BUSINESS PLAN

CEN/TC 189
GEOSYNTHETICS

EXECUTIVE SUMMARY

The term 'Geosynthetics' includes the product categories of (1) geotextiles and geotextile related products and (2) geosynthetic barriers, also referred to as geomembranes. **Geosynthetics (GSY) is a** generic term describing a product, at least one of whose components is made from a synthetic or natural polymer, in the form of a sheet, a strip, or a three-dimensional structure, used in contact with soil and/or other materials in geotechnical and civil engineering applications. Also metallic products (e.g. meshes, grids, strips, etc.) are included.
Geosynthetics are used in a wide range of civil engineering and geo-environmental applications,. with different functions, i.e. reinforcement, drainage, separation, protection, barrier, controlling surface erosion, providing stress relief (e.g. for asphalt overlay). Geosynthetics play a major role in today's infrastructure construction helping to control costs, extend service life and reduce environmental impact of projects. A more extended overview over the definitions related to geosynthetics and their functions can be found in EN ISO 10318:2015.

Business Environment
The product market is essentially worldwide, being dominated by about 30 large companies, of which ca. 20 have their main office or important branch offices in the European Union. Europe represents ca. 25 % of the geosynthetics world market and is still growing by about 3% per year (forecast to 2020). Although the use of geosynthetics shows some signs of maturity in particular in industrialized regions of the world, there is still considerable potential for increased application elsewhere, especially in Eastern Europe, Asia Pacific, Middle East, Africa, South and Central America. The parties interested in the work of CEN/TC 189 include the construction industry, National and European public authorities, regulators, private and public consumers and users, certification bodies, researchers, test houses and standardisation bodies.

Benefits
CEN/TC 189 develops the necessary standards to assess the desired level of performance of geosynthetics, in order to ensure transparancy of the market and free circulation of goods, while maintaining a necessary level of safety. CEN/TC 189 has the task of establishing European Standards for geosynthetics, superseding all previous national standards, and thereby supporting a common European market. Since 1989, about 70 standards were adopted, with about another 35 being at an advanced development stage. All major test methods have been developed under the Vienna Agreement and have become international standards. Product requirement standards for geosynthetics form the basis of the CE marking system (since 2002-10 for geotextiles and geotextile-related products). Most industrialized countries have, for many years, used standards as a common basis of reference for formulation of requirements for inspection and testing, EC Type-examination, conformity assement with EU law and numerous other precautions concerning geosynthetics. Using standard test methods and reference methods enhances the confidence of consumers with respect to safety, quality and ergonomics of geosynthetics.

Priorities
Priorities of CEN/TC 189 include facilitating circulation of goods on the European market by means of (harmonized) European standards, improvement of first generation standards (tests and product requirements) from the experience gathered in the market, preventing the entrance in the market of uncontrolled product and therefore prevent unfair competition by making available European Standards in the domain of geosynthetics.

1 BUSINESS ENVIRONMENT OF THE CEN/TC

1.1 Description of the Business Environment

The following political, economic, technical, regulatory, legal, societal and/or international dynamics describe the business environment of the industry sector, products, materials, disciplines or practices related to the scope of this CEN/TC, and they may significantly influence how the relevant standards development processes are conducted and the content of the resulting standards:

Scope of CEN/TC 189
The scope of CEN/TC 189 comprises standardization efforts related to geosynthetics, including terminology, sampling before testing, identification and marking rules, test methods and requirements related to the intended uses.
The term 'Geosynthetics' includes the product categories of (1) geotextiles and geotextile related products and (2) geosynthetic barriers, also referred to as geomembranes and geosynthetic clay liners. Also metallic products (e.g. meshes, grids, strips, etc.) are included.
Geosynthetics are used in a wide range of civil and geo-environmental engineering and specialist applications, including thefollowing:

- transportation infrastructures and roads,
- railways,
- canals, reservoirs and dams,;
- tunnels and underground structures;
- foundations , retaining walls and other geotechnical works;
- storage and disposal of liquid and solid waste;
- drainage systems;
- surface erosion control systems;
- coastal structures;
- mining applications;
- asphalt reinforcement/ interlayers;
- building constructions and sport fields;
- agriculture

Geosynthetics play a major role in today's infrastructure construction helping to control costs, extend service life and reduce environmental impact of projects.
A more extended overview over the definitions related to geosynthetics and their functions can be found in EN ISO 10318:20015.

Relevant Stakeholders for the work of CEN/TC 189
Stakeholders/ interested parties include:

- construction and civil engineering companies and their subcontractors;
- building industry;
- manufacturers of geosynthetics;
- converters;
- suppliers, distributors;
- engineering bureaus and consultants
- designers
- installers companies;
- national and European public authorities (public infrastructure, environment, public health);
- Regulators;
- private and public consumers and users;
- certification bodies;

- universities/academics and research centres;
- laboratories/ test houses;
- standardisation bodies.

The state of the art in the field addressed by the scope of the CEN committee
Concerning Geosynthetics one observes a segmentation of the market where the developments are going in two directions. On one hand there is an enlargement of scale and consolidation of manufacturing. There are an increasing number of "commodity" producers, particularly from Asia. On the other hand there is an increasing specialisation by niche players.
Here one sees two trends:

- Use of standards as tools of (worldwide) competition, where one sees the use of national (often ASTM) standards in competition with EN and ISO standards
- The importance of publicly funded projects focussing on large volume applications to strict technical specifications, which are very price competitive, but irregular in flow and continuity

Recent or expected technological changes and major innovations related to the industry sector, products or materials addressed by the scope of the CEN committee
At present the highest growth potential for geosynthetics is situated in the emerging markets in Eastern Europe, Asia Pacific, Middle East, Africa, South and Central America.The strongest evolution is seen towards the use of geosynthetics in new application fields, e.g. for sports fields and towards the development of composite materials or systems by combining two or more geosynthetics to offer multiple functions. These, often project-made, multi-functional products are not easy to define and assess in standards. The use of geosynthetics in new application fields also requires re-definition of existing standards for assessing performance and safety complicance. Also, care should be taken to develop a standardization framework that does not have a limiting effect on innovation.

The concerns and perceptions of relevant stakeholders
Major concerns of relevant stakeholders are:

- Comparable product (technical) specifications (according to EN standards)
- Procurement tenders
- State of the art references: trustable solutions in relevant applications
- Minimum requirement to be suitable in the different applications

On the one hand European standards are a reference for solving commercial disputes and can be used to prove compliance with national and European legislation. On the other hand they can encourage manufacturers to focus on developing products that optimize on the performance characteristics in the standards without regard to their overall functionality or performance in place. Care must be taken therefore to develop standards that allow evaluating the latter, which is what the standards are intended for.

Social, safety, health, environmental or cultural issues related to the industry sector, products, materials, disciplines or practices addressed by the scope of the CEN committee
For one, there is an environmental pressure which is an important driver for the use of geosynthetic barriers and lining systems, increasingly used for hazardous, industrial and municipal waste containment.
For another, there is the need to better demonstrate the advantage of geosynthetics solutions to fight soil erosion and coastal erosion.

Other relevant international, regional or national standards or voluntary initiatives
The work of TC 189 can also be used to develop standards on an ISO level by cooperation with ISO/TC 221 through the Vienna agreement. These standards can then also become tools for

product evaluations for labels like the EU Ecolabel or commercial labels for product quality and performance. Important are also the reduction of the carbon footprint to help meet the recommendations of the Kyoto protocol.

Real or potential technical barriers to trade related to the scope of the CEN committee, due to diverging national, regional or other standards and/or technical regulations. If possible, an estimation of their financial impact on trade should be provided.
Geosynthetics are in Europe considered as construction products and hence shall meet the provisions of the CPR and the mandates that support this legislation.
The current CEN/TC 189 standards define relevant characteristics for geosynthetics used in a given application and the test methods to measure these characteristics. They don't specify the values to be obtained in these tests, since this will depend on the design of the geotechnical construction. This approach allows design engineers and specifiers to take into account the specific needs and particularities of the construction, but may also constitute an obstacle to more general requirements.

Other regulatory and legal issues, such as the existence of international, regional and national legislation/regulations, with special reference to existing or planned European Directives, product bans, etc.
International and national legislation/regulations: in particular the European Regulation 305/2011 on Construction Products (CPR). CEN/TC 189 answers the mandates 107 and 386 of the European Commission for the establishment and updating of the Harmonised Standards.

1.2 Quantitative Indicators of the Business Environment

The following list of quantitative indicators describes the business environment in order to provide adequate information to support actions of the CEN /TC.

1) Key success factors:
Towards users:
- improving and systematising knowledge of possibilities offered by geosynthetics
- understanding advantages and limitations of using geosynthetics
- investigating long-term performance of geosynthetics. Users (public authorities) require durability guarantees, which can not readily be derived from existing experience. These concerns are mostly related to mechanical and hydraulic stability of the works or environmental issues.
- Design methodologies that take full advantage of the functional benefits of geosythetics

Towards Geosynthetics manufacturers in the sector:
- work with technical standards and procedures of the civil engineering and construction sector
- seek optimum economies of scale to provide cost-effective solutions
- cope with cycles of demand imposed by the timing of major construction projects
- develop and market products that comply with harmonized European standards (CE marking)

2) Market size and growth trends

The European geosynthetics market is estimated at approximately 1000 million square meter per year, representing a value of 1100 million €. This represents the annual consumption of geosynthetics, subdivided as follows[1]:

Product Type	***Area (millions m²)***	***Percentage***
Nonwoven geotextiles	*750*	*75 %*
Woven geotextiles	*70*	*7 %*
Woven geotextiles (high strength reinforcing)	*30*	*3 %*
Geocomposites	*20*	*2 %*
Geogrids	*40*	*4 %*
Geosynthetic Barriers	*90*	*9 %*
Metallic products	*Unknown*	*unknown*
Total	*1000*	*100 %*

For the period 2014-2020 a growth rate of 3% is expected in Europe.

Total international trade in the industry sector/products/materials (in € or US$) over the last 3 years

At the end of 2017 the forecast for the worldwide sales are exceeding 5000 millions m² for a total value of 7.5 billion US$ (7.0 billion €).

Estimated number of companies (European-wide) operating in the industry sector or producing the products/materials over the past three years

IGS (International Geosynthetics Society) has 160 Corporate Members, of which 50 are EU members. Most of the companies, even located outside EU, are operating on the EU market.

Estimated employment (European-wide) in the industry sector over the last 3 years

There are approximately 3000 employees in the geosynthetics sector in Europe.

Estimated percentage of products in the marketplace self-declared or certified to European Standards over the past 3 years

Approximately 98% of all products are self-declared or certified to European Standards over the past 3y.

Real examples of increased income and/or cost savings achieved through implementation of the CEN committee's European Standards

By developing the harmonized standards under CEN/TC 189 the need to perform extra tests has decreased strongly.

Indication of cases where organizations (European-wide) require compliance with the CEN committee's European Standards by suppliers, contractors and other service providers

EN standards developed by CEN/TC 189 are used to prove compliance with the requirements of the CPR and its mandates. They are also used by voluntary certifications schemes, such as Norgeospec in Scandinavia, Asqual in France, IVG in Germany, RVS in Austria, Copro in Belgium etc. and by specifiers (for roads, railroads, waste deposits etc.) all over Europe and beyond.

[1] Information based on the statistics performed by EAGM (European Association of Geosynthetics Manufacuterers)

Indication of cases of governmental adoption of European Standards into legislation, regulations or procurement requirements
With the new CPR the Harmonised standards developed by TC 189 and cited in the OJEU (Official Journal of the European Union) are immediately applicable in all EU countries since July 2013.

Indication of cases where CEN committee's European Standards are cited as normative references in European Standards of own and other CEN committees
The following CEN and ISO committees have a liaison with CEN/TC 189:

- CEN/TC 227
- CEN/TC 250 SC 7
- CEN/TC 254
- CEN/TC 288
- CEN/TC 350
- CEN/TC 351
- CEN/TC 396
- ISO/TC 221

2 BENEFITS EXPECTED FROM THE WORK OF THE CEN/TC

CEN/TC 189 develops the necessary standards to assess the desired level of performance of geosynthetics, in order to ensure transparancy of the market and free circulation of goods, while maintaining a necessary level of safety. CEN/TC 189 has the task of establishing European Standards for geosynthetics, superseding all previous national standards, and thereby supporting a common European market. Since 1989, about 70 standards were adopted, with about another 35 being at an advanced development stage. All major test methods have been developed under the Vienna Agreement and have become international standards. Product requirement standards for geosynthetics form the basis of the CE marking system (since 2002-10 for geotextiles and geotextile-related products). Most industrialized countries have, for many years, used standards as a common basis of reference for formulation of requirements for inspection and testing, EC Type-examination, conformity assement with EU law and numerous other precautions concerning geosynthetics. Using standard test methods and reference methods enhances the confidence of consumers with respect to safety, quality and ergonomics of geosynthetics.

The CEN committee's standards:

- Respond to recent changes and major innovations in the field addressed by the scope of the CEN committee
- Support cost savings through implementation of them by harmonizing test procedures and product requirements
- Remove technical barriers to trade and open markets throughout Europe
- Responde to relevant social, safety, health or environmental concerns
- Harmonise national standards throughout Europe
- Support of other European Standards
- Support European legislation, in particular the Construction Products Regulation (11/305 CPR) and its execution mandates. 17 available standards have already been cited in the Official Journal of the European Union and confer presumption of conformity with Essential Requirements of the CPR.

3 PARTICIPATION IN THE CEN/TC

All the CEN national members are entitled to nominate delegates to CEN Technical Committees and experts to Working Groups, ensuring a balance of all interested parties. Participation as observers of recognized European or international organizations is also possible under certain conditions. To participate in the activities of this CEN/TC, please contact the national standards organization in your country.

4 OBJECTIVES OF THE CEN/TC AND STRATEGIES FOR THEIR ACHIEVEMENT

4.1 Defined objectives of the CEN/TC

The TC will amend and/or revise a set of eleven harmonized European Standards in the geotextiles (and geotextile-related products) sector. A second series of amendments is available since the beginning of 2014. Revision of the annex B concerning durability is already ongoing and is expected to be available within a couple of years.
The TC has further elaborated a set of six (harmonized) European Standards in the geosynthetic barriers sector.
The TC will, in co-operation with ISO/TC 221, amend and improve the existing test method standards, needed to assess the properties of geosynthetics. Where necessary, new test methods will be developed.

Priorities for CEN/TC 189 are to:

- facilitate circulation of goods on the European market by means of (harmonized) European standards;
- improve first generation standards (tests and product requirements) from the experience gathered in the market
- prevent the entrance in the market of uncontrolled product and therefore prevent unfair competition;
- make available European Standards in the domain of geosynthetics, with respect to:
    - quality and technical requirements
    - safety aspects
    - testing procedures
    - terminology
    - environmental requirements
    - sustainability
    - design (in the framework of Eurocodes)
    - installations and construction procedures
    - durability

4.2 Identified strategies to achieve the CEN/TC.s defined objectives.

To achieve its objectives CEN/TC 189 will:

- Prioritise projects, developing terminology standards first, then test methods and later product specification standards.
- Make use of available national, regional or international source documents (such ISO standards via the Vienna Agreement) on which to base European Standards.
  One important activitiy here will be co-operation with ISO/TC 221 Geosynthetics to develop standards (mainly test methods) under the Vienna Agreement.
- Where appropriate, CEN/TC 189 will co-operate and liaise with other CEN, CENELEC, ETSI and International committees

The following CEN and ISO committees as well as industrial associations have a liaison with CEN/TC 189:

- CEN/TC 227
- CEN/TC 250 SC 7
- CEN/TC 254
- CEN/TC 288
- CEN/TC 350
- CEN/TC 351
- CEN/TC 396
- ISO/TC 221
- EUPC (European Plastics Converters
- EDANA (European Disposable and Nonwovens Association)
- EuBA (European Bentonite Association)

- It is expected to develop the CEN deliverables EN's, CEN/TS's, CEN/TR's. Systematic reviews and revisions will be made where needed, taking into account changes in EU legislation and market trends.
- For the development of test methods and product specifications pre/co-normative research would enable faster progress of the CEN committee's work program as well as verification of the developed test methods and product specification standards. Currently there are very little EU resources available for this purpose. Regional funding is often too scattered.
- CEN/TC 189 is divided into six WG's:
  WG 1 Geotextiles and geotextile-related products - General and specific requirements
  WG 2 Terminology, identification, sampling and classification
  WG 3 Mechanical testing
  WG 4 Hydraulic testing
  WG 5 Durability
  WG 6 Geosynthetic barriers - General and specific requirements
  The structure of the TC has to reflect the market situation and if needed will be adapted. Regular WG and TC meetings will be organized to optimize the work flow.

4.3 Environmental aspects

TC 189 commits itself to include consideration of environmental aspects in its work. Some aspects are covered by EU law (e.g. EU Regulation 305/2011 laying down harmonised conditions for the marketing of construction, EU Regulation 1907/2006 concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH)). Important issues are also the reduction in carbon footprint and sustainability.

Key environmental issues associated with the scope of the work & how they are reflected in all New Work Item Proposals (NWIPs)

Optimized use of resources with testing, including chemicals, sample material, sampling procedure, test equipment, etc.

Objectives regarding addressing environmental issues and consideration of how to assess progress in achieving those objectives

Geosynthetic barriers and lining systems are increasingly used e.g. for hazardous, industrial and municipal waste containment. These products therefore answer to an increasing pressure from society, industry and legislation for waste containment. Adapting the geosynthetic products further to these needs is therefore a driving force for the industry, which is then also interested in the availability of standards for test methods and product specifications.
Recent studies have shown that geosynthetics support the reduction of carbon footprint of civil and geoenvironmental engineering projects.

5 FACTORS AFFECTING COMPLETION AND IMPLEMENTATION OF THE CEN/TC WORK PROGRAMME

Expert resources are not sufficiently available (for certain projects)
Due to the wide range of geosynthetics and their applications, various polymers are commonly used without knowing their behavior under site-specific conditions and on a long term basis. Here expertise on a fundamental scientific level is needed for specific polymers consisting of artificial and natural ingredients.

Specific expertise for a project is lacking, which could affect the project's development as well as the credibility of the resulting standard in the business community.
The standards developed until now envisaged to define requirements for the most common applications of geosynthetics and to provide index tests to measure their properties. For more specific applications (e.g. asphalt reinforcement, erosion control, some applications of geosynthetic barriers, metallic products) there is a lack of expertise and/or suitable test methods, which has considerably delayed the projects.

Validation of a test method is dependent upon funding being available to undertake the necessary pre/co-normative research
Development and validation of more realistic performance test methods is dependent upon availability of expertise and funding to undertake the necessary pre/co-normative research and interlaboratory testing.
Legal/regulatory issues such as uncertainties regarding a possible EUDirective, which in turn may necessitate modifications of the content and target dates for projects in the work program
Environmental and drinking water regulations and standardisation mandates can affect the content of the (revised) harmonized standards.