इंटरनेट मानक

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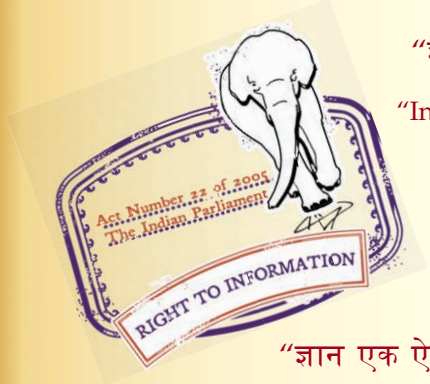
"जानने का अधिकार, जीने का अधिकार"
Mazdoor Kisan Shakti Sangathan
"The Right to Information, The Right to Live"

"पुराने को छोड नये के तरफ"
Jawaharlal Nehru
"Step Out From the Old to the New"

IS 1322 (1993, Reaffirmed 2008): Bitumen Felts for Water-Proofing and Damp-Proofing--Specification (Fourth Revision). UDC 691.165 : 699.82



"ज्ञान से एक नये भारत का निर्माण"
Satyanarayan Gangaram Pitroda
"Invent a New India Using Knowledge"

"ज्ञान एक ऐसा खजाना है जो कभी चुराया नहीं जा सकता है"
Bhartṛhari—Nītiśatakam
"Knowledge is such a treasure which cannot be stolen"

IS 1322 : 1993
(Reaffirmed 2008)

भारतीय मानक

जलसर और नमसर बनाने के लिए बिटूमैन नमदा — विशिष्टि

(चौथा पुनरीक्षण)

Indian Standard

BITUMEN FELTS FOR WATER-PROOFING AND DAMP-PROOFING — SPECIFICATION

(Fourth Revision)

Fourth Reprint OCTOBER 2009
(Including Amendment No. 1 & 2)

UDC 691.165 : 699.82

BUREAU OF INDIAN STANDARDS
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002

December 1993

Price Group 4

FOREWORD

This Indian Standard (Fourth Revision) was adopted by the Bureau of Indian Standards, after the draft finalized by the Water-proofing and Damp-proofing Sectional Committee had been approved by the Civil Engineering Division Council.

This standard was first published in 1959 and revised in 1965, 1970 and 1982. The fourth revision of this standard is based on the experience gained during the last few years in the use of the bitumen felts for water-proofing and damp-proofing purposes. This revision mainly incorporates the method of test for determination of the binder content by Soxhlet extraction method, the revised method for determination of water absorption of bitumen felts and increasing of the total weight of the finished bitumen felt (*see* Table 1) on the basis of the practical experience of using the minimum quantity of dusting powder. The requirement of base fabrics for fibre base felts has also been changed. The weight of saturant for fibre base felts has also been revised on the experience gained during the last few years. The self finished felt Type 2, Grade 2 has been deleted.

In the formulation of this standard due weightage has been given to international coordination among the standards and practices prevailing in different countries in addition to relating it to the practice in the field in this country.

The composition of the Sectional Committee responsible for the formulation of this standard is given in Annex A.

For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS 2 : 1960 'Rules for rounding off numerical values (*revised*)'. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

AMENDMENT NO. 2 FEBRUARY 2009
TO
IS 1322 : 1993 BITUMEN FELTS FOR WATER-PROOFING AND DAMP-PROOFING — SPECIFICATION

(Fourth Revision)

[*Page* 2, *clause* **6** (*see also Amendment No.* 1)] — Substitute the following for the existing clause:

'Unless specified otherwise, bitumen felts shall be supplied in widths of 90 cm or 100 cm and in lengths of 10 m or 20 m. Tolerances on width shall be ±3 cm. Length shall not be less than the specified values.'

(CED 41)

AMENDMENT NO. 1 AUGUST 1995
TO
IS 1322 : 1993 BITUMEN FELTS FOR WATER-PROOFING AND DAMP-PROOFING — SPECIFICATION

(Fourth Revision)

[*Page* 1, *clause* **4.3.1**(a), *ninth line*] — Substitute '[*see* IS 460 (Part 1) : 1985]' *for* '[*see* IS 460 (Part 1) : 1978]'.

