STANDARD SPECIFICATION

FINE-WOOL FELT AND PARTS FABRICATED FROM IT FOR INDUSTRIAL PURPOSES

GOST 288-72

SUPERSEDES GOST 282-58

This standard pertains to fine-wool felt and machinery parts fabricated from it (packing glands, gaskets and filters).

1. TYPES AND DESIGNATIONS

1.1. Tech. fine-wool felt is according into following types depending upon its use:

Felt for packing glands, which are used for retaining lubricating oils at the places of friction and for preventing infiltration of water and dust at the places of friction; conventional designation - FP;

Felt for gaskets protecting the m/c parts from wear, impurities, dampness, vibration and is also used for sound absorption; conventional designation - FPP;

Felt for filters, used for filtering oils; conventional designation - FF.

1.2. The following make up the conventional designation: nomenclature as regards type of wool(fine-wool F), purpose (packing gland - P, gasket - PP, filter - P), thickness, and also this standard no.

Method of calling fine-wool felt of thickness 7 mm:

for packing gland - felt FP-7 GOST 288-72;

for gaskets - felt FPP-7 GOST 288-72;

for filters - felt FF-7 GOST 288-72.

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1.3. The following types of machinery parts from fine-wool felt(indicated in table 1) are fabricated, depending upon the purpose and shape.

Table 1

Name of part	Conventional designation of parts
Fine-wool ring-type packing gland	Ring SF
Fine-wool ring-type packing gasket	Ring PrT
Fine-wool ring-type packing filter	Ring FT
Fine-wool strip-type packing gland	Strip SF
Fine-wool strip-type packing gasket	Strip PrT
Fine-wool strip-type packing filter	Strip FT
Fine-wool sheet-type packing gland	Sheet SF
Fine-wool sheet-type packing gasket	Sheet PrT
Fine-wool sheet-type packing filter	Sheet FT
Fine-wool disc-type packing gland	Disc SF
Fine-wool disc-type packing gasket	Disc PrT
Fine-wool disc-type packing filter	Disc FT
Fine-wool irregularly-shaped packing gland	Packing gland FgT
Fine-wool irregularly-shaped packing gasket	Gasket FgT
Fine-wool irregularly-shape packing filter	Filter FgT

Note - 1. A rectangular felt part of width upto 100 mm incl. is called a strip, and that of width above 100 mm is called a sheet.

2. Conventional designation of irregularly shaped parts is Fg.

1.4. The designation for types of parts and their dimensions (in millimetres) form the conventional designation of felt parts, in the following order:

for rings - outer diameter, inner diameter, thickness;

for strips and sheets - length, width, thickness;

for irregularly - shaped parts - "Drg.No." is indicated after the conventional designation.

Method of calling:

Fine-wool, ring-type packing gland with outer diameter 75 mm, internal diameter 50 mm, thickness 7mm:

Ring PT 75-50-7 GOST 288-72

Fine-wool, strip-type gasket with length 80 mm, width 40 mm, thickness 15 mm:

Strip FT 80-40-15 GOST 288-72

Fine-wool sheet-type filter with length 200 mm, width 200 mm, thickness 5 mm:

Sheet FT 200-200-5 GOST 288-72

Fine-wool, disc-type gasket with diameter 120 mm, thickness 10 mm:

Disc FT 120-10 GOST 288-72

Fine-wool, irregularly-shaped packing gland:

Packing gland FT as per drg.No.....
GOST 288-72.

1.5. Dimensions of all types of felt as regards length, width and thickness are established by mutual agreement between the customer and manufacturer. In the range 0.8 to 30.0 m for length; 0.7 to 2.0 m - for width; thickness: for strip-type felt used for gaskets - from 2.5 to 7.0 mm (with an interval of 0.5 mm); for packing glands and gaskets - from 7.0 to 30.0 mm; for filters - from 10.0 to 50.0 mm (with an interval of 1 mm

1.6. Nominal dimensions and tolerances on thickness for all types of felt should correspond to the norms, given in table 2.

Table : 2

NOMINAL DIMENSIONS	TOLERANCES
From 2.5 to 5.0	± 0.75
Above 5.0 to 10.0	± 1.50
Above 10.0 to 15.0	± 2.00
Above 15.0 to 20.0	± 2.50

1.7. As regards shape and dimensions, the felt parts should correspond to the tech. documents of the customer, approved by the manufacturer.

Tolerances on nominal dimensions of felt rings and discs should correspond to the values, given in table 3, and tolerances for strips, sheets and irregularly - shaped parts should correspond to the values, given in table 4.

MM Table : 3

Part	Tolerances on outer diameter						Tolerances on inner diameter					
	upto 10	above 10 upto 25	above 25 upto 100	above 100 upto 200	above 200 upto 300	above 300 upto 400	upto 10	above 10 upto 25	above 25 upto 100	above 100 upto 200	above 200 upto 300	above 300 upto 400
Washers (plain and spring)	±0.3	±0.5	±0.7	±1.0	±1.0	-	±0.5	+0.7 -0.5	±0.7	±1.0	+1.3 -1.0	-
Washers	±0.5	±1.0	+1.3 -1.0	+1.5 -1.0	+2.0 -1.5	-	±0.8	±1.0	+1.3 -1.0	+1.5 -1.0	+2.0 -1.5	-

MM Table : 4

Part	Tolerances on length						Tolerances on width					
	upto 10	above 10 upto 25	above 25 upto 100	above 100 upto 200	above 200 upto 300	above 300 upto 400	upto 10	above 10 upto 25	above 25 upto 100	above 100 upto 200	above 200 upto 300	above 300 upto 400
Packing plate and liners	+1.0 -0.5	±1.0	±1.5	+2.0 -1.5	+3.0 -2.0	+5.0 -3.0	±0.5	+1.0 -0.5	+1.5 -1.0	+2.0 -1.5	+3.0 -2.0	+5.0 -3.0
Liners	±1.0	±1.5	±2.5	±3.0	±3.5	±5.0	+1.0 -0.5	±1.0	±2.0	+3.0 -2.5	±3.0	±5.0

Note : Tolerances for strips and sheets having length and width above 400 mm is established as follows:
... per 100 mm of additional length and width above 400 mm.

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1.8. Nominal dimensions and tolerances on thickness of felt parts(fabricated with interval of 0.5 mm) should correspond to the values given in table 5.

Table : 5

mm

Nominal Dimensions	Tolerances for	
	Packing glands and gaskets	Filters
From 2.5 to 10.0	± 0.5	± 1.0
Above 10.0 to 20.0	± 1.0	± 1.5

2. TECHNICAL REQUIREMENTS

2.1. The physico-mechanical and chemical properties of fine-wool felt having thickness above 6 upto 20 mm incl. should corresponds to the norms, given in table 6.

Table : 6

Properties	Norms as per types of felt for:		
	Packing glands	Gaskets	Filters
1	2	3	4
1) Moisture content(standard), %	13	13	13
2) Volumetric weight, gm/cm³	0.44±0.02	0.30±0.02	0.28±0.02
3) Tensile strength(when felt thickness is 5 mm), in kg/cm², not less than	35	30	-
4) Elongation at rupture, % not more than	135	135	-
5) Content of free sulphuric acid, %, not more than	0.5	0.5	0.15
6) Content of vegetable admixtures, %, not more than	0.5	0.5	0.5
7) Content of non-woollen fibres, %, not more than	5.0	5.0	5.0

1	2	3	4
g) Content of mineral admixtures (together with ash from vegetable admixtures), %, no more than	0.12	0.12	0.12
q) Capillarity (when felt thickness is 10 mm and below), mm, not less than:			
in 5 minutes	-	-	35
in 10 minutes	-	-	40
in 25 minutes	-	-	45

Note : The actual moisture content of felt should not exceed the standardised value.

2.2. Fine-wool felt is fabricated from a mixture of the following composition:

Fine virgin wool not below grade 60-30%;

Semi-fine virgin wool - 20%;

Semi-coarse virgin wool - 25%;

Fine and semi-fine large combings and furry sheep wool of I and II category - 35%;

Content of non-woollen fibres in the mixture is allowed through their presence in combings or partial replacement by non-woollen fibres. Content of non-woollen fibres in finished felt should not exceed the norms, given in table 6.

2.3. The felt should have its natural colour. Difference in shades, as a result of using dyed fine and semi-fine combings, is allowed.

2.4. Volumetric weight, tensile strength, elongation at rupture and content of free-state sulphuric acid for felt in sheets (unstamped for making gaskets) with thickness from 2.5 to 7 mm incl. should correspond to the values, given in table 7.

Table : 7

Properties	Norms when thickness of felt (in mm) is				
	2.5	3.0	4.0	5.0	6.0 and 7.0
1) Volumetric weight, gm/cm^3, not less than	0.26	0.27	0.23	0.25	0.23 ✓
2) Tensile strength(at actual felt thickness), kg/cm^2, not less than	15	15	20	20	25 ✓
3) Elongation at rupture, % not more than	180	150	160	180	150 ✓
4) Content of free-state sulphuric acid, %, not more than	0.2	0.2	0.2	0.2	0.2

Note : Moisture content, content of non-woollen fibres, vegetable and mineral admixtures for felt in sheet form (used for making gaskets) should correspond to the norms, given in table 6.

2.5. On customer's request, felt for filters and felt in sheet form(used for making gaskets) should be supplied with content of free-state sulphuric acid not more than 0.1%.

2.6. Felt with thickness from 2.5 to 6 mm incl. is obtained by cutting from thicker felt(which is used for packing glands).

Volumetric weight, tensile strength, elongation at rupture should correspond to the values given in table 8.

Table 2

Properties	Norms when thickness of felt (in mm) is 2.5	3.0	4.0	5.0	6.0
1) Volumetric weight (when moisture content of felt is 13%), gm/cm^2, not less than	0.36	0.37	0.38	0.38	0.38
2) Tensile strength (at actual felt thickness), kg/cm^2, not less than	15	15	20	20	20
3) Elongation at rupture, %, not more than	170	170	170	170	170

Note : Moisture content, content of free-state sulphuric acid, non-woollen fibres, vegetable and mineral admixtures for felt (prepared by cutting) should correspond to the norms given in table 6.

This felt should be supplied to the customer as sheets.

2.7. Properties as regards volumetric weight, content of free-state sulphuric acid, non-woollen fibres, mineral and vegetable admixtures for all types of fine-wool felt and parts fabricated from them pertain to felt with moisture content (standardised) 13%.

2.8. Volumetric weight of felt parts, depending on their thickness and outer diameter or length, should correspond to the norms, given in table 8.

Table : 9

Name of part	Thickness, mm	Volumetric weight, gm/cm³, when outer diameter or length of part is (in mm)				
		to 10	above 10 to 25	above 25 to 50	above 50 to 100	above 100
Packing glands	From 2.5 to 5	0.34	0.37	0.37	0.38	0.38
	Above 5 to 10	0.35	0.37	0.37	0.38	0.39
	Above 10 to 20	0.36	0.37	0.39	0.39	0.40
Gaskets	From 2.5 to 5	0.31	0.33	0.34	0.35	0.36
	Above 5 to 10	0.32	0.33	0.34	0.35	0.37
	Above 10 to 20	0.33	0.34	0.36	0.36	0.38

The following deviations, as regards volumetric weight of felt parts, are allowed : minus(-) 0.01 gm/cm³, plus(+) within the limits of the property for felt considering tolerance as regards volumetric weight of felt (see table 6).

2.9. Norms of volumetric weight of rings (given in table 9), pertain to those having width not less than 7 mm.

Norms of volumetric weight of rings,(having width less than 7 mm) are set by mutual agreement between customer and manufacturer.

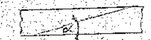
2.10. Volumetric weight of filters of all sizes should be $0.25^{+0.02}_{-0.04}$ gm/cm³.

2.11. Felt rings having outer diameter upto 60 mm incl. are fabricated by punching (in one piece)and those having outer dia.above 60 mm - by stitching together the strips, except those rings, which cannot be stitched together due to the great difference between width and thickness of the ring. Such rings are fabricated by punching(blanking) in one piece.

2.10. Felt rings, obtained by stitching the strips, should correspond to the following requirements:

one stitch(seam) is allowed if outer diameter of ring is upto 400 mm incl; 2 stitches are allowed if outer diameter of ring is above 400 mm;

the joining line of stitch (at the stitched place) should be diagonal, whereas the angle(α) should be 20-30°(see fig.);



stitching is done in not less than 2 rows with linen thread (GOST 2360-73) of following thicknesses and nos. corresponding to them: 105 texX4(№9, 5/6), 130 texX4(№7, 5/4), 105 texX6(№9, 5/6), 130 tex X6(№7,5/5) or durable cotton thread (GOST 6309-73) of the following nos.: 00(with no.of twists 30), 0(with no.of twists 9), 1(with no.of twists 9), 10(with no.of twists 6).

The thread no. is selected depending upon the width and thickness of ring. If the ring-width is 10 mm and above, the stitch, nearest to the inner edge of ring, should be at a distance of not less than 3 mm from it. If ring width is less than 10 mm it is allowed to stitch the rings in single row, arranging the stitches at equal distance from the edges of the ring;

If rings are stitched from strips with thickness upto 10 mm, the spacing of stitches should not be more than 6 mm; and if thickness of strips is more than 10 mm - not more than 10 mm;

the planes of the joint should be in close contact with each other and should not shift;

at the joining place the ring thickness should not exceed the norms and tolerances, given in table 5;

at the joint the elasticity of ring should not significantly differ from the elasticity of ring in other portions;

the main fibres in the stitched ring should be in the direction of ring circumference.

2.13. Felt and felt parts should not have exfoliation.

2.14. Gluing of felt and felt parts is not allowed.

2.15. The edges of felt piece should not have deviation exceeding ±1 cm (as regard rectilinearity) over 1 m length and width.

2.16. The surface of parts should be clean, with the "fleece" removed uniformly, without scars. "Fleece" is allowed on gaskets.

2.17. The parts should not have tears, frayed portions, tapering portions and other mechanical damage.

3. TEST METHODS

3.1. The test methods as per GOST 314-72 should be used for checking the quality of felt and felt parts for their conformity to the requirements of this standard.

3.2. The conversion of weight of felt and felt part batches, at existing value of moisture content, into weight moisture content (13%) should be done as per GOST 4650-49.

4. PACKING, MARKING, TRANSPORTATION AND STORAGE

4.1. During transportation, the felt pieces should be compactly rolled into a roll of weight not more than 70 kg, bound with cords at 2 places and packed in cloth. With customer's approval, the felt pieces may be supplied without packing.

4.2. The felt parts are packed in boxes, crates, packets or bags. The gross weight of each box, crate, packet or bag should not exceed 50 kg.

4.3. Each roll of felt, also each box, crate, packet or bag containing felt parts should contain the following marking :

a) name of manufacturing plant;

b) description of felt or felt parts as regards type of wool and purpose;

c) felt thickness or the numbers of felt parts;

d) weight of felt at standard (13%) moisture content or quantity of felt parts;

e) date of manufacture;

f) this standard number.

4.4. Each supplied batch of felt and felt parts should be furnished by a document, which certifies the conformity of the product to the requirements of this standard. The document should contain :

a) name or manufacturing plant;

b) description of product as regards type of wool and purpose;

c) results of checks and grade of the product;

d) this standard number.

4.5. Felt and felt parts should be stored in a dry well-ventilated room at relative humidity not more than 65%.

If the felt is arranged in a stack(pile), its height should not exceed 2 m.

For air access, the base of the pile should be at least 0.2 m above the floor level.

The felt parts should be stored in boxes or on racks, in order to prevent their deformation.

4.6. In case of prolonged storage felt and felt parts should be treated with antimoth compound at least once in 6 months.

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Other standards referred to in this standard:

ГОСТ 2259-73

ГОСТ 6309-73

ГОСТ 314-72

ГОСТ 4680-49

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