

DRAFT

Technical requirements for and type approval of studded tyres for vehicles

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Background and legal basis of the Regulation

The need for issuing a regulation on the technical requirements for studded tyres was first identified in a legislative project (LVM069:00/2011) launched by the Ministry for Transport and Communications in 2011. The overall focus of the project was the transfer of the authorisation to issue standards from the Ministry to the agency level. As a result of the project, the Vehicles Act (1042/2014) was amended and section 27a of the Act included an authorisation for the Finnish Transport Safety Agency, the predecessor of the current Finnish Transport and Communications Agency, to issue provisions on the requirements for studs and studded tyres allowed in road traffic.

Until now, requirements for the type approval of studs and studded tyres have been prescribed on the basis of the Ministry of Transport and Communications Decree 408/2003 on the studs used in vehicle tyres.

The contents of the current Regulation are largely similar to previous Decree-level provisions and the practices followed in the type approval process, but in the future the goal is to further mitigate the road wear caused by studs. This has become necessary due to the increase in total travel distances and the increasing traffic concentrations in the road infrastructure of Southern Finland. At the same time, the Regulation aims to reduce the dust-related nuisances caused by the studded tyres used in passenger cars and vans.

The Vehicles Act also includes authorisations for the enactment of other provisions that will support the development of the type approval of studs and studded tyres, as prescribed in this Regulation, towards more EU-level, internationally harmonised procedures. The authorisation presented in section 36(3) of the Act covers the Finnish Transport and Communications Agency's requirements for the technical means to demonstrate the conformity of studs, while section 45(4) of the Act contains the provisions on conformity control in the production of studs and studded tyres subject to type approval. In addition, section 48(2) includes the authorisation to issue provisions on defining the contents of the reports, calculations and certificates issued by recognised experts who serve in a test laboratory-oriented capacity.

Drafting process of the Regulation

The Regulation was prepared by the Finnish Transport and Communications Agency, and the process was supported among other things by a thesis on the determination of limit values for road wear. In addition, studies on road wear and ice grip were commissioned between 2018 and 2019 for the determination of road wear limit values.

Assessment of the impact of the Regulation

During the transition period laid down by the Regulation and prior to the adoption of the new road wear limit values, tyre and stud manufacturers will be required to re-design and test their products as part of their overall product development processes for the fulfilment of the new requirements. Considering the design cycle used in the

tyre industry, a 5–8-year transition period is considered appropriate before the adoption of stricter road wear limits. This relatively long transition period will also help ensure that the cost impact to manufacturers remains reasonable in relation to the benefits that can be achieved.

Based on the tyre tests commissioned by the Finnish Transport and Communications Agency, the even stricter approval limits for road wear as well as other test method reforms could help reduce road wear by approximately 15 per cent. Due to the long transitional period before the requirements enter into force, future developments in technical solutions are expected to compensate for the possible effects on the ice grip properties of studded tyres almost entirely.

The main benefit of the more-stringent requirements in terms of road wear will become apparent in the future, as studs and studded tyres conforming to the new requirements become widely available. In addition, the new requirements will help reduce the amount of dust emissions caused by transport.

Detailed justifications

Section 1 of the Regulation presents the scope of application of the requirements for studs and studded tyres. The type approval required in section 4 of the Government Decree on the Structure and Equipment of Vehicles (1270 / 2014) can be applied for a stud model intended for use in passenger cars and vans and their trailers or for specific tyre–stud combination types. The type approval of a stud model is not limited to a specific tyre make or model; however, as before, the number of studs, their stud force, and the related stud protrusion and stud mass are limited by tyre class, in accordance with the general requirements of the Regulation. The scope of the Regulation also encompasses the tyres used in other vehicle categories, such as mopeds, motorcycles, mobile machinery and tractors. For these tyres, type approval is not mandatory for studded tyres or studs, but they have been taken into account in the application of the Requirements by including a referral to the general requirements for studs and studded tyres presented in section 3.

Section 2 defines the terms that are the most central to the application of the Regulation. For example, the definition of tyre rolling circumference is specified in accordance with current prevailing practices. In this respect, reference is made to the international tyre and rim standards included in UN Regulation No. 117 concerning the approval of tyres with regard to rolling sound emissions, to adhesion on wet surfaces and to rolling resistance. Stud protrusion is defined as the distance between the tip of a stud and the tread surface of a tyre, measured parallel to the longitudinal axis of the stud with a specialised stud protrusion measurement device. This definition corresponds to current practices. The definition of static stud force is the same as the one used in the previous national decree on studs. The definitions of tyre–stud combination and stud type were added to the Regulation for the purpose of limiting the product variations covered by a single type approval.

