



NorGeoSpec 2002

A Nordic system for
specification and control of geotextiles
in roads and other trafficked areas



Nordic Industrial Fund
center for innovation and commercial development

Preface

NorGeoSpec 2002 is the result of a Nordisk Industrifond project with financial support from the road authorities in Finland, Sweden and Norway and a group of geotextile producers and distributors. The project work is done by VTT and SINTEF and with an advisory group consisting of:

Øystein Myhre and Arne Sørli, The Norwegian Directorate of Roads, Norway

Pentti Salo, The Finnish Road Authority, Finland

Lovisa Moritz and Ingrid Sødergren, The Swedish Directorate of Roads, Sweden

Oddur Sigurdsson, VSO Consulting, Island

The project has resulted in a common Nordic system for specification and control of geotextiles which is likely to have a strong beneficial effect both economically and technically. We would like to thank the participants in the project and especially the road authorities for the good contribution to the project.

We would also like to give our appreciation to Nordic Industrial Fund for the financial support and for the possibility to have a project WEB-site for the internal project work and for external information.

Arnstein Watn
Project leader

**SINTEF****SINTEF REPORT****SINTEF Civil and Environmental Engineering**
Rock and Soil Mechanics

Address: NO-7465 Trondheim, NORWAY

Location: Rich Birkelands vei 3
Telephone: +47 73 59 46 00
Fax: +47 73 59 71 36Location: Høgskoleringen 7a
Telephone: +47 73 59 46 00
Fax: +47 73 59 53 40

Enterprise No: NO 948 007 029 MVA

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Revision 1

AUTHOR(S)

Arnstein Watn, Gudmund Eiksund, Maj Gøril Glåmen, Hans Rathmayer VTT

CLIENT(S)

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ABSTRACT

This report presents a Nordic system for specification and control of geotextiles for separation and filtration in roads (NorGeoSpec). The system is based on results from an inter-nordic research and development project. The project had a working group consisting of VTT, Finland and SINTEF in Norway and an advisory group including the public road authorities in Finland, Sweden and Norway and VSO Consulting in Iceland. The project is financed by Nordic Industrial Funding, the public road authorities in Finland, Sweden and Norway and a group of distributors and producers of geotextiles.

With the new system, the Nordic countries will form a common market place which eventually will result in development of geotextile products adapted to the climate and soil conditions in these countries. The system includes five specification profiles based on seven characteristics measured with test methods defined by CEN and ISO. The system also includes procedures for field quality control and guidelines for selection of relevant specification profile.

KEYWORDS	ENGLISH	NORWEGIAN
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GROUP 2	Road construction	Vegbygging
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	Specification	Spesifikasjon
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1 Introduction

The **NorGeoSpec 2002** system is prepared as a common Nordic system for specification and control of geotextiles for separation and filtration in roads. In Finland, Sweden and Norway a common classification system for this application was developed in 1979. This system has been revised in the different countries over the years and a number of standardised test methods have been prepared at a European level by CEN TC 189. The intention of the NorGeoSpec was to develop a new system for specification and control based on the required characteristics and test methods standardised by CEN.

The NorGeoSpec is based on the experiences from the previous classification systems in Finland, Sweden and Norway and a research project involving laboratory and field testing of geotextiles. The specification is based on the required documentation of product characteristics and test methods as given in the relevant application standard EN 13 249.

The NorGeoSpec includes:

- general requirements for the geotextiles
- requirements on which characteristics for the geotextiles shall be declared by the manufacturer
- specific requirements related to specification profiles
- guidelines for selection of relevant specification profile
- system for control of geotextiles delivered on site

The specification system **NorGeoSpec 2002** as such is implemented as a complete system.

This is a revised version of the NorGeoSpec dated 2004-06-30. The rules of NorGeoSpec and responsibilities of the parties involved are described in detail in Appendix A.

1.1 Scope

This document presents a Nordic system for specification and control of geotextiles (NorGeoSpec) used for separation and filtration in roads and other traffic areas. The separation function is always used in conjunction with filtration; accordingly the separation will never be specified alone.

The NorGeoSpec defines product requirements related to specification profiles, a system for certification and control of geotextiles and guidelines for selection of relevant specification profiles.

This specification should not be applied in cases where large water flow is expected, like in ditches. In such cases other specifications based on a site specific design should be used.

2 Normative references

This *specification* also contains provisions from other publications, such as dated or undated references. These normative references are cited at the relevant places in the text, and publications are listed in the following. If dated references are changed or revised, the changes or revision will not be valid in the NorGeoSpec system. They will only become valid through the publication of an amendment or a revised edition of NorGeoSpec. For undated references, the latest edition of the cited publication is valid.

EN	918	Geotextiles and geotextile-related products - Dynamic perforation test (cone drop test)
prEN ISO	9862	Geotextiles and geotextile-related products - Sampling and preparation of test specimens.
EN ISO	9002	Quality systems - Model for quality assurance in production and installation
EN ISO	10318	Geotextiles - Vocabulary
EN ISO	10319	Geotextiles - Wide width tensile test (ISO 10319:1993)
EN ISO	10320	Geotextiles and geotextile-related products- Identification on site
EN ISO	11058	Geotextiles and geotextile-related products - Determination of water permeability normal to their plane without load
EN ISO	12236	Geotextiles and geotextile-related products - Static puncture test (CBR-test)
EN ISO	12956	Geotextiles and geotextile-related products - Determination of the characteristic opening size
EN	13249	Geotextile and geotextile related products-“Required characteristics for use in the construction of roads and other trafficked areas.”

3 Terms, definitions and abbreviations

In general all terms are referred to EN ISO 10318 Geotextiles - Vocabulary.

In the specific requirements the following terms are used:

Nominal value	The value of a characteristic stated by the manufacturer. The nominal value is considered to correspond to the mean value of a large number of samples.
Tolerance	The tolerance for a characteristic is to be stated by the manufacturer. The tolerances are used to define the one sided 95% confidence limit for the characteristic.
Average values	The average of the properties in machine and cross machine direction.
Uniformity requirement	Some products may have a large difference in strength and strain between machine and cross machine direction. A uniformity requirement of 1.5 is included to not give credit for strain at failure higher than 1.5 times the direction with the smallest value.
95% confidence limit	The nominal value subtracted or added the tolerance is defined as the one sided 95% confidence limit.
Sample	In the delivery control a sample consists of tests on several single specimens. The number of tests on single specimens for a specific characteristic is specified in the test standards.
Test result	The average value of the tests on single specimens in the sample.
F	Maximum tensile strength (kN/m)
ϵ	Strain at maximum tensile strength
R	Strain energy index, $R = 1/2 * F * \epsilon$
T_i	The tolerance of the characteristic in engineering units
U	Uniformity requirement.

