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IS 1838-3 (2011): Preformed Fillers for Expansion Joints in Concrete Pavements and Structures(non-extruding and resilient type) Part 3 Polymer Based [CED 13: Building Construction Practices including Painting, Varnishing and Allied Finishing]



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“Knowledge is such a treasure which cannot be stolen”



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*भारतीय मानक*

कंक्रीट पटरी व संरचनाओं (नॉन एक्सट्रूडिंग व रेज़ीलियेन्ट प्रकार की) के लिए पहले से तैयार भरण सामग्री — विशिष्टि

भाग 3 पॉलिमर आधारित

*Indian Standard*

**PREFORMED FILLERS FOR EXPANSION JOINTS IN  
CONCRETE PAVEMENTS AND STRUCTURES  
(NON-EXTRUDING AND RESILIENT TYPE) —  
SPECIFICATION**

**PART 3 POLYMER BASED**

ICS 91.100.10

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

## FOREWORD

This Indian Standard (Part 3) was adopted by the Bureau of Indian Standards, after the draft finalized by the Building Construction Practices Sectional Committee had been approved by the Civil Engineering Division Council.

Joints are required in concrete pavements, roads, runways, floor and roof slabs in buildings to relieve stresses developed due to temperature shrinkage, creep, relaxation, vibration, etc. To provide an even surface these joints must be filled and at the same time the materials used for filling should permit expansion and contraction of the concrete member. The joint filler is a strip of compressible material used to form and fill the expansion joints in structures. The chief function of the joint filler is to permit the joint to expand without developing stresses. Joint filler are produced from a variety of materials such as bitumen impregnated fibre, cork strips, sponge or synthetic rubber, expanded plastics, epoxy, coconut pith and CNSL resin.

To make the joints effective it is also necessary to prevent the ingress of water or grit down the joint. This is achieved by using a sealing compound over the joint filler. The requirement for sealing compounds and methods of installation of joints has been covered separately in IS 1834 : 1984 'Specification for hot applied sealing compound for joints in concrete (*first revision*)', IS 3414 : 1968 'Code of practice for design and installation of joints in buildings', IS 6509 : 1985 'Code of practice for installation of joints in concrete pavements (*first revision*)', IS 11433 (Part 1) : 1985 'Specification for one-part gun-grade polysulphide-based joints sealants: Part 1 General requirements' and IS 12118 (Part 1) : 1987 'Specification for two parts polysulphide based sealants: Part 1 General requirements'.

This standard is published in three parts. Other parts are:

- Part 1 Bitumen impregnated fibre
- Part 2 CNSL aldehyde resin and coconut pith

This standard has been published to cover the requirements for polymer based filler type of expansion joint fillers.

The composition of the Committee responsible for the formulation of this standard is given at Annex B.

For the purpose of deciding whether a particular requirement of this standard is complied with the final value, observed or calculated, expressing the results 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.

*Indian Standard*

# PREFORMED FILLERS FOR EXPANSION JOINTS IN CONCRETE PAVEMENTS AND STRUCTURES (NON-EXTRUDING AND RESILIENT TYPE) — SPECIFICATION

**PART 3 POLYMER BASED****1 SCOPE**

**1.1** This standard (Part 3) specifies the requirements for polymer based fillers for expansion joints.

**1.1.1** The fillers may be used for filling expansion joints such as in buildings, concrete pavements and other structures.

**2 REFERENCES**

The following standards contain provisions which through reference in this text, constitute provisions of this standard. At the time of publication, the editions indicated were valid. All standards are subject to revision and parties to agreement based on this standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below:

| <i>IS No.</i>         | <i>Title</i>   |
|-----------------------|--|
| 10566 : 1983          | Methods of tests for preformed fillers for expansion joints in concrete paving and structural construction |
| 12118 (Part 1) : 1987 | Specification for two parts poly-sulphide based sealants: Part 1 General requirements                      |

**3 MATERIAL**

The material used shall be pre-moulded cross-linked polymers that are non-absorbent, non-staining, non-deteriorating, closed-cell and compressible in nature and may undergo stretching.

**4 MANUFACTURE**

The materials shall be suitably polymerized to obtain fillers for appropriate use conforming to the requirements laid down in this standard.