Section 3 of the Regulation lays down the general requirements for studs and studded tyres that are to be applied in cases where a stud or studded tyre does not need to be subjected to type approval. In this regulation, this requirement concerning the mass and maximum protrusion of studs, without the type approval obligation, is thus extended to other tyres than those intended for category M, N or O vehicles. These include, for example, tyres for mopeds and motorcycles, tractors and mobile machinery. The number of studs is limited to a maximum of 50 studs per metre of tyre rolling circumference, which is the same as the limit for tyres used in cars and their trailers.

The maximum permissible masses of studs and their corresponding studs protrusions on tyres other than those of category M N and O vehicles will be limited accordingly

to the current requirements of tyres for cars and their trailers. Vehicles with maximum classification mass of more than 3,500 kg (typically agricultural tractors and mobile machinery) and their trailers will, in the future, be limited to a maximum stud mass of 5.0 g, as studs that are lighter and smaller in dimension detach more easily when subjected to this type of use. Since studded tyres are used to a relatively small extent in other vehicles than passenger cars, there is less reason to limit the stud mass used in these vehicles to the same extent as the studs used in car tyres.

Section 4.1 stipulates that the type approval of tyre–stud combinations must be based on a road wear test that is in accordance with the standard SFS 7503:2018:en. The contents of the road wear test are largely similar to the current methods used in corresponding type approvals. With the introduction of the standard, the type approval procedures will, for the most part, continue as before, but the criteria for applying for type approval and for making the necessary measurements will be updated. The standard will, however, be used to specify the requirements utilised in the mounting of test stone pieces and how the test track’s groove is to be defined.

Annex 1 to the Regulation sets out the additional requirements necessary for the application of the standard in relation to the road wear measurement process. In addition to this, the phase-II requirement for the limitation of the type of drive axle configuration used in the test vehicle has been separately highlighted in section 4.1. In a road wear test that is conducted according to the limit values specified in phase II, the vehicle used in the test may only be powered by its front axle. Whenever a four-wheel drive test vehicle has been used, the results of these road wear tests have generally been found to be lower than usual, so it has been considered necessary to harmonise the test requirements applied by different testing laboratories in this respect as well.

The limit values for road wear are summarised in a separate table in that section. The limit values for implementation phase I of the Regulation are the same as in the previous requirements. In implementation phase II, the limit values for road wear have been reduced by approximately 15 per cent, and the limit value for the road wear of a test tyre is determined linearly according to the tyre’s load index, i.e. its LI category. In implementation phase II of the Regulation’s limit values, the limit values for road wear have been reduced for all tyre load indexes except for the tyres included in the increasingly common load index category of over 800 kg, for which it was considered appropriate to further restrict its limit values. This is based on an observation that, on the basis of estimates made during the processing of type approvals, it has been easier to achieve a value that was lower than the road wear limit for this load index category than in others.

The provision introduces a procedure whereby, for the purposes of the implementation phase II limit value-compliant type approval process, only one of the least favourable options of the type of tyre–stud combination is required to be tested. As a rule, the test tyres are selected from the tyres belonging to the same tyre–stud combination type on the basis of which option has the highest number of studs per metre of tyre rolling circumference. This procedure to test the worst case is more commonly used in the type approvals of other tyre-related requirements, and its purpose is to reduce the number of tests related to type approvals. However, the selection and testing of the least favourable option does not remove the obligation that every alternative of the tyre–stud combination covered by the type approval must meet the requirements of the Regulation. Section 4.1 of the Regulation emphasises, in line with section 32a of the Vehicles Act, the obligation of the holder of the type approval to ensure the regulatory compliance of all the tyre–stud combinations they manufacture, even if in this case only the least favourable option is required to be tested. Compliance with the requirement is to be verified also by means of market surveillance, by regularly subjecting studded tyres to road wear tests.

To ensure that the inherent uncertainties in the repeatability of road wear tests are sufficiently taken into account, the previously observed undershooting margin of 10% is, on the basis of a single test, considered as the condition for the approval of the test result. The test will need to be repeated when the measurement result does not undershoot the approval limit by at least 10%. The margin used in the type approval process is based on the previously documented repeatability of measurement results in the measurement procedure in question.

Section 4.2 mandates the affixing of an approval mark in the form of a label to all tyres whose studding is based on a type approval granted on the basis of the result of a road wear measurement. The requirement for affixing a label bearing the approval mark will enter into force at a later date and will apply to tyre–stud combinations manufactured on or after 1 July 2024, irrespective of the tyre category that the tyre belongs to. As this stipulation concerns the marking of a new, unused tyre, the provision includes a clarification that the marking label can be removed when, for example, when the tyre is sold and it is installed on its rim in the vehicle .

