



Geosynthetics — Geogrids used in Reinforced Soil Retaining Structures — Specification
IS 17373: 2020 के अनुसार

PRODUCT MANUAL
FOR Geosynthetics — Geogrids used in Reinforced Soil Retaining Structures — Specification
ACCORDING TO IS 17373: 2020

विभिन्न उत्पादों के लिए भारतीय मानक ब्यूरो (अनुरूपता मूल्यांकन) विनियम, 2018 की योजना -I के तहत प्रमाणन के संचालन में एकरूपता और पारदर्शिता के लिए इस उत्पाद मैनुअल का उपयोग सभी क्षेत्रीय / शाखा कार्यालयों और लाइसेंसधारियों द्वारा संदर्भ सामग्री के रूप में किया जाएगा। दस्तावेज़ का उपयोग बीआईएस प्रमाणन प्राप्त करने के इच्छुक संभावित आवेदकों द्वारा भी किया जा सकता है।

This Product Manual shall be used as reference material by all Regional/Branch Offices & licensees to ensure uniformity of practice and transparency in operation of certification under Scheme-I of Bureau of Indian Standards (Conformity Assessment) Regulations, 2018 for various products. The document may also be used by prospective applicants desirous of obtaining BIS certification.

1.	मानक संख्या IS No.	:	IS : 17373 : 2020
	शीर्षक Title	:	Geosynthetics — Geogrids used in Reinforced Soil Retaining Structures -Specification
	संशोधनों की संख्या No. of amendments	:	03
2.	नमूना दिशानिर्देश Sampling Guidelines		
a)	कच्चा माल Raw material	:	Raw material of geogrids shall be as per Cl. 5 of IS 17373 Conformity of raw materials to the prescribed requirement shall be established by supplier test certificate/test report from BIS recognized lab/empanelled lab or any other lab having accreditation as per IS/ISO/IEC17025 or inhouse testing/combination thereof. Note: This section indicates the requirements for raw material (if specified in the IS) for which compliance is to be established during Grant of Licence/Change in Scope of Licence/Factory Surveillance
b)	समूहीकरण दिशानिर्देश Grouping Guidelines	:	Please refer to Annex-A

c)	नमूने का परिमाण Sample Quantity	:	Full width sample with sufficient length to form a minimum of 04 sq m of sample and One bobbin of Fibre or Yarn of 01 kg, min. Note: This section indicates the quantity of the sample of the product and/or the raw material (if applicable), required to be sent to the laboratory for testing, for the purpose of Grant of Licence/Change in Scope of Licence/ Factory Surveillance (in case of market surveillance, effort may be made to procure the required quantity of product sample, as far as possible since rawmaterial sample may not be available in market)
d)	परीक्षण अनुरोध में घोषित किए जाने वाले पैरामीटर Parameters to be Declared in Test Request	:	i. Type of Geogrids Based on Tensile Strength and Aperture Size ii. Type of Geogrids Based on Physical Property iii. Tensile Strength iv. Aperture size Note: Apart from the above, any other requirements/parameters may also be declared as per the standard, as applicable.
e)	Surveillance Sampling Guidelines	:	One Factory Sample shall be tested for all requirements while two Market Samples may be tested for all requirements except UV resistance, strength retained after 500 h exposure and Chemical resistance, strength retained after 72 h immersion in an operative year.
3.	परीक्षण उपकरणों की सूची List of Test Equipment	:	Please refer to Annex-B
4.	ननरीक्षण और परीक्षण की स्कीम Scheme of Inspection and Testing	:	Please refer to Annex-C
5.	एक दिन में संभावित परीक्षण Possible tests in a day		
	a) Dimensional Stability (CI 6.1) b) Ultimate tensile strength (Table 1, 2 and 3, Sl. No. i), CI 6.2) c) Elongation at Designated Load (Table 1, 2 and 3, Sl. No. ii), CI 6.2) d) Width (Table 1, 2 and 3, Sl. No. v), CI 6.2) e) Roll Length (Table 1, 2 and 3, Sl. No. vi), CI 6.2) Note: This section is for the guidance of BIS Certification Officers/Technical Auditors of BIS Authorized Outside Surveillance Agencies(OSAs) during factory inspection to provide ready reference regarding the tests which can be witnessed during the inspection in the factory by the officer/auditor.		
6.	लाइसेंस का दायरा /Scope of the Licence:		
	Licence is granted to use Standard Mark as per IS 17373 : 2020 with the following scope:		
	Name of the product	Geosynthetics — Geogrids used in Reinforced Soil Retaining Structures	
	Type of Geogrids Based on Tensile Strength and Aperture Size	- Type 1; - Type 2; or - Type 3;	
	Type of Geogrids Based on Physical Property	- Rigid or - Flexible	
	Tensile Strength	As per Table 1, 2 & 3	

