Modification of tractor propulsion system, tyres and rims

Regulation background and legal basis

The Regulation of the Finnish Transport and Communications Agency on the modification of tractor propulsion systems, tyres and rims (TRAFICOM/218559/03.04.03.00/2024) entered into force on 9 December 2024.

The regulation repealed the previous Regulation on modification of tractor propulsion (TRAFICOM/285315/03.04.03.00/2022). The regulation lays down the technical requirements for the modification of the propulsion system of a tractor and the reports required for the modification of the propulsion system.

It also lays down technical requirements for the modification of tractor tyres and rims, as well as provisions on the demonstration of conformity of these changes in a registration or modification inspection.

Before the regulation on tyre modifications entered into force, the conditions for modifying tyre sizes were unclear and based only on strict type-approval requirements.

However, since the regulation entered into force, it has been found that its practical application remains unclear, particularly in inspections that assess the suitability of a tyre. This project would add to the regulation a complementary method to the standards in effect to determine the suitability of a tyre for a vehicle to the regulation.

According to section 7(7) of the Vehicles Act, unless otherwise provided for in, or pursuant to, that Act, a vehicle and its parts, systems, components and separate technical units must comply with the technical requirements applicable in Finland when the vehicle first starts to be driven. Alternatively, the technical requirements applied in Finland since the time when the vehicle started to be driven may be applied. The conformity assessment of a used vehicle, part, system, component or separate technical unit shall take into account natural wear and tear due to use which does not have more than a minor impact on safety or its environmental performance.

Under section 7a(1) of the Vehicles Act, notwithstanding the provisions of subsections 1-4 of section 7, a vehicle may only be modified in such a way that it does not meet the technical requirements referred to in those provisions if the modification does not have any more than a minor impact on safety or its environmental performance. The Finnish Transport and Communications Agency may issue regulations on alternative technical requirements to the technical requirements referred to in section 7, subsection 1, taking into account the intended purpose of the vehicle and the practical feasibility of any modifications to the vehicle, as well as regulations on additional requirements to ensure the safety of the vehicle and a low level of adverse environmental implications after the modifications.

The Finnish Transport and Communications Agency may also issue further provisions on the technical requirements for the modification of a vehicle referred to in section 7a and the associated required reports, as well as on minor exceptions and alternative requirements to be applied to the demonstration of conformity and the requirements pursuant to sections 139 and 144, for reasons of expediency. The risk to safety, health or the environment caused by derogations and optional requirements may not increase above a negligible level.

The obligation to inspect a modified vehicle is laid down in section 143 of the Vehicles Act. Under subsection 1, paragraph 1, a motor vehicle and a vehicle connected to it or its trailer must be approved in a modification inspection prior to its use in traffic, if the vehicle's structure has been modified in such a way that the change has a slightly greater impact on the safety or emissions of the vehicle, for example.

According to section 143, subsection 3 of the Vehicles Act, the Finnish Transport and Communications Agency may issue further provisions on the changes referred to in subsection 1 which require a modification inspection and on minor changes that do not require a modification inspection.

The requirements for a tractor, including those for tyres and rims to be fitted to such a vehicle, are laid down in particular in Regulation (EU) No 167/2013 of the European Parliament and of the Council on the approval and market surveillance of agricultural and forestry vehicles (framework Regulation for tractors and their trailers) and, preceding it, Directive 2003/37/EC of the European Parliament and of the Council on type-approval of agricultural or forestry tractors, their trailers and interchangeable machinery, together with their systems, components and separate technical units and repealing Directive 74/150/EEC, and the delegated acts relating to those acts. In addition, the requirements for tractors have been laid down in the UN Regulations annexed to the Agreement Concerning the Adoption of Uniform Conditions of Approval and Reciprocal Recognition of Approval for Motor Vehicle Equipment and Parts (Treaty Series of the Statute Book of Finland 70/1976), drafted by the United Nations Economic Commission for Europe.

In line with the Framework Regulation for tractors and their trailers, the Regulation does not apply to the approval of individual vehicles. However, under section 78 of the Vehicles Act, a T category vehicle may not be individually approved; instead, a new T category vehicle sold or first registered for road use must be EU or EC type-approved or subjected to a national small series type-approval. A registration inspection is possible as a measure similar to individual approval for an individual vehicle, but in the absence at national level of requirements deviating from the type-approval requirements, the registration inspection must show that the tractor meets the same requirements as those required for type-approval.

The requirements for the tyres on a tractor are provided in Article 34 of (framework) Delegated Regulation (EU) 2015/208 for tractors and their trailers, which refers to Annex XXX of the same Regulation. According to the Regulation, permitted tractor tyres are primarily those for agricultural and forestry vehicles approved under UN/ECE Regulation 106, or Framework Regulation 167/2013. Tyres for cars and their trailers, as well as for vehicles in category L, may also be approved for fitting on a tractor if the vehicle is designed for special operating conditions that require them. The vehicle type-approval authority and the technical service conducting approval tests must assess the suitability of the tyres for their intended use.

In the case of different quad tractors, it has been widely recognised that tyres for L-category vehicles approved under UN/ECE Regulation 75 are best suited to their purpose. Indeed, it is only tyres such as these that are frequently type-approved for smaller tractors on the market.

Car tyres (UN/ECE Regulations 30, 54 and 117) are less frequently found on tractors, as the special operating conditions, where their use on the tractor would be justifiably safer than any other tyre option provided for in the requirements, are less common. Some tractors used in property management have car tyres approved back at the time of type-approval, because their specific purpose of use is road use only.

In Finland, the use of a tractor on the road in winter conditions, where the use of car tyres would be justified, may be classed as special operating conditions. Tractors are mainly type-approved for the entire European market. Finland, together with the other Nordic countries, has not proved to be the right size of market for manufacturers to have promoted the approval of car tyres for tractors. There is a great deal of research on the performance and viability of winter tyres for cars, in particular as a result of various market-driven tyre tests and government-led studies. The viability of tractors or L-category tyres in winter road conditions has barely been tested.

The regulation therefore makes it possible to fit car tyres on certain tractors. However, the use of car tyres is not limited to winter tyres only, since it has not been considered necessary to prohibit their use in other conditions.

Drafting of the regulation

The regulation was drafted by the Finnish Transport and Communications Agency. A notification of the start of the project to draft the regulation was posted on the Finnish Transport and Communications Agency’s website and also sent by email to subscribers to the mailing list for the drafting of new road transport regulations.

Written statements on the draft regulation have been requested to be submitted by xx. The request for opinions was posted on the Finnish consultation service lausuntopalvelu.fi. In addition, the request for opinions was sent by email to subscribers to the mailing list for the drafting of new road transport regulations. Stakeholders and citizens have also had the opportunity to comment on the project as the preparation progresses.

The finalised Regulation will be published in Finlex and on the website of the Finnish Transport and Communications Agency. Notification of the issuance of the regulation will be posted on the Finnish Transport and Communications Agency’s website and also sent by email to subscribers to the mailing list for the drafting of new road transport regulations.

The draft regulation was notified according to the notification procedure for technical regulations (Directive (EU) 2015/1535 of the European Parliament and of the Council).

Feedback

Assessment of the impact of the regulation

The aim of this regulation is to clarify the legal situation and to support the practical application of the law by issuing more detailed provisions on the prerequisites for the modification of tractor tyres and rims. The police, inspectors, sellers of tractors and ordinary citizens have all said that they want the requirements to be made clearer. In particular, they wanted clarification of the conditions under which the use of tyres approved in different ways are permitted for a tractor.

Since the entry into force of the regulation, additional needs have been identified in its practical application, in particular to determine certain tyre sizes under the regulation. In this project, a complementary method to the standards in effect to determine the suitability of a tyre for a vehicle would be added to the regulation so that application of the regulation in roadworthiness testing and by citizens will be clearer in the future.

The adoption of the regulation will contribute to the aims of reducing the regulatory burden by adding an alternative way to determine the suitability of a tyre for a vehicle in the future.

Efforts have been made to ensure that the regulation allows for a very wide range of alternative tyre sizes, which have been widely used on small tractors in outlets.

During the consultation round, it will also be possible to bring to the attention of the Finnish Transport and Communications Agency potential tyre sizes that would be unjustifiably excluded from the permitted changes.

A regulation of the Finnish Transport and Communications Agency's may not, due to matters related to competency, regulate warranty or liability issues related to vehicles. However, it must be ensured that consumers are aware of the warranties and liabilities associated with their vehicle after the conversion.

Detailed rationale

1. Scope

No substantive changes are to be made to the scope, but a linguistic amendment is made to refer also to the design speed in the second paragraph.

Regarding propulsion modifications, the regulation concerns the modification and replacement of an engine of a category T1, T2, C1 or C2 vehicle with a design speed not exceeding 60 km/h and the demonstration of conformity of these changes in a registration or modification inspection. No changes have been made to this in this regulatory project.

With regard to the change in tyre size, section 1 is amended to extend the scope the modification of tyres and rims of a category T_1, T_2, T_3, C_1, C_2 or C_3 vehicle with a design speed not exceeding 60 km/h to tyre sizes other than those approved in the type-approval or previously recorded in the register. These categories of vehicles cover the vast majority of tractors registered in Finland. In addition, the scope of the regulation will in future cover the modification of tyres and rims of category T_1, T_2, T_3, C_1, C_2 or C_3 vehicles used by the police, the rescue services, Finnish Customs and the Border Guard, as referred to in section 9.1.2. The design speed of these vehicles may, furthermore, be greater than 60 km/h.

According to the Framework Regulation for tractors and their trailers, category T_1 tractors, which fall within the scope of this regulation, are wheeled tractors, with the closest axle to the driver having a minimum track width of at least 1 150 mm, with an unladen mass, in running order, of more than 600 kg, with a ground clearance of not more than 1 000 mm; for tractors with a rotating driving position (rotating seat and steering wheel), the axle closest to the driver is equipped with the largest diameter tyres.

According to Article 4 of the Framework Regulation for tractors and their trailers, tractors of category T2 include wheeled tractors with a minimum track width of less than 1 150 mm, with an unladen mass, in running order, of more than 600 kg, with a ground clearance of not more than 600 mm; if the height of the centre of gravity of the tractor (as defined by ISO 789-6:1982 and measured in relation to the ground) divided by the average minimum track for each axle exceeds 0,90, the maximum design speed be restricted to 30 km/h.

Category T3 comprises wheeled tractors with an unladen mass of not more than 600 kg.

In addition, the category of tractors is followed by the letter 'a' for wheeled tractors with a maximum design speed not exceeding 40 km/h and the letter 'b' for wheeled tractors with a maximum design speed exceeding 40 km/h.

Category C comprises track-laying tractors propelled by endless tracks or by a combination of wheels and endless tracks, with subcategories defined by analogy with category T. A category C tractor may be fitted with tyres in addition to the tracks, so the regulation also applies to their tyre modifications.

2. Definitions

The definition for the outer diameter of a tyre in indent 11 is amended to refer to the diameter to be defined in accordance with Annex 2 to the regulation instead of the previous definition in the STRO or ETRTO tyre standard.

Additionally, a new indent 13 on the definition of a radial tyre is added to the set of definitions, the purpose of which is to clarify what is meant by a radial tyre in the regulation. Some tyres intended for ATV use have a structure similar to the radial tyre and this may have been highlighted in the marketing. However, such a tyre is not necessarily a radial tyre within the meaning of the regulation and conforms to tolerances that are different from those for a tyre approved as a radial tyre. It can be decided from the tyre size markings whether the tyre is a genuine radial tyre. The tyre size marking shall bear the letter "R" (e.g. 26x10.00R14, 195/65R15). Thus, a tyre other than a radial tyre referred to in the regulation covers all other tyre structures on the market, the most common being the cross-ply and half-belt structure.

3. General requirements

No changes are to be made to section 3.

4. Changes to the registered information

A more specific provision is added to this section stating that if more than one alternative tyre size has been indicated on the tyre of the vehicle presented for a modification inspection, only such tyre size markings that meet the requirements of this regulation shall be entered in the Transport Register.

Particularly in the case of all-terrain vehicle tyres, there may be a way in which the tyre size is indicated on the tyre in inches and millimetres. However, it should be noted that the sizes are not directly proportional, their dimensions differing slightly from each other. However, the tyre meets the requirements of both size designations, although one size cuts across the standard deviation in size for the other. The tyre would otherwise not meet the requirements for both sizes. In a modification inspection, both sizes on the tyre must be assessed. From the point of view of compliance with the requirements of the regulation, only one size needs to meet the requirements, but only the size designation meeting the requirements is entered in the register.

5. Replacement of a tractor engine

No changes are to be made to section 5.

6. Conversion of a tractor engine to gas-powered

No changes are to be made to section 6.

7. Impact of the modification of an engine on power, speed and noise

No changes are to be made to section 7.

8. Changes in the structure of a tractor when the engine is replaced or modified

No changes are to be made to section 8.

9 Change of tractor tyre size

Section 9 (see in particular paragraph 9.1.3 and Annex 2) shall be amended so that the impact of a tyre with a differing outer diameter directly on the vehicle speed is not assessed. Instead, the permissible and required dimensional tolerances for the outer diameter of tyres are included in the regulation. The effect on speed is thus taken into account indirectly.

The tolerances maintain the principle in the existing regulation, i.e. they will continue to allow tyre options to the extent that their impact on the vehicle's design speed remains minimal.

The dimensions and tolerances of tyres intended for u7se on the are based on internationally recognised standards and requirements, which make it possible to carry out a comparison also between tyres intended for different vehicles. The dimensions are listed fairly comprehensively in different tyre standards.

The most familiar tyre dimensions are listed in the standard set by the Nordic tyre standards organisation STRO, which is commonly used by tyre industry professionals and inspectors. However, the standard has been found unsatisfactory as regards some fairly common tyres for cabin ATVs and tractor quads, and not all the necessary information may be available to the party making the tyre modification or to the inspector assessing it. For this reason, in order to obtain the necessary information, a new Annex 2 is added to the regulation, providing supplementary formulas and permissible tolerances for tyre sizes to be added to the standards. In addition, other amendments as required by Annex 2 will be made to the regulation.

In the future, a comparison between tyre sizes will, in principle, be made on the basis of the nominal outside diameters of the tyres. The nominal diameter is also used as a reference for the national structural modification requirements for other vehicles. The nominal dimensions of tyres are readily available measurement data, as this information can be found directly from the tyre size. A comparison should be made between the tyre size with the highest outer diameter selected from the vehicle's registration data and the tyre installed in the vehicle in place of it.

The permitted and required tolerances are derived from the static and dynamic dimensional tolerances allowed for different types of tyres.

Nominal dimensions and variations in the dimensions allowed for tyres in standards

The nominal dimension is a kind of average or target dimension for a tyre, which can be calculated from the tyre size markings. The actual dimensions of tyres may differ somewhat from this nominal dimension under the conditions and tolerances laid down in the standards and the approval requirements for tyres. The tolerances allow for a certain spread of tyre dimensions due to manufacturing technology and causes resulting from different uses.

The conditions for changing the tyre size of a tractor reflect the corresponding requirements for cars, their trailers and L-category vehicles (motorcycles, tricycles and quadricycles), but take into account the specific characteristics of the structure and use of tractors.

Tyre sizes for tractors in the Transport Register

The Transport Register and related notification obligations and responsibilities are governed by the Act on Transport Services (320/2017).

For bigger tractors, a large number of different tyre sizes and their combinations are often type-approved. The manufacturer may limit to a specific vehicle version and individual the relevant tyre sizes in their certificate of conformity. In addition, only some of the tyre sizes approved for the tractor and authorised by the manufacturer may have been recorded in the Register during the registration inspection or when the prior notification was made.

Since the type-approval of tractors has, as a general rule, only been compulsory since 1 July 2009, the older register entries may have just recorded the details of the tyres on the tractor at the time of the registration inspection, although the manufacturer may have also permitted the use of other tyre sizes for the tractor. Instead of type-approval, it is also possible to present the vehicle for a registration inspection.

The tyre sizes recorded in the tractor register may be supplemented in part by adding all the tyre sizes recorded by the manufacturer in the certificate of conformity without a modification inspection, by correcting the technical details made by the vehicle inspection station.

The regulation also lays down requirements for the use on the tractor of tyres deviating from the tyre sizes recorded in the Register.

9.1. General conditions for tyre size modifications

No substantive changes will be made to the section, but linguistic revisions will be made to the regulation as regards the change in the classification of the vehicle.

In principle, the tractor’s tyres and rims may be replaced without presenting the vehicle for a modification inspection under the conditions set out in section 9, unless otherwise provided by law or stipulated. For example, periodic activity under Regulation (EU) No 167/2013 of the European Parliament and of the Council of 5 February 2013 on the approval and market surveillance of agricultural and forestry vehicles could contribute to limiting changes affecting speed. The vehicle could also, without further regulation, exceed the dimensions or masses permitted under the Road Traffic Act. In addition, following modification, vehicles might fall within the scope of another regulation of the Agency, such as the Regulation on Special Transport and Special Transport Vehicles (TRAFICOM/420073/03.04.03.00/2019), in which case the conditions of that Regulation must be complied with instead of this Regulation.

In addition, it should be noted that a change to tyres or rims may not affect the classification of a vehicle unless the vehicle complies with the technical requirements referred to in section 7(1) of the Vehicles Act under the new classification and sub-classification.

The classification of a tractor depends on a number of factors, such as the mass, ground clearance, track width and speed of the vehicle, which are also likely to be affected by changes to the tyres and rims of the vehicle. Under the regulation, for example, the design speed of a vehicle may only be reduced if the change does not affect the classification of the vehicle.

From the point of view of safe tyre installation, the starting point is always that the used rim and tyre are compatible.

The regulation requires compliance with either the standards of the Scandinavian Tire & Rim Organisation (STRO), the European Tyre and Rim Technical Organisation (ETRTO), or the tyre and rim manufacturer’s declaration on tyre and rim

compatibility.[1] This requirement applies to all tyre installations permitted under the regulation.

However, the STRO and ETRTO standards can only be complied with as such when the tyre to rim installation has been identified therein. In any case, the regulation does not exclude installations not contained in these standards, but in such a case the compatibility of the tyre and rim must be determined by other means. Such a tyre/rim combination that deviates form standards is, for example, a car tyre mounted on the rim of a 'quad tractor'. The regulation provides as a requirement for all installations instructions in the STRO and ETRTO standards that a radial tyre for a car or motorcycle without inner tubes may only be installed on a rim whose construction prevents the border cable from slipping off the rim cone. In practice, this type of structure refers to rims that are fitted with a safety hump/humps, to lock the bead of the tyre onto the rim. This solution ensures that the tyre remains on the rim, especially in the event of a reduction in air pressure. The dimensions and shape of the rim safety humps should be compatible with the dimensions and shape of the tyre bead, i.e. the tyre bead fits properly between the outer edge of the rim, the flange and the shoulder, to ensure that the tyre stays on the rim properly.

If the tyre's shape and dimensions do not allow it to fit tightly on the rim and its safety humps, there is a risk of the tyre bead coming loose from the groove formed by the safety shoulder and the edge. In such a situation, the tyre will immediately deflate. When this happens, the vehicle veers sharply in the direction of the fast deflating tyre and, when the vehicle turns, this may cause the vehicle to roll over. An incompatible tyre and rim can also lead to gradual leakage of the tyre, unbeknown to the driver. This can lead to repeated trips driving when the tyre pressure is too low, which not only has an adverse impact on the vehicle's behaviour, but also puts a strain on the tyre and increases the risk of tyre damage.

In addition, with an unsuitable installation solution, there is a risk that the longitudinal grip is compromised and, with sudden acceleration, wheelspin will result. This may cause the tyre to come loose immediately, or, if this happens repeatedly, there will be damage to the tyre bead, which may subsequently lead to sudden damage to the tyre.

In addition to the risks on the road, the installation of an incorrect tyre on a rim may pose an occupational safety risk to the party carrying out the installation work. If the wrong type of tyre is fitted, the tyre or rim may also be damaged, though may not be any obvious damage visible immediately, but, for example, there may have been hidden tears in the bead of the tyre or damage to the rim that makes it less durable. In the case of smaller, quad-type tractors, when choosing a tyre and rim combination, special consideration must be given to the features typical of the vehicle's tyre arrangement, to ensure the compatibility of tyre and rim.

In all off-road vehicles, spacial attention is paid to keeping the tyre on the rim in challenging conditions and very low atmospheric pressures. As a result, the safety hump for the tyre bead and the tyre are often more robustly designed than with rims intended for road use. This also applies to ATVs.

As a general rule, All Terrain tyres conforming to UN Regulation 75, whose bead shape and size differ from those used on car tyres, are used in the original fitting for ATVs

Therefore, when fitting car tyres on ATV rims, special care should be taken to ensure that the tyre and rim are compatible so that the risk of the tyre coming loose

[1] See STRO tyre standards, ETRTO standards and EDI documents, publicly available summary: Tyre Seller Manual, https://ejulkaisu.grano.fi/grano/rengasmyyjan_kasikirja_22#p=1

from the rim or the risk of leakage due to air pressure is no greater than when complying with STRO or ETRTO standards.

The conformity of a tyre/rim combination can only be assessed in very limited way during a modification inspection if the combination is not included in the standards in place. In addition, it is not appropriate to assess an individual rim and tyre arrangement in a modification inspection: the appropriateness of the tyre and rim size submitted for the inspection is assessed in the test. Therefore, responsibility for how appropriate the solution is rests ultimately with the driver of the vehicle. The Finnish Transport and Communications Agency is unaware of any problems connected with the suitability of car tyres for ATV rims, so it has been considered possible to allow such fittings.

The Finnish Transport and Communications Agency, as the market surveillance authority for tractors, monitors the conformity of tyre sets sold on the market for quad-type tractors.

9.1.1. Prerequisites for changing the tyre size of agricultural and forestry tractors

No substantive changes are to be made to this section. However, as regards the tolerance of the outer diameter, the section will clarify the wording of the regulation to take account more clearly of the general conditions for changing the vehicle category in accordance with the Vehicles Act. A similar clarification is also to be made in section 9.1.2.

It is not necessary or reasonable to regulate with particular precision a change of the tyres of a tractor used in agriculture or forestry and equipped as a motor-driven machine, since tractors used for these purposes are often highly multifunctional and the required tyre options can vary enormously. The tractor may be equipped with wider tyres, e.g. when driven on a wet field or in a forest.

The set of tyres used depends in practice on the instructions given by the tractor manufacturer on the tyre sizes which may be used on the tractor in consideration of matters of transmission and structural durability. Modern agricultural and forestry tractors are, as a rule, four-wheel drives, so that the durability of the transmission system means that tyre sizes must in any case be very precise.

However, the requirements are that the design speed may not be increased beyond the given tolerance. The tolerance is the same as that given in Annex III to Delegated Regulation (EU) No 2015/208 supplementing Regulation (EU) No 167/2013 (framework Regulation for agricultural and forestry vehicles) for determining design speed for type-approval requirements. Due to variations in tyre sizes, tolerances must be allowed. The increase in speed due to an increase in the outer diameter of the tyre is offset by tyre wear.

The cut-off point has been established because the classification of tractors and the driving licence requirements are based on the tractor’s design speed and there is no particular reason to increase the speed.

A clarification has been added to the section to allow tractors for use in agriculture and forestry and equipped as motor-driven machines also to be fitted with tyres approved for cars and L category vehicles. However, tyres intended for cars may not be installed on a tractor steered by means of a guide rod, even if it is equipped as a motor-driven machine. Otherwise, the requirement could be circumvented by, for example, keeping a snowplough fixed to a tractor quad throughout the year.

Agricultural and forestry tractors and tractors equipped as motor-driven machines are defined in the Act on Fuel Charges (1280/2003).

9.1.2. Tractors used by the police, the rescue services, Finnish customs or the Finnish Border Guard

No substantive changes are to be made to the section, but a linguistic amendment is to be made to the section in line with section 9.1.1.

The regulation lays down less stringent requirements for the police, rescue services, Finnish Customs and the Border Guard to allow tractors to be equipped for appropriate use on the part of these authorities when at work. A tractor when used by such agencies is for professional use. The discretion required by a public authority shall also be exercised for the acquisition and fitting-out of vehicles, and personnel shall be trained in the use of such vehicles.

However, in the use of tyres and rims, the requirements set out in section 9.1 and other general safety requirements must be observed.

The Finnish Transport and Communications Agency does not have the authority to issue regulations on military vehicles used by the Finnish Defence Forces.

9.1.3. Prerequisites for changing the tyre size of a tractor used for other than agricultural and forestry purposes

The conditions for replacement of rims and tyres are amended in indent 1. The section is amended so that a change affecting the outer diameter is not evaluated on the basis of any change in speed, but with reference to the tolerances for the outer diameter of the tyre on the drive axle, as set out in section 2 of Annex 2.

In the future, the requirement will refer only to the drive axle, so that the purpose of the earlier requirement is preserved. The outer diameter of the free rotating axle has no effect on the design speed of the vehicle.

It should be noted, however, that if the vehicle’s speed data come from a free rotating axle and the tyre size on it is altered radically, it is likely that an error will occur in the speedometer and other systems requiring speed data may become faulty. Nevertheless, this is not thought to pose a road safety risk so urgent that the tyre size on the free rotating axle would need to be regulated more precisely.

When modifying rims and tyres, any changes affecting the classification of the vehicle shall always be taken into account, and the vehicle must meet the requirements of the new classification. For example, the external diameter may also be smaller if the change does not affect the classification of the vehicle. If the external diameter is significantly smaller than in the type-approval certificate, it is possible that the design speed of the vehicle will be reduced so that the vehicle would be placed in another vehicle category due to the lower speed. However, such a situation would be very rare. In the future, the regulation on the reduction in size of an external diameter, given in the previous indent 1, will be with the permitted tolerances in Annex 2.

Tractors will continue to be used not only in the cases referred to in sections 9.1.1 and 9.1.2, but also for property management and gardening and, increasingly, as a general means of transport. Such tractors are typically used repeatedly and for long periods on the road, often in densely populated areas.

As a general means of transport, tractors have become more widespread, especially among young drivers, as the right to drive a tractor of up to 60 km/h is granted at the age of 15.

Because tractors are mainly used on the road, their users are often young and they do not have to present the vehicle for a roadworthiness test, the regulations are more precise.

In particular, the statistics show an increasing number of accidents in the case of quad tractors, so the requirements have been designed to improve the safety features of these vehicles and to avoid adverse effects.

However, the requirements are not so strict as to cause inconvenience associated with tractors used for property management or gardening work. For these tractors too, the requirements offer clarity in order to provide clear room for manoeuvre to replace tyres and rims.

Tyre changes on these tractors must not result in an increase in the vehicle's design speed. In practice, the outer diameter of the tyre on the drive axle may not be increased beyond the maximum value recorded in the register. The manufacturer of the tractor has designed the control of the vehicle for a certain maximum speed. Furthermore, the vehicle classification of tractors, and therefore the requirements for driving licences, are based on the maximum design speed for the vehicle, meaning an increase in speed cannot be allowed. A tolerance of 3 km/h and 5% is given, corresponding to the tolerance allowed in Annex III to Commission Delegated Regulation (EU) 2015/208 for the determination of the design speed in type-approval testing of tractors. The dimensions of tractor tyres, especially those intended for off-road conditions, may be imprecise due to production techniques, so some tolerance should be allowed for modification. The tolerance values given for type-approval testing are also based on this. The design speed decreases naturally with tyre wear.

Any change in the width of the tyre or rim may not result in an increase in the overall width of the vehicle by more than 51 mm. As a general rule, the widest point on tractors is at the tyres or mudguards. Mirrors, indicators, front, side, rear and parking lights and foldable components such as liftable footrests and splashguards are excluded from the width measurement for the tractor as recorded in the register.

According to Framework Regulation (EU) No 167/2013, for approved tractors, the definition of width is set out in Delegated Regulation (EU) 2015/208 and the older definition is from ISO 612-1978, which is the same in terms of content. In practice, this requirement, together with the requirement limiting the change to the track width, also restricts a change to the width of the tyre, but allows a margin for adjustment in the choice of tyre size. The tolerance given the width measurement also facilitates the choice of tyre size. The tolerance allows for an increase in width due to a change to the track. Changes beyond the width tolerance may be accepted in a modification inspection under the conditions set out in section 9.2. The permissible change in width was increased from 51 millimetres in the consultation round to 102 millimetres. The tyre sizes of tractors typically change one inch at a time, and what was originally proposed would not have been sufficient for many justified changes in tyre sizes.

A change of 102 mm to the track is permitted when rims are being replaced in the case of tractors equipped with rollover protection structures, such as a roll bar or safety cab. The dimensions of the rims are often in inches and, unlike in the case of cars, the rims are not sold in sizes measured to the nearest millimetre. The requirement allows a change of size by one inch either side of the vehicle. It must be possible to change the track slightly, so that, for example, tyres which are narrower than the original tyre size can be fitted without an excessively undesirable effect on the stability of the vehicle and to prevent the wider tyres and rims from striking vehicle structures. Just changing the rims for those that widen the track, with the tyre sizes remaining the same, can facilitate the installation of snow chains on smaller tractors. Any major change to the track will lead to an increase in the stress on vehicle bearings and steering joints and the extent of the change is therefore restricted. A bearing under stress may break unexpectedly while the vehicle is being driven, which may result in the vehicle's tyre becoming detached.

