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Road vehicles — Wheels and rims — Use, general maintenance and safety requirements and out-of-service conditions

Véhicules routiers — Roues et jantes — Exigences en matière d'utilisation, de maintenance générale et de sécurité