TERMS OF REFERENCE FOR THE R&D PROJECT

1. Title: Study construction, performance and safety requirements of prevailing varieties of Woven Ground Covers for Horticulture Application.

2. Background:

2.1 The Woven Ground Covers made up of natural or synthetic materials are used to meet diverse needs of crops in the horticulture sector like suppression of weed growth around the plant, water conservation, soil temperature moderation, increase in yield etc, by blocking extreme climatic conditions of sunlight or cold.

2.2 Woven Ground Covers come in a variety of types, distinguished by their GSM and deniers and other parameters, given their growing demand and diverse applications, it becomes essential to revise the existing Indian standard IS 16202: 2014 *Agro Textiles — Woven Ground Covers for Horticulture Application — Specification* for inclusion of all the major varieties of woven ground covers prevailing in the current market scenario.

3. Objective: To collect the technical data and scientific evidence for constructional, performance and safety requirements of prevailing varieties of Woven Ground Covers from primary and secondary sources of information.

4. Scope:

a) Undertake study and analyze the existing literature which include but not restricted to the following :-

- International and Indian standards and regulation,
- Journals and research papers,
- Standard operating procedures (SOPs)/guidelines of Ministry/regulator/users,
- Studies/research conducted by any organization
- Any other relevant published information.

b) Collection of the database for manufacturers (small, medium and large-scale), testing infrastructure and users of woven ground covers in the country.

c) Collection of import and export data, type of standards and regulation being followed by domestic/foreign manufacturers, comparative analysis of these standards and regulation.

d) Undertake 2 visits to each of small, medium and large-scale manufacturer and collect the information on the following aspects :-

i) Types of raw material being used
ii) Manufacturing process
iii) Good manufacturing practice
iv) In-process controls being exercised during manufacturing

v) Varieties being manufactured
vi) Standards being followed
vii) Testing method being used
viii) Testing infrastructure available
ix) Post manufacturing quality/in-house data for safety, performance and constructional parameter for all the varieties being manufactured
x) Sampling plan being followed.
xi) Marking and labelling of the product.
xii) Packaging and storage conditions.
xiii) Sustainability practices [sustainable raw material, energy efficient processes and methodologies, renewable energy sources, 3Rs (Reduce, Reuse and Recycle), waste management and disposal mechanisms].
xiv) Focused group discussions with teams involved in production, testing, and R&D to address quality issues, discuss challenges faced, and gather suggestions for improvement

The feedback from other manufacturers (where visit is not carried out) shall be collected by circulating suitable questionnaire covering above information through email or any other digital means.

e) Undertake 2 visits to users and 2 visits to testing labs (one govt and one private NABL accredited lab) to collect information including but not restricted to the following: -

User

i) Standards and regulations being followed
ii) Compliance verification mechanism being followed (test certificate from supplier, third party testing)
iii) Focused group discussion on quality issues, challenges being faced and suggestions if any.

Lab

i) Standards and regulation being followed
ii) Testing methods being followed
iii) Testing infrastructure
iv) Focused group discussion on testing related issues, challenges being faced and suggestion

The feedback from other users and labs (govt and private NABL accredited) where visit is not carried out shall be obtained through suitable questionnaire covering the above information.

f) Collection of 2 samples from each from large, medium and small-scale industries of each variety of woven ground covers and carry out testing from 2 NABL accredited labs (1 Govt Lab and 1 Pvt. Lab) for parameters like but not restricted to GSMs, raw materials (HDPE, PE, Nylon etc), deniers and EPcm and PPcm.

g) Preparation of a comprehensive project report covering all the above information.

5. Research Methodology:

i) Collect and analyze the data/information as specified in the scope [4 (a), (b) and (c)].
ii) Visit manufacturers, users and labs and collect data/information as specified in the scope [4 (d) and (e)].
iii) Collect and test the samples as specified in the scope 4 (f).
iv) Analyze the data/information and prepare a comprehensive project report.

6. Expected Deliverables:

a) Comprehensive report in soft/hard form of study covering all the aspects detailed in the scope of the R & D project.
b) Questionnaire feedback, testing report, focused group discussion report, other relevant documents and information shall be appended to the project report.

7. Requirement for the CVs:

Graduate in Textile Technology/Textile Engineering with minimum 5 years of working experience in testing or manufacturing of Agrotextiles.

8. Timeline and Method of Progress Review: The timeline for the completion of the project is 120 days from the date of award of project.

Timeline	Method of progress
0 to 30 days	Literature review, desktop study, collection of data and information Note – The sampling plan for visit and collection of samples shall be discussed and finalized with the nodal officer after literature survey and desktop research.
30 to 60 days	**MID-TERM REVIEW** Visit to manufacturer, user, testing lab and collection of samples
60 to 90 days	Testing of samples (except long duration test with testing time more than 30 days) preparation and submission of first draft report
90 to 120 days	Submission of the final project report.

9. Support from BIS:

BIS will provide access to latest available editions of Indian standards and/ or international standards relevant to the project, on request.

10. Nodal Point

In case of queries/clarification, nodal officer from BIS Shri Tanishq Awasthi, Scientist B and Member Secretary of TXD 35 may be contacted on txd@bis.gov.in.