(*Page* 2, *Table* 1) — Substitute '4.5' *for* '3.6' and '5.7' *for* '4.5' in col 4.

(*Page* 2, *clause* **6**) — Substitute the following for the existing matter:

'Unless otherwise specified, bitumen felts shall be supplied in widths of 90 cm or 100 cm and generally in lengths of 10 m or 20 m.'

(*Page* 3, *clause* **7.1**) — Substitute 'Pliability test after conditioning the sample for 3 h at 5°C' *for* 'Pliability test' and 'Heat resistance test conducted at 68 ± 2°C' *for* 'Heat resistance test'.

(*Page* 3, *clause* **7.1**, *Note* 1) — Substitute the following for the existing note:

'1 Diameter of Mandrel for pliability shall be as follows:

Type 1 Type 2 Type 3, Grade 1	50.0 mm
Type 3, Grade 2	75.0 mm'

(*Page* 3, *clause* **7.1**, *Note* 2) — Substitute 'three' *for* 'two' in the first line.

(*Page* 3, *clause* **9.1.1**) — Add the following matter below '**9.1.1** *Lot*':

'All the rolls of the same type and grade and from the same batch of manufacture, in one consignment shall constitute a lot.'

(*Page* 3, *clause* **9.1.2.1**, *para* 2, *lines* 6 *and* 7) — Insert 'n is' between the words 'lot, and' and 'the number'.

(*Page* 4, *Table* 2) — Substitute '(*Clauses* 7 and 8)' *for* '(Clauses 6 *and* 8)' below the title.

(CED 41)

Indian Standard

BITUMEN FELTS FOR WATER-PROOFING AND DAMP-PROOFING — SPECIFICATION

(Fourth Revision)

1 SCOPE

This standard covers the requirements for saturated bitumen felts (underlay) and self-finished bitumen felts used for water-proofing and damp-proofing.

2 REFERENCES

The Indian Standards listed in Annex B are necessary adjuncts to this standard.

3 CLASSIFICATION

3.1 Bitumen felts shall be classified as given in **3.1.1** and **3.1.2** depending upon the type of base used in their manufacture and the uses to which the felts are suited.

3.1.1 *Fibre Base*

Type 1 — Saturated felt for underlay

Type 2 — Self finished felt (for water-proofing)

3.1.2 *Hessian Base*

Type 3 — [Self-finished felt (for water-proofing) — Grade 1]

— [Self-finished felt (for damp-proofing) — Grade 2]

4 MATERIALS

4.1 Base Fabrics

4.1.1 *Fibre-Base Felt*

The base fabric for fibre-base felts shall consist of a suitable blend of vegetable and/or animal fibres. The weight of ash on incineration of the fabric shall not exceed 10 percent of its original weight.

4.1.2 *Hessian Base Fibre*

The fabric shall conform to Type II hessian conforming to IS 2818 (Part 2) : 1971.

4.2 Bituminous Saturant

4.2.1 *Composition*

The saturant used in the case of all types of felt shall conform to IS 73 : 1992 with a penetration of not less than 80 at 25°C (*see* IS 1203 : 1978).

4.2.2 *Weight*

The weight of the saturant shall be not less than 110 percent of the weight of the untreated felt for fibre-base felts and not less than 60 percent of the weight of the untreated fabric for hessian base felts subject to the minimum weight given in Table 1.

4.3 Bituminous Coatant

4.3.1 *Composition*

a) The bituminous coatant used for Types 2 and 3 felts shall consist of bitumen conforming to IS 702 : 1988, with or without admixture of bitumen conforming to IS 73 : 1992 and inert and water insoluble fine mineral filler which shall pass 100 percent through 150-micron Sieve and 95 percent through 75 micron Sieve [*see* IS 460 (Part 1) : 1978] or inert and water insoluble fibrous mineral filler.

b) The inert filler shall not exceed 42 percent by weight of the coatant, subject to the minimum weight specified in Table 1 for coatant.

