and height of $20^{+0.5}_{-1.5}$ mm as per a mode and a method set by a technological maintenance or by a maintenance or by a process sheet for rubber mixes.

1.1.3 For foam rubber, manufactured by continous process use specimens with height of 20 ± 0.2mm cut out from round, rectangular or any other regular shape cords with area of $3^{-0.5}_{+1.0}$ cm^2 ,

NOTE: It is allowed to test specimens of different dimensions from above mentioned ones which are to be specified in standards and technical specifications for items. Test results should be compara ble with these for specimens of the same dimensions.

1.2 Not less than 3 specimens should be tested which differ as per apparent density from mean apparent density by ±10%

2. EQUIPMENTS AND DEVICES.

Testing device which makes it possible to compress a specimen bya measuring platform with a base diameter of more than 28mm under the influence of applied loads of 100 to 9000 gf and which allows measuring of height of 0 to 25mm with an accuracy upto 0.1mm.

2.1.1 Device BH- 5424 with an additional set of wieghts is one of the possible variants.

2.2 Stop watch

3. TESTING PROCEDURE.

Place a specimen on a base platform of the device. Put a measuring platform on the top ofthe specimen and measure its initial height (H_o) with an accuracy upto 0.1mm.

3.2 Load the specimen succesively putting wieghts on it, to such an extent that it deforms by 50% of initial height.

Measure the height of the loaded specimen (H_1) after 30 seconds since the next in turn weight has been loaded on the specimen.

During the test use safety precuations instructions accepted at the plant concerned.

4. CALCULATION OF TEST RESULTS.

4.1 Rigidity of foam rubber is determined by way of reference of a load, needed to compress a specimen by 50% of initial height, to a base area of a specimen.

4.2 Rigidity (T) in kgf/cm3 is calculated as per the following formula:

$$T=\frac{P}{S}$$

Where:

P is a load needed to compress a specimen by 50%, kgf/cm3
S is a base area of an initial specimen.

4.3 Arithmetic mean of three measurements is to be taken as a test results:

4.4 The test results are recorded in the following manner

Date of testing	Code of mix	Number of specimen	h_0, mm	h_1, m	P, kg.	T, kgf/cm^2.

Appendix: 4

METHOD MC-51-9-110-72

TESTING OF FOAM RUBBER FOR COMPRESSIVE RESIDUAL DEFORMATION

Testing of foam rubber for compressive residual deformation consists in compressing specimens between parallel plates in keeping them in compressed condition for a fixed time and at a fixed temperature and in measuring relative compressive residual deformation.

This particular method specifiges a test of foam rubber for determination of relative compressive residual deformation, ~~which~~ while compressing by 50% which accumalates for 22 hours at a room temperature as well as at 70^{o}c.

I. SPECIMENS FOR TESTING.

1.1 Use three types of standa rd specimens for testing.

1.1.1 For foam sheets use cylindrical specimens with a diameter of 19±1.0mm and a height of 10±20mm cut out from sheets with the help of cylindrical knife of a drilling machine or on a blanking press.

NOTE: It is allowed to conduct a test on sheets of larger or smaller heights, but minimum of 6mm height. Sheet thinner than 6mm are to be tested glued together.

1.1.2 For moulded foam rubbers use specially vulcanized cylindrical specimens with a base diameter of 19±1.0mm and a height of 20+0.5mm specimens are to be vulcanized in a mould with a seat diameter of 19mm and a height of 20mm as per mode and method set by technological maintenance or by a process sheet for rubber mixes.

1.3 For foam rubbers, manufactured by continuous process use specimens with height of 20±2mm. Cut out from round circular rectangular or any other regular shaped cords with an area of $3^{-0.5}_{+1.0}$ cm2.

NOTE: It is allowed to test specimens of dimensions different from above mentioned ones, which are to be specified in standards and technical specifications for items. Test result should be comparable with these for specimens of the same dimensions.

2. EQUIPMENTS AND DEVICES.

A screw clamp for testing for resudual deformation. This screw clamp represents parallel steel plates connected by bolts. Specified compression ratio is provided by limiters installed on the lower plate. Height difference between the limiters of one screw clamp should not exceed 0.1 mm.