In section 4.3, the type approval process for studs and studded tyres is accompanied by the controlling methods used to ensure the conformity of production procedures as in other type approval activities. Specifically, the section refers to the requirements of the framework regulation for cars and trailers, which are further specified in Annex 2 to this Regulation. Reports on the conformity control procedures are required to be presented to the type approval authority if type approval is sought for a new type of the tyre–stud combination or stud on or after 1 July 2024.

Section 5.1 specifies the maximum permissible stud mass and stud force in cases covered by the separate type approval of a stud. The requirements set for studs in phase I of the implementation of the Regulation will remain largely the same. However, due to the low use rate of studs in Class C3 tyres, the maximum permissible stud mass could be increased to 5.0 grams. In this category, the previously permitted studs of up to 3.0 grams proved impractical, as it was difficult to get the small studs to stick adequately to the tyres used in heavy duty vehicles.

Much like with the other requirements of implementation phase II of the limit values, the maximum permissible mass of said type-approved studs has been reduced to reduce the road wear caused by studded tyres. In terms of Class C3 tyres, it was considered appropriate to keep the permissible maximum mass of studs unchanged when moving from phase I to phase II.

The measurement of stud force in connection with the type approval of passenger car studs is laid down in section 5.2. In practice, the measurement principles and more detailed measurement requirements are much the same as those applied to date. However, it was considered necessary to increase the number of studs measured in the measurement of stud force from 10 to 20 studs, to prevent any individual stud variations in the measurement results from having an overstated effect on the average stud force value, which is one of the criteria for type approval. In order to ensure that the correct conditions for measuring stud force are achieved, the Regulation includes further details on the type of standardised measuring conditions that should be established so that, for example, the temperature of the tyre in the measurement is sufficiently standardised.

Section 5.3 contains the provisions corresponding to the preceding paragraph on the measurement of the stud force of Class C2 and C3 tyres used in commercial vehicles.

A tyre that is fitted with type-approved studs does not need to be affixed with a type approval mark, but section 5.4 provides that, in the cases covered by the separate type approval of the stud model, the studded tyre may be affixed with a Regulation-compliant stud type approval mark. The approval mark is specified in more detail in Annex 3.

Section 5.4 specifies the general requirement of the framework regulation concerning the extension of type approvals. Any modifications to the product that could have a wider effect than that covered by the definition of the stud type will result in the type approval of an entirely new type of stud, thereby negating the possibility of extending the type approval.

In section 5.5, the controlling methods used to ensure the conformity of production are defined for the type approval process used for studs and studded tyres, in the same way as they would be for other type approval activities. In regard to the control procedures, the Regulation contains a general reference to the procedures compliant with the framework regulation for cars and trailers, which are further specified in Annex 2 to this Regulation.

Section 6 specifies in further detail the information and reports that must be submitted to the type approval authority when applying for type approval. In addition to the application criteria, the stud approval application must include, for example, 10 reference samples of the stud that will be used in the permit process to ensure the validity of the stud's dimensional drawings. In addition, for purposes of supervision cases, the reference samples are used to ensure that the product concerned is identical in all details to the product that has been submitted for type approval.

Section 7 of the Regulation contains transitional provisions that determine the entry into force of requirements and allow for a flexible transition process before the application of the Regulation's more stringent new requirements. This section lays down, for example, the schedule for the application of the limit values used in the road wear measurements of the type approval process, as well as the gradual entry into force of the corresponding, increasingly stringent gram-based limits concerning the mass of type-approved studs. The entry into force dates of these requirements depend on the manufacture date of the studded tyre, which is permanently marked on the tyre sidewall with a code that specifies the week and year of manufacture. For Class C1 tyres, the more stringent limit values and stud mass limits will enter into force for applications concerning the type approval of new types on 1 July 2024 or later, and for all new tyres with a date of manufacture of 1 July 2026 or later. For Class C2 and C3 tyres, the more stringent limit values for road wear and stud mass limits will enter into force for applications concerning the type approval of new types on 1 July 2026 or later, and for all new tyres with a date of manufacture of 1 July 2028 or later.

However, with regard to the verification of production conformity and the type approval marking, it is necessary to provide these with separate effective dates. The verification of production conformity will become mandatory for the type approval of new types applied for from 1 July 2024 onwards. When it comes to the type approval marking, however, it is justified to require that all tyre-stud combinations on the market be affixed with these at the same time, so that consumers can become aware of the markings as simultaneously as possible on tyres manufactured from 1 July 2024 onwards. In this respect, the entry into force of the marking requirement is the same for all tyre-stud combinations, regardless of the tyre class (C1 and C2) in question or the date of type approval.

