Nordic certification system for road marking materials

Version 11:2026

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Kort sammanfattning

Ett nordiskt certifieringssystem för vägmarkeringsmaterial introducerades under 2015. Systemet baseras på dokumenterade materialtester på provfält, där materialen certifieras utifrån hur många hjulpassager de klarar. Certifieringssystemet omfattar både plana (typ I) och profilerade/våtsynbara (typ II) markeringar, friktionsmaterial (material med förbättrad friktion), temporära markeringar, nedfrästa markeringar (endast Norge), tvärgående markeringar (material för handläggning) samt slitstarka material utan krav på retroreflexion för högtrafikerade belysta vägar.

Materialtester görs på två provfält: ett i Norge och ett i Danmark. Provfälten är placerade på allmän väg och materialen som testas är exponerade för trafik samt för väderförhållanden representativa för de nordiska länderna. Materialen följs upp med funktionsmätningar under ett eller två år. Certifieringen omfattar krav på retroreflexion R_L, luminanskoefficient *Qd*, friktion och kulör. Antalet hjulpassager som materialen utsätts för mäts årligen. Certifieringssystemet inkluderar även materialidentifiering, för att bekräfta att tillverkarens materialdeklaration stämmer överens med det material som lagts ut på provfältet.

Certifieringssystemet baseras på Europastandarderna *EN 1824 Road marking materials – Road trials*, *EN 1436 Road marking materials – Road marking performance for road users*, *EN 12802 Road marking materials – Laboratory methods for identification* samt *EN 13212 Road marking materials – Requirements for factory production control*.

Föreliggande dokumentation utgör instruktion för det nordiska certifieringssystemet. Dokumentet beskriver hur certifieringen går till, vilka typer av produkter som kan certifieras och vilka krav som ställs för certifiering. Vidare beskrivs de procedurer och metoder som tillämpas vid utläggning av material, vid mätning av materialens funktion och vid materialidentifiering. Dokumentet ger också specifikationer och praktisk information gällande provplatserna samt gällande anmälan och utläggning av material för certifiering.

Nyckelord

Vägmarkeringsmaterial, certifiering

Abstract

A Nordic certification system for road marking materials was introduced in 2015. The system is based on documented performance measurements of material samples applied on test fields on public roads. The certification system includes both flat (type I) and structured/profiled (type II) markings, antiskid materials (materials with enhanced friction), temporary markings, inlaid markings (Norway only), materials for hand application and materials with enhanced durability for illuminated high-traffic urban areas.

Material tests are carried out at two test sites: one in Norway and one in Denmark. The test fields are situated on public roads and the tested materials are thus exposed to real traffic conditions and to weather conditions representative for the Nordic countries. The materials are followed up by performance measurements for one or two years. The certification includes requirements on coefficient of retroreflected luminance R_L under dry and wet conditions, luminance coefficient under diffuse illumination *Qd*, friction and chromaticity coordinates. The number of wheel passages is measured at the test sites annually. The certification system includes material identification, to verify that the manufacturer's declaration of constituents agrees with the material applied on the test field.

The certification system is based on the European standards *EN 1824 Road marking materials – Road trials*, *EN 1436 Road marking materials – Road marking performance for road users*, *EN 12802 Road marking materials – Laboratory methods for identification,* and *EN 13212 Road marking materials – Requirements for factory production control*.

This document constitutes the guidelines for the Nordic certification system. The document describes the certification procedure, what type of products that are included in the system and the requirements for certification. Furthermore, the procedures and methods used for application of materials, performance measurement and identification analysis are described. The document also gives specifications and practical information regarding the test sites and regarding registration and application of products for certification.

Keywords

Road marking material, certification

Table of content

Preface

A Nordic certification system for road marking materials was introduced in 2015. The certification of products is based on documented performance measurements of material samples applied on test fields on public roads. The introduction of the certification system was motivated by the following reasons:

- to promote fair competition
- to promote the development of new and better materials
- to obtain better documentation of the use of public funds
- to guarantee that the road authorities get the material paid for
- to improve the quality of the road markings from the road user perspective
- to increase the knowledge about road marking materials.

This publication provides guidelines and specifications for the certification system. The publication is revised when necessary. The most recent version replaces older versions.

Ramboll and the Swedish National Road and Transport Research Institute (VTI) have the formal and operational responsibility of the certification system, formalised in a joint certification organisation called *NordicCert*. The management team consists of Morten Hafting (project manager), Ramboll, Berne Nielsen, Ramboll, Carina Fors, VTI, Hanna Fager, VTI, and Anna Anund, VTI.

Oslo, April 2026

Morten Hafting
Project manager

Granskare/Examiner

Anna Anund, VTI.

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1. Introduction

A Nordic certification system for road marking materials, *NordicCert*, was established in 2015. The certification system aims at testing and certifying road marking materials with respect to the durability of the products, which allows for public purchasers of road marking materials to set requirements on product quality in their procurements and contracts. Product certification is based on monitored and documented performance measurements of material samples applied on test fields on public roads. The certification system includes two test sites with different characteristics with respect to climate and winter maintenance: one in Norway, representative of the conditions in Finland, Iceland, Norway and Sweden (FI-IS-NO-SE), and one in Denmark (DK), representative of the conditions in Denmark.

The certification system includes road marking materials for all types of white and yellow longitudinal markings, as well as antiskid and normal markings for transversal and longitudinal use, temporary markings, as used at roadworks, and inlaid markings (FI-IS-NO-SE test site only). From 2019 the certification system also includes materials for hand application, and materials with enhanced durability with no requirement on retroreflectivity for illuminated high-traffic urban areas.

The certification comprises the road marking material (paint, thermoplastic and cold plastic materials) in the applied thickness and with the specified drop on material. For type II markings (road markings with special properties intended to enhance the retroreflection in wet or rainy conditions), the certification comprises the *assembly*, i.e. the material itself, including the drop on material (glass beads and antiskid aggregates), in the applied design/pattern put out on the trials.

Performance requirements include coefficient of retroreflected luminance R_L under dry and wet conditions, luminance coefficient under diffuse illumination *Qd*, friction and chromaticity coordinates. Approval is given in relation to the number of wheel passages the material will withstand.

This publication provides guidelines and specifications for the certification system. The publication is revised when necessary. The most recent version replaces older versions.

The Nordic certification system is based on the European standards:

- *EN 1824 Road marking materials – Road trials (Swedish Institute for Standards [SIS], 2020)*
- *EN 1436 Road marking materials – Road marking performance for road users (Swedish Institute for Standards [SIS], 2018)*
- *EN 12802 Road marking materials – Laboratory methods for identification (Swedish Institute for Standards [SIS], 2011a)*
- *EN 13212 Road marking materials – Requirements for factory production control (Swedish Institute for Standards [SIS], 2011b).*

Related standards are:

- *EN 1423 Road marking materials – Drop on materials – Glass beads, antiskid aggregates and mixtures of the two (Swedish Institute for Standards [SIS], 2012)*
- *EN 1424 Road marking materials – Premix glass beads (Swedish Institute for Standards [SIS], 1997)*
- *EN 1790 Road marking materials – Preformed road markings (Swedish Institute for Standards [SIS], 2013).*

The certification system may be modified and/or extended later.

Some terms and definitions are given in Appendix 1.

1.1. The NordicCert organisation

The Swedish National Road and Transport Research Institute (VTI) and Ramboll together have the formal responsibility of the road trials and the material approval, formalised in a joint certification organisation called NordicCert. Ramboll provides the project management of the certification system and is responsible for administration, material application, performance measurements and data handling. The project manager is responsible for the contacts with the road authorities and with the material manufacturers participating in the road trials. VTI is responsible for documents, reports and certificates, supervision of measurements, data analyses, handling of material samples from the road trials and database. VTI is also the financial administrator of the road trials.

The administration of the road trials refers to Ramboll and VTI.

Contact information can be found in Appendix 5.

1.2. Website

Information about NordicCert, including this document, result reports, forms, lists of certified products, pictures and maps, can be found at www.nordiccert.com.

2. Road marking materials

The certification system includes materials for longitudinal and transversal markings in the product categories described below. Any type of material for longitudinal or transversal markings can be used, including preformed road markings, provided that the materials comply with current legislation.

The products are tested as applied assemblies, comprising the road marking material (paint, thermoplastic, or cold plastic materials) with a certain thickness and with drop on materials (glass beads, antiskid aggregates) and primer (if relevant) as determined by the manufacturer. For type II markings (see Section 2.1.2), the assembly also includes the design/pattern of the marking.

2.1. Product types

This section describes the product categories that are included in the certification system. Allowed material thicknesses are specified in Section 4.3. The full performance requirement for each product type is given in Section 7.3.

2.1.1. Colour

The certification system includes white and yellow materials.

Other colours may be applied as *Test materials*, see definitions in Section 7.2.

2.1.2. Type I and type II

From 2016, the certification system includes both type I (flat) and type II (structured/profiled road markings intended to enhance the retroreflection in wet or rainy conditions) markings. For type II materials, certification is given for the combination of material and pattern/design that was applied on the test field. The design/pattern is documented by a photo, that will be included in the certificate.

Any type of pattern or design is allowed for type II markings.

2.1.3. Inlaid markings

Inlaid markings are markings that will be installed in a milled track. The bottom of the milled track will be flat, and the width will be 30–35cm. The depth of the track will be about 7 mm, so that the surface of the marking will stay below the surface of the pavement. The purpose of inlaid markings is to extend the functional lifetime of the markings, as snowploughs will not affect markings that are placed below the surface of the pavement.

Inlaid markings can be applied in white or yellow colour, as type II, on the FI-IS-NO-SE test site.

2.1.4. Antiskid material

From 2017, the certification system includes white road marking assemblies intended to provide enhanced antiskid properties[1]. Such road markings are sometimes used in urban areas with street lighting, for instance for pedestrian crossings. For antiskid materials there is no requirement for coefficient of retroreflected luminance, R_L. However, the requirement for friction is higher than for type I and type II materials, see Section 7.3.

2.1.5. Materials for hand application

From 2019, the certification system includes materials for hand application, typically used for pedestrian crossings, text and symbols on the pavement. Materials for hand application can be

[1] In a previous version of this document (version 4:2017) materials with enhanced antiskid properties were called “friction materials”.

registered either as retroreflective, with specified requirements on the coefficient of retroreflected luminance, R_L, or as non-retroreflective, where there is no requirement on R_L. The requirement on friction is higher than for type I and type II materials but lower than that for antiskid materials. The requirements on luminance coefficient under diffuse illumination, *Qd* and chromaticity coordinates are identical to those for ordinary type I materials. Materials for hand application can be applied in white or yellow colour.

2.1.6. Materials with enhanced durability

From 2019, the certification system includes materials with enhanced durability for longitudinal application in illuminated urban areas with a high number of wheel passages. For this product type, there is no requirement on coefficient of retroreflected luminance, R_L. Requirements on luminance coefficient under diffuse illumination, *Qd*, friction and chromaticity coordinates are identical to those for ordinary type I materials. Materials with enhanced durability are applied as type I markings in white or yellow colour.

2.1.7. Temporary markings

Temporary markings are typically in use when traffic must be redirected due to roadworks. At the road trials, the temporary markings will be followed up within 6 months of the application. Winter conditions will not be included in the follow up period. Materials will be certified according to the achieved roll-over class for temporary road markings, see also Section 7.4.

Temporary markings can be applied in white or yellow colour.

2.2. Content of material and system

All ingredients/components of the material, including binder and premix beads, are parts of the material. The system includes both the road marking base material and the drop on material, and this means that the certification is valid only for the specific combination of base material (type of binder, amount of pigment, amount of glass beads, etc.) and the specific drop on material applied on the test field.

2.2.1. Use of alternative drop on materials

The certification allows for adding alternative drop on materials to an existing certificate, provided that the technical specifications and performance of the products are equivalent to those that were originally used on the road trials. The type - and relative amount - of antiskid aggregates in the drop on material must be same as certified on the trials.