Loose steering joints can lead to poor control of the vehicle. A track that is too wide may also lead to the vehicle being affected by an unfavourable steering movement when uneven ground is being driven over on just one side of the tyres. Excessive narrowing of the track is restricted by the vehicle's structures. A tyre and rim fitted too far inwards would strike the vehicle's structures and therefore be in breach of the requirements of the regulation. Tractors are not subject to periodic roadworthiness tests, unless they are used for licensed transport. In addition, they are largely self-maintained, so the play may not necessarily be noticed or corrected in time. As a result, the change in track gauge must be limited in the regulation. However, the permissible change of track width was increased for the same reasons as the permitted change to the width from 51 mm to 102 mm.

The track width for a tractor without a rollover protection structure may be increased by 77 mm but may not be narrowed. The types of tractors with no protective structure are usually quad tractors steered using guide rods, or rather old tractors. The same criteria apply to a change in the track of a tractor such as that mentioned in the previous paragraph. The requirement ensures that, following the change, the stability of the tractor is not impaired. In practice, if a tractor overturns it will cause serious injuries to the driver and any passenger, so the stability must be preserved. The change of track width is more restricted on roll-over-protected tractors because, although the extended track width makes the vehicle less prone to roll-over, it may lead to unfavourable effects concerning the control of the vehicle. The steering geometry of off-road vehicles is often influenced by the so-called bump steer phenomenon, in which a tyre moving over an uneven road or other substrate in connection with shock rebound causes a steering force that can lead, at worst. to a loss of control. However, the authorised change to the track width was increased on the basis of the feedback from consultation, as it was pointed out that a change of 1.5 inches per rim is very typical, and such a change has not been found to cause problems on the road.

It should be noted that the classification between categories T1 and T2 under Framework Regulation EU 167/2013 is based on the track measurement, so that any change that would affect the classification of the vehicle requires the vehicle to be presented for a modification inspection.

The permissible change to the nominal rim diameter with no obligation to have a modification inspection conducted is 51 mm, i.e. it is in practice possible to fit a rim two inches larger or smaller. The permitted value was increased by an inch compared to the one in the consultation round, based on the feedback received. The one-inch change was seen as too restrictive. A change of 77 mm, i.e. a three-inch change in the nominal rim diameter is permitted in a modification inspection. In the absence of a roadworthiness test, the permitted change is always compared with the original vehicle's type-approved sizes.

The change in the nominal rim diameter allows the use of a different rim size when a tractor is being used with different sets of tyres or pairs of tyres in the absence of a separate modification inspection. For example, in the case of summer tyres and winter tyres, or if the tractor is equipped for a different purpose, rims and tyres of different sizes can therefore be used.

In addition, the rims must be suitable for the wheel hubs. Rims with oval bolt holes, suitable for different pitch circles, may not be fitted to a vehicle. Only matching sections intended to reduce the centre hole of the rim may be installed between the vehicle's hub and the rim.

With some tractor quads, the installation of snow chains is possible only by widening the track, and spacers are known to be used for this. However, there is currently no approval procedure for spacers, so there is no background information on their durability. The fitting of these is therefore not included among the

permitted tyre changes. Rims that widen the track and narrower tyres also provide more space if snow chains cannot be fitted otherwise.

As in other vehicle categories, the replacement of tyres and rims is subject to the condition that they do not strike the vehicle structures in any steering or suspension position. This requirement is also applicable to tractors.

With no modification inspection, it is permissible for tractors other than those with guide rods to be used on free rotating axles, i.e. in practice also tyres for cars or quadricycles on the front axle, provided that the conditions in this section are met. For example, on more traditional tractor models, where the rear-wheel drive tyres are larger than the free rotating front tyres, car tyres can therefore be used on the front axle. Such tractors could thus benefit from a wider range of winter tyres on the market for use on the front axle. Tyres on a free rotating axle do not affect the vehicle's design speed, so it is not necessary to judge the tyre change in the modification inspection.

The ratio between the height of the cross-section and the width of a tyre intended for motor vehicles and their trailers and used on a tractor may not be less than the equivalent of 50%. This requirement restricts the use of particularly low profile tyres on tractors. Tractors have, in principle, high profile tyres and the manufacturer has taken this into account when designing the control of the vehicle. A vehicle changes its behaviour when its profile changes and the impact of a change in profile on the tractor's cornering stability has not been studied and no specific need for very low-profile tyres has been identified, so a cut-off point has been established. The requirement is not particularly strict: the 50% profile is fairly neutral.

At the time of entry into force of the Regulation, the requirements for splash guards are only for tractors with a design speed exceeding 60 km/h and must continue to be met in the event of tyre changes. It may only be possible to comply with the requirements by modifying the mudguards or fenders, so their modification must be permitted in order, for example, to allow the fitting of a wider tyre. The splash guard or anti-splash system on other tractors may be modified when a tyre is changed, for example by installing wider fenders.

9.2. Modifications permitted in a modification inspection

The tractor must be presented for a modification inspection if tyres for cars and trailers are fitted to its trailer axle(s). A tyre fitted to the trailer axle affects the vehicle's design speed and this should therefore be assessed in the modification inspection. This restriction has also been made to allow certain tractors to be fitted with tyres intended for cars on free rotating axles without a modification inspection. Tyre sizes which comply with different size standards but often deviate from the previous registration data should be recorded in the vehicle registration information in order to ensure clear procedures in roadside checks for all parties involved.

During the preparation phase, the Finnish Transport and Communications Agency considered the restriction on the authorisation of car tyres for different types of tractors. The manoeuvrability and control of quads are designed by the manufacturer to work with certain types of tyres. Considerations of safety dictate that the fitting of tyres intended for cars and their trailers was excluded from the tyre changes permitted for quad tractors with guide rods in the draft regulation.

A change of 77 mm, i.e. in practice a change to the nominal rim diameter of three inches, can be accepted in the modification inspection. For example, in small side-by-side tractors, the general 12-inch rim size could be increased to 15 inches from the original type-approval size entered in the register at the time of the change inspection. In the case of the use of tyres intended for cars and their trailers, the

requirement in section 9.1.1 for the ratio of the height of the cross-section must be observed, which may restrict the nominal rim diameter change.