The type approvals of studs and tyre-stud combinations valid at the effective date of the Regulation may, in essence, retain their validity up to the date that the requirements related to road wear remain unchanged, i.e. at its best until 30 June 2026. For Class C2 tyres, previous type approvals may remain in use for even two years longer than this. The Regulation does not restrict the road use of previously used studded tyres that meet the requirements of the legislation in force before this Regulation. Such tyres may still be used in traffic even after this Regulation enters into force.

In the case of tyres intended mainly for the vehicle categories not previously covered by the Ministry of Transport and Communications Decree 408/2003, but which are covered by the general requirements for studded tyres in this Regulation, the new

requirements concerning the maximum mass and number of studs must be taken into account in the studding and sale of tyres after the entry into force date of this Regulation, 1 September 2020, at the latest. This special group of tyres, characterised by its low sales volumes, includes the studs and studded tyres used in, for example, mobile machinery, tractors, and motorcycles.

For the sake of clarity, it is stated at the end of the transitional provisions that applications concerning the approval of the area of competence of a recognised expert can be initiated and processed immediately after the Regulation has been published and before it enters into force. Furthermore, as the standard SFS 7503:2018:en, which forms a central part of this Regulation, is currently available in English only, the Finnish Transport and Communications Agency will provide the necessary information on the contents of the standard in accordance with the Language Act.

Table on the introduction of the different parts of the requirements – example Class C1 tyre–stud combination:

#	wear limit / introduction phase	approval marking on tyre	COP procedures * approved	mandatory for new type of a tyre–stud combination	last permitted tyre manufacture date
A0	I	-	-	01/09/2020	30/06/2024 ¹⁾
A1	I	+	-	01/07/2024	30/06/2026
A2	I	-	+	01/07/2024	30/06/2026
A3	I	+	+	01/07/2024	30/06/2026
B0	II	-	-	-	30/06/2024
B1	II	+	-	01/07/2024	30/06/2026
B2	II	-	+	01/07/2024	30/06/2026
B3	II	+	+	01/07/2024	-

1) even if the type approval of the tyre–stud combination meets the latest pre-Regulation requirement level

* COP, i.e. Conformity of Production

Annex 1 sets out the requirements for specifying the contents of standard SFS 7503:2018:en on road wear measurements with regard to the type approval process. These requirements focus on the details of the testing itself, the calculation of results, and the selection of test tyres. The purpose of these is to ensure that, when it comes to the type approval process, the test results are adequately replicable and subject to a consistent set of practices. In addition to the standard, the requirements have been supplemented so that the stud force of the studs on the test tyres must be measured before the road wear test. This so-called reference value measurement of the stud force, which has been also previously required for type approval, is intended to support the conformity control of products to be placed on the market.

Annex 2 specifies the production conformity control procedures from the perspective of the type approval process for studs and tyre–stud combinations. According to section 2.2 of the Annex, sufficient conformity control arrangements and written control plans must be agreed upon with the manufacturer before any type approval is granted so that the necessary tests can be carried out to verify conformity of production. Section 2.3.5 of the Annex contains specific minimum requirements for type-approved tyre–stud combinations in connection with the measurements used in annual production inspections. These require that at least 0.02 per cent of the annual production of tyre–stud combinations be measured for stud protrusion. The results of the tests must be reported to the Finnish Transport and Communications Agency, which serves as the type approval authority in Finland.

Annex 3 specifies the requirements for tyre labels which, in addition to referencing the Regulation, include the identifier of the type approval granted. The label marking, which must be at least 35 cm² in size, is intended to provide consumers with easily identifiable information on the type approval of the product. More detailed information on the approval is available on the website of the Finnish Transport and Communications Agency. In addition, type approval identifiers can be used to identify specific type approvals in connection with market surveillance practices.

Annex 4 contains provisions on the reporting model to be used by testing laboratories, according to which the detailed results of the road wear test must be reported when applying for type approval. The end of the report template contains a checklist on the preparation of the test report and other necessary reports, to support the type approval application process.

Regulation schedule

The Regulation is intended to enter into force gradually from 1 September 2020. The intention is to introduce the more stringent road wear limits for new tyres of Category C1 for passenger cars in road wear measurements by 1 July 2026 at the latest - however, for new tyres of Category C2, by 1 July 2028 at the latest.

Publicising and communicating about the Regulation

Information on the launch of the regulatory project, the circulation of the Regulation for comments, and the issuing of the Regulation was provided on the website of the Finnish Transport and Communications Agency and by email to those who have joined the announcement list for regulatory affairs concerning road transport and to other known contact persons.

APPENDICES: