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 of 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 was amended with an authorisation for the Finnish Transport Safety Agency, the predecessor of the current Finnish Transport and Communications Agency, to issue regulations on a number of matters on which provisions had previously been issued by Ministry of Transport and Communications decree. Largely comparable authority to issue regulations has been proposed in the new Vehicles Act (82/2021) which will replace the Vehicles Act currently in force. The Act contains provisions on the authority to issue more specific regulations regarding the requirements on studs and studded tyres authorised for traffic use (section 16(6)), the national type-approval mark for tyre-stud combinations and its placement (section 44(5)), the technical information provided when applying for type-approval for studs and tyre-stud combinations (section 48(5)), the demonstration of conformity and the content of the information provided in the context of demonstrating conformity (section 49(3)), and the sufficient arrangements related to conformity and minor deviations from compliance with the procedures laid down in Framework Regulation (EU) 2018/858 in the context of national type-approval (section 66(8)).

Until now, requirements for the type-approval of studs and studded tyres have been laid down by virtue of the Ministry of Transport and Communications Decree on Studs in Vehicle Tyres (408/2003). This Decree is to be repealed by a new Vehicle Act on the 1st of July 2021 following the entry into force of that Act.

The contents of the Regulation to be issued are largely similar to previous Decreelevel 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.

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[1]. In addition, studies on road wear and ice grip were commissioned between 2018 and 2019 for the determination of road wear limit values.

Stakeholders were requested to submit their comments on the draft Regulation between 13 February and 14 April 2020. A list of stakeholders and a summary of their comments as well as the changes made to the draft Regulation on the basis of the comments are attached to this Explanatory report in a table format.

While the draft Regulation was circulated for comments, it was also notified to the European Commission pursuant to Directive 2015/1535 (EU) (notification 2020/66/FIN). As a response to the notification, the Commission made its comments dated on 18 May 2020 in compliance with Article 5(2) of Directive 2015/1535 (EU). The Commission's comment concerned subsection 4.1 of the draft Regulation, under which the type-approval of tyre–stud combinations for class C1 tyres for passenger cars and Class C2 tyres for commercial vehicles is based on a road wear test conducted in accordance with the standard SFS 7503:2018:en. In its comment, the Commission recommended that commercial actors be expressly given the possibility of using other standards relevant to road wear testing which can meet the typeapproval requirements in a corresponding manner. As a result of this comment, the possibility of measuring road wear by using another procedure that fulfils the national requirements equivalent to the aforementioned standard laid down by a Member State of the European Economic Area was added to the draft Regulation.

The Commission's comment also concerned subsections 4.2 and 5.4 of the draft Regulation. Subsection 4.2 of the draft Regulation states that before a type-approved tyre–stud combination is placed on the market, it must be fitted with an Annex 3compliant type-approval label on the side or tread of the tyre. Under subsection 5.4 of the draft Regulation, before placing on the market a Class C1, C2 or C3 tyre that has been studded with type-approved studs, it may be fitted with an Annex 3compliant type-approval label on the side or tread of the tyre, and said label must contain the markings for the type-approval in question. The Commission notes in its comment that restrictions to the free mobility of goods arising from the fact that goods imported from and legally manufactured and placed in the market in Member States must comply with requirements laid down in the legislation of another Member State concerning, for example, the designation, shape, size, weight, consistency, appearance, labelling or packaging of the goods must be considered as measures having equivalent effect prohibited under Article 34 TFEU. According to the Commission's comment, manufacturers incur additional costs from the requirement concerning a specific label fitted on the side or tread of the tyre as they must modify their products accordingly. The costs incurred from this modification may have the effect of the manufacturers declining to place their products in the market in the Member State which has introduced particular requirements concerning national markings. The Commission acknowledges that the requirements provide for the possibility of using detachable markings but wishes to ensure that the requirement set out in subsections 4.2 and 5.4 can be met by using stickers bearing these markings and recommends citing this as a concrete example in Annex 3. The draft Regulation submitted together with the notification already states that a sticker may

[1] https://aaltodoc.aalto.fi/handle/123456789/38961?locale-attribute=fi

be used for this marking. However, the English translation at the Commission's disposal uses the more general word 'label', which does not indicate that a sticker is specifically referred to. Consequently, the Finnish wording of the draft Regulation notified to the Commission is considered to already comply with the Commission's recommendation.