2.3 Thermostats for thermostating.

2.3 Thickness guage with a scale division of 0.1MM for example a portable thickness guage of type TP.25-16.

3. TEST PROCEDURE.

3.1 Measure the height of specimen with an accuracy upto 0.1mm(h_o).

3.2 Fix limiters on the lower plate of the screw clamp. Limiters should provide compression of specimens by 50±5%.

3.3 Place specimens on the lower plate in such a way that the distance between the neighbouring specimens is of minimum 5mm, and cramp the specimens by the screw clamp. Place the screw clamp with the specimens in a thermostat in case of testing at a temperature of $70 \pm 1^{o}c$ or keep at a room temperature $23 \pm 5^{o}c$.

3.5 After 22 hours the screw clamp should be removed from the thermostat, immediately unclamped and the specimens should be taken out from the lower plate. Leave the specimens released from compression in free state for restitution. Duration of restutition is to be 30 minute.

3.6 Measure height of the specimens after restitution.

While testing use safety precuations instructions accepted at the plant concerned.

4. CALCULATION OF TEST RESULTS.

4.1 Calculate the value of relative residual deformation ($\mathcal{E}$) in % as per the following formula ;

$$\mathcal{E} = \frac{(h_o - h_2)}{(h_o - h_1)} \times 100$$

where,

h_o is initial height of a specimen mm,

h_1 is height of a compressed specimen mm

h_2 is height of specimen after 3 0 minutes restitution, mm

4.2 Arithmetic means of three measurements is to be taken as a test result.

4.3 The results are recorded in the following manner:

Date of testing	Code of mix	Number of specimen	h_0, mm	h_1, mm	h_2, mm	ε, %	ε mean, %

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Appendix: 5

METHOD MC-405152-72

DETERMINATION OF FROST-RESISTANCE OF FOAM RUBBERS.

Present method refers to foam rubbers on the basis of solid rubber and consists in determination of three characteristics.

A Frost-resistance coefficeint, specifying increase in rigidity at sub zero temperature.

B. Coefficeint of elastic restitution specifying capacity of rubber to restitute after compression at sub zero temperature.

C. Brittleness temperature.
This method provides determination of a frost-resistance co-efficient and an elastic restituion coefficient at a given sub zero temperature. Result should be comparable only at the same temperatures.

Determination of Frost-Resistance Co-efficient

Determination of a Frost-Resistance coefficient consists in measuring deformation of specimens at a normal temperature and in comparing between this deformation and that at a specified sub zero temperature under the action of one and the same applied load.

I. SPECIMENS FOR TESTING.

1.1 Use for testing standard specimens of three types.

1.1.1 ~~For foam sheets-use cylindrical specimens with a diameter of 19±1.0mm~~ and a height of 20±2mm. ~~andas per the mode and method set by technological maintenance or by a process sheet for rubber mixes.~~

1.1.3

1.1.1 For foam sheets use cylindrica l specimens with a diameter of 19±1.0mm and a height of 20±2.0mm, cut out from sheets with the help of a cylindrical ~~knife~~ knife on a drilling machine or on a blanking press. For sheets with a height less than 18mm, specimens are to be tested by way of using two specimens of a height of 10±1.0mm or of three specimens of a height of 6 to 7mm.

1.1.2 For moulded foam rubber use specially vulcanized cylindrical specimens with a base diameter of 19±1.0mm and a height of $20^{+0.5}_{-1.5}$ mm. Specimens are to be vulcanized in a mould~~ing~~ with a seat diameter of 19mm and a height of 20mm as per mode and method set by technological maintenance or by a process sheet for rubber mixes.

1.1.3 For foam rubber, manufactured by continuous process use specimens with a height of 20±2.0mm cut out from round, rectangular or any other regular shape cords with area of 3-0.5 cm2.
+1.0

NOTE: It is allowed to test specimens of other dimensions which are to be specified in standards and technical specifications for items. Test result should be comparable with those for specimens of the same dimensions.

2. EQUIPMENT AND DEVICES:

2.1 Device for testing should provide the followings:

- Measuring height of a specimen from 0 to 20mm with an accuracy upto 0.1mm and at measuring pressure not exceeding 50 gf;
- Compression of specimen under action of loads of 100 to 10000gs;
- Precooling of a specimen placed in a testing chamber upto a specified temperature.
- Temperature for testing with an accuracy upto 1°c;
- Diameter of a device measuring platform of atleast 25mm.

2.2 Device described in GOST 12967-67, is one of possible variants.

2.3 Stopwatch.

3. TEST PROCEDURE.

3.1 At room tempera ture, place a specimen on a base platform of the device. Put the measuring platform on the top of the sample and measure its initial height (h_o) with an accuracy upto to 0.1mm.

3.2 Load the sample, succesively putting weights on it to such an extent that it deforms by 50% of initial height. Measure the height of the loaded sample(H_1) after 30 seconds since the next in turn weight has been loaded on the sample.

NOTE: It is allowed to carry out testing at compression less than 50%, for exa mple at 40% and 25% compression in case of testing hard foam rubbers.

3.4 Set specified temperature for tests in the testing chamber of the device.

3.5 Keep specimens tested as per points 3.4 and 3.5 for 3 hours (minimum) at a testing temperature.

3.6 Load the specimen with weight which can compress it by 50±5% at room temperatu re. Measure the height of the loaded specimen (h_1) after 30 seconds since the next inturn wieght has been loaded on the sample.

3.7 While testing use safety precuations instructions accepted at the plant concerned.

4. CALCULATION OF TEST RESULTS.

4.1 Frost-resistance coefficient is determined by reference of the deformation of a specimen at a specified testing sub-zero temperature to the deformation at a room temperature under the action of a load which causes compression by 50±5% at room temperature.

4.2 Frost-resistance coefficeint (Km) is calcula ted as per the following formula:

$$K_m = \frac{D_2}{D_1} = \frac{h_0 - h_2}{h_0 - h_1}$$

Where,

D_1 = Deformation of a specimen of room temperature,%

D_2 = Deformation of a specimen under the same wieght at specified temperature,%

h_0 = Initial height of specimen,mm

h_1 = Height of specimen compressed at room temperature,mm

h_2 = Heifht of specimen compressed by the same weight, at specified temperature,mm.

4.3 Arithmetic mean of three measurements is to be taken as a test result.

4.4 Results of the test are recorded in the following manner:-

Date of testing	Code of mix	Number of specimen	h_0, mm	P, Kgf	D_1		D_2		K_m,	K_m mean.
					h_1 mm	$h_0 - h_1$ mm	h_2 mm	$h_0 - h_2$ mm		

B. DETERMINATION OF COEFFICIENT OF ELASTIC RESTITUTION.

Determination of coefficient of elastic resittution consists in measurement of restitution of a specimen at specified sub zero temperature, the specimeb being first compressed upto 50% at normal temperature and then exposed to decreased temperature.

I. SPECIMENS FOR TESTS.

1.1 Use for testing three types of standard specimens.

1.1.1 For foam sheets use cylindrical specimens with a diameter of 19±1.0mm and a height of 10±2.0mm cut out from sheets with the help of a cylindrical knife on a drilling machine or on a blanking press.

1.1.2 For moulded foam rubber use specially vulcanized cylindrical specimens with a base diameter of 19±1.0mm and height $20^{+0.5mm}_{-1.5mm}$. Specimens are to be vulcanizedin a mould with a seat diameter of 19mm and a height of 20mm as per mode and method set by technological maintenance, technological or by a process sheet for rubber mixes.

1.1.3 For foam rubber manufactured by continouus process use specimen obtained with a height of 20±2.0mm cut out from round rectangular of any other regular shape cords with an area of $3^{+1.0}_{-0.5}$ cm2.

NOTE: It is allowed to test specimens of other dimensions which are specified in standards and technical specifications for the items. Test results of which should be comparable with those for specimens of same dimensions.

2. EQUIPMENT AND DEVICES.

2.1 Devices for test should provide the followings:

- Compression of a specimen placed between base and measuring platforms of the device;
- Cooling of a tested specimen in liquid medium down to a temperature of minus 70°c.
- Testing temperature with an accuracy upto ±1°c.
- Measurement of height of specimen upto 25mm with an accuracy upto 0.1mm.

2.2 Stop-watch

3. TEST PROCEDURE.

3.1 Place a specimen on the platform of the device and measure its initial height(h_0) at room temperature.

3.2 Compress the specimen by 50% of initial height; after that, submerge all the lower part of the device along with the specimen into a Dewar flask containing cooling liquid.

3.3 Keep the specimen at testing temperature for 5 minutes, maintaining the testing temperature within an accuracy upto $\pm 1^{o}c$.

3.4 Then by rapid rotation of the fly wheel, release the specimen. from pressure.

3,5 After 3 minutes since the specimen has been released from pressure measure the height of the restituting specimen using an indicator.

3.6 There should be atleast 3 tested specimens from trial to be characterised.

3.7 While testing use safety precuations instructions, accepted at the plant concerned.

4. CALCULATION OF TEST RESULTS.

4.1 Elastic restitution ocefficient(K_B) is calculated as per the following formula:

$$K_B = \frac{h_2 - h_1}{h_0 - h_1},$$

wherein

h_0 is initial height of a specimen, mm
h_1 is height of a compressed specimen, mm
h_2 is height of a specimen after restitution at a specified subzero temperature, mm

4.2 Arithmetic mean of three measurements is to be taken as a test result

4.3 Results of test are recorded as per the following manner:

Date of testing	Code number of mix	Number of specimen	h_0, mm	h_1, mm	h_2, mm	K_B	K_B mean

B. DETERMINATION OF BRITTLENESS TEMPERATURE.

Determination of brittleness temperature consists in determination of maximum temperatue, at which a specimen is destroyed or cracks under the action of impact load.

I. SPECIMENS FOR TEST.

1.1 Specimen for test should be cut out from foam rubbers and should have the form of strips of dimensionf of 25.0±0.5x6.5±0.5x2.0±0.5mm. Cutting should be done with the help of a knife or a special fixture in such a way that to preserve a surface film on the side of 25x6.5mm.

1.2 Differences in thickness of specimen as per the dimension 2±0.5mm should be within tolerance zone.

2. TEST PROCEDURE.

.1 Tests are to be carried out as per GOST 7912-74.

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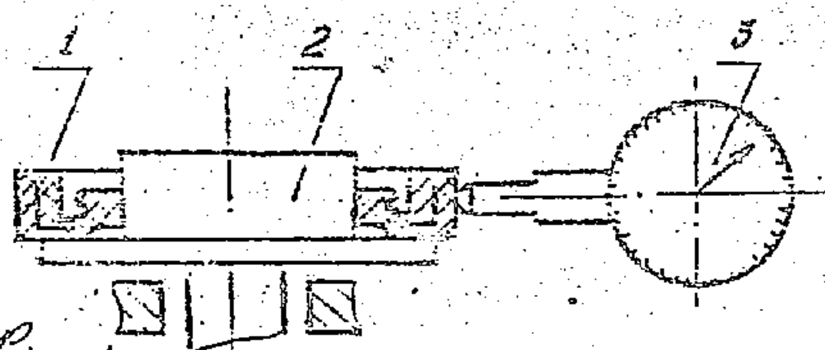
Appendix: 6

INSTRUCTIONS FOR CHECKING RUN OUT OF EXTERNAL DIAMETER OF CUPS WITH RESPECT TO INTERNAL DIAMETER.

1. Run out of external diameter of a cup ... to internal diameter is checked on a device, ~~the diagram is ... in a ...~~, the diagram of which is shown in the ~~below~~ drawing below:



1-Cup
2-Mandrel
3-Indicator.

2. Procedure of checking.

2.1. Cup(1) is to be placed on a cylindrical mandrel (2) of a diameter, equal to the nominal diameter of a shaft.

2.2 The indicator is to be brought to the external cylindrical surface of the cup. Run out value is determined by rotating the mandrel.