4.3.2 The bituminous coatant shall have a softening point of not less than 105°C when measured by the Ring and Ball method (*see* IS 1205 : 1978) and a penetration of not less than 7 at 25°C (*see* IS 1203 : 1978). The coatant shall be designed so that the finished felts comply with high temperature storage test and the low- temperature pliability test.

4.3.3 *Weight*

The weight of the coatant shall comply with the minimum weights specified in Table 1 for Type 2 and Type 3 felts.

4.4 Mineral Powder for Dusting

4.4.1 *Composition*

The mineral powder shall be powdered mineral matter, for example, mica, talc or slate, passing through 600-micron IS Sieve [*see* IS 460 (Part 1) : 1985].

Table 1 Minimum Weight of Bitumen Felt (in kg)

(*Clauses, Foreword,* 4.2.2, 4.3.1(b), 4.3.3, 5.4 *and* 7.2)

Sl No.	Type of Felt	For 10 m²				
		Untreated Base (*see* Note 1)	Saturant	Coatant	Bitumen Content	Total Weight of the Finished Bitumen Felt in Dry Condition with Mica Dusting Powder, *Min* (*see* Notes 2 and 3)
(1)	(2)	(3)	(4)	(5)	(6)	(7)
a)	Fibre Base					
	i) Type 1 Underlay	4·0	3·6	—	3·6	7·6
	ii) Type 2 Self finished felt	5·0	4·5	12·9	12·0	22·6
b)	Hessian Base					
	i) Type 3 Self finished felt Grade 1	2·3	1·8	17·7	12·1	23·0
	ii) Type 3 Self finished felt Grade 2	2·3	1·8	31·8	20·2	37·1

NOTES

1 The weight of the untreated base shall be taken as in dry condition for fibre base felts. In the case of hessian base the weight of untreated base shall conform to IS 2818 (Part 2) : 1971.

2 Include allowance for 1·2 kg minimum mica dusting powder in dry condition except for Type 1.

3 When other type of mineral powders are used, the weights shown in the last column shall be changed on the basis of **4.4.2**.

4.4.2 *Weight*

The weight of the dusting powder incorporated shall be as follows:

a) Mica powder — 1·2 to 2 kg/10 m²

b) Talc powder — 1·5 kg to 2·25 kg/10 m²

c) Slate powder — 1·5 kg to 2·25 kg/10 m²

5 MANUFACTURE

5.1 The base fabric, fibre or hessian, after the removal of the major portion of the inherent moisture, shall be saturated by immersion in the bitumen maintained in a molted condition and the surplus saturant shall be removed. The manufacture of the underlay, that is, Type 1 felt, is complete at this stage.

5.2 The base fabric shall be thoroughly and uniformly saturated.

5.3 For the manufacture of self-finished felts, the saturated felt shall be treated by passing through the bituminous coatant material. The coatant shall be uniformly applied. The resultant coated felts shall be given a superficial application of fine mineral powder.

5.4 Weight

The weights of the ingredients of bitumen felts for 10 m² shall be not less than those specified in Table 1 during process.

5.5 The finished material shall be free from visible external defects, such as holes, oil patches, ragged or untrue edges, breaks, cracks, tears, protuberances and indentations.

6 DIMENSIONS

Unless otherwise specified, bitumen felts shall be supplied in width of 90 cm or 100 cm and in lengths of 10 m or 20 m.

7 OTHER REQUIREMENTS OF BITUMEN FELTS

7.1 Bitumen felts shall be subjected to the following tests, in addition to bitumen content test as per **7.2**, and shall conform to the requirements given in Table 2. Sample shall be cut as explained in Fig. 1

Type	*Test*	*References to*
Type 1 Underlay	Breaking strength test	IS 13826 (Part 1) : 1993
	Pliability test	IS 13826 (Part 2) : 1993
Type 2 and Type 3 All grades	Breaking strength test	IS 13826 (Part 1) : 1993
	Pliability test	IS 13826 (Part 2) : 1993
	Storage sticking test	IS 13826 (Part 3) : 1993
	Pressure head test	IS 13826 (Part 4) : 1993
	Heat resistance test	IS 13826 (Part 5) : 1993
	Water absorption test	IS 13826 (Part 6) : 1993

NOTES

1 Diameter of Mandrel for pliability shall be as follows:

Type 1, Type 2, Type 3, Grade 2	50·0 mm
Type 3, Grade 2	75·0 mm

2 The tests shall be carried out not earlier than two days from the date of manufacture.

7.2 Total Bitumen Content

The minimum weight of bitumen in the bitumen felts, when determined in accordance with IS 13826 (Part 7) : 1993 shall conform to the values given in col 6 of Table 1.

8 TESTS

Tests shall be carried out as per the relevant standards mentioned in 7 and as specified in col 2 to 8 of Table 2.

9 SAMPLING AND CRITERIA OF CONFORMITY

9.1 Sampling

9.1.1 *Lot*

9.1.1.1 The conformity of the lot to the requirements of this standard shall be determined on the basis of inspection and tests carried out on the samples selected from the lot.

9.1.2 The number of rolls to be selected from the lot shall depend upon the size of the lot and shall be in accordance with col 1 and 2 of Table 3.

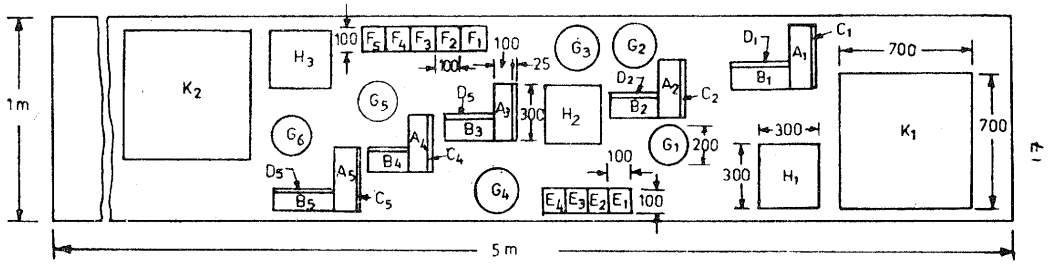
9.1.2.1 These rolls shall be selected at random from the lot, and in order to ensure randomness of selection, random number tables may be used. In case random number tables are not available, the following procedure may be adopted for the selection of the rolls.

Starting from any roll in the lot count them as 1, 2, 3, ... , r, and so on, in order. Every rth roll thus counted may be selected till the requisite number of rolls for the sample is obtained, r being the integral part of N/n, where N is the number of rolls in the lot, and the number of rolls to be selected in the sample.

9.1.3 *Test Samples and Number of Tests*

9.1.3.1 All the rolls selected in **9.1.2** shall be inspected for width, length and visible external defects.

9.1.3.2 The number of rolls to be tested for breaking strength, pliability and storage sticking, heat resistance, water absorption test, pressure head test and binder content shall be in accordance with col 4 of Table 3. These rolls



A, B—Breaking Strength C, D—Pliability E—Storage Sticking
F—Heat Resistance G—Pressure Head H—Water Absorption K—Binder Content

All dimensions in millimetres.

FIG. 1 TYPICAL LAYOUT FOR CUTTING TEST PIECES FROM THE ROLL

shall be taken at random from those inspected under **9.1.3.1** and found satisfactory for dimensions. From each of these rolls, one test sample 5 m long and the full width of the felt shall be cut out for preparing test specimens. Test sample shall not be taken from damaged portion of the roll, if any. The required number of test specimens shall be taken from each of the test sample and subjected to the corresponding tests.

9.1.3.3 From each sample the test specimens shall be cut out in the manner shown in Fig. 1 which depicts the layout of test specimens.

Table 2 Requirements of Bitumen Felts

(*Clauses* 6 *and* 8)

Type of Felt	Breaking Strength, *Min*, Kg		Pliability Test	Storage Sticking Test	Heat Resistance Test	Pressure Head Test	Water Absorption Test, *Max*
	Warpway	Weftway					
	IS 13826 (Part 1) : 1993		IS 13826 (Part 2) : 1993	IS 13826 (Part 3) : 1993	IS 13826 (Part 5) : 1993	IS 13826 (Part 4) : 1993	IS 13826 (Part 6) : 1993
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Type 1	72	24	i) The roll shall not show cracks on unrolling	—	—	—	—
			ii) Consider any surface rupture exceeding 5 mm in length as failure	—	—	—	—
Type 2	95	60	i) The roll shall not show cracks on unrolling	The test pieces shall be examined after cooling	The test pieces shall show no sign of melting of the bitumen compound	The test pieces shall show no sign of leakage	5·0 per cent
			ii) Consider any surface rupture exceeding 5 mm in length as failure	After release of the load, the layers of felt shall be capable of being separated without damaging the coatant, in any way	—	—	—
Type 3 (all grades)	135	90	i) The roll shall not show cracks on unrolling	The test pieces shall be examined after cooling	The test pieces shall show no sign of melting of the bitumen compound	The test pieces shall show no sign of leakage	2·0 per cent
			ii) Consider any surface rupture exceeding 5 mm in length as failure	After release of the load, the layers of felt shall be capable of being separated without damaging the coatant in any way	—	—	—

NOTE — Appropriate tests for the above requirements are described in 7.

Table 3 Sample Size and Criterion of Conformity

[*Clauses* 9.1.2, 9.1.3.2 *and* 9.1.4.1(a)]

No. of Rolls in the Lot	No. of Rolls to be Selected in the Sample	Permissible No. of Defective Rolls	Sub-Sample Sizes, No. of Rolls to be Selected in the Sample
(1)	(2)	(3)	(4)
Up to 100	5	0	2
101 to 150	8	0	3
151 to 300	13	0	4
301 to 500	20	1	5
501 to 1 000	32	2	6
1 001 to 3 000	50	3	8
3 001 and above	80	5	10

9.1.4 Criteria for Conformity

9.1.4.1 The lot shall be considered to be in conformity with the requirements of the standard if the following conditions are satisfied:

a) The number of rolls found defective with respect to any characteristics mentioned in **9.1.3.1** does not exceed the corresponding number given in col 3 of Table 3.

b) From the observed values of breaking strength, the average X and the range R are calculated for each direction (that is, warp-way and weftway) separately, and the value of the expression $X - 0{\cdot}6R$ is found to be greater than or equal to the applicable specified value.

NOTES

1 Average X is the value obtained by dividing the sum of the observed values by the number of observed values.

2 Range R is the difference between the maximum and the minimum in a set of observed values.

c) All the sample rolls tested for water absorption shall satisfy the conditions of IS 13826 (Part 6) : 1993 individually.

d) For the other characteristics mentioned in **9.1.3.2** (except breaking strength and water absorption), all the test pieces satisfy all the requirements of the characteristics individually.

10 PACKING AND MARKING

10.1 Packing

Unless otherwise specified, bitumen felts should be securely packed in rolls. The rolls of hessian base Type 3 bitumen felts shall be wound on cores and the fibre base Types 1 and 2 bitumen felts need not be wound on cores, but they shall be securely wrapped in a kraft paper of the same width as the fabric. The wrapper shall completely encircle the roll and shall be pasted at the overlap in manner that will prevent it from opening out. The ends of the roll need not be covered.

10.2 Marking

Each package shall be legibly and indelibly marked with the following information:

a) Indication of the source of manufacturer;

b) Type and grade of the bitumen felt;

c) Length, width and weight of the roll; and

d) Batch number in code and date of manufacture.

ANNEX A
(*Foreword*)

COMMITTEE COMPOSITION
Water Proofing and Damp-Proofing Sectional Committee, CED 41