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Assessment of the impact of the Regulation

The Regulation applies to new studded tyres that are to be type approved and placed on the market. The impacts of the Regulation concern manufacturers of tyres and studs, tyre dealers, companies providing tyre studding services, recognised experts conducting testing, and Traficom, which is the supervisory authority for type-approval and the tyre market.

During the transition period laid down by the Regulation and prior to the adoption of the new phase A+ road wear limit values, tyre and stud manufacturers will be required to redesign 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.

Tyre dealers may market only studded tyres that meet the requirements of the Regulation. This may have an impact on the market of tyres manufactured in accordance with the earlier requirements during the transition periods.

When applying for type-approval for a new type, the applicant shall use a recognised expert meeting competence required by the Regulation. It is thus likely that as the Regulation enters into force, recognised experts will apply for an extension of their area of competence in accordance with the Regulation.

The more specific requirements regarding the supervisory procedures related to typeapproval and to the conformity of production as well as tyre markings facilitate the supervision of type-approval and the market surveillance of studded tyres and studs.

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 44 of the Vehicles Act applies to studs intended for use in the winter tyres of cars or their trailers

commissioned or sold for road traffic use. Under that Act, the studs do not, however, need to have received national type-approval if the tyre-stud combination has received national type-approval. Type-approval can be applied for 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 contained in subsection 5.1 of the Regulation. The scope of the Regulation also encompasses the tyres used in other vehicle categories, such as mopeds, motorcycles and tractors travelling at speeds of over 40 km/h. For these tyres, type-approval is not mandatory for studded tyres or studs, but they have been taken into account in this Regulation by including a reference to the general requirements for studs and studded tyres presented in section 3. The authorisation provided in section 16 of the Vehicles Act applies to regulations regarding the requirements on studs and studded tyres approved for traffic use, and is not limited to type approved studs or studded tyres. However, in light of the comments received on the Regulation, its scope of application excludes all studs or studded tyres used in tractors whose maximum design speed does not exceed 40 km/h, public works vehicles, or the trailers of tractors or public works vehicles.

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, which are referenced in such documents as 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 Ministry of Transport and Communications decree on studs. The definitions of tyre–stud combination and stud type were added the 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 as well as tractors travelling at speeds of over 40 km/h. 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. Due to such factors as the low use of studded tyres and the tyre structure, in category L vehicles and also other light vehicles it has, on the basis of comments received on the Regulation, been deemed appropriate to limit the stud number to 100 studs per metre of the tyre rolling circumference as an exception to other vehicles.

The maximum permissible masses of studs and their corresponding stud protrusions on tyres other than those of category M N and O vehicles will be limited accordingly to the earlier requirements of tyres for cars and their trailers. In the tyres of vehicles with a maximum classification mass of more than 3,500 kg (typically agricultural tractors with speeds of over 40 km/h) and their trailers, the maximum stud mass will be limited to 5.0 g, as studs that are lighter and smaller in dimension detach 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. The greatest permitted average protrusion of studs will be limited similarly to what has previously been prescribed in the Decree on the Use of Vehicles on the Road (1257/1992), repealed on 1 June 2020, or to at most 2.0 mm or 2.5 mm depending on the tyre class.

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 or with another procedure that fulfils the national requirements equivalent to that standard laid down by a Member State of the European Economic Area. The content of the measurement procedure that complies with the national standard is largely the same as the procedure hitherto used in comparable type-approvals. With a view to the future development of measurement procedures and in compliance with the Commission's comments, the possibility to also use other road wear measurement procedures has been included in the Regulation, where they can be shown to fulfil the national requirements equivalent to the aforementioned standard laid down by another Member State of the European Economic Area. 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 A + 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 A+, the vehicle used in the test may only be powered by its front axle or, alternatively for class C2 tyres, a vehicle powered by its back axle may be used. Whenever a fourwheel 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 A of the Regulation are the same as in the previous requirements. In implementation phase A+, 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 then determined linearly according to the tyre's load index, i.e. its LI category. In implementation phase A+ 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 typeapprovals, 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 A+ 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. On the basis

of comments received on the Regulation, the possibility was added for recognised experts and the type-approval authority to assess another tyre as least favourable. 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 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 sticker 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 sticker bearing the approval mark will enter into force at a later date and will apply to tyre–stud combinations manufactured on or after 1 January 2025, 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 sticker can be removed when, for example, when the tyre is sold and it is installed on its rim.