**5 DIMENSIONS AND TOLERANCES****5.1 Dimensions**

Typical dimensions of individual filler member are as follows:

|           |   |
|-----------|---|
| Length    | : 1 800 mm, 2 200 mm                      |
| Width     | : 900 mm, 1 100 mm                        |
| Thickness | : 8 mm, <i>Min</i><br>: 50 mm, <i>Max</i> |

Alternatively, the dimensions of the preformed strips shall be mutually agreed between the purchaser and the manufacturer. For dimensional measurements, a reference may be made to IS 10566.

**5.2 Tolerance**

The tolerance on the average dimensions shall be as given below:

|              |                |
|--------------|----------------|
| On length    | : $\pm 5$ mm   |
| On width     | : $\pm 3$ mm   |
| On thickness | : $\pm 1.5$ mm |

**6 PHYSICAL REQUIREMENTS**

The physical requirement of the fillers shall conform to col 3 of Table 1 when tested in accordance with the method specified in IS 10566.

**7 INSTALLATION**

For general guidance in installing the preformed fillers, the provisions in Annex A may be referred.

**8 PACKING**

The performed joint fillers shall be packed in such a manner that there shall be no distortion or breakage of the fillers or deterioration of their properties during transportation.

**9 MARKING**

**9.1** The packages shall be marked with the manufacturer's name or trade-mark, if any, dimensions and type of filler.

**9.2 BIS Certification Marking**

Each package may also be marked with the Standard Mark.

**Table 1 Physical Requirements of Fillers**  
(Clause 6)

| Sl No. | Characteristic         | Requirement  | Method of Test, Ref to IS |
|--------|------------------------|--|---------------------------|
| (1)    | (2)                    | (3)  | (4)                       |
| i)     | Resistance to handling | Filler strips shall not be deformed or broken by twisting, bending or other types of ordinary handling when exposed to atmospheric conditions ( <i>see</i> Note)                               | —                         |
| ii)    | Recovery               | 90 percent, <i>Min</i>   | 10566                     |
| iii)   | Compression            | a) Load required to compress the specimen to 50 percent of its original thickness before the test shall be,<br>1) 7 kgf/cm <sup>2</sup> , <i>Min</i><br>2) 53 kgf/cm <sup>2</sup> , <i>Max</i> | 10566                     |
| iv)    | Extrusion              | Amount of extrusion of the free edge shall not exceed 6 mm   | 10566                     |
| v)     | Water absorption       | 1 percent, <i>Max</i>  | 10566                     |
| vi)    | Density                | 100 ± 10 kg/m <sup>3</sup> , <i>Min</i>  | 10566                     |
| viii)  | Weathering             | a) Shall show no sign of disintegration, delamination or separation after the test<br>b) Shall satisfy the requirement of recovery, compression and extrusion after the test                   | 10566                     |

NOTE — Pieces of the joint filler that have been damaged shall be rejected.

**9.2.1** The use of the Standard Mark is governed by the provisions of the *Bureau of Indian Standards Act*, 1986 and the Rules and Regulations made thereunder. The details of conditions under which the licence for the use of the Standard Mark may be granted to manufacturers or producers may be obtained from the Bureau of Indian Standards.

## 10 SAMPLING

### 10.1 Number of Samples

One representative sample shall be selected from each lot of 100 m<sup>2</sup> of the material having same thickness.

The sampling shall be done at random.

### 10.2 Size of Sample

Each sample shall consist of sufficient material so that five test pieces measuring 100 mm × 100 mm could be obtained.

### 10.3 Tests

All the test pieces as selected in **10.2** shall be subjected to dimensional and physical requirements. The lot shall be accepted, if all the five test pieces meet the physical and dimensional requirements; otherwise not.

## ANNEX A (Clause 7)

### TYPICAL LAYING PROCEDURE

#### A-1 LAYING PROCEDURE

**A-1.1** Expansion joints are full depth joints provided transversely in concrete pavements and also between structural members of a structure like slabs, beams and columns, etc to allow their expansion and contraction without stressing them. The cross-linked closed cell polymer filler may be used as shuttering on one side of the expansion joint by abutting with the already cast RCC member and fixed in proper position by using double sided adhesive tape or synthetic rubber adhesive as per manufacturer's recommendations. Both open ends of the polyethylene filler (already fixed on exposed face of structural member) shall be restrained and kept in position with the normal shuttering materials as per the manufacturer's recommendations.