The use of alternative drop on materials must be applied for by the material manufacturer and approved in accordance with a separate procedure, governed by NordicCert. The application procedure is described in detail in Appendix 2. NordicCert is the only organization that can authorize the applications. Approved changes apply to all contractors and are valid until further notice unless NordicCert informs otherwise. Applications for alternative drop on systems can be submitted at any time of the year by sending the application form found on the NordicCert webpage to application.nordiccert@vti.se, but must be **approved** at latest on December 31st to be included in the renewed certificate the following year. Please account for a processing time of up to six weeks, provided that all requested documentation is handed in.

The use of alternative drop on materials is permitted immediately from when the approval is given from NordicCert. At the same time, information about approved drop on material systems will be updated on the NordicCert webpage.

If no application for alternative drop on materials is made, the material will only be considered approved using the drop on that was used on the road trials and which is the basis for the certificate's approval.

2.3. Product documentation

For products that fulfils the requirements for certification (see Section 7.1) and for which the manufacturer will request certificates, the following product documentation must be handed in together with the form for request of certificates:

- Road marking material (paint, thermoplastic and cold plastic materials): Product data sheet, see Appendix 3.
- Road marking material (paint, thermoplastic and cold plastic materials): Safety data sheet (SDS), see Appendix 3.
- Road marking material (paint, thermoplastic and cold plastic materials): Manufacturer’s declaration of constituents, see Appendix 3.
- Drop on material: Product data sheet, see Appendix 3.
- Drop on material: Safety data sheet (SDS), see Appendix 3.
- Drop on material: Declaration of Performance (DoP), see below.

The administration of the road trials has the right to request product documentation for materials registered for the road trials at any time if there are certain reasons.

Drop on materials, i.e. glass beads, antiskid aggregates and mixtures of the two must bear CE marking and shall be in accordance with EN 1423 (SIS, 2012). Their properties shall be documented by the *Declaration of Performance* (DoP) according to the specifications and classes given in the named standard. Product data sheets, safety data sheets and DoP’s must be submitted for glass beads and antiskid aggregates separately, or for the mixture of the two. The CE marking shall be affixed on the packaging of the products.

Materials cannot receive certification unless the documentation is complete. For further information, see Appendix 3.

Drop on materials that have not yet received the CE marking may (only) be used with road marking materials (paint, thermoplastic and cold plastic materials) registered and applied on the test field as *test materials*, see Section 7.2.

2.4. Requirements regarding health, environment, and safety

Materials applied on the test field must comply with current chemicals-, health-, safety-, and environmental legislation and practice in the Nordic countries. Materials must not contain any heavy metals or other materials that are in violation of legislation. Volatile organic compounds (VOCs) shall not exceed 2% by weight of any materials.

The use of yellow lead chromate pigments is not allowed in the Nordic countries.

Solvent based paint is prohibited in the Nordic countries and is thus not allowed on the test field.

3. Test sites

The road trials of the certification system in 2026 are carried out in Norway and Denmark. The locations of the test sites are shown in Figure 1.

The reason for having two test sites is the differences between Finland, Iceland, Norway, and Sweden on one hand, and Denmark on the other hand, with respect to climate and the use of studded tyres. See also Section 7.5.

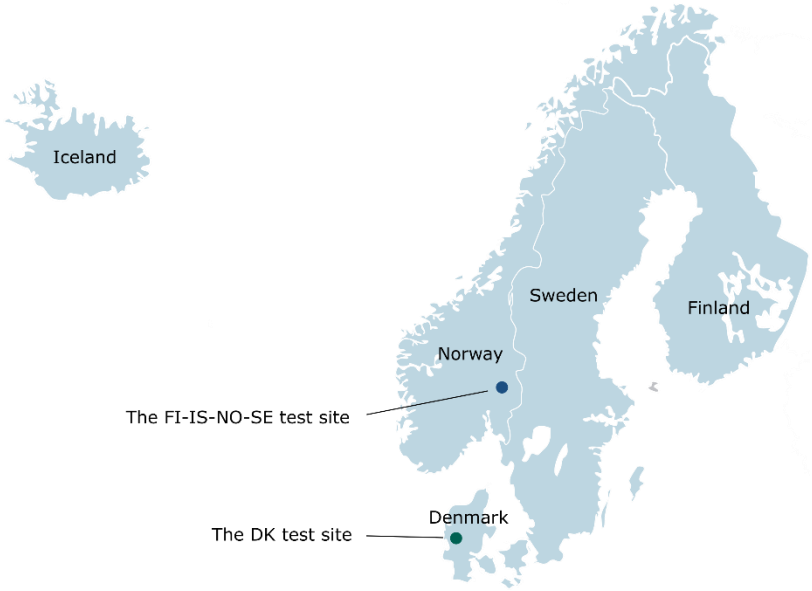

Figure 1. Locations of the test sites. (Image: Modified from Hayden120, CC BY-SA 3.0, Wikimedia Commons).

The establishment of the test sites is done according to *EN 1824 Road marking materials – Road trials* (SIS, 2020). The exact location of the test sites must be approved by the road authority. NordicCert is responsible for obtaining the required permits before any activities are carried out at the test sites.

3.1. The FI-IS-NO-SE test site

The present Finnish-Icelandic-Norwegian-Swedish test site was established in 2017.

3.1.1. Location

The FI-IS-NO-SE test site is currently located in Hedmark, close to Haslemoen in eastern Norway, approximately 180 km northeast of Oslo, Norway. The location is intended to represent the average climate conditions in Norway and Sweden (and Finland).

The road used for the test site is road Rv2, from Haslemoen and southeast approximately 5 km. The GPS coordinates for the test site in WGS84 DDM are:

- N 60° 38.665
- E 11° 52.755

Signs with the text *prøvefelt vegoppmerking* (English: *Test field, road markings*) inform drivers about the test site.

3.1.2. Road characteristics

The road used for the test site is a two-lane rural road located in an open landscape, Figure 2. The road is straight and relatively flat and without any major junctions. The posted speed limit is 90 km/h. From 2023, the northbound lane is used for the test field.

Figure 2. The road used for the FI-IS-NO-SE test site. (Photo: Trond Cato Johansen, Ramboll).

The width of the road is 9 m. Each lane is 3.15 m from the edge of a milling track in the middle to the edge of a milling track at the edge line. The shoulders are 1.00 m, 0.65 m outside the milling track.

The road surface in the northbound lane consists of a stone matrix asphalt (SMA) of type SKA 11 that was installed in 2022. The roughness class is RG2 i.e., the mean texture depth (MTD) is in the range of 0.60–0.90 mm, see Table 2 in EN 1824 (SIS, 2020).

3.1.3. Traffic volume

The annual average daily traffic (AADT) is approximately 3 300 vehicles per day (Trafikkdata, 2026). The proportion of heavy vehicles is approximately 10% of the total number of vehicles.

Measurements of the traffic volume and the transversal distribution of wheel passages are carried out at the test site annually, see Section 3.3.

3.1.4. Climatic conditions

The average temperature during the last five years (Jan 2021–Dec 2025) was 5.7˚C. The highest and lowest temperatures registered were 31.0˚C and -30.3˚C, respectively. The average annual precipitation during the last five years was 561 mm. The average snow depth in December–March (Jan 2021 – Dec 2025) was 13 cm and the largest snow depth was 52 cm. (Norsk klimaservicesenter, 2026)

The Köppen classification of the test site is Dfb, close to the boundary of the Dfc climate zone, based on data for the period 1986–2010 (Kottek et al. 2006). The large areas in the inlands in the north of Finland, Norway and Sweden belong to climate zone Dfc, while the most densely populated areas in the south of Finland and Sweden and along the south and west coasts of Norway belong to climate zones Dfb and Cfb. The coastal areas of Iceland and central Norway belong to class Cfc. The climatic class according to EN 1824 (SIS, 2020) is C3.

During wintertime, the road is salted and cleared from snow by a snowplough.

The weather conditions at the test site will be registered continuously during the road trials, see Section 3.4.

3.1.5. Studded tyres

Studded tyres are permitted in Norway from 1 November to the first Sunday after Easter. (In the northern areas of Nordland, Troms and Finnmark, it is permitted to begin using studded tyres from 15 October.) There is no data available regarding the proportion of vehicles with studded tyres on the test site road, but in Hamar, which is located around 60 km northwest of the test site, the proportion of cars with studded tyres is 45% and it can be estimated[2] that the proportion of cars with studded tyres is 50–55% on the test site road. Heavy vehicles may use studded tyres but can also have non-studded winter tyres.

3.2. The DK test site

The present Danish test site was established in 2022.

3.2.1. Location

The Danish test site is located on Jutland, approximately 100 km west of Aarhus, Denmark. The road used for the test site is road 15, between the villages Havnstrup and Albæk. The GPS coordinates in WGS84 DDM for the test site are:

- N 57˚ 07.449
- E 08˚ 50.144

Warning signs with subpanels inform drivers about the test site, Figure 3.

Figure 3. Warning sign. (Photo: Kai Sörensen).

3.2.2. Road characteristics

The road used for the test site is a two-lane rural road surrounded by an open landscape, Figure 4. The road is relatively straight and flat and without any major junctions. The posted speed limit is 80 km/h. Both lanes are used alternatingly for the test field.

The width of the road is about 8.5 m. Each lane is 3.30 m wide. There are bike lanes on the shoulders.

The road surface consists of asphalt of type SMA8/11 that was placed in 2022. The mean texture depth (MTD) is in the range of 0.60–0.90 mm, i.e. the roughness class is RG2.

[2] According to Jon Haglund at the Norwegian Public Roads Administration.

Figure 4. The road used for the Danish test site. (Photo: Trond Cato Johansen, Ramboll).

3.2.3. Traffic volume

The annual average daily traffic (AADT) is approximately 8 750 vehicles per day (*AADT data: the Danish Road Directorate, 2022*). The proportion of heavy vehicles is approximately 7% of the total number of vehicles.

Measurements of the traffic volume and the transversal distribution of wheel passages are carried out at the test site annually, see Section 3.3.

3.2.4. Climatic conditions

The annual average temperature during the years 2021–2025 was 8.9˚C. The highest and lowest temperatures registered were 35.6˚C and -17.9˚C, respectively. On average, the temperature was below 0˚C 76 days per year. The annual average precipitation was 965 mm and the average number of sun hours was 1 685. (Danmarks Meteorologiske Institut, 2026).

The Köppen classification of the test site is Cfb, based on data for the period 1986–2010 (Kottek et al. 2006). The climate zone Cfb covers the whole of Denmark, the southern parts of Sweden and the south and west coasts of Norway. The climatic class of the Danish test site according to EN 1824 (SIS, 2020) is C3, i.e. Cfb with winter maintenance. The extent of winter maintenance may vary a lot between years.

During wintertime, the road is salted and cleared from snow by a snowplough (rubber blade or steel blade).

The weather conditions at the test site will be registered continuously during the road trials, see Section 3.4.

3.2.5. Studded tyres

Studded tyres are permitted in Denmark from 1 November to 15 April. The number of cars with studded tyres is low (estimation: <5%).

3.3. Measurements of wheel passages

The number of wheel passages and the transversal distribution of wheel passages is measured annually at the test sites. The assessment of wheel passages is conducted after the markings have been applied, in order to account for any influence on vehicles' lateral position from the markings.

The measurement equipment that is used is based on coaxial cable technique, which provides data with high accuracy. Data is collected during approximately one week in the autumn or in the spring (i.e. studded tyres are not used when data is collected). The measurements of wheel passages are carried out by VTI.

From the collected data, the distribution of wheel passages is calculated according to the procedures described in Annex B in EN 1824 (SIS, 2020). Roll-over classes will then be determined from the calculated distributions, see Section 7.4.

3.4. Measurements of weather conditions

The following data is registered at the test sites each year:

- annual average temperature
- average summer temperature
- average winter temperature
- highest temperature
- lowest temperature
- annual precipitation
- number of sun hours (not available for the FI-IS-NO-SE test site)
- number of weeks with snow (in Denmark: snow or frost)
- number of times the snow plough has operated
- number of times the road has been salted.

Meteorological data is retrieved from *Yr* (which is a joint service by *the Norwegian Meteorological Institute* and *the Norwegian Broadcasting Corporation*), *the Norwegian Centre for Climate Services* and *the Danish Meteorological Institute* (DMI), respectively. Information about winter maintenance is obtained from the road entrepreneurs.