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 January 2025.

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 A 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 has been difficult to get the small studs to stick adequately to the tyres used in heavy duty vehicles.

Much like with the requirements of implementation phase A+ of the limit values for road wear, 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 A to phase A+.

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 affixed with a typeapproval 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 Regulationcompliant stud type-approval mark. The approval mark is specified in more detail in Annex 3.

Section 5.4 also 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 contains more specific provisions on the information and reports that shall be submitted to the type-approval authority when applying for type-approval. In addition to the test report and the materials appended to it, approval applications for studs shall, for example, be accompanied by 10 reference samples of the studs in question so that it can be ascertained that the dimensional drawings do not contain errors. The reference samples may also be used in the context of supervisory activities in order to ascertain that the product in question corresponds completely to the product concerned by the application for type-approval.

Section 7 of the Regulation contains transitional provisions that determine the entry into force of the key new requirements and allow for a flexible transition process to the more stringent new requirements. This section lays down, for example, the schedule for the application of the more stringent 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.

The type-approvals for studs and tyre-stud combinations which are valid as the Regulation enters into force may basically remain valid for as long as the road wear limit values remain unchanged, or in the best case until 1 January 2027. For class C2 tyres, the old type-approvals for tyre-stud combinations may be used for up to two years longer. The Regulation does not restrict the road use of studded tyres already in use that meet the requirements of the legislation valid before the entry into force of this Regulation. The use of these tyres on the roads will still be permitted after the Regulation enters into force.

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 January 2025 or later, and for all new tyres with a date of manufacture of 1 January 2027 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 January 2027 or later, and for all new tyres with a date of manufacture of 1 January 2029 or later.

However, with regard to the verification of production conformity and the typeapproval marking, it is necessary to provide these with separate effective dates. The verification of production conformity will become mandatory for the typeapproval of new types applied for from 1 January 2025 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 January 2025 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.

Regarding vehicles' studded tyres falling within the scope of the Regulation other than type approved studded tyres, the new requirements will apply to tyres manufactured on or after 1 January 2022. When studding such other tyres manufactured before 1 January 2022, the requirements of the previous Decree or the later requirements contained in this Regulation must be complied with. Technical requirements for studded tyres in the group of other tyres previously only existed for tyres intended for category L vehicles and their trailers.

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	A	-	-	01/7/2021	31/12/2024 [1)]
A1	A	+	-	01/1/2025	31/12/2026
A2	A	-	+	01/1/2025	31/12/2024 [(x)]

A3	A	+	+	01/1/2025	31/12/2026
B0	A+	-	-	-	31/12/2024
B1	A+	+	-	01/1/2025	31/12/2026
B2	A+	-	+	01/1/2025	31/12/2024 (xx)
B3	A+	+	+	01/1/2025	-

1) even if the type-approval of the tyre–stud combination meets the latest preRegulation requirement level
* COP, i.e. Conformity of Production

(x) Until 31.12.2026, if a valid type-approval was granted for a tyre-stud combination before the entry into force of the studded tyre marking sticker requirement, provided that such a tyre bears a type-approval marking sticker when the tyre is manufactured on or after 1.1.2025.

(xx) No limit for tyre manufacturing, if a valid type-approval was granted for a tyrestud combination before the entry into force of the studded tyre marking sticker requirement, provided that such a tyre bears a type-approval marking sticker when the tyre is manufactured on or after 1.1.2025.

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 typeapproved 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 sticker which, in addition to referencing the Regulation, include the identifier of the type-approval granted. The sticker marking, which must be at least 35 cm^2 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 typeapproval application process.

Regulation schedule

The Regulation is intended to enter into force simultaneously with the repealment of the Ministry of Transport and Communications Decree on studs in vehicle tyres on the 1st of July 2021.

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. The final Regulation will be published on the Finlex.fi website as well as the website of the Finnish Transport and Communications Agency.

APPENDICES: Comment summary table