If a tractor is used for licensed transport and is equipped with a tachograph, it must be calibrated if its operation is affected by a change in tyre size. In practice, such a change with no obligation to carry out a roadworthiness test would represent a reduction in the design speed of more than 3 km/h and 5%. A tractor used for licensed transport means, for example, a vehicle used for the transportation of goods. Licensed transport is provided for in Chapter 2, section 3 of the Act on Transport Services (320/2017).

10 The regulation’s entry into force and transitional provisions

The regulation will enter into force.

The obsolete transitional provision will be deleted from the transitional provisions.

Annex 1 Requirements for the replacement of an electric motor

No changes are to be made to Annex 1.

Annex 2 Specification of the outer diameter of tyres

A new Annex 2 on the specification of the outer diameter of tyres is added to the regulation.

In the current regulation, the outer diameter of the tyre covers only the nominal diameter declared for the tyre size according to ETRTO or STRO standards.

In addition to those standards, the regulation will also enable the external diameter to be determined with reference to the standards of the Japanese JATMA and the US TRA codes and, where necessary, to the formulae laid down in the regulation for tyres intended for L-category vehicles. In this way, several options are available for determining the outer diameter if there are problems with in one of the standards or information on the definition of the nominal outer diameter is not reasonably available.

AT tyres intended for L-category vehicles are not specifically comprehensively listed in the STRO standards, and therefore the definition of nominal outside diameter is not clearly identifiable there for these tyres.

In applying the definition of external diameter under the standards, reference is made to the nominal external diameter given as such in the table in the standards and, for example, the 1% increase to the external diameter for car winter tyres should be ignored. In practice, this tolerance offers more leeway for studded winter tyres and/or higher tyre tread patterns that increase friction while driving, so the effect of this additional tolerance on vehicle speed can be considered to be non-existent.

The nominal diameters of car tyres are comprehensively listed in the STRO standards and information about these is widely available in tyre marketing materials. Therefore, it has not been considered necessary to include an equivalent solution for car tyres in the regulation.

In Annex 2, point 2, provisions are added on ways to show permissible deviations from the outer diameter specifications. An outer diameter according to a tolerance greater than the tolerances given in the table may be fitted to the vehicle if it is shown that the vehicle's design speed meets the relevant requirements. The opinion of an approved expert and the higher levels of compliance demonstration

methods X and A referred to in Annex I shall be accepted as the compliance demonstration methods.

A statement by an approved expert or a report at a higher level could be considered if, for example, a vehicle manufacturer, its representative or an importer wished to promote tyre sizes that had been omitted for one of their products at the type-approval stage. The solution is quite possible for everyone, even individuals, but in practice changing the vehicle to meet the test requirements can be difficult without some kind of link to the vehicle manufacturer. The reports are also quite pricey, and this is very rarely a viable solution financially for an individual vehicle.

At present, the conformity of tractors with the design speed requirements can be carried out by means of a level A report corresponding to the competence of a designated technical service.

Point 1 of the Annex: Formulae

The formulae make it possible to calculate the nominal outer diameter of tyres intended for L-category vehicles.

A tyre intended for L-category vehicles is defined in section 2 of the regulation. This is an all-terrain vehicle tyre approved for use on the road in accordance with the requirements of ECE Regulation 75.

Point 2 of the Annex: Permissible and required tolerances in the outer diameter of a tyre

The tolerances are based on the dimensional tolerances permitted for the tyres of tractors and all-terrain vehicles, which are relatively substantial compared to car tyres.

The height of the profile of a car tyre may be 4% greater or 3% less than its nominal dimension.[2] The height of the profile of an AT tyre for L-category vehicles, i.e. an ATV tyre, may be 6% greater than or less than its nominal dimension.[3]

The simplest way to illustrate tolerance in respect of the tyre profile is to say that the outer diameter of a car tyre may vary by approximately 1–2% of the nominal external diameter in both directions, and the outer diameter of a ‘quad tyre’ may be approximately 3–4% greater or smaller than its nominal size. This can be seen, for example, in the STRO standards when comparing nominal and maximum diameters.

Tractors known as cabin ATVs and quads often have diagonal ply tyres as the initially fitted tyres, which, in addition to the static tolerances mentioned above, tend to cause the outside diameter to increase as the driving speed increases. This increase has also been given a separate upper limit, which is 7% of the actual outer diameter of the tyre. This feature therefore has an impact on the speed of the vehicle, since the tyre acts as a type of CVT.

Within the tolerances allowed under the regulation, it is possible to replace tyre sizes one with the other. Tolerances are restricted so that the risk of an increase in structural speed is minimal.

In the course of the preparation of the regulation, the Finnish Transport and Communications Agency explained that the tolerances allow tyre sizes very commonly used on the market to be installed on tractors.

[2] See STRO (*Scandinavian Tire & Rim Organization*) Tyre Standards’, General Information’.

[3] See ETRTO (*The European Tyre and Rim Technical Organisation*) standard and structural documents Standards Manual 2024, as well as Engineering Design Information 2024.

Radial tyre other than one in place of a radial tyre

Cabin ATVs and quad tractors are very commonly equipped and first fitted with AT tyres that are not radial tyres in design, as referred to in UN Regulation 75.

The nominal outer diameter of a radial tyre may exceed the nominal outer diameter of the original tyre size, the tolerance value being 5%. The tolerance takes into account that allowed for the tyre in static mode and the deformation caused by the rotational speed, while providing sufficient assurance that an excessive increase in the design speed will not occur.

For example, for an AT25x10-12 tyre size with a nominal external diameter of 635 mm, the nominal diameter of a replacement car tyre or other radial tyre should be +5%, i.e. 667 mm. The replacement should be a very common tyre size 195/65R15 with a nominal diameter of 635 mm, but also, for example, a larger size 205/65R15 with a nominal diameter of 647 mm would be acceptable. The tyre size 205/65R15 is available as an off-road car tyre. It should be noted that such a modification referred to above requires the vehicle to be presented for a modification inspection.