ANNEX-A

GROUPING GUIDELINES

1. Based on the tensile Strength and aperture size, following types of geogrids have been specified in the Standard:
 - i. Type-1
 - ii. Type-2
 - iii. Type-3
2. Geogrids may be of below 2 types based on physical property:
 - i. Rigid
 - ii. Flexible
3. Further, each type has been sub-categorized in different categories based on the Ultimate tensile strength:
 - i. Type-1: 60/20, 80/30, 100/30, 120/30, 150/30, 180/30, 200/30, 250/30, 300/30, 350/30 & 400/30.
 - ii. Type-2: 30/5, 40/5, 50/5, 60/5, 70/5, 80/5, 90/5, 100/5, 120/5, 1308/5, 140/5, 150/5, 175/5, 200/5, 250/5 & 300/5.
 - iii. Type-3: 300, 350, 400, 500, 600, 700, 800, 900, 1000, 1100, 1200, 1300, 1400, 1500 & 1600.
4. Considering the above, following grouping guidelines have been prepared for GOL/CSOL:
 - i. Sample of each type of Geogrid shall be tested to be included in the scope of licence.
 - ii. Sample of Rigid geogrid and Flexible geogrid shall be tested separately to be included in the scope of licence.
 - iii. Sample of geogrid with minimum and maximum tensile strength for a particular variety (Type-1/Type-2/Type-3 and Rigid/Flexible) shall be tested to cover all the tensile strengths that lies in that range.
 - iv. Scope of licence shall be restricted based on the manufacturing and testing facilities available.
 - v. During operation of licence, samples of each variety covered in the scope of licence, shall be tested in rotation, to the extent possible

ANNEX-B

List of Test Equipment

(INDICATIVE LIST, FOR GUIDANCE ONLY)

Sl. No.	Tests used in with Clause Reference	Test Equipment
1.	Dimensional Stability (Clause 6.1)	Visual
2.	Ultimate Tensile Strength, Elongation at Designated Load (Clause 6.2, Table 1, 2 and 3, SI i), ii))	Tensile testing Machine(class-2 or better, CRE Type, Compressive jaws with sufficient width with swivel on top, With digital Extensometer
3.	Roll Length(Claude 6.2, Table 1, 2 and 3)	Length Counter Meter, Measuring tape
4.	Width(Claude 6.2, Table 1, 2 and 3)	Measuring tape
5.	UV Resistance test(Cl. 6.2, Table 1, 2 and 3, SI iii))	Conditioning Chamber, Xenon-arc apparatus, Sample preparation tools(like electric cutter, scissors, etc), Tensile testing Machine(class-2 or better, CRE Type, Compressive jaws with sufficient width with swivel on top, Provision for measuring strength at different strain (0.5%, 1%, 2%, 3%, 4%, 5%, 10% , 15%), With digital Extensometer
6.	Chemical resistance(Cl. 5.1, 6.2 Table 1 and 2, SI iv))	- a pneumatic vessel, is to be used, equipped with: a sealing lid or equivalent device and if necessary a reflux condenser or equivalent device to restrict evaporation of volatile components; a stirring or equivalent device to maintain homogeneity of the liquid and the exchange of matter between the liquid and the specimens; specimen holders to ensure correct placing of the specimens, the free distance between specimens being at least 10 mm; at least one closable aperture in the lid for access to control the composition of the liquid. general borosilicate glass or stainless steel Containers. - Two types of test liquids are to be used: an inorganic acid: 0,025 M sulfuric acid (method A); an inorganic base: calcium hydroxide (Ca(OH)₂), used as a saturated suspension, i.e. approximately 2,5 grams per litre (method B). Constant temperature Water Bath
7.	General Laboratory Equipments	Thermo-Hygrometer, Conditinong room/chamber, Vernier Calliper.

ANNEX-C

SCHEME OF INSPECTION AND TESTING

1. QUALITY ASSURANCE PLAN

1.1 It is expected that manufacturers (licensees/applicants) will implement a Quality Assurance Plan i.e. a plan of regular testing and in-process controls, designed to ensure that the product bearing the Standard Mark conforms to all requirements of the Indian Standard.

1.2 The manufacturers shall define a Quality Assurance Plan defining the control unit (i.e. lot/batch etc.) and the levels of control (i.e. the frequency and number of samples for conducting the different tests as per the Indian Standard) and submit the same to BIS Branch Office for information. The manufacturer shall comply with the same and maintain test records in accordance with para 2.4.

1.3 RECOMMENDED LEVELS OF CONTROL/CONTROL UNIT:

1.3.1 For the guidance of manufacturers, the recommended definition of control unit is: The entire quantity of Geogrid, of each type manufactured under similar conditions in a single day from the same raw material.

1.3.2 For the guidance of manufacturers in preparing the Quality Assurance Plan, recommended levels of control are given in **Table 1**.

1.3.3 The manufacturer shall ensure inspection and testing as per the Quality Assurance Plan submitted by them on the whole production of the factory which is covered by this plan. Alternatively, the manufacturer has the option of adherence to the quality plan as per levels of control recommended in column 3 of Table 1.

1.4 However, all manufacturers shall ensure compliance of their products to all the requirements of the Indian Standard.

2. ENSURING COMPLIANCE THROUGH TESTING- It is expected that manufacturers (licensees/applicants) will establish a suitably equipped and staffed in house laboratory (In house testing facility) for testing at least those parameters of the Indian Standard which require routine testing for ensuring quality of the product. This includes in-process controls as may be defined and put in place by the manufacturer and testing parameters/requirements which can only be performed in the factory.

2.1 For the guidance of manufacturers, Table 1 giving the recommended levels of control is given below. Column 2 of Table 1 indicates routine tests where test equipment is required in house as "R" or other tests which can be subcontracted as "S". Subcontracting is permitted to BIS recognized/empaneled laboratory or any other laboratory having valid NABL accreditation as per IS/ISO/IEC 17025.

2.2 For MSME manufacturers, the requirement of maintaining a laboratory/in-house testing facility for routine tests (indicated as "R" in Column 2 of Table 1) is also optional.

2.2.1 MSME manufacturers may utilize common cluster based facilities as per guidelines for the utilization of cluster based test facilities by MSMEs or the provisions of Sharing of testing facilities or get testing done from BIS recognized/empaneled laboratory or any other laboratory having valid NABL accreditation as per IS/ISO/IEC 17025.

2.3 Large Scale manufacturers shall maintain an in-house laboratory equipped at least with test facilities for routine tests (indicated as “R” in Column 2 of Table 1), where different tests given in the specification shall be carried out in accordance with the method given in the specification. They shall also implement a calibration plan for the in-house test equipment.

2.3.1 Alternatively, in lieu of an in-house laboratory, large scale manufacturers can also utilize the provisions of Sharing of testing facilities as per the Guidelines for Grant of Licence available on BIS website www.bis.gov.in. (Under Conformity Assessment>Product Certification Process). Even for subcontracted tests, provisions for sharing of testing facilities can be utilized.

2.4 TEST RECORDS- The manufacturers maintaining an in-house laboratory or utilizing common cluster based facilities or shared test facilities shall maintain test records for the tests carried out to establish conformity. For the tests being subcontracted to BIS recognized/empanelled laboratory or any other laboratory having valid NABL accreditation as per IS/ISO/IEC 17025, test reports issued by the laboratories shall be available for inspection by BIS.

3. PACKING AND MARKING - The Standard Mark as given in the Schedule of the licence shall be incorporated legibly and indelibly on the label attached to each roll, provided always that the material so marked conforms to each requirement of the specification.

3.1 Packing and Marking shall be done as per the Indian Standard.

3.2 Additional Marking requirements: The material shall also be marked with the following additional requirement on the label attached to each roll:

a) “For BIS certification details please visit www.bis.gov.in”

REJECTION - All the production which conforms to the Indian Standard and covered under the scope of this licence shall be marked with the Standard Mark. Disposal of non-conforming product shall be done in such a way so as to ensure that there is no violation of provisions of BIS Act, 2016.

TABLE 1
(ONLY FOR GUIDANCE PURPOSE)

(1)				(2)	(3)		
Test Details				Test equipment requirement R: required (or) S: Sub-contracting Permitted	Levels of Control		
Cl.	Requirement	Test Method			No. of Sample (Geogrids)	Frequency	Remarks
		Clause	Reference				
5	Material of Geogrids	5.1 and 5.2	IS 17373	S	One	Each Consignment	No testing is required if material is accompanied by supplier's test certificate and/or test report from BIS recognized or empaneled lab or Any other NABL Accredited Lab or ISI Marked.
6.1	Dimensional Stability	6.1	IS 17373	R	05	Each Control Unit	Samples of each type and variety to be drawn and tested
6.2	Requirements of Uniaxial Polyester Geogrids						
i)	Ultimate tensile strength		IS 16635	R	05	Each Control Unit	-do-
ii)	Elongation at designated load		IS 16635	R	05	Each Control Unit	-do-
iii)	UV resistance, strength retained after 500 h exposure		IS 13162 (Part 2)	S	02	Once in 3 years or whenever there is change in the material/process	Samples of different types to be drawn and tested in rotation such that each type of geogrid covered in the scope of licence is tested at least once in three years
iv)	Chemical Resistance (see note 3)		IS 17363	S	02	-do-	-do-
v)	Width		IS 17373	R	10	Each control unit	-do-

vi)	Roll length		IS 17373	R	10	Each control unit	-do-
6.3	Reduction factors	6.3.1, 6.3.2, 6.3.3	IS 17373	S	As per the agreement between the buyer and the seller based on the specific site conditions		