The following subscripts are used in combination with F, ϵ and T:

MD	Machine Direction
CMD	Cross Machine Direction
a	Average of machine and cross machine direction
95	95% confidence limit
F, ϵ	Tolerance for strength and strain properties respectively.

TC	NorGeoSpec Technical Committee, with representatives from national road authorities in the countries where the NorGeoSpec is applied, VTT and SINTEF.
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NCB	NorGeoSpec Certification Body, mandated and nominated by the Technical Committee appointed by the National Roads Administrations of the countries where the NorGeoSpec is applied.
QC	Quality Certificate
IPA	Independent Product Attestation

4 General requirements

Identification of the geotextile products according to EN ISO 10320 “Geotextiles and geotextile related products – Identification on site” shall be enabled.

The geotextiles have to comply with the general requirements as set down in EN 13249 “Geotextiles and geotextile related products – Characteristics required for use in the construction of roads and other trafficked areas (excluding railways and asphalt inclusion)”. The characteristics, their relevancy to the conditions of use, and the test methods to be used are given in Table 1 in EN 13249. The geotextile products have to fulfil all the conditions and requirements set in EN 13249 for CE-marking and FPC (factory production control) and have to be assigned durable > 25 years (according to Appendix A in EN 13249).

5 Specific requirements

The specific requirements in NorGeoSpec are related to the five different specification profiles. Guidelines for evaluation of relevant specification profile dependent on the application are given in Chapter 7. These specification profiles give requirements to the characteristics and test methods in Table 5.1.

The specific requirements have to be fulfilled for both Independent Product Attestation and Quality Certification.

Table 5.1 Required characteristics, standardised test methods and type of requirements

Required characteristic	Standardised test method	Requirements (nominal value \mp tolerance)
Mass per unit area	EN 965	Maximum tolerance value
Tensile strength Average value MD and CMD	EN ISO 10319	Minimum strength Maximum tolerance value
Static puncture	EN ISO 12236	Maximum tolerance value
Tensile strain at max load Average value MD and CMD	EN ISO 10319	Minimum elongation Maximum tolerance value
Strain Energy Index ¹	EN ISO 10319	Minimum energy index
Dynamic perforation resistance	EN 918	Maximum hole size Maximum tolerance value
Characteristic opening size, O_{90}	EN ISO 12956	Maximum characteristic opening size Maximum tolerance value
Permeability ² normal to the plane without load	EN ISO 11058	Minimum velocity index Maximum tolerance value

The required values for each characteristic and corresponding maximum tolerance limits are given in Table 5.2. All requirements in Table 5.2 are regarded as figures corresponding to 95% confidence limits and related to the nominal value +/- the tolerance value as stated by the manufacturer.

¹ If not provided by the manufacturer, this value will be calculated.

² In the CE mark the velocity index is given. The relation between the permeability (k) and the velocity index (VI_{H50}) are: $VI_{H50} = K * 50/t$, where t is the geotextile thickness in mm. This relation is only valid for permeability tests with laminar flow.

Table 5.2 Required values corresponding to 95% confidence limits

Characteristic	Maximum tolerance ³	Required values ⁴ corresponding to 95% confidence. limit				
		Specification profiles				
		1	2	3	4	5
Min. tensile strength (kN/m), $F_{a,95}$	-10%	6	10	15	20	26
Min. tensile strain at max. load (%), $\varepsilon_{a,95}$	-20%	15	20	25	30	35
Max. cone drop diameter (mm)	+20%	42	36	27	21	12
Min. energy index (kJ/m), $R_{a,95}$		1.2	2.1	3.2	4.5	6.5
Min. velocity index (10^{-3} m/s)	-30%	3	3	3	3	3
Max. char. opening size, O_{90} (mm)	\mp 30%	0.2	0.2	0.2	0.15	0.15
Max. tolerance for mass per unit area		\mp 12%	\mp 12%	\mp 10%	\mp 10%	\mp 10%
Max. tolerance for static puncture strength		-10%				

5.1 Strength and strain properties, 95% confidence limits

The 95% confidence limits for strength and strain characteristics are calculated as:

$$F_{MD,95} = \{F_{MD} - T_{F,MD}\}, \quad F_{CMD,95} = \{F_{CMD} - T_{F,CMD}\}$$

$$\varepsilon_{MDa,95} = \{\varepsilon_{MD} - T_{\varepsilon,MD}\}, \quad \varepsilon_{CMD,95} = \{\varepsilon_{CMD} - T_{\varepsilon,CMD}\}$$

For the tensile strength and tensile strain at maximum load the specification profiles are related to average characteristics in machine and cross machine direction (MD and CMD). To give limited credit for large differences in strength in MD and CMD, a uniformity requirement ($U = 1.5$) is included in this specification. Strength values higher than 1.5 times the minimum of the MD and the CMD are not accounted for. The 95% confidence limits for the average characteristics are then calculated as:

$$F_{a,95} = 1/2 \cdot \{F_{MD,95} + F_{CMD,95}\}, \quad [F_{a,95} \leq 1/2 \cdot (1 + U) \cdot \text{Min}(F_{MD,95}, F_{CMD,95})]$$

$$\varepsilon_{a,95} = 1/2 \cdot \{\varepsilon_{MD,95} + \varepsilon_{CMD,95}\}$$

5.2 Strain energy index, 95% confidence limit

The strain energy index R is defined as the product of the maximum tensile strength multiplied with the strain at maximum strength divided by two. The average of MD and CMD is used for both strength and strain.

$$R_a = 1/2 \cdot F_a \cdot \varepsilon_a$$

³ The tolerance shall be stated by the manufacturer, this table gives the maximum allowable tolerance in the accompanying document to the CE-mark.

⁴ The tolerances are not to be added to the required values. The nominal values + / - the tolerance shall fulfil the requirement.

The manufacturers are not obligated to state the tolerance value for the strain energy index R. T_R is therefore estimated on basis of the tolerances for strength and strain. The average tolerances in machine and cross machine direction are calculated as:

$$T_{F,a} = 1/2 (T_{F,MD} + T_{F,CMD}), \quad T_{\varepsilon,a} = 1/2 (T_{\varepsilon,MD} + T_{\varepsilon,CMD})$$

The nominal values for the average strength and strain properties are calculated as:

$$F_a = 1/2 \cdot \{F_{MD} + F_{CMD}\}, \quad F_a \leq 1/2 \cdot (1 + U) \cdot \text{Min}(F_{MD}, F_{CMD})$$

$$\varepsilon_a = 1/2 \cdot \{\varepsilon_{MD} + \varepsilon_{CMD}\}$$

Assuming that the tensile strength and the strain at maximum tensile strength are independent variables, the tolerance of the strain energy index can be estimated with the following formula⁵:

$$T_{R,a} = 1/2 \sqrt{T_{F,a}^2 \cdot \varepsilon_a^2 + F_a^2 \cdot T_{\varepsilon,a}^2}$$

The 95% confidence limit for R is expressed as:

$$R_{a,95} = 1/2 \cdot F_a \cdot \varepsilon_a - T_{R,a}$$

⁵ The calculation must be done with the tolerances in engineering units.

6 Product Attestation, Quality Certification and Product Control

Compliance with the NorGeoSpec requirements is declared by the NorGeoSpec mandated Certification Body (NCB). Compliance with the requirements can be achieved by two different procedures:

- Independent Product Attestation (IPA)
- Quality Certification (QC)

The NCB is a Notified Body according to the EC-mandate 102 for geotextiles and geotextile related products, is for NorGeoSpec purposes mandated and nominated by the Technical Committee (TC) appointed by the National Roads Administrations of the countries where the NorGeoSpec is applied. The TC represents partners involved in the NorGeoSpec certification, including representatives from the National Roads Administrations in the NorGeoSpec countries, VTT and SINTEF.

The NCB is the prime contact of the manufacturer. The NCB handles the procedures of both Independent Product Attestation (IPA) and Quality Certification (QC), with the support of the NorGeoSpec accredited laboratory and is advised by the Technical Committee in its decisions.

The rules to issue NorGeoSpec Quality Certificates and Independent Product Attestation for geotextile products are described in the NorGeoSpec report and its Appendix A. This document is regularly revised and updated by the Technical Committee (TC) and published on the website <http://www.norgeospec.org>.

6.1 Compliance with the NorGeoSpec specification

Compliance with the NorGeoSpec requirements are declared by the NCB to any manufacturer, or the manufacturer's authorised representative, who applies for it, on condition that the concerned product satisfies the present rules published on the website <http://www.norgeospec.org>. Declared compliance can only be stated for a product with the same name as on its CE-mark accompanying document.

The manufacturer or the manufacturers authorized representative applying for compliance with the NorGeoSpec rules must:

- accept all the conditions stated in the current issue of the NorGeoSpec and its annexes
- publish the same average value for each *required* characteristic for the CE-mark and for the NorGeoSpec
- inform the NCB of essential modifications that occur in the production
- facilitate the assignments of the auditor described in the present rules
- conform without any restriction to decisions taken in accordance with the present rules
- forward at the request of the NCB all commercial and promotional documents (incl. electronic format) where the NorGeoSpec is referenced
- inform the NCB in case of stop in manufacturing or in the manufacturing control process
- inform the NCB of all production places and stock locations operated by the manufacturer for the products the manufacturer applies for the certification
- accept publication of list of its certified or attested products and their quality certificate(s) or their product attestations or <http://www.norgeospec.org>.

Compliance with the NorGeoSpec requirements can be verified by two different procedures:

- Quality Certificate (QC)
- Independent Product Attestation (IPA)

QC: The NCB can issue a Quality Certificate (QC) according to the following requirements:

- The manufacturer shall provide nominal values and tolerances for the characteristics according to Table 5.1.
- The values corresponding to 95% confidence limits (nominal value +/- the tolerances) shall meet the requirements in Table 5.2.
- The data provided by the manufacturer must be the same as given on the CE-mark accompanying document.
- When requesting certification, initial testing must be performed at all products and for all characteristics according to Table 5.2. The testing must be performed at an external laboratory and the sampling must be done by an independent auditor, recognised by the NCB. The sampling and testing must be organised by the NCB. The initial type testing results must comply with the NorGeoSpec requirements.
- The manufacturer must have a contract with the NCB, which will be responsible for running continuous surveillance. This involves unannounced sampling at production sites, at stock and at construction sites. There will be minimum two and maximum four random samplings every year.

IPA: The NCB can issue an Independent Product Attestation according to the following requirements:

- The manufacturer shall provide nominal values and tolerances for the characteristics according to Table 5.1.
- The values corresponding to 95% confidence limits (nominal value +/- the tolerances) shall meet the requirements in Table 5.2.
- The data provided by the manufacturer must be the same as given on the CE-mark accompanying document.
- Mean values from accredited tests at an independent laboratory shall be within the 95% confidence limits. The results from the independent laboratory shall not be older than 3 months at the time of the request.

6.2 Delivery control

The frequency of delivery control shall be:

- **For products with Quality Certificates:**
1 every 50 000 m² minimum but 1 identification control above 10 000 m²

For products with Quality Certificates, only identification control according to EN 10320 are required. If a product fails in the delivery control it is to be decided by the client, whether additional tests for attestation of conformity with specification are to be made or if the lot is to be rejected.

- **For products with Independent Product Attestation:**
1 every 10 000 m², but minimum 1 test above 1 000 m²

For products with Independent Product Attestation, the delivery control can be performed according to a Simplified Procedure (SP) or, if required by any of the parties, an Extended Delivery Control (EDC). If the product is not accepted as complying with the requirements according to the SP any of the parties may require that the delivery control be performed according to EDC.

6.3 Procedures for delivery control

Simplified Procedure (SP):

- The marking and labelling of the rolls and of the products shall be checked. The marking of the products shall be according to EN ISO 10320.
- The compliance of characteristics with the values defined by the manufacturer shall be made on tests made on two representative samples (A and B) taken from different rolls. Sampling shall be made according to prEN ISO 9862.
- The characteristics to be controlled on sample A in the simplified procedure are:
 - mass per unit area, in field quality control the sample size shall be 500x500 mm
 - tensile strength or static puncture force from the CBR test.

The tensile strength can be checked by wide width tensile test according EN ISO 10319, static puncture test EN ISO 12236 (CBR) or by a simplified test method if a correlation between the test results from tests performed according to EN ISO 10319 and the simplified method is established.

For the CBR test the nominal value and the tolerance are to be provided by the manufacturer. The test result from the CBR test is therefore compared with 95% confidence limit for static puncture strength.

Decision procedure for SP (presented as flow chart in Appendix B):

- 1 If the test results for one or more of the particular characteristics are within the tolerance values given by the manufacturer the product is accepted.
- 2 If the test results for one or more of the particular characteristics are outside 1.5 times the tolerance values provided by the manufacturer the product does not comply with respect to the requirements. Any of the parties may then require delivery control according to EDC.
- 3 If the test results for one or more of the particular characteristics are within 1 and 1,5 times the tolerance values given by the manufacturer sample B shall be tested.
- 4 If the test results of the sample B of one or more for the same particular characteristics are within the tolerance values provided by the manufacturer the product is accepted as complying with respect to that characteristic.
- 5 If the test results of the sample B for one or more of the same particular characteristics are outside the tolerance values given by the manufacturer the product does not comply with respect to the characteristics. Any of the parties may then require delivery control according to EDC.

Extended Delivery Control (EDC):

- The delivery control according to EDC may be required by any of the parties. The EDC is to be based on accredited tests at an independent laboratory.
- The marking and labelling of the rolls and of the products shall be checked. The marking of the products shall be according to EN ISO 10320.
- The compliance of characteristics with the values defined by the manufacturer shall be made on tests on two representative samples (A and B) taken from different rolls. Sampling shall be made according to prEN ISO 9862.
- The characteristics to be controlled on sample A in the EDC are:
 - mass per unit area, EN 965
 - tensile strength, EN 10319
 - tensile strain, EN 10319
 - dynamic perforation resistance, EN 918.

Decision procedure for EDC (presented as flow chart in Appendix B):

If the test result(s) (average of the tested sample) for the particular characteristics is (are) within the 95% confidence limits the product is accepted.

- 1 If the test results for one or more of the particular characteristics are within the tolerance values given by the manufacturer the product is accepted.
- 2 If the test results for one or more of the particular characteristics are outside 1.5 times the tolerance values provided by the manufacturer the product does not comply with respect to the requirements.
- 3 If the test results for one or more of the particular characteristics are within 1 and 1,5 times the tolerance values given by the manufacturer sample B shall be tested.
- 4 If the test results of the sample B of one or more for the same particular characteristics are within the tolerance values provided by the manufacturer the product is accepted as complying with respect to that characteristic.
- 5 If the test results of the sample B for one or more of the same particular characteristics are outside the tolerance values given by the manufacturer the product does not comply with respect to the characteristics.

7 Guidelines for selection of specification profile

The selection of specification profile may be based on subsoil conditions, fill material grain size and a combination of construction conditions and quality requirements for the road. For conditions not covered by these guidelines, a special evaluation of required specification profile should be done.

The construction conditions and road quality requirements are combined into traffic classes *Normal* and *High* according to the following:

Subsoil:

The subsoil is divided into two groups, *Soft* and *Firm*. Evaluation of type of subsoil can be done according to the remarks.

- Soft - soft clay with undrained shear strength ≤ 25 kPa, and peat
- Firm - Medium - and stiff clay with undrained shear strength > 25 kPa, and sand and gravel

Construction conditions:

- Normal: Two or more of the following conditions: Heavy construction traffic, angular and sharp fill material, compaction with heavy and vibrating equipment, construction traffic on fill layers with thickness less than 300 mm
- Favourable: For fill material with maximum stone size < 200 mm and layer thickness $> 1,5$ x max. stone size.

Traffic:

- High - Medium and high volume roads (> 500 vehicles per day)
- Normal - Access roads, small roads (< 500 vehicles per day)

Based on these input parameters the selection of relevant specification profile can be done according to Table 7.1.

Table 7.1 Selection of relevant specification profile

Sub-soil	Construction conditions	Traffic	Maximum grain size (d_{max}) in fill material (mm)			
			$d_{max} < 60$	$60 < d_{max} < 200$	$200 < d_{max} < 500$	$d_{max} > 500$
Soft	Normal	High	3	4	5	5
		Normal	3	4	4	5
	Favourable	High	3	3	4	5
		Normal	2	3	4	4
Firm	Normal	High	2	3	3	4
		Normal	2	2	3	3
	Favourable	High	2	2	3	3
		Normal	2 ⁶	2	2	3

⁶ Specification profile 1 may be used for roads with temporary traffic, access roads or similar.

Appendix A Quality Reference Document (QRD)

1 Introduction

Compliance with the NorGeoSpec requirements are declared by the NCB to any manufacturer, or the manufacturer's authorised representative, who applies for it, on condition that the concerned product satisfies the present rules published on the website <http://www.norgeospec.org>. Compliance can only be declared for a geotextile product which is CE-marked and assigned durable > 25 years (according to EN 13 249 and its Appendix A).

Compliance with the requirements can be achieved by two different procedures:

- Independent Product Attestation (IPA)
- Quality Certification (QC)

The NCB is the prime contact of the manufacturer. The NCB handles the procedures of both Independent Product Attestation (IPA) and quality certification (QC), with the support of the NorGeoSpec accredited laboratory and is advised by the Technical Committee in its decisions.

The NCB is a Notified Body according to the EC-mandate 102 for geotextiles and geotextile related products, and is for NorGeoSpec purposes mandated and nominated by the Technical Committee (TC) appointed by the National Roads Administrations of the countries where the NorGeoSpec is applied. The TC represents partners involved in the NorGeoSpec certification, including representatives from the National Roads Administrations in the NorGeoSpec countries, VTT and SINTEF.

The TC has in its meeting on 11.2.2004 appointed SINTEF as the mandated NCB.

2 Terms, definitions and abbreviations

In general all terms are referred to ISO 10318 Geotextiles - Vocabulary.

Additionally, the following terms are used:

TC	NorGeoSpec Technical Committee, with representatives from road authorities in countries where the NorGeoSpec is applied, VTT and SINTEF.
NCB	The NorGeoSpec certification is delivered by the NorGeoSpec Certification Body (NCB, mandated and nominated by the Technical Committee which is appointed by the National Roads Administrations of the countries where the NorGeoSpec is applied.
QC	Quality Certificate, with product surveillance, ref. NorGeoSpec report
IPA	Independent Product Attestation, without product surveillance, ref. NorGeoSpec report
QRD	Quality Reference Document, describing the procedures of certification in detail and the responsibilities of the parties involved.

3 Certification organisation

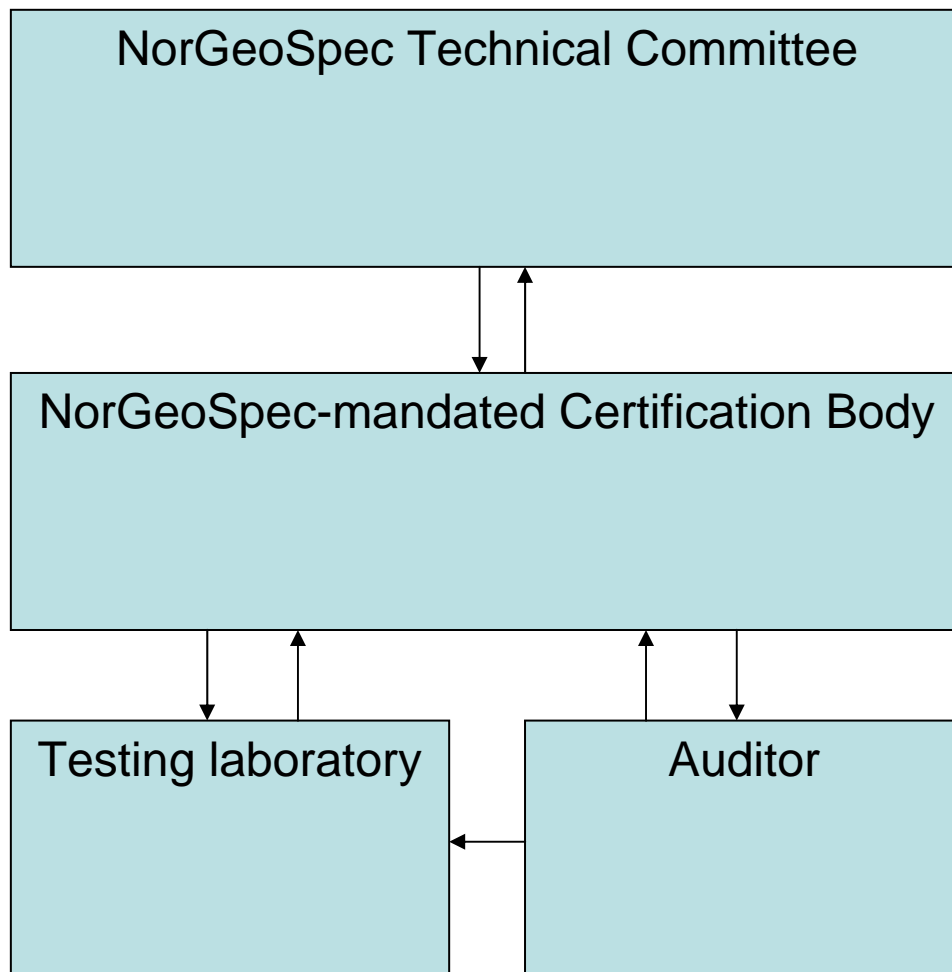


Figure 1 Principles of organisation

3.1 Responsibilities of the NorGeoSpec Technical Committee (TC)

Responsibilities

The TC upholds the NorGeoSpec and proposes revisions of the NorGeoSpec when seen necessary.

The TC examines:

- the request for Quality Certification or Independent Product Attestation
- the test results from random sampling and testing

The TC recommends decisions for the Quality Certification or Independent Product Attestation of the products.

The TC handles appeals and decides on action in case of misuse of NorGeoSpec Quality Certificates or Independent Product Attestation.

Administration

The TC represents partners involved in the NorGeoSpec, including representatives from the National Roads Administrations in the countries where NorGeoSpec is applied, VTT and SINTEF.

The NCB representative manages the secretariat of the TC. The chairman of the TC is elected amongst its members.

For revision of the specification the national road authorities in the countries where the NorGeoSpec is applied should all agree to the revision.

Majority decides in cases of handling of the rules. A minimum of 50% of the members is requested for valid deliberation. In case of equality of voting the vote of the chairman decides.

3.2 Responsibilities and requirements of the NorGeoSpec-mandated Certification Body (NCB)

Responsibilities

The NCB is responsible for application of quality certification (QC) and Independent Product Attestation (IPA) as defined in the NorGeoSpec and its annex A.

The NCB assures to treat all applicants equally.

The NCB mandates auditors.

The NCB receives the request from the applicants and dependent on level of documentation declares compliance with the NorGeoSpec requirements according to one of the two procedures: Quality Certification (QC) or Independent Product Attestation (IPA). The level of documentation required differs for the two procedures:

QC:

- Values corresponding to 95% confidence limits (nominal value +/- the tolerances) according to Table 5.2 in the NorGeoSpec-report.
- Initial test of the product at laboratory recognised by the NCB with independent sampling of the products, procedure organized by the NCB.
- Continuous surveillance based on contract with NCB.
- Advice of the TC.

IPA:

- Values corresponding to 95% confidence limits (nominal value +/- the tolerances) according to Table 5.2 in the NorGeoSpec-report
- Mean values from accredited tests at an independent laboratory recognised by the NCB shall be within the 95% confidence limits. The results shall not be older than 3 months at the time of requesting certification.
- Advice of the TC.

Administrative requirements

The NCB must be:

- An organisation conforming to EN 45011 requirements.
- Accredited by an accreditation body involved in European Accreditation.
- A notified body for CE marking of geotextiles and related products according to Mandate 102.

- Mandated by the NorGeoSpec TC.

3.3 Responsibilities and requirements of the NorGeoSpec-accredited test laboratories (TL)

Responsibilities

The responsibilities of the TL are:

- sampling of products when required from the NCB
- testing of the product according to the test plan prepared by the NCB
- preparing test reports and sending the results to the NCB

Requirements

The TL shall fulfil the following requirements:

- accredited according to EN ISO 17025 covering the tests required by NorGeoSpec.
- independent and impartial (not owned by a manufacturer of geotextiles or by a holding company, which also owns such a manufacturer).
- independent from the NCB (not owned by the same company or by same holding company).
- able to perform all the tests required by NorGeoSpec.

The laboratory performs the tests on the samples, which they get from the auditors on behalf of the NCB. The test report shall contain the following elements:

- the name of the geotextile product and origin of production (=plant)
- information on sampling and dates
- information on the test procedures
- the resulting data obtained from the tests, both average values and single values.

Interpretation of test results related to NorGeoSpec requirements may be given in an informative annex to the test report.

3.4 Responsibilities and requirements of the auditors

Auditors are mandated by the NCB. The accreditation of the auditors is yearly reviewed by the NCB following the requirements defined within the NorGeoSpec.

The auditor shall take samples to be addressed to the laboratory for testing.

Auditors must be accredited or recognised competent, especially in geotextile and geotextile related products, impartial and independent of manufacturers. They must meet the requirements of ISO 10011/EN 45004.

3.5 Confidentiality clause

All persons engaged in the certification process have to keep confidentiality.

4 Certification request

The applicant applies for the NorGeoSpec Quality Certificate or Independent Product Attestation for a geotextile product which is CE-marked and assigned durable > 25 years (according to EN 13 249 and its Appendix A).

The NCB examines the request and the NCB commits itself to give an answer to an applicant within three months after receiving the complete request.

A complete request is defined as to include all information and documentation required to reject or issue certification and should be presented according to EN ISO 10318 and EN ISO 10320.

The TC examines the request and advises the NCB to declare or to refuse the right of usage. The TC can also ask for an extra investigation or invite the applicant before a final decision.

A complete request for Independent Product Attestation (IPA) must contain:

- The request must be made for a geotextile product which is CE-marked and assigned durable > 25 years (according to EN 13 249 and its Appendix A).
- The CE-mark accompanying document must be provided to the NCB.
- Values corresponding to 95% confidence limits (nominal value +/- the tolerances) according to Table 5.2 in the NorGeoSpec-report must be declared and provided to the NCB. The values stated for NorGeoSpec must be identical to those stated on the CE-mark accompanying document.
- Mean values from accredited tests at an independent laboratory recognised by the NCB must be provided to the NCB. The results shall not be older than 3 months at the time of the request.

A complete request for quality certification (QC) includes multiple steps:

1st step; initial request:

- The request must be made for a geotextile product which is CE-marked and assigned durable > 25 years (according to EN 13 249 and its Appendix A).
- The CE-mark accompanying document must be provided to the NCB.
- Values corresponding to 95% confidence limits (nominal value +/- the tolerances) according to Table 5.2 in the NorGeoSpec-report must be declared and provided to the NCB. The values stated for NorGeoSpec must be identical to those stated on the CE-mark accompanying document.

On the basis of this information the NCB makes a contract for 3rd party audit and product control with the applicant and arranges for initial sampling and testing of the product which are up for certification.

2nd step; signing contract and product testing

- Signing 3rd party audit and product control contract with the NCB.
- Initial sampling at production site and testing of the product at accredited laboratory, organized by the NCB.

3rd step; declared compliance or refusal

- The NCB reviews the documentation presented by the applicant in the 1st step and the test results from the 2nd step
- The NCB submits a recommendation to the TC whether the request should be refused or compliance with the NorGeoSpec should be declared

- The TC decides whether the request should be refused or compliance should be declared.
- If the TC decides that compliance should be declared, the NCB issues the NorGeoSpec Quality Certificate.

4.1 Responsibilities of the applicant

The applicant is responsible for faulty manufacturing, errors of marking and labelling. The right to use the NorGeoSpec-certificate does not transfer the applicant's liability to the NCB or TC under any circumstances. In essence the manufacturer remains legally responsible in all respect relating to the placement of the product in the market.

Any change of a characteristic of the product (e.g. characteristics required by NorGeoSpec either declared for CE-marking or required by NorGeoSpec, like mass per unit area), shall be announced to the NCB immediately and will automatically induce the withdrawal of NorGeoSpec certification for this product.

When requesting Quality Certification initial testing must be performed for the product and for all NorGeoSpec-relevant characteristics. The testing must be performed at an external laboratory, recognised by the NCB and the results must comply with the NorGeoSpec requirements. The applicant must have a contract with the NCB, which will be responsible for running continuous surveillance. This involves unannounced sampling at the production site, at the stock and at construction sites. During the certification period of two years the product will be tested at least twice, but not necessarily for all the characteristics.

When requesting Independent Product Attestation the applicant must submit mean values from accredited tests at a laboratory recognized by the NCB. The test results must be within the 95% confidence limits. The results from the laboratory shall not be older than 3 months at the time of the request.

4.2 Validity of the Quality Certificate and the Independent Product Attestation

The NorGeoSpec Quality Certificate and Independent Product Attestation of a product are valid in all countries where the NorGeoSpec is applied.

The NCB distributes on behalf of the TC the information on the website www.norgeospec.org.

The certificate is valid for a 2 years period, provided that the rules as defined in the QRD are followed.

The certificate states:

- The name of the NCB which has issued the Quality Certificate or Independent Product Attestation.
- The declared values and the specification profiles fulfilled by the product.

4.3 Renewal of a request

A request that has been refused cannot be renewed until at least six months have passed by since the refusal.

5 Verifications

5.1 Verifications performed by the applicant

The applicant is responsible for controlling the equipment, raw materials and manufacturing of products in order to benefit from the rights to use the NorGeoSpec. The applicant must secure a continued verification of the production and must maintain reliable records of the results.

5.2 Verifications performed at request of Quality Certification

The applicant must provide the requested documentation:

- The CE-mark accompanying document must be provided to the NCB.
- Values corresponding to 95% confidence limits (nominal value +/- the tolerances) according to Table 5.2 in the NorGeoSpec-report must be declared and provided to the NCB. The values stated for NorGeoSpec must be identical to those stated on the CE-mark accompanying document.

The applicant, or the manufacturer, must sign a contract with NCB concerning continuous surveillance as described in chapter 5.4.

The applicant must agree to initial testing of the products at an independent accredited laboratory recognised by the NCB with independent sampling of the products; the procedure will be organized by the NCB.

5.3 Verifications of the Quality Certification, continuous surveillance

Sampling of all certified products for testing in an independent accredited laboratory (TL) are undertaken every second year by an auditor in the production place⁷, on NCB initiative in accordance with the applicant.

5.4 Unannounced random product sampling and controls according to QCA-procedure

The NCB organises random controls. They can be at the production place, on the stock or at the construction site.

The announcement to the producer and/or the applicant is made the working day before. In case of stock control at the distributor or at site, the distributor shall be informed also. During the certification period of two years a product will be tested at least twice, but not necessarily for all the characteristics.

The selection on products for random sampling could be based upon information about which products are already produced and available at the time of the audit.

6 Certification

The NCB, with advice from the TC, has the right to declare or refuse to declare compliance with the NorGeoSpec.

Quality Certificates and Independent Product Attestation are published on the NorGeoSpec website; www.norgeospec.org. The Quality Certificates and Independent Product Attestation are valid for two years, unless:

6.1 In case of non-conformity of a product

⁷ In case the applicant is not the manufacturer of the product or not manufacturing in EEA, the sampling is made at the applicant's stocking place.

The NCB, with advice of the TC, pronounces the decision which could be suspension between 3 to 12 months or complete cancellation of the Quality Certification or Independent Product Attestation. Non-conformity involves test results from random sampling and testing not being within the declared 95% confidence limits.

The applicant is not allowed to use the NorGeoSpec Quality Certificate or Independent Product Attestation for the failed product from the date the applicant receives the decision.

6.2 In case of voluntary withdrawal of a product

Voluntary withdrawal is possible after a minimum period of 2 years. The cancellation is pronounced and the remaining stock can be sold under the NorGeoSpec within a period of 6 months.

6.3 In case of non-payment of the fees

The NCB, with advice from the TC, pronounces the cancellation.

6.4 In case of non-compliance by the applicant with respect to the responsibilities

The NCB, with advice of the TC, pronounces the decision, which could be suspension between 3 to 12 months or cancellation of the Quality Certificate or Independent Product Attestation.

The applicant is not allowed to use the NorGeoSpec Quality Certificate or Independent Product Attestation for the failed product from the date the applicant receives the decision.

6.5 Taking effect

The granting, renewal, withdrawal or suspensions are enforceable from the date of receipt of the decision by the applicant. However, the obtaining of the NorGeoSpec is dependent on the payment of all the related costs.

The certified or attested products, which are affected by a suspension or a withdrawal, are removed from the list of NorGeoSpec products on the website. The original NorGeoSpec Quality Certificates or Independent Product Attestations of the suspended or cancelled products shall be returned to NCB within 1 month.

6.6 Change of commercial reference of certified product

The change of commercial references of certified products can take place under the following conditions:

- All properties remain unchanged
- The applicant shall not manufacture under the old reference from the date the new reference applies
- The validity of old certificates is limited to 6 months after the change of reference
- The applicant cannot publish the 2 references on the technical data sheets or commercial documents
- The applicant shall not reuse the names of products previously certified or attested.

6.7 Appeals

Where the applicant disagrees with the decision relating thereto, it is possible for the applicant to lodge one, and only one, appeal with the TC. The appeal must be presented within a period of 30 days from the date of receipt of the notification of the corresponding decision. All costs related to the appeal must be borne by the applicant.

Three different types of appeal are possible:

- I. on the test results recorded by the TL (accredited laboratory)
- II. for non compliance with the applicant responsibilities
- III. for non payment of costs

In case number I additional tests are carried out on spare specimens from the original sample in an alternative TL (accredited laboratory) mandated and chosen by the NCB. If the results are in accordance with the values indicated by the applicant, the TC is consulted by fax for final decision. If the results are not in accordance with the values the case will be studied at the next Technical Committee meeting

In case number II the appeal is studied by the TC. The NCB prepares the file and meets the applicant if possible.

Appeal can not delay the application of the decision.

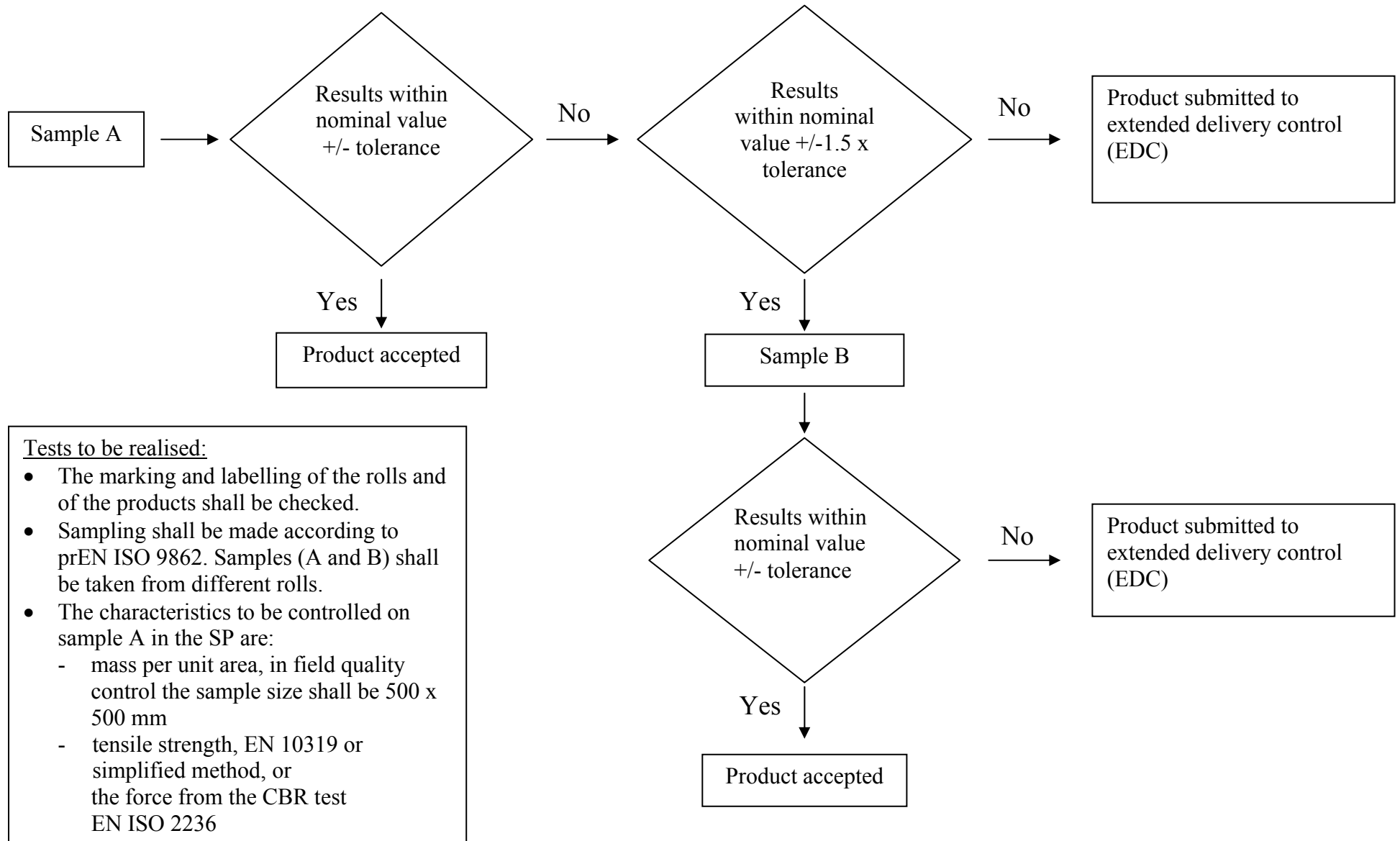
6.8 Unauthorised use of the Quality Certificate or Independent Product Attestation

In case of unauthorised use of the NorGeoSpec Quality Certificate or Independent Product Attestation, the TC can decide any action it finds necessary.

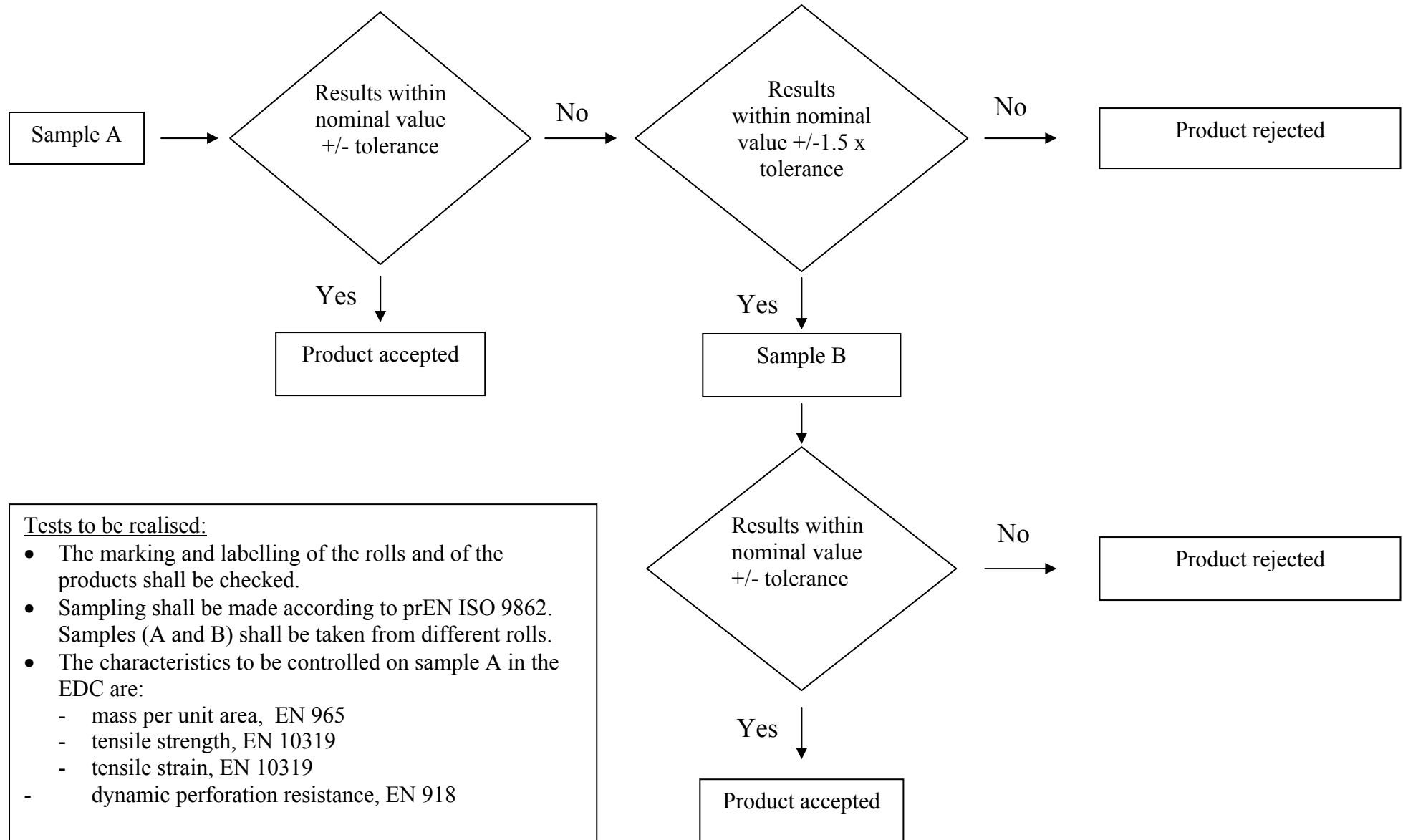
7 Contentious matter

For contentious matters, the laws and tribunals of the country of the NCB are the ones to be referred.

Appendix B Flow chart, Simplified Procedures for delivery control (SP)



Appendix C Flow chart, Extended Delivery Control (EDC)



- Tests to be realised:
- The marking and labelling of the rolls and of the products shall be checked.
 - Sampling shall be made according to prEN ISO 9862. Samples (A and B) shall be taken from different rolls.
 - The characteristics to be controlled on sample A in the EDC are:
 - mass per unit area, EN 965
 - tensile strength, EN 10319
 - tensile strain, EN 10319
 - dynamic perforation resistance, EN 918