Based on the tolerance value in the proposal, the replacement could also be a with 26" radial tyre with a nominal diameter of 660 mm. Such a modification does not require a modification inspection for the vehicle if, after the modification, the vehicle meets the conditions laid down in this regulation. The impact on the structural speed with such a change is roughly the same as 5%, which is within the range of deviation permitted under Regulation (EU) No 167/2013 for the top speed of vehicles approved for agricultural and forestry use. It is true that it is quite possible that the vehicle’s design speed will barely change, or even decrease slightly, due to the different behaviour of the different tyre types.

A tyre other than a radial tyre in place of a radial tyre

When the structure of the tyres adheres to the same legal specifications as given in the standards, there is no need or justification for a specific tolerance as such, as the structure remains the same.

If a 25" tyre other than a radial tyre is replaced by a 26" tyre other than a radial tyre, all the measurements for the tyre jump go up by an inch, and thus it cannot be ruled out that this will have an effect on the design speed that could be seen as excessive. Under the regulation, such a change would not be possible.

However, the tolerance allowed allows room for manoeuvre, in particular the swapping of tyres with sizes marked in millimetres and inches.

Tyres other than radial tyres in place of a radial tyre

A change, in which a radial tyre is replaced by a tyre other than a radial tyre, perverts the tolerance logic compared to earlier. If a radial tyre is replaced by a tyre other than a radial tyre, it cannot be ruled out that the outer diameter of a tyre with a flexible structure will increase with speed to such an extent that it clearly increases the vehicle’s structural speed – even resulting in an excess of speed for the vehicle’s classification. For this reason, the nominal diameter of the tyre should not be increased at all. Under section 7(3) of the Vehicles Act, a vehicle whose classification or sub-classification has altered must meet the technical requirements referred to in subsection 1 in accordance with its new classification and sub-classification.

However, the 0 % tolerance includes a built-in tolerance due to the characteristics of the tyres, as the characteristics of a tyre other than a radial tyre extend to an

increase in the outer diameter as a function of speed. The outer diameter of a 25-inch radial tyre at 60 km/h is therefore smaller than that of a 25-inch tyre other than a radial tyre. In theory, the tolerance would even have to be negative, i.e. a tyre other than a radial tyre in place of a radial tyre should have a lower nominal diameter due to this characteristic.

However, according to the Finnish Transport and Communications Agency, there is no need for a negative tolerance value, as in practice the increase in the structural speed remains moderate and is within the permitted deviation under Regulation (EU) No 167/2013 for the maximum speed of vehicles approved for agricultural and forestry use.

Tyre comparison when making a change and in a modification inspection

When replacing a tyre size with one that differs from the registration data, the nominal outer diameter of the tyre size with the largest outer diameter on the drive axle in the registration data must be determined, and the nominal outer diameter allowed for the replacement tyre must be calculated, taking into account any tolerance.

The outer diameter of the free-rotating axle is not relevant to the comparison. However, the tyre on a free rotating axle must otherwise comply with the relevant requirements of the regulation.

The sizes entered in the Traffic Register can also be checked free of charge using the electronic service provided by the Finnish Transport and Communications Agency.[4]

Approval of a tyre with an outer diameter greater than the tolerances given

Besides the tolerances given, the regulation does not allow an increase in the outer diameter of the tyre for any other reason.

Since the entry into force of the regulation, it has been suggested that in some tractors, the impact of tyre size on speed my be adjusted from the vehicle's instrument panel, and the registered sizes would therefore not need to be taken into account when changing the tyre size. However, that feature was essentially created in order to correct the error caused by the tyre sizes permitted for the type-approval of the tractor in the instrument panel and is not capable of dealing with the error caused by tyres that deviate in terms of their size, in particular those with a larger external diameter than that required for the type-approval of the vehicle. If such changes could be made to the tyres excluded from the type-approval assessment, the tractor would not comply with the structural speed requirements laid down for it.

In addition to speed, an increase in the outer diameter of a tyre also leads to changes in other characteristics. Increasing the outer diameter may affect, inter alia, the steering, the brakes and the stability of the vehicle. There are also rarely special grounds for substantially increasing the outer diameter of a tyre.

Change in the design speed due to a tyre change

When applying the regulation, it should be borne in mind that a change in tyre size, despite compliance with the tolerances in the regulation, may lead to an increase in the design speed of the tractor, which could mean the vehicle no longer met the requirements for its classification. Therefore, an increase in the structural speed

[4] See the website of the Transport and Communications Agency: https://www.traficom.fi/en/transport/drivers-and-vehicles/buying-and-selling-vehicle/check-vehicle-information

may lead to a change in the classification or sub-classification of the vehicle, in which case the vehicle would have to meet the requirements of its new classification. The tolerances given in this regulation are intended to enable tyres of the same size to be changed one for another to the same degree of precision as is permitted for tractors during their type-approval test.

In roadside checks, the police measure the speed of a vehicle with radar, and can order an inspection of a tractor that is travelling too fast and also impose penalties if the driver is found not to have a licence to drive the vehicle. According to the Finnish Transport and Communications Agency, the impact of the tolerance value for tyre sizes is the same as, or less great than, the ‘technical reduction’ used by the police when measuring speed by radar or automatic speed control systems. In practice, therefore, a correct tyre change does not stand out at all in speed control procedures. However, compliance with the tolerances set out in the regulation does not mean that a driver of a vehicle cannot be charged for possible traffic offences or driving without a licence.

Distinguishing between tyres for L-category vehicles and tyres for cars

The replacement of one type of tyre with another is a key factor in the requirement for a modification inspection.

The available data on tyres should consist of the tyre sizes recorded in the vehicle registration data and the markings of a tyre fitted or to be fitted as a replacement.

An L-category tyre in millimetres is similar in shape and sometimes identical to the car tyre size designations. Some time ago the letter ‘P’ came before car size designation, but hardly ever applies now. However, different types of tyres can to a large extent be deduced from the size of the tyre. The sizes used in L-category vehicles are different from those used on cars. For example, a 255/65R14 tyre is in practice not available as a car tyre, but it is available for L-category vehicles. Ultimately, it is the vehicle manufacturer that has the most accurate information about the vehicle's tyres.

Annexes

Annex 1 Feedback