**A-1.2** When forming expansion joint with the polymer based filler in cast-*in-situ* concrete, joint sealing slots are to be formed in the following manner:

- Shape of the field moulded sealant is important as it is subjected to compression and tension during expansion and contraction phases of concrete members. The sealants which are solid at service temperatures are likely to change in their shape when subjected to varying temperatures and humidity, but their volume will remain same. The shape of the sealant is important as strains developed in them during expansion and contraction should not exceed the permissible limit recommended by the manufacturers. In all the

cases, width and total depth of expansion joint is always known but only depth of the sealant is to be worked out which varies depending on the location and its environmental conditions like temperature and humidity etc, around the place. For further details on sealants, *see* IS 12118 (Part 1).

- b) For cast-*in-situ* concrete work in respect of concrete pavements as well as structures, the polymer based filler board is used in expansion joint as one side shuttering for the entire depth of concrete. To enable application of sealant in the expansion joint groove, the filler board has to be cut according to requirements and removed upto the sealant depth. In order to achieve this requirement, the filler board provided for the entire depth, is cut up-to sealant depth 'D' for the entire length and further subdivided into two or more lengths as per site requirements and convenience, before concreting of the adjoining panel. This cut top strip is pinned

back on to the bottom strip using nails at two-inch intervals or as per recommendations of the manufacturers, after ensuring that the slot is clean and dry. Also install a strip of filler material on top of the filler, flush with the finished surface using either a tape/synthetic rubber based adhesive. This top strip shall remain in this position till completion of concreting (including water curing and drying the concrete surface completely) in adjoining panel, before application of sealants in the joint groove. This top strip shall however be removed at the time application of sealants in the expansion joint groove (*see* Fig.1).

**A-1.3** The filler material may also be used as shuttering on one side the expansion joint by abutting with the already cast member. To hold the two free sides of shuttering, suitable MS bolts both threaded sides may be used at every regular interval (say 1 m) and secured with concrete using appropriate nuts. These bolts shall be taken out later and the hole grouted with suitable cement mortar (*see* Fig. 2)

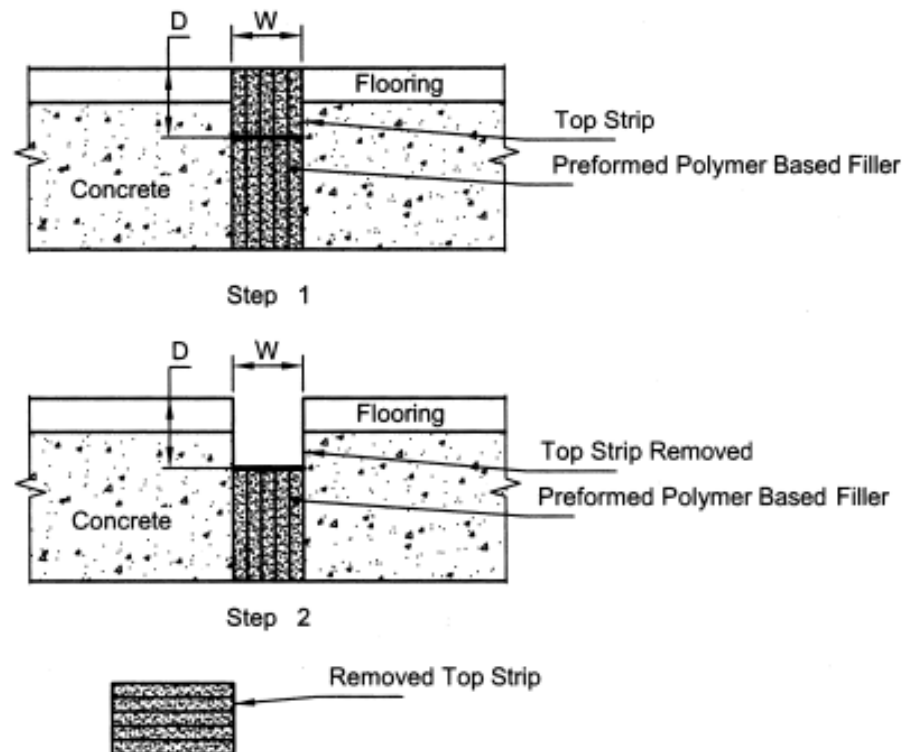
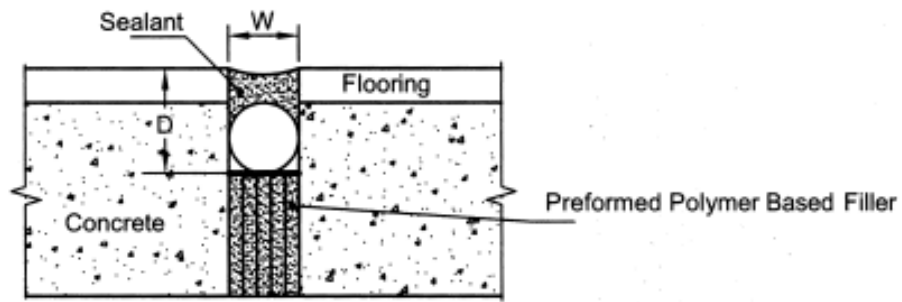
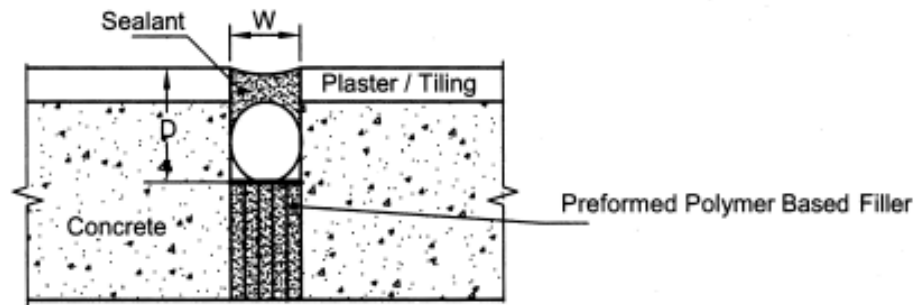