4. Application of road marking materials

The application of road marking materials at the test sites is based on EN 1824 (SIS, 2020). Details are given below.

4.1. Application pattern

The application pattern is based on the longitudinal pattern described in Section 5.2.3 in EN 1824 (SIS, 2020). Each marking material is applied as a row of longitudinal lines in the direction of the traffic. Specifications:

- nine longitudinal lines in a row in the lane and, at the FI-IS-NO-SE test site, a tenth line on the shoulder
- length of the lines: 2.5 m
- width of the lines: 0.15 m
- distance between two adjacent lines: approximately 0.15 m
- distance between two adjacent rows of lines: depends on the number of materials/rows, but at least 2 m.

The position of the lines will be pre-marked. The administration of the road trials is responsible for the application of pre-markings. The position of the lines will also be measured after application.

The tenth line on the shoulder serves as a reference without any wheel passages.

For inlaid markings, there will be a milled flat track over two sections in line positions 2, 3, 9 and 10 (the lines are numbered from right to left, i.e. line 1 is the line on the shoulder and line 10 is the one next to the centre line). Inlaid markings will be applied in those milled tracks. The other line positions will be filled with the same type of markings but will not be inlaid. The administration of the road trials is responsible for the milling of tracks.

4.2. Application method

Preferably, materials shall be applied using self-propelled road marking equipment of maximum 3 500 kg. Application by hand is permitted, e.g. in case the participant does not have a self-propelled machine. Due to practical reasons of precision and not having newly applied markings run over, heavy truck mounted equipment is to be avoided[3]. The application method will be documented in the certification report.

Materials intended for hand application should be applied by hand on the test site.

4.3. Material thickness

Materials can be applied in five thicknesses:

- 0.4 mm wet (example: paint). Maximum thickness allowed at application: 0.45 mm wet
- 0.6 mm wet (example: paint). Maximum thickness allowed at application: 0.65 mm wet
- 1.5 mm (example: sprayed thermoplastic). Maximum thickness allowed at application: 2.0 mm

[3] If there is no other possibility for application, a special approval for using heavy truck mounted equipment must be given beforehand by the administration of the road trials. The manufacturer then must apply for the approval by contacting the project manager (see Appendix 5) at latest at the last day for registering materials.

- 3.0 mm (example: extruded thermoplastic). Maximum thickness allowed at application: 3.5 mm
- 5.0 mm (Structured/profiled type II markings and antiskid materials only. Example: thermoplastic and cold plastic). Maximum thickness allowed at application: 5.5 mm.

Prefab and tape shall be applied in commercially available thicknesses.

The thickness is measured when the material is applied. For each row of lines, a steel plate is placed in the end of one of the lines that are expected to reach the highest number of wheel passages. When material is applied on this line, the length of the line should be extended so that material is applied also on the steel plate. Drop on materials must not be applied on the steel plate. The thickness of the material is measured on the steel plate. In addition, the thicknesses of one or more lines applied on the road surface will be measured by a portable measurement tool.

The steel plates are weighed before and after application, so that the volume applied can be controlled, and the mean thickness be calculated.

If the thickness of the material, based on measurements of the thickness and volume of the material applied on the steel plate and of measurements of the random samples of lines, is greater than the maximum allowed, the material will be disqualified and excluded from the road trial. The material may be disqualified directly at the test site or after the control of the steel plates.

4.4. Application of drop on materials

Drop on materials must be packed in the original manufacturing package, labelled with the product name, the manufacturer, the CE marking and necessary specifications about the product (e.g. size distribution of glass beads, size distribution of antiskid aggregates, and type and percentage of antiskid aggregates). The package(s) of drop on materials must be unopened. The label of the drop on package will be documented by a photo.

The rate of application of drop on materials will be determined.

4.5. Weather conditions at application

Participants are to verify that the weather conditions during application of their materials are within acceptable limits. Meteorological data at application will be registered.

4.6. Practical information about the application of materials

The test sites will be open for application of materials for 1–5 days, depending on the number of registered materials. Participants will get instructions on when and where to apply their materials. The application will be organized so that the risk of materials being spoiled by weather, traffic or other participants' equipment or presence is minimized.

The lane where the markings will be applied will be closed during application and for a few hours after application. The administration of the road trials will be responsible for closing the road.

Participants are responsible for masking the road surface during application of their materials, to avoid spill and damage of other materials. Roofing felt or tar paper is suitable for this purpose, but also other types of masking materials can be acceptable. The participants are responsible for the masking and for the availability of masking materials.

4.7. Practical information about customs bill of entry to Norway

As Norway is not a member of the European Union, a registration of machinery and equipment, when entering the country, is necessary. This is an easy and inexpensive procedure. Your Chamber of

Commerce will issue an ATA carnet for this purpose. The documents are to be presented to the customs office at the border upon entering the country. The ATA carnet is also to be presented to the customs office when leaving Norway.

4.8. Participants' responsibilities

The participant, or its representative, is responsible for its products during installation on the test field and has to verify a correct application of its materials. A protocol for each material applied on the test field is to be signed by the participant and the administration of the road trials, see Appendix 4. By signing the protocol the participant approves the application, and confirms that the material was correctly sampled.

Participants are obliged to:

- Apply their own materials on the test field(s) at their own cost.
- Follow the instructions given by the administration of the road trials on-site.
- Provide the administration of the road trials with samples of each material (see Chapter 6).
- Bring unopened packages of drop on materials.
- Assure that the material samples taken from the application machine are homogeneous and representative for the material in use.
- Mask the road surface during application of their materials, to avoid spill and damage of other materials. The participant is responsible for the masking and availability of masking materials, see also Section 4.6.
- Make sure that all personnel working on the road at the test sites have a minimum level of road safety training.

After the road trials have been closed for application, the participant, or its representative, is not allowed to enter the test field to perform their own measurements without a permission granted by the road administration in charge. For all kind of activities on the road trials, it is necessary to have an approved traffic safety plan. This plan will also describe the necessary level of warning systems and safety barriers. The participant will have to cover all costs for such a plan and all necessary safety equipment. Please contact the administration of the road trials for contact details of the respective road administrations and of suppliers of safety barriers.

The administration of the road trials aims to arrange an "open day" at the test sites in May-June each year, when participants can visit the test site and assess the condition of their materials that were applied on the test field the previous year. More information about the open days will be sent out by email.

5. Performance measurements

Performance measurements are based on EN 1824 (SIS, 2020) and EN 1436 (SIS, 2018).

5.1. Periodicity of measurements

Initial measurements of all materials are carried out approximately two weeks after application. Follow-up measurements are carried out after approximately one year and, if the participant wishes, after two years. At the FI-IS-NO-SE test site, three year follow-up measurements are offered, see also Sections 2.1.6 and 8.1. After two (and three) years, higher P-classes will have been reached, which implies that the material may be certified for a higher P-class. Follow-up measurements for temporary markings are carried out within 6 months.

The follow-up measurements are usually carried out in August–September.

In case a material does not fulfil the requirements stated in Chapter 7 at the initial measurements, the material will be excluded from the certification program. If the participator wishes, the excluded materials can have a continued follow-up as a *Test material,* see Section 7.2.

In case a material that was registered for two years follow-up measurements does not fulfil the requirements in the highest P-class in year one, no measurements will be carried out in year two, unless the participator asks for it.

If a participator wants continued follow-up for materials that did not fulfil the requirements either at the initial measurements or in the highest P-class in year one, a request must be sent by email to the administration of the road trials, at latest on June 30 in the year when the follow-up measurements are to be carried out.

5.2. Performance parameters

The following parameters are included in the certification system:

- coefficient of retroreflected luminance, R_L dry
- coefficient of retroreflected luminance, R_L wet (type II markings only)
- luminance coefficient under diffuse illumination, *Qd*
- friction
- chromaticity coordinates, x, y.

Performance requirements are given in Chapter 7.

5.3. Measurement details

The coefficient of retroreflected luminance, R_L, and the luminance coefficient under diffuse illumination, *Qd*, are measured in three points on each line, within a 0.15 x 1.5 m large area centered on the line, in accordance with Figure 2 in EN 1824 (SIS, 2020). The parameter values are calculated as the average of the three measurements. Measurements of R_L and *Qd*, are done using an *LTL-XL* or an *LTL3500* (Delta, Denmark).

For measurements of the coefficient of retroreflected luminance R_L on wet markings, water is poured on the measurement area 60 s before the measurements are carried out.

Friction is measured along the centre of each line (one measurement per line), on wet markings. Measurements are carried out using a *Portable Friction Tester version 4* (PFT), which has a proven correlation with the *Skid Resistance Tester* (SRT), see (Wälivaara 2007).

Chromaticity coordinates are measured in one point on each line. A *Konica Minolta Spectrophotometer CM-2500c* or *CM-25cG* is used to measure the chromaticity coordinates. The chromaticity coordinates of yellow materials in retroreflected light are measured by an *LTL3500* (Delta, Denmark). If necessary, more than one measurement point is selected.

All measurements are carried out in the direction of the traffic. Measurements are performed on dry markings in dry weather conditions. The markings are not cleaned before carrying out the measurements, but polluted measurement points will be avoided.

Measurements that involve wetting of the markings, i.e. coefficient of retroreflected luminance R_L on wet markings and friction, are carried out after the measurements of the coefficient of retroreflected luminance R_L on dry markings, luminance coefficient under diffuse illumination *Qd* and chromaticity coordinates.

All measurement equipment will be calibrated according to procedures recommended by the respective manufacturer.

6. Material identification

An identification analysis is carried out on road marking materials (paint, thermoplastic and cold plastic materials) applied and certified on the test fields, to verify that the material agrees with the manufacturer's declaration of constituents.

6.1. Samples for identification

Samples of the base material and of the drop on material are taken from all products that are applied on the test fields. It is the responsibility of the manufacturer to assure that the material samples are representative for the material applied on the test field. Samples can be taken prior to application, during application, or directly after application, as preferred by the manufacturer. Samples are taken directly from the application machine during installation at the test field, if possible. In case the application of materials is carried out without using a self-propelled machine, the material sample will be taken directly from the boiler/heating kettle (thermoplastics) or the material container used at the trial site (paint and cold plastics). If the base material is a multi-component material, samples will be taken from each component. The sampling is done by the administration of the road trials.

Two samples are taken from each base material and from each drop on material.

The samples will be stored for 10 years or until they are sent to lab for analysis (see Section 6.2), in an indoor climate-controlled environment.

6.2. Identification analysis

Samples of the base material of assemblies which have fulfilled the requirements for certification in a P-class will be sent to an accredited testing laboratory for identification analysis according to EN 12802, provided that the manufacturer requests a certificate for the product, see also Section 7.8. The analysis of the sample will be considered the Initial Type Testing (ITT) of the material.

The result of the identification analysis will be compared with the manufacturer's declaration of constituents of the material (see also Appendix 3). Any deviations between the analysis result and the values declared by the manufacturer shall be within the tolerances defined in EN 12802:2011 (SIS, 2011a). In case of any disputes regarding deviations between the ITT identification analysis and the manufacturer's declaration of constituents, the procedure in EN 12802:2011 *5.8 Tolerances* is followed (SIS, 2011a). If the manufacturer demands that the test is repeated, this is paid for by the manufacturer self.

Manufacturers will receive copies of the test report from the identification analysis of their own products, for which they have requested certificates for. Copies of the analysis reports and the manufacturer's declaration of constituents will be distributed by the administration of the road trials together with the certificates and the certificate annexes (see Section 7.8). The test reports and the manufacturer's declaration of constituents are treated confidentially and are only shared with the accredited lab that is carrying out the material analysis for identification to verify that the material applied on the test field agrees with the manufacturer's declaration of constituents.

6.3. Factory production control

The manufacturers, participating in the Nordic certification system, are obliged to have a system for factory production control (FPC), following the requirements in EN 13212 (SIS, 2011b).