Chairman	*Representing*
PROF M. S. SHETTY	In personal capacity (*No. 4, Sapan Baug, Near Empress Garden, Pune 411001*)
Members	
CAPT ASHOK SHASTRY	Osnar Chemical Pvt Ltd, Bombay
SHRI S. K. BANERJEE (*Alternate*)	
SHRI T. CHAUDHURY	National Test House (ER), Calcutta
SHRI B. MANDAL (*Alternate*)	
DIRECTOR (DESIGN)	National Buildings Organization, New Delhi
SHRI D. C. GOEL	Central Road Research Institute, New Delhi
SHRI A. K. GUPTA	Engineers India Ltd, New Delhi
SHRI D. MOUDGIL (*Alternate*)	
SHRI A. K. GUPTA	Metro Railway, Calcutta
SHRI K. RAJGOPALAN (*Alternate*)	
SHRI M. B. JAYAWANT	Synthetic Asphalts, Bombay
SHRI MOIZ S. KAGDI	Polyseal India Engineering Centre, Bombay
SHRI SUREN M. THAKKER (*Alternate*)	
SHRI M. K. KANCHAN	Central Public Works Department, CDO
SHRI K. D. NARULA (*Alternate*)	
BRIG V. K. KANITKAR	Engineer-in-Chief's Branch, Army Headquarters, New Delhi
SHRI C. S. S. RAO (*Alternate*)	
SHRI M. H. KHATRI	Overseas Water-Proofing Corporation Ltd, Bombay
SHRI A. BOSE (*Alternate*)	
SHRI Y. P. KAPOOR	Fosroc India Ltd, Bangalore
SHRI V. NATARAJAN (*Alternate*)	
SHRI H. C. METAI	Building Materials & Technology Promotion Council, New Delhi
SHRI M. M. MATHAI	Cempire Corporation, Madras
SHRI R. D. NAYAK	Bharat Petroleum Corporation Ltd, Bombay
SHRI P. C. SRIVASTAVA (*Alternate*)	
COL (Retd) D. V. PADSALGIKAR	B. G. Shirke & Co, Pune
SHRI R. P. PUNJ	Lloyd Bitumen Products Pvt Ltd, Calcutta
SHRI A. K. SEN (*Alternate*)	
SHRI RAVI WIG	MES Builders' Association of India, New Delhi
SHRI K. K. MADHOK (*Alternate*)	
SHRI T. K. ROY	STP Ltd, Calcutta
SHRI B. B. BANERJEE (*Alternate*)	
SHRI SAMIR SURLAKER	MC-Bauchemic (India) Ltd, Bombay
SHRI JAYANT DEOGAONKAR (*Alternate*)	
SHRI R. SARABESWAR	Integrated Water-proofing Ltd, Madras
SR DEPUTY CHIEF ENGINEER	Public Works Department, Government of Tamil Nadu
SUPERINTENDING ENGINEER (Madras Circle) (*Alternate*)	
SHRI A. SHARIFF	FGP Ltd, Bombay
SHRI D. KUSHWAHA (*Alternate*)	
SHRI J. S. SHARMA	Central Building Research Institute (CSIR), Roorkee
SHRI R. S. RAWAT (*Alternate*)	
SHRI SRAMAL SENGUPTA	Projects and Development India Ltd, Dhanbad
SHRI U. R. P. SINHA (*Alternate*)	
SHRI J. VENKATARAMAN, Director (Civ Engg)	Director General, BIS (*Ex-Officio Member*)

Secretary

SHRI J. K. PRASAD
Joint Director (Civ Engg), BIS

ANNEX B

(*Clause* 2)

LIST OF REFERRED INDIAN STANDARDS

IS No.	*Title*
73 : 1992	Specification for paving bitumen (*second revision*)
460 (Part 1) : 1985	Specification for test sieves: Part 1 Wire cloth test sieves (*third revision*)
702 : 1988	Specification for industrial bitumen (*second revision*)
1203 : 1978	Methods of testing tar and bituminous materials: Determination of penetration (*first revision*)
1205 : 1978	Methods for testing tar and bituminous materials: Determination of softening point (*first revision*)
2818 (Part 2) : 1971	Specification for Indian hessian: Part 2 305 and 229 g/m² at 16 percent contract regain (*first revision*)
13826	Methods of tests for bitumen based felt :
(Part 1) : 1993	Breaking strength test
(Part 2) : 1993	Pliability test
(Part 3) : 1993	Storage sticking test
(Part 4) : 1993	Pressure head test
(Part 5) : 1993	Heat resistance test
(Part 6) : 1993	Water absorption test
(Part 7) : 1993	Determination of binder content

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