FIG. 1 TYPICAL INSTALLATION DETAILS—*Continued*





Step 3 Complete Expansion Joint Treatment  
for Horizontal Surface (Floor)



Step 4 Complete Expansion Joint Treatment  
for Vertical Surface (Wall)

FIG. 1 TYPICAL INSTALLATION DETAILS

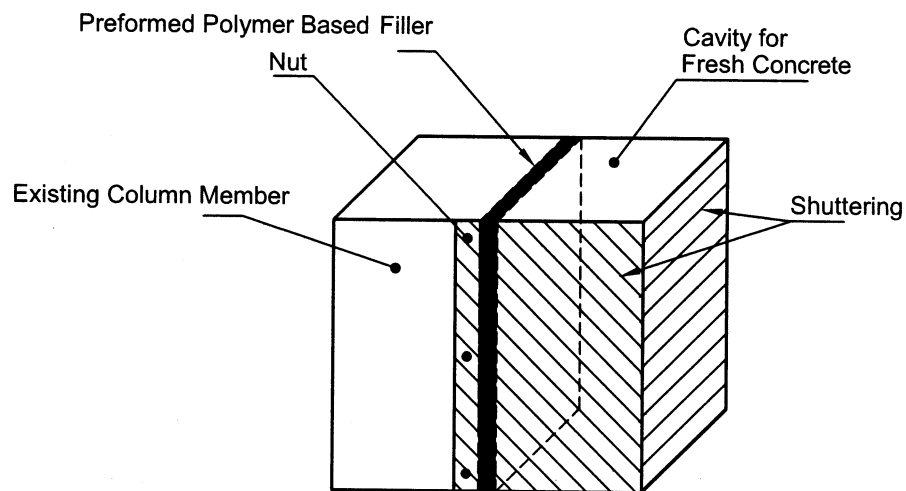


FIG. 2 TYPICAL LAYOUT OF USE OF PREFORMED POLYMER BASED FILLER AS SHUTTERING TO COLUMN MEMBER

**ANNEX B***(Foreword)***COMMITTEE COMPOSITION****Building Construction Practices Sectional Committee, CED 13**

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Scientist 'C' (Civ Engg), BIS

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This Indian Standard has been developed from Doc No.: CED 13 (7733).

### Amendments Issued Since Publication

| Amend No. | Date of Issue | Text Affected |
|-----------|---------------|---------------|
|           |               |               |
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### BUREAU OF INDIAN STANDARDS

#### Headquarters:

Manak Bhavan, 9 Bahadur Shah Zafar Marg, New Delhi 110 002

Telephones : 2323 0131, 2323 3375, 2323 9402

Website: [www.bis.org.in](http://www.bis.org.in)

#### Regional Offices:

Telephones

|          |  |  |
|----------|--|--|
| Central  | : Manak Bhavan, 9 Bahadur Shah Zafar Marg<br>NEW DELHI 110002            | { 2323 7617<br>2323 3841                       |
| Eastern  | : 1/14 C.I.T. Scheme VII M, V. I. P. Road, Kankurgachi<br>KOLKATA 700054 | { 2337 8499, 2337 8561<br>2337 8626, 2337 9120 |
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