To maintain the validity of published product certificates, audits of the manufacturing process and the FPC system is required. The audits must be executed by a Notified body formally notified to EAD 230011-00-0106, or an organization experienced in the surveillance of relevant production processes and accredited against EN/IEC 17021, or corresponding accreditation. The audit shall confirm that an

FPC system is implemented. A copy of the audit report, containing all necessary information must be sent to NordicCert latest December 31 for renewal of the product certificate. All certified materials, for which certificate renewals are requested, must be included in the audit. The audit report must have been completed the same year as the application for renewal is submitted. Renewed certificates are valid for two years, see also Section 7.6.

For an individual certificate/product, an FPC audit is required every two years. If the manufacturer has several certified products, audits might be required annually, but for different products in different years.

In the case that road marking materials or drop on materials are manufactured by another supplier under licence, the same requirements are placed on a FPC system for that supplier as if the material had been manufactured internally. Audits of the FPC system of the external supplier according to the requirements in this document is mandatory for renewal of the product certificate.

If a manufacturer wishes to withdraw a product from certification for one or several years, no audit report of the FPC is required for that particular material. If the material is re-introduced, an audit report must be handed in again to activate the certification, according to the procedure described above, i.e, the audit report must have been completed the same year as the application for renewal is submitted.

Materials that have been applied to the test fields, and where a Y1 certificate (see definition in Section 7.8.1) is requested latest January 31st the year after the one-year follow-up measurements, does not have to be included in the FPC audit report. If the certificate is requested more than one year after the 1-year follow-up performance measurements were published, an audit report of the FPC system including that particular material must be submitted before the certificate can be issued, see also Section 7.2.

Instructions for certificate renewal, forms and some clarifying examples are available at www.nordiccert.com/request-of-certificates/, see also Section 7.8.2.

7. Certification

7.1. The certification procedure

The certification procedure consists of several steps and requirements, which are explained in Figure 5. In year 0, the manufacturer registers the material for the certification procedure and applies the material at the test site. Provided that requirements 1 to 4, stated in Figure 5, are fulfilled, initial performance measurements are carried out. If the material fulfils the performance requirements, it qualifies for follow-up measurements in year 1.

If the material fulfils the performance requirements in one or more P-classes (see Section 7.3) in year 1, the manufacturer may request an identification analysis of the material. If the result of the analysis agrees with the manufacturer's declaration of constituents, a certificate is issued, provided that full product documentation (see Section 2.3) has been submitted. The certificate is valid for years 2 and 3.

If the manufacturer has registered the material for 2- or 3-years follow-up, additional performance measurements are carried out in year 2 and 3, provided that the material fulfilled the performance requirements in the highest P-class in the year before. If the material fulfils the requirements in a higher P-class, the certificate is updated with the new result.

From year 3 onwards[4], the validity of the certificate is maintained provided that audits of the manufacturing process and the factory production control (see Section 6.3) are carried out and approved every two years, and provided that the manufacturer has requested certificate renewal and has paid the fee for renewal.

Activities that require actions from the manufacturer are:

- Registration of the material, including paying registration fee.
- Application of the material at the test site.
- Requesting identification analysis of the materials the manufacturer wants to have certified, including submission of full product documentation.
- Ensuring that audits of the manufacturing process and the factory production control are carried out every two years.
- Submission of a verification of the audit and a request for certificate renewal to the administration of NordicCert every two years, including paying the renewal fee.

[4] The audit must be carried out in year 3 and the request for certificate renewal must be submitted by December 31 in year 3. The renewed certificate will be issued in January in year 4 and it will be valid for years 4 and 5.

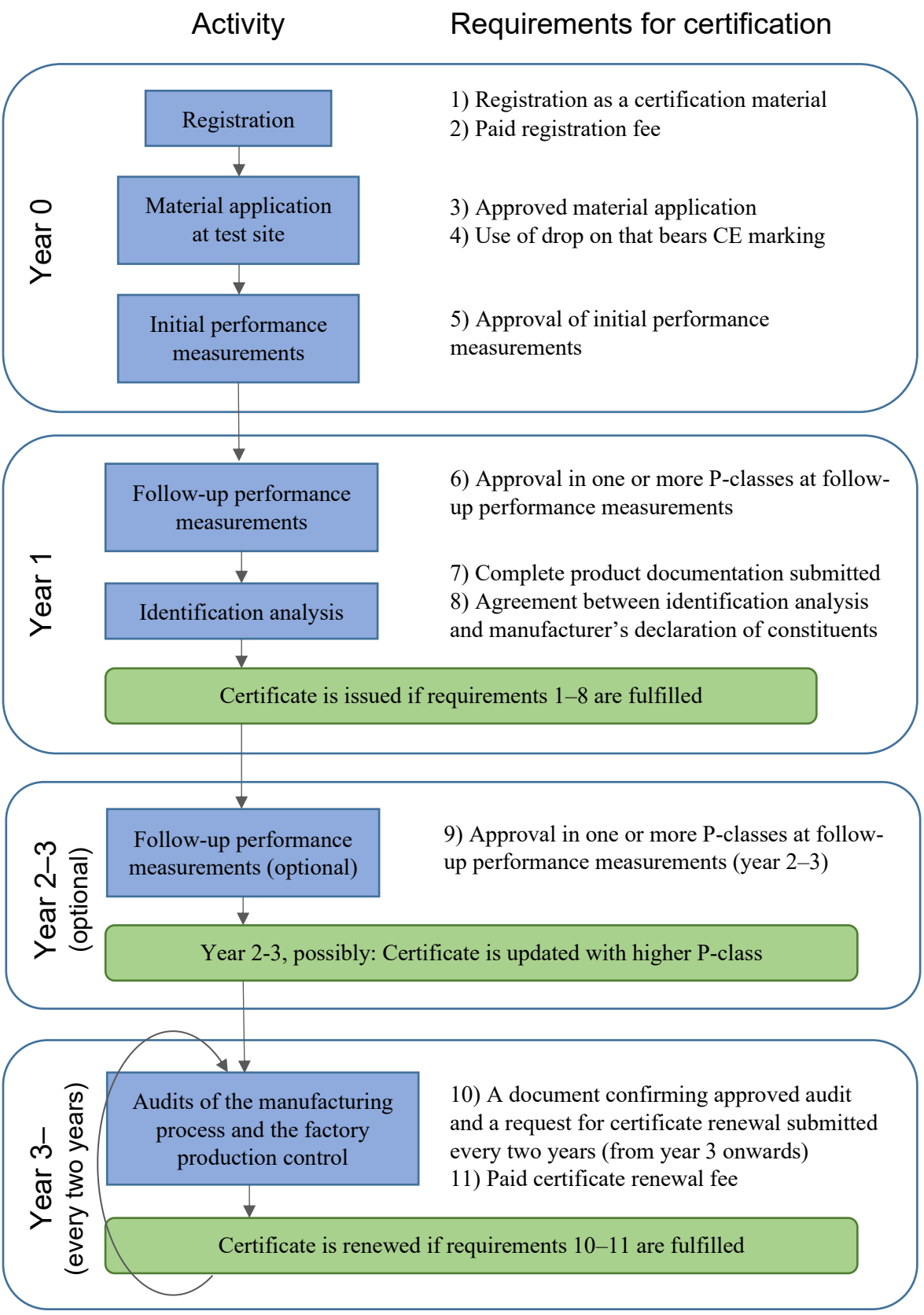

Figure 5. The certification procedure.

7.1.1. Requirements for certification

The requirements for certification are summarized as follows:

- Registration as a certification material (see Section 7.2)
- Paid registration fee (see Section 8.1)
- Approved material application (see Sections 4.1–4.5)
- The drop on material used bears CE marking (see Section 2.3)
- Approval at initial performance measurements (see Sections 5.1 and 7.3)
- Approval in one or more P-classes at the follow-up performance measurements (see Sections 5.1, 7.3–7.4)
- Complete product documentation (see Section 2.3 and Appendix 3)
- Verification of the manufacturer's declaration of constituents by the identification analysis of the sample taken at the test field (see Section 6.2)

To maintain the validity of the certificate, biannual audits of the manufacturing process and the factory production control is required (see Section 6.3 and Section 7.8.2). Renewal of certificates is subject to a fee.

The requirements for certification applies to all materials for which the manufacturer requests certificates, i.e. both to new and to renewed certificates.

7.2. Certification materials and test materials

Participants will have to register their material(s) either as a *certification material,* or as a *test material*, before the material is applied on the test field.

- **Certification material:** The material is applied on the test field for certification purposes, which implies that it will receive certification for use in Finland, Iceland, Norway and Sweden, or Denmark, provided that it fulfils the performance requirements. Application and performance measurements will be done in accordance with the procedures described in this report. The results of the materials registered as certification materials will be published in a public report, see Section 7.7. The administration of the road trials may use de-identified data for research purposes.
- **Test material:** The material is applied on the test field for test purposes only. The application and the performance measurement will be done in the same way as for certification materials. The results of the performance measurements will be available to the administration of the road trials and to the manufacturer of the material. The results will be confidential to other participants. The administration of the road trials may however use de-identified data for research purposes. Materials registered as test materials **cannot** receive certification. Test materials may be applied on the FI-IS-NO-SE as well as on the DK test site.

The certification comprises the road marking material (paint, thermoplastic and cold plastic materials) in the applied thickness, with the specified drop on material and with specified primer, if relevant. Materials that are applied as type I markings are certified (provided that they fulfil the performance requirements) for use as type I markings. Materials that are applied as type II markings are certified for use as type II markings only, and as assemblies, i.e. the combination of the material and the design/pattern applied on the test field. Similarly, products that are certified as inlaid markings, antiskid materials, temporary markings, materials for hand application or materials with enhanced durability are certified for the intended use only.

7.3. Performance requirements

The performance requirements include four parameters for type I markings and five parameters for type II markings which are given in Table 1. These requirements apply also to inlaid markings. Table 2 shows the requirements for materials for hand applications and Table 3 shows the performance requirements for materials with enhanced durability and for temporary markings. Table 4 shows the performance requirements for antiskid materials.

Table 1. Performance requirements for type 1 and type II markings, including inlaid markings.

Performance parameter	Type I, white	Type I, yellow	Type II, white	Type II, yellow
Coefficient of retroreflected luminance, R_L dry [mcd/m²/lx]	≥ 150	≥ 100	≥ 150	≥ 100
Coefficient of retroreflected luminance, R_L wet [mcd/m²/lx]	n/a	n/a	≥ 35	≥ 35
Luminance coefficient under diffuse illumination, *Qd* [mcd/m²/lx]	≥ 130	≥ 100	≥ 130	≥ 100
Friction, [PFT units]	≥ 0.52	≥ 0.52	≥ 0.52	≥ 0.52
Chromaticity coordinates, x, y	[5]	[6]	[5]	[6]

Table 2. Performance requirements for materials for hand application.

Performance parameter	Materials for hand application, retroreflective, white	Materials for hand application, retroreflective, yellow	Materials for hand application, non-retroreflective, white	Materials for hand application, non-retroreflective, yellow
Coefficient of retroreflected luminance, R_L dry [mcd/m²/lx]	≥100	≥ 100	n/a	n/a
Coefficient of retroreflected luminance, R_L wet [mcd/m²/lx]	n/a	n/a	n/a	n/a
Luminance coefficient under diffuse illumination, *Qd* [mcd/m²/lx]	≥ 130	≥ 100	≥ 130	≥ 100
Friction, [PFT units]	≥ 0.65	≥ 0.65	≥ 0.71	≥ 0.71
Chromaticity coordinates, x, y	[5]	[6]	[5]	[6]

[5] Chromaticity coordinates, x, y, for white road markings: According to EN 1436:2018 (SIS, 2018).

[6] Chromaticity coordinates, x, y, for yellow road markings: Includes both daytime (class Y1) and night-time colour (class RC1), according to EN 1436:2018 (SIS, 2018).

Table 3. Performance requirements for materials with enhanced durability and for temporary markings.

Performance parameter	Materials with enhanced durability, white	Materials with enhanced durability, yellow	Temporary markings, white	Temporary markings, yellow
Coefficient of retroreflected luminance, R_L dry [mcd/m²/lx]	n/a	n/a	≥ 150	≥ 200
Coefficient of retroreflected luminance, R_L wet [mcd/m²/lx]	n/a	n/a	n/a	n/a
Luminance coefficient under diffuse illumination, *Qd* [mcd/m²/lx]	≥ 130	≥ 100	≥ 130	≥ 100
Friction, [PFT units]	≥ 0.52	≥ 0.52	≥ 0.52	≥ 0.52
Chromaticity coordinates, x, y	[7]	[8]	[7]	[9]

Table 4. Performance requirements for antiskid materials.

Performance parameter	Antiskid materials, white
Coefficient of retroreflected luminance, R_L dry [mcd/m²/lx]	n/a
Coefficient of retroreflected luminance, R_L wet [mcd/m²/lx]	n/a
Luminance coefficient under diffuse illumination, *Qd* [mcd/m²/lx]	≥ 130
Friction, [PFT units]	≥ 0.71
Chromaticity coordinates, x, y	[7]

Friction will be measured by a PFT, see also Section 5.3. A PFT value of 0.52 corresponds to an SRT value of 50 (class S2 in EN 1436), whereas a PFT value of 0.65 corresponds to an SRT value of 60 (S4). A PFT value of 0.71 corresponds to an SRT value of 65 (S5). In practice, the requirements on friction stated in Table 1–Table 3 are lowered by 0.05 units to take into account the uncertainty when translating from SRT to PFT units (see also the public result reports).

At the initial measurements, the performance parameters are calculated as averages of the nine lines in the lane. For inlaid markings, the performance parameters are calculated as averages of the markings applied in the four milled tracks. At the follow-up measurements, the performance parameters are

[7] Chromaticity coordinates, x, y, for white road markings: According to EN 1436:2018 (SIS, 2018).

[8] Chromaticity coordinates, x, y, for yellow road markings: Includes both daytime (class Y1) and night-time colour (class RC1), according to EN 1436:2018 (SIS, 2018).

[9] Chromaticity coordinates, x, y, for yellow temporary road markings: Includes both daytime (class Y2) and night-time colour (class RC1), according to EN 1436:2018 (SIS, 2018).

calculated as averages of the measurement points of one of the lines that belong to a certain P-class, see also Section 7.4.

As the average is the most representative value of the performance of the material, the performance of individual lines will not be evaluated at the initial measurement. This implies that there might be individual lines that do not fulfil the requirements, but as long as the average does, the material will be approved. This also implies that if the average is below any of the values in Table 1, all lines will be disqualified, regardless of whether individual lines fulfil the requirements.

An exception to the rule above is that if individual lines exhibit performance parameter values that deviate markedly from the other lines. These lines may be excluded when determining the material's average value, in order to avoid that a material meets the requirements solely because of anomalies such as application failure. Deviating values are identified based on established statistical principles for detection of outliers in measurement data.

Materials that do not fulfil the performance requirements at the initial measurement will be excluded from the certification program.

7.4. Roll-over classes

Materials will be certified in relation to the number of wheel passages it will stand. The nine lines on the test field will be exposed to different numbers of wheel passages, which means that different roll-over classes will be reached on different lines.

Roll-over classes according to EN 1824 (SIS, 2020) will be determined from the measurements of wheel passages (see Section 3.3), for each of the nine lines (see Section 4.1), Table 5–Table 6. The tenth line on the shoulder at the FI-IS-NO-SE test site will have no wheel passages and will thus not be included in the calculation of the performance parameters for certification purposes.

Materials will be certified for a certain roll-over class (P-class for permanent road markings or T-class for temporary road markings). In order to be certified, all relevant performance requirements (see Section 7.3) must be fulfilled for that particular class.

In case two or more of the nine lines represent the same roll-over class, the line most representative for the class will be chosen for analysis and the performance parameters of this line will be used as the result for that class. The same line will be used for all materials.

The materials must fulfil the requirements for all classes lower than certified for, provided that the lower classes exist on the test field. Example: For a material to be certified as a P3 material, the performance requirements must be fulfilled also for classes P0, P1 and P2.

If a material has been certified for a certain P-class after one year (i.e. at the 1-year follow-up measurement), this certification is valid irrespective of the results of the measurements after two years. The 2-year follow-up measurements will merely be used to evaluate whether the material fulfils the requirement for a higher P-class than what it already is certified for.

The expected roll-over classes for permanent road markings range from P0 to P4 after one year and P5 after two years at the FI-IS-NO-SE test site. At the DK test site, roll-over classes P0–P5 are expected after one year and P5.5–P6 after two years. The time needed to reach the different P-classes will be derived from the measurements of wheel passages.

Table 5. Roll-over classes for permanent road markings, EN 1824 (SIS, 2020).

Roll-over class	Number of wheel passages
P0	≤ 50 000
P1	Between 50 000 and 60 000
P2	100 000 (± 20 000)
P3	200 000 (± 40 000)
P4	500 000 (± 100 000)
P5	1 000 000 (± 200 000)
P5.5	1 500 000 (± 150 000)
P6	2 000 000 (± 200 000)
P7	4 000 000 (± 400 000)

Table 6. Roll-over classes for temporary road markings, EN 1824 (SIS, 2020).

Roll-over class	Number of wheel passages
T0	≤ 50 000
T1	Between 50 000 and 60 000
T2	100 000 (± 20 000)

7.5. Climatic classes

The climatic class of the test site where the material was tested and certified is stated on the certificate, according to Table 7.

Table 7. Climatic classes, EN 1824 (SIS, 2020).

Climatic class	Test site
C3, Cfb	The DK test site
C3, Dfb	The FI-IS-NO-SE test site

The proportion of cars with studded tyres is approximately <5% at the Danish test site and approximately 50% at the FI-IS-NO-SE test site (see also Chapter 3).

7.6. Validity of certification

A certification is valid for two years and can be renewed upon request by the manufacturer. Audits of the manufacturing process and the FPC system are required for renewal of issued certificates, see also Section 6.3 and Section 7.8.2.

7.7. Publications

The results of the follow-up performance measurements of all materials registered as certification materials are published in public reports yearly. Results, i.e. the measured (averaged) values of each performance parameter for each P-class and for each material, are published regardless of whether the material fulfils the requirements or not. The names of the manufacturer and of the material are published along with the results.

The reports are freely available from www.nordiccert.com and www.vti.se.

The results of the initial measurements are compiled in reports which are distributed to the participants. Materials that are not approved at the initial measurements will not be included in the result reports of the follow-up measurements.

Report forms for registration, application and performance measurements can be found in Appendix 3–4.

7.8. Certificates

7.8.1. Certificate format and content

Certificates are issued as pdf files, secured with an electronic seal through which the authenticity of the document can be verified. In short, the certificates include information on the material, the manufacturer, the testing conditions, the validity period, and the achieved P-class. For type II materials, the certificates also include a photo of the pattern. The certificates have a unique identification code – the material ID – that corresponds to the certified material. Certificates issued after one year have the version number “Y1”. Certificates updated with a higher P-class after the 2-years follow-up measurements have the version number “Y2” while renewed certificates have the version number “Y2 (renewed)”. An example of the certificate is shown in Figure 6.

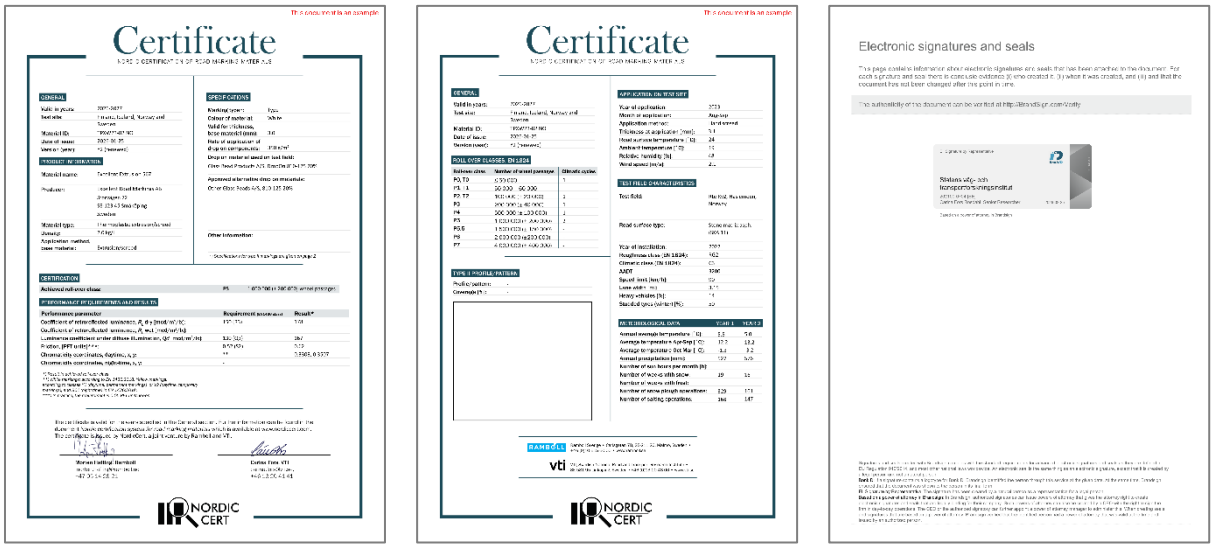

Figure 6. An example of the certificate (page 1–2), including the electronic seal (page 3). A high-resolution certificate example can be downloaded from www.nordiccert.com.

From 2026 onwards, the certificates will be supplemented with a certificate annex (also secured with an electronic seal through which the authenticity of the document can be verified), which enables verification of the identity of materials, for example when they are used in contracts. The certificate annexes include the following:

- Manufacturer's declaration of constituents, verified by the ITT (see Section 6.2)
- IR spectrum of the binder(s)
- IR spectrum of pigment and inorganic materials

The certificate annex is issued once and is valid provided that the material holds a valid NordicCert certificate. An example of a certificate annex is shown in Figure 7.

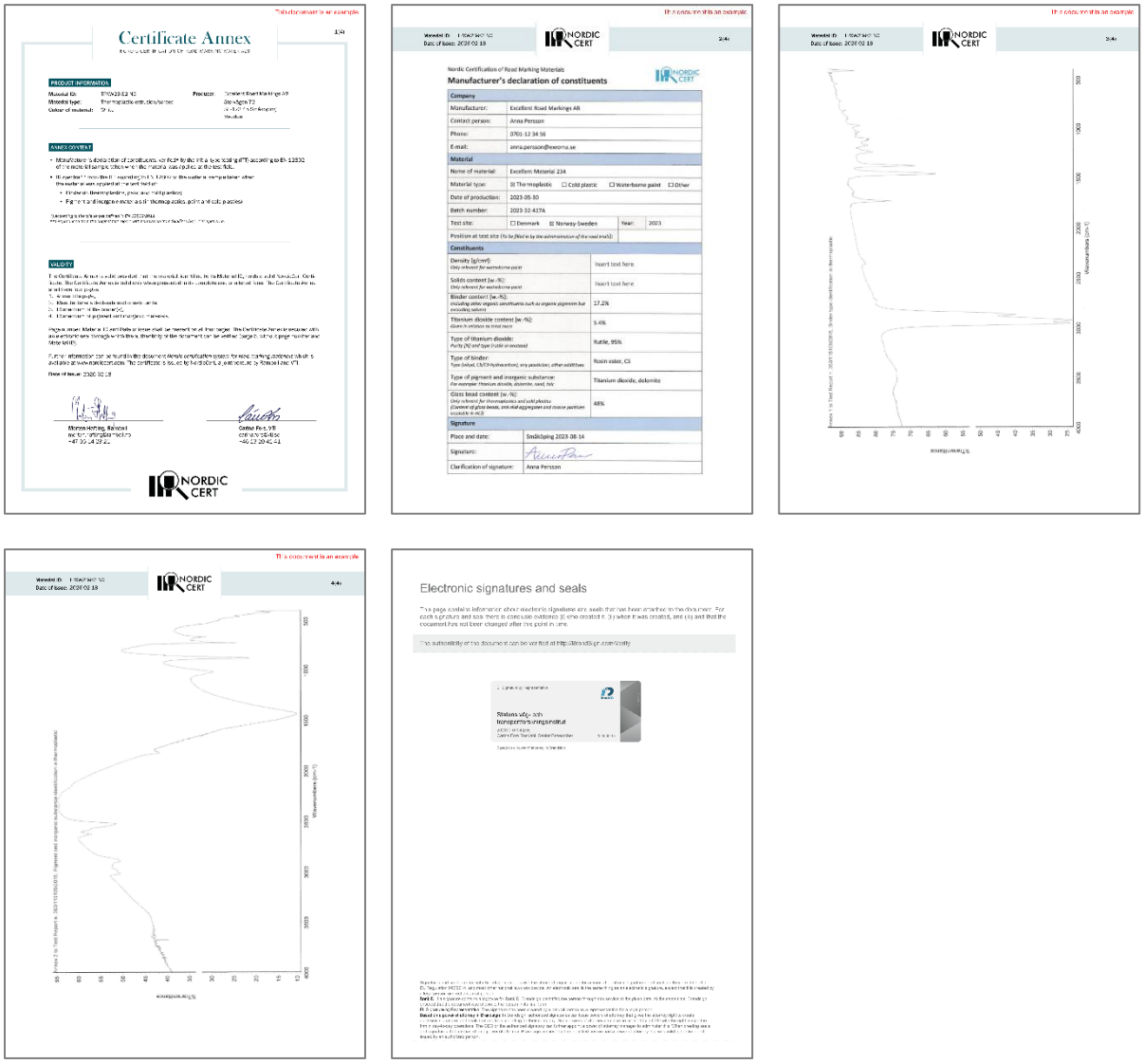

Figure 7. An example of the certificate annex (page 1–4), including the electronic seal (page 5). A high-resolution certificate annex example can be downloaded from www.nordiccert.com.

The administration of NordicCert distributes the certificates and the certificate annexes solely to the manufacturer. Other parties, such as road authorities, contractors, or laboratories, cannot obtain certificates or certificate annexes from NordicCert.

7.8.2. Requesting certificates

When the results reports have been published, the manufacturer must request certificates for its products, including submission of full product documentation. When a certificate is requested, an identification analysis of the base material is carried out (see Section 6.2). The certificate is issued provided that the identification analysis verifies the manufacturers declaration of constituents and that all other requirements for certification are fulfilled (see Section 7.1). Certificates must be requested within 10 years after the material was initially applied to the test fields. To maintain the validity of issued certificates, the manufacturer must request renewal every two years (see Section 7.1). Practical information and forms for requesting certificates is available at www.nordiccert.com/request-of-certificates/

A fee of SEK 4 000 excl. VAT will be charged for certificate renewal (per certificate and renewal).

7.8.3. Commercial product names

The product name on the certificate will be identical to that in the registration form. If the manufacturer wishes, there is a possibility to change to a commercial product name before the Y1 certificate is issued. The name change is applied for via the form for requesting new certificates (see Appendix 3). Changing the product name before the Y1 certificate is issued is free of charge. Please note that the product name in the submitted product documents must agree with the product name on the certificate.

Any additional or later changes will be charged a fee of SEK 4000 excl. VAT per material.

To change the name of a material after the Y1 certificate has been issued, the following is required:

- Verification from an accredited[10] laboratory that the product content is identical to the product that was applied on the test field.
- Submission of the form for Change of material product name (see Appendix 3).
- A signed declaration from the manufacturer by person with a legally binding signature, verifying that the materials are identical.
- Submission of updated product documentation with the new name, see Section 2.3.
- (Where applicable) Paid application fee.

7.9. Ownership and transfer of certificates

Certificates are distributed to and owned by the manufacturer that registered the product for participation in the certification procedure.

There is a possibility to transfer certificates to another manufacturer. This implies that the original certificate is discarded, i.e. the original manufacturer cannot use the certificate anymore. Further information and a form for transfer of certificates is available at www.nordiccert.com/forms/

A fee of SEK 4 000 excl. VAT per certificate will be charged for transfer of certificates. Updated certificates with the company name of the new owner will be distributed to the new owner.

7.10. Lists of certificated products

Updated lists of valid certificates are available at www.nordiccert.com.

[10] The laboratory shall be accredited according to EN 1871 or to EN 12802.

7.11. Complaints

Complaints related to measurement results and certification must be sent to the administration of the road trials within two weeks after the result report has been distributed to the participants, preferably by email. The administration of the road trials will handle the complaint and make a decision.

7.12. Use of logotype

NordicCert's logotype may be used on labels of the packages of certified road marking materials (paint, thermoplastic and cold plastic materials).

The logotype version to be used on packages is available on www.nordiccert.com/logotype/.

8. Registration and practical information

Registration for participation in the road trials is accomplished online via NordicCert's website. The information needed for registration can be found in Appendix 3. To be accepted for participation, the registration form must be completely filled out.

The information specified in the registration form cannot be changed between the registration deadline and application at the test field. If changes are unavoidable, they are handled at the test field. It is the responsibility of the participant to inform the administration of the road trials about any changes in the registration information when the material is applied at the test field. The changes must be documented in the application report (Appendix 4).

An invitation to participate in the road trials, including a link to the registration form and deadline for registration is sent out by email during the spring by the administration of the road trials. Information about registration can also be found on NordicCert's website.

8.1. Participant fee and other costs

A fee is charged for each material applied on the test fields. For type I, type II and antiskid materials, and for materials for hand application and with enhanced durability, there are two (or three, see below) options:

- 1-year follow-up: Includes administration, performance measurements after two weeks (initial) and after one year (follow-up), and documentation of the results.
  Participant fee: SEK 55 000 excl. VAT.
- 2-years follow-up: Includes administration, performance measurements after two weeks (initial) after one year and after two years (follow-up), and documentation of the results.
  Participant fee: SEK 65 000 excl. VAT.

For temporary markings and inlaid markings, the following fees apply:

- Temporary markings: Includes administration, performance measurements after two weeks (initial) and within 6 months (follow-up), and documentation of the results.
  Participant fee: SEK 55 000 excl. VAT.
- Inlaid markings: Includes administration, milling of the tracks, performance measurements after two weeks (initial) after one year and after two years (follow-up), and documentation of the results.
  Participant fee: SEK 75 000 excl. VAT.

Optional 3-years follow-up for materials registered for 2-years follow-up at the FI-IS-NO-SE test field: the participant can request 3-years follow-up measurements for materials that have fulfilled the highest P-class after two years. The request must be submitted to the administration of the road trials by 30 June in year 3.
Participant fee (additional): SEK 30 000 excl. VAT.

The same participant fees apply to certification materials and test materials.

The participant fee will be charged before the application of materials. If payment has not been received, materials must not be applied on the test field.

Costs for application of materials (cost of labour, material, equipment) are paid by the participant.

The administration of the road trials will bear the costs for closing of the road, pre-marking, plates for thickness measurements and containers for material samples.

Please note that the registration is binding and cannot be withdrawn after the registration deadline, i.e. the participant fee will not be refunded if the participant chooses to not apply the registered material on the test field.

If there are too few materials registered for a test field to be financially viable, the material application on that test field will be cancelled. Information on whether the material application will take place or not will be communicated within one week after the registration deadline. No participant fee will be charged if the material application is cancelled.

8.2. Processing of personal data

The name, email address and phone number of the contact person stated on the registration form are stored in digital form and is accessible only to the administration of the road trials. The information is used for communication regarding the certification process. The information will be kept after the certification process of the material is finished, to facilitate further communication. The stored information will be deleted if the manufacturer asks to change contact persons or upon request by the contact person. Further information on the processing of personal data can be found at VTI´s website.

9. Important dates and information about submitting documentation

January 31st: Renewed certificates will be issued.

January 31st: Deadline for request of new certificates (requests can be made at any time of the year, but may then take longer to process)

Around May 20th: Last day for registration of temporary materials to the road trials. The exact date will be available in the invitation.

Around June 20th: Last day for registration at the road trials for all other types of materials. The exact date will be available in the invitation.

December 31st:

- Last day for submitting the FPC-audit report and requesting renewal of certificates (requests can be made at any time of the year, at a higher fee).

To reduce the administrative burden and ultimately avoid unnecessary costs for the participants in the certification system, following applies for all applications, registrations and documents:

- The manufacturer must submit requested documents latest on the deadlines listed above.
- The manufacturer must ensure that the requested documentation is complete and contains all information.
- The administration has no obligation to ask for supplemental information.

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Appendix 1. Terms and definitions

AADT	Annual average daily traffic, a measure of traffic flow.
Antiskid material	A material with enhanced antiskid (friction) properties, see also Section 2.1.4
CE mark	A certification mark indicating that a product complies with all applicable EU legislation and meets the required performance and conformity requirements for its intended use.
Certification material	A material that is applied on the test field for certification purposes, see also Section 7.2.
Chromaticity coordinates, x, y	Describes the colour of the material. See also EN 1436 (SIS, 2018).
Coefficient of retroreflected luminance, R_L	Retroreflection under vehicle headlamp illumination. See also EN 1436 (SIS, 2018).
Declaration of performance	A document in which a manufacturer declares the performance of a construction product in relation to its essential characteristics and in accordance with applicable regulations.
Friction	The force resisting the relative motion between two surfaces that are sliding against each other.
Inlaid marking	Inlaid markings are markings that are installed in a milled track, see also Section 2.1.3.
Luminance coefficient under diffuse illumination, *Qd*	Reflection in daylight. See also EN 1436 (SIS, 2018).
Manufacturer	A manufacturer of road marking materials that is either participating in the NordicCert road trials, is planning to participate or is the owner of certificates issued by NordicCert.
Manufacturer's declaration of constituents (MDoC)	A declaration of the constituents of a road marking material.
Material for hand application	Materials for hand application are typically used for marking pedestrian crossings, text and symbols on the pavement, see also Section 2.1.5.
Material with enhanced durability	Materials intended for longitudinal application in illuminated urban areas with a high number of wheel passages, with no requirement on coefficient of retroreflected luminance, RL, see also Section 2.1.6.
MTD	Mean texture depth, the average depth of a surface's macrotexture.
P-class	The P-class (synonym: roll-over class) describes the number of wheels passing over a point of a road surface within a specified period of time, for permanent road markings. See also Section 7.4 and EN 1824 (SIS, 2020).
Participant	A manufacturer of road marking materials that participates in the NordicCert road trails.
Permanent marking	Road markings intended for permanent use. May be yellow or white.
PFT	Portable Friction Tester, an instrument for measurement of friction. See also Sections 5.3 and 7.3

Roughness class	Describes the roughness of a road surface. See also EN 1824 (SIS, 2020).
SDS	Safety Data Sheet, a documentation of the properties and safe use of chemicals.
SRT	Skid Resistance Tester, an instrument for measurement of skid resistance (friction). See Skid resistance in EN 1436 (SIS, 2018).
T-class	The T-class (synonym: roll-over class) describes the number of wheels passing over a point of a road surface within a specified period of time, for temporary road markings. See also Section 7.4 and EN 1824 (SIS, 2020).
Temporary marking	Temporary yellow markings are typically in use when traffic must be redirected due to roadworks, see also Section 2.1.7.
Test material	A material that is applied on the test field for test purposes, see also Section 7.2. Test materials cannot receive certification.
Type I marking	A flat marking.
Type II marking	A structured/profiled marking with enhanced wet night visibility.

Appendix 2. Procedure for application of alternative drop on materials to an existing certificate

Application and approval process

- Only the holder of the certificate can apply for registration of an alternative drop on system. Once the application is approved, the approval applies to all contractors.
- Application is made by filling out a form available at www.nordiccert.com. The form must be signed by a representative for the owner of the certificate with a legally binding signature, certifying that the drop on systems technical specifications are equivalent, and that the performance of the alternative drop on system will be the same as the drop on system used on the road trails.
- The application must contain following information:
    - Manufacturer and commercial name for the drop on system used on the road trials when the certificate was originally issued.
    - Manufacturer and commercial name for the alternative drop on system.
    - Declaration of performance (DoP) and full technical specifications for both drop on glass beads and anti-skid aggregates must be submitted for the products for which the application relates. The documents must contain all the necessary information to enable NordicCert to assess whether the products are equivalent to the certified material (see requirements below). If the documents handed in at the time for registration at the test field lack important information, supplemental information will be required.
- The application is sent to NordicCert with all requested information.
- NordicCert will review the given information and return with an approval or a dismissal of the application. In the case of a dismissal a motivation will be given.
- Approved systems will be added to the certificates next time they are renewed but will be valid from the date of approval.
- Approved drop on systems for each road marking product will be presented on the website.
- It is possible to apply for several alternative drop on systems. A fee will be charged for each system.
- The fee for application of an alternative drop on system is SEK 7000 excl. VAT.
- Permits for alternative drop on materials are valid until further notice unless NordicCert informs otherwise (see withdrawal process below).

Requirements for approval

It is the responsibility of the certificate owner to ensure that the provided documents contain the information needed for NordicCert to assess if the products are equivalent or not. For an alternative drop on system to be approved, technical specifications and Declaration of performance (DoP) must be equivalent for both products. The alternative drop on system must have the same type of coating, refractive index, granulometry, and anti-skid aggregate. The type of anti-skid aggregates must be the same as certified in the road trials, i.e., if the certificate was issued with glass-grain anti-skid aggregates, glass grains must be used. The relative amount of anti-skid aggregates in the drop on

system must be the same as certified on the road trials. All products must bear the CE marking in accordance with EN 1423 (SIS, 2012).

The parameters given in Table 8 and Table 9 shall be clearly stated in the documentation and must be the same for both products.

Table 8. Requirements for drop on glass bead parameters.

Drop on glass beads	**Requirement**
Surface treatment of the glass beads	The type of surface coating of the glass beads must be the same, and the type must be declared (e.g. moisture proof, adhesion, floatation, or other type). If no information is provided, it will be assumed that the product does not have any type of coating. If there are combinations of coatings, this must be stated.
Refractive index	The value of the refractive index must be given, and the class (A, B or C) must be the same.
Granulometry	The size gradation of the glass beads must be given in a table with cumulative retained mass and following the requirements for number of sieves and sieve size in EN 1423 (SIS, 2012).
Dangerous substances	The class must be stated and be Class 1: ≤ 200 ppm (mg/kg)

Table 9. Requirements for anti-skid aggregate parameters.

Anti-skid aggregates	**Requirement**
Granulometry	The size gradation of the anti-skid aggregates must be given in a table with cumulative retained mass and following the requirements for number of sieves and sieve size in EN 1423 (SIS, 2012).
Dangerous substances	The class must be stated and be Class 1: ≤ 200 ppm (mg/kg)
Resistance to fragmentation (friability)	The measured value must be given and must be equal or higher.
Chromaticity co-ordinates for non-transparent aggregates	The (x,y) color coordinates must be given.
Luminance factor for non-transparent aggregates.	The measured value must be given and must be equal or higher.

Withdrawal process

If the conditions change, for example if it comes to NordicCert's knowledge that the products do not perform equally, or that the conditions for product approval change due to for example updates of underlying standards, certifications, legislation or the like, the permit to use alternative drop on materials can be withdrawn. In that case, this will be announced as soon as possible after a formal decision has been taken and will apply from January 1 the following year. The certificate holder will be informed by email. Complaints must be filed within 20 working days after the information was communicated. If the certificate holder wishes to withdraw alternative drop on materials from its certificates, this is done in writing to NordicCert and applies from January 1 the following year.

Appendix 3. Specifications and forms to be used by the manufacturer

Below are specifications and forms to be used by the manufacturer:

- Specifications for the product data sheet of the road marking material (paint, thermoplastic and cold plastic materials)
- Specifications for the product data sheet of the drop on material
- Specifications for the safety data sheets (SDS)
- Form for the manufacturer's declaration of constituents
  (can be downloaded from www.nordiccert.com)
- Form for registration for the road trials
  (web form)
- Form for change of material product name
  (can be downloaded from www.nordiccert.com)
- Form for application of alternative drop on material to an existing certificate
  (can be downloaded from www.nordiccert.com)
- Form for request of new certificates
  (can be downloaded from www.nordiccert.com)
- Form for request of certificate renewal
  (can be downloaded from www.nordiccert.com)

Product names on specification and documentation that is handed in must match what is filled in by the manufacturer in the different forms listed above.

Specification: Product data sheet for road marking materials

As a minimum, the product sheet of the road marking material (paint, thermoplastic and cold plastic materials) should include the following information:

- Name of material
- Manufacturer and contact information
- Country of origin
- Field(s) of application
- Technical data (if relevant): colour, density, thinner, content (%) of components (eg. binder, solvent, glass beads)
- Application instructions (if relevant):
    - Preparation of material
    - Preparation of road surface
    - Weather restrictions
    - Recommendations on layer thickness
    - Recommendations on drop on material
    - Recommendations on application technique
- Packaging information
- Storage information

Specification: Product data sheet for drop on materials

As a minimum, the product sheet of the drop on material should include the following information:

- Name of material
- Manufacturer and contact information
- Country of origin
- Technical specification (if relevant), see Table 8
- Application instructions (if relevant)
- Affirmation that the product is in accordance with EN 1423 (SIS, 2012)
- Packaging information
- Storage information

Specification: Safety data sheets (SDS)

Safety data sheets (SDS) for road marking materials (paint, thermoplastic and cold plastic materials) and for drop on materials must be compiled according to the REACH regulations.

For further information, see:

Understanding REACH (echa.europa.eu)
Guidelines for compilation of safety data sheets (each.europa.eu)

Form: Manufacturer’s declaration of constituents

Nordic Certification of Road Marking Materials

Manufacturer’s declaration of constituents

Company			
Manufacturer:	Insert text here.		
Contact person:	Insert text here.		
Phone:	Insert text here.		
E-mail:	Insert text here.		
Material			
Name of material:	Insert text here.		
Material type:	☐ Thermoplastic ☐ Cold plastic ☐ Waterborne paint ☐ Other		
Date of production:	Insert text here.		
Batch number:	Insert text here.		
Test site:	☐ DK ☐ FI-IS-NO-SE	Applied on test site in year:	Insert text here.
Material position on test field (number): *Can be found in the Application of Material report*	Insert text here.		
Constituents			
Density [g/cm³]: *Only relevant for waterborne paint*	Insert text here.		
Solids content [w.-%]: *Only relevant for waterborne paint*	Insert text here.		
Binder content [w.-%]: *Including other organic constituents such as organic pigments but excluding solvent*	Insert text here.		
Titanium dioxide content [w.-%]: *Given in relation to total mass*	Insert text here.		
Type of titanium dioxide: *Purity [%] and type (rutile or anatase)*	Insert text here.		
Type of binder: *Type (alkyd, C5/C9-hydrocarbon), any plasticizer, other addititves*	Insert text here.		
Type of pigment and inorganic substance: *For example: titanium dioxide, dolomite, sand, talc.*	Insert text here.		
Glass bead content [w.-%]: *Only relevant for thermoplastics and cold plastics* *(Content of glass beads, anti skid aggregates and coarse particles insoluble in HCl)*	Insert text here.		
Signature			
Place and date:	Insert text here.		
Signature:			
Clarification of signature:	Insert text here.		

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Form: Registration for the road trials

The registration for the road trials is accomplished online via NordicCert's website. The following information is required:

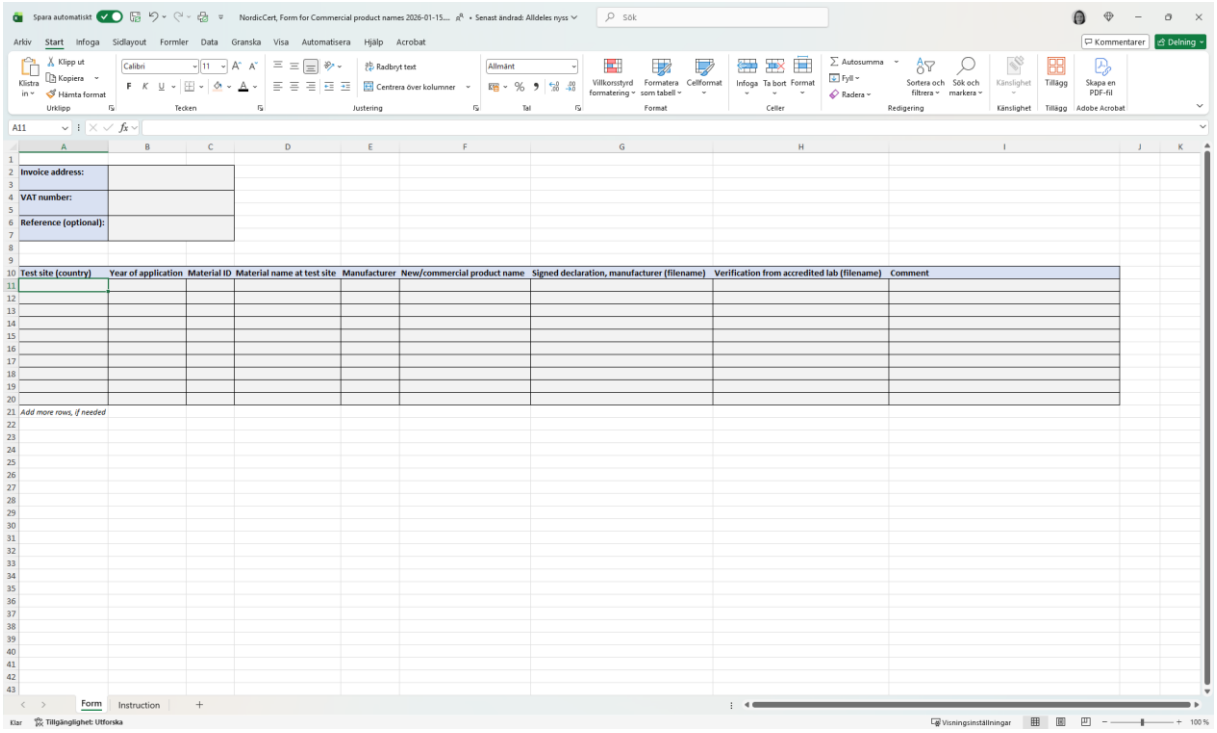
- Manufacturer, address
- Contact person, email address, phone number
- Invoicing information
- Material:
    - Product name
    - Country of origin
    - Material type (thermoplastic extrusion/screed, thermoplastic spray, thermoplastic preformed, cold plastic, paint, other)
    - Density
    - Drop on name
    - CE-marking of drop on (yes/no)
    - Rate of application of drop on components
    - Test site (DK, FI-IS-NO-SE)
    - Marking type (type I marking, type II marking, type II inlaid marking, antiskid material, material for hand application retroreflective, material for hand application non-retroreflective, material with enhanced durability, temporary marking)
    - Type of profile (for type II markings only)
    - Colour (white, yellow, other)
    - Intended thickness at application (0.4 mm, 0.6 mm, 1.5 mm, 3 mm, 5 mm)
    - Application method at test field (self-propelled machine, by hand)
    - Application method at normal use (extrusion/screed, spray, manually w/heater)
    - Follow-up (1 year, 2 years, 2 years inlaid markings, temporary markings)

Further information and a link to the registration form can be found here:

Registration for the road trials – NordicCert

Form: Change of material product name

The form for requesting change of material names (after the Y1 certificate has been issued) can be downloaded from www.nordiccert.com.



Invoice address:	
VAT number:	
Reference (optional):	

Test site (country)	Year of application	Material ID	Material name at test site	Manufacturer	New/commercial product name	Signed declaration, manufacturer (filename)	Verification from accredited lab (filename)	Comment

Add more rows, if needed

Form: Application of alternative drop on material to an existing certificate

The form for application of alternative drop on material to an existing certificate can be downloaded from www.nordiccert.com.

Nordic Certification of Road Marking Materials

Application of alternative drop on material

Company			
Manufacturer:	Insert text here.	Phone:	Insert text here.
Contact person:	Insert text here.	E-mail:	Insert text here.
Invoicing information			
Invoicing address: *(Street address, postal code, city, country, OR email address)*	Insert text here.	Reference: *(optional)*	Insert text here.
		VAT number:	Insert text here.
Material			
Name of material	Insert text here.		
Material ID	Insert text here.		

Drop on system used at the road trials		
	Original system	**Alternative system**
Manufacturer:	Insert text here.	Insert text here.
Product name:	Insert text here.	Insert text here.
Type of surface treatment of the glass beads:	Insert text here.	Insert text here.
Refractive index of glass beads: *Value and class (A, B, or C)*	Insert text here.	Insert text here.
Granulometry of glass beads:	Given as a table in the documentation	Given as a table in the documentation
Dangerous substances in glass beads [ppm or mg/kg]: *Value and class (0 or 1)*	Insert text here.	Insert text here.
Amount of anti-skid aggregates in the mixture [%]:	Insert text here.	Insert text here.
Type of anti-skid aggregates:	Insert text here.	Insert text here.
Granulometry of anti-skid aggregates:	Given as a table in the documentation	Given as a table in the documentation
Dangerous substances in anti-skid aggregates: *Value and class (0 or 1)*	Insert text here.	Insert text here.

	Original system		Alternative system	
Resistance to fragmentation (friability): *Value*	Insert text here.		Insert text here.	
Chromaticity co-ordinates for non-transparent aggregates: *(x,y) colour coordinates*	Insert text here.		Insert text here.	
Luminance factor for non-transparent aggregates: *Value*	Insert text here.		Insert text here.	
Documentation	☐ Declaration of Performance (DoP)	☐ Technical specification	☐ Declaration of Performance (DoP)	☐ Technical specification
Signature				
I hereby assure that the drop on system´s technical specifications are equivalent, and that the performance of the alternative drop on system will be the same as the drop on system used on the road trials.			☐ Yes ☐ No	
Signature				

Administrator's notes		
Date for when the application and all requested information was received:		Insert text here.
The application of use of the alternative drop-on systems is	☐ Approved	☐ Not approved
Motivation: (*if not approved*)	Insert text here.	
The permit for the alternative drop-on system is valid for one year and is renewed automatically, unless otherwise is informed. Further information can be found in the document Nordic certification system for road marking materials which is available at www.vti.se. The permit is issued by Ramboll and VTI.		
Signature Morten Hafting, Ramboll morten.hafting@ramboll.no, +47 95 14 28 21		Signature Hanna Fager, VTI Hanna.fager@vti.se, +46 13 20 42 51

Form: Request of new certificates

The form for request of new certificates can be downloaded from www.nordiccert.com.

Nordic Certification of Road Marking Materials

Request of new certificates

Company and contact person	
Manufacturer:	Insert text here.
Contact person:	Insert text here.
Phone:	Insert text here.
E-mail:	Insert text here.

The certificates will be sent by email to the contact person.

Material					
Test site:	☐ DK ☐ FI-IS-NO-SE	Application year[1]:	Insert.	Position on testfield[2]:	Insert.
Material name on testfield:	Insert text here.				
Commercial product name[3]:	Insert text here.				
Marking type:	☐ Type I marking ☐ Type II marking ☐ Type II inlaid marking ☐ Antiskid material	☐ Material for hand application, retroreflective ☐ Material for hand application, non-retroreflective ☐ Material with enhanced durability ☐ Temporary marking			
Thickness:	☐ 0.4 mm	☐ 0.6 mm	☐ 1.5 mm	☐ 3.0 mm	☐ 5.0 mm
Colour:	☐ White	☐ Yellow	P-class:	Insert text here.	
The following documentation is enclosed with the request of new certificates (mandatory):					

Road marking material:	Filename:
☐ Product sheet	Insert text here.
☐ Safety Data Sheet (SDS)	Insert text here.
☐ Manufacturer's declaration of constituents	Insert text here.
Drop on materials:	Filename:
☐ Product sheet[4]	Insert text here. Insert text here.
☐ Safety Data Sheet (SDS)[4]	Insert text here. Insert text here.
☐ Declaration of Performance[4]	Insert text here. Insert text here.

[1]) The year the material was applied on the testfield.

[2]) The material position (number) on the testfield. Can be found in the application report (*Form: Application of the material at the test site*).

[3]) If a commercial product name is to be used on the certificate, please insert the name here. Any name changes registered in this form is free of charge and no verification from an accredited laboratory is required (see also the NordicCert instruction, section 7.8.2). Please note that the product name on the certificate must agree with the product name in the submitted product documentation.

[4]) The documentation shall include both glass beads and antiskid material (if used).

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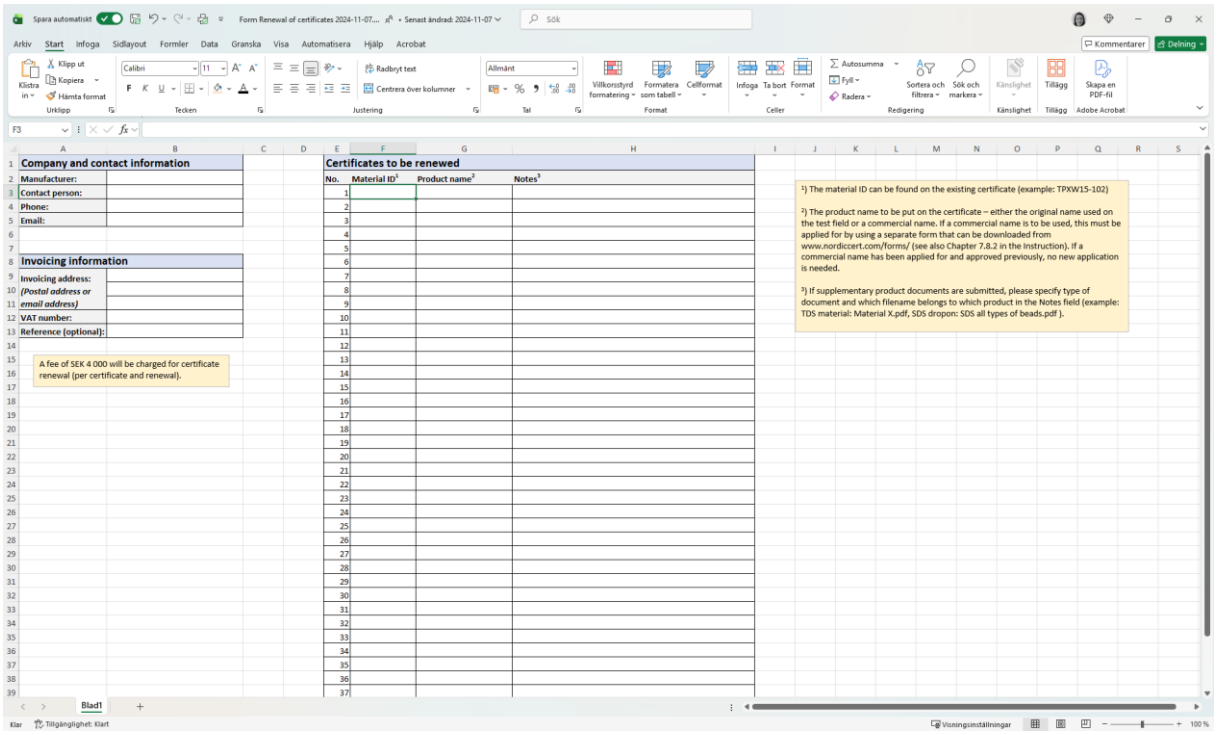
Form: Request of certificate renewal

The form for request of new certificates can be downloaded from www.nordiccert.com.



Company and contact information	
Manufacturer:	
Contact person:	
Phone:	
Email:	

Invoicing information	
Invoicing address:	
(Postal address or	
email address)	
VAT number:	
Reference (optional):	

A fee of SEK 4 000 will be charged for certificate renewal (per certificate and renewal).

Certificates to be renewed

No.	Material ID[1]	Product name[2]	Notes[3]
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			
13			
14			
15			
16			
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24			
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32			
33			
34			
35			
36			
37			

[1]) The material ID can be found on the existing certificate (example: TPXW15-102)

[2]) The product name to be put on the certificate – either the original name used on the test field or a commercial name. If a commercial name is to be used, this must be applied for by using a separate form that can be downloaded from www.nordiccert.com/forms/ (see also Chapter 7.8.2 in the instruction). If a commercial name has been applied for and approved previously, no new application is needed.

[3]) If supplementary product documents are submitted, please specify type of document and which filename belongs to which product in the Notes field (example: TDS material: Material X.pdf, SDS dropon: SDS all types of beads.pdf).

Appendix 4. Specifications and forms to be used by NordicCert

Below are specifications and forms to be used by the administration of the road trials (NordicCert):

- Specifications for performance measurements
- Form for application of material at the test site

Specification: Performance measurements

The following information is registered during the performance measurements:

- Date
- Test site
- Type of measurement (Initial, 1 year, 2 years, 3 years)
- Operators
- Meteorological data
    - Road marking temperature (˚C)
    - Ambient temperature (˚C)
    - Relative humidity (%)
- For each material:
    - Material ID
    - Position on test site
- For each relevant line of each material (if relevant):
    - $R_{\text{L-dry}}$ (mcd/m^2/lx), three values
    - $R_{\text{L-wet}}$ (mcd/m^2/lx), three values
    - Qd, (mcd/m^2/lx), three values
    - Friction, (PFT units), one value
    - Colour, x
    - Colour, y
    - Colour NTY, x
    - Colour NTY, y
    - Comments

Form: Application of material at the test site

Nordic Certification of Road Marking Materials

Application of Material

Test site			
Test site:		Position on test site:	
Manufacturer			
Manufacturer:		Phone:	
Contact person:		Email:	
Material			
Material ID:		Cert or test:	
Name of material:		Material type:	
Country of origin:		Marking type:	
Density:		Type II profile:	
Name of drop on:		Colour:	
Rate of appl.:		Thickness:	
Follow-up:		App method normal use:	
Application			
Date of application:		App method at test field:	
Installed by (contractor):		Application device:	
Thickness at application *(measured using a steel plate)*:	_____ mm ☐ Approved* ☐ Not approved **) Lines may be disqualified after control*	Thickness samples *(measured when applied on road)*: ☐ Approved ☐ Not approved Average thickness: _____ mm	
Steel plate line position:	w/ DO:	w/o DO:	CE marking, drop on mat.: ☐ Yes ☐ No
Photo of drop on label:	☐ Yes	Type II: Photo of profile: ☐ Yes	Coverage (%):
Meteorological data			
Road surface temperature (C):		Wind speed (m/s):	
Ambient temperature (C):		Humidity (%):	
Comments			
☐ Changes have been made			
Supplier's signature			
I hereby approve the sampling of the material, the application of the material and its participation in the road trials:			☐ Yes ☐ No
Name:		Signature:	
Place and date:			
Administrator's signature			
The material fulfils the requirements for participation in the road trial:			☐ Yes ☐ No
Name:		Signature:	
Place and date:			

Appendix 5. Contact information

Administration of the road trials

Name	Contact information and organisation
Morten Hafting, project manager	morten.hafting@ramboll.no +47 951 428 21 Ramboll RST, Norway
Carina Fors	carina.fors@vti.se +46 709 430 436 VTI (Swedish National Road and Transport Research Institute), Sweden
Hanna Fager	hanna.fager@vti.se +46 722 078 041 VTI (Swedish National Road and Transport Research Institute), Sweden

For questions about the road trials and the certification system, please contact Morten Hafting.

Application forms for requests of certificates and certificate renewal, requests of certificates with commercial names and alternative drop on material are to be submitted by email to application.nordiccert@vti.se

The Swedish National Road and Transport Research Institute (VTI) is an internationally prominent research institute in the transport sector, whose principal task is to conduct research and development related to infrastructure, traffic, transport, and mobility users. The Institute is an assignment-based authority under the Swedish Ministry of Rural Affairs and Infrastructure, dedicated to continuously developing knowledge pertinent to the transport sector and in this way actively contributing to achieving the Swedish transport policy objectives.

Our operations cover all modes of transport, including areas of pavement technology, infrastructure maintenance, vehicle technology, traffic safety, traffic analysis, mobility users , environment, planning and decision making processes, transport economics, and transport systems. Knowledge developed by VTI provides a basis for decisions made by stakeholders in the transport sector. In many cases our findings have direct applications in both national and international transport policies.

VTI conducts commissioned research in an interdisciplinary organization, and also undertakes investigations, consulting services, and various measurement and testing services. The Institute has a wide range of advanced research equipment and facilities, including laboratories for road material testing, measurement technology, crash safety testing, and world-class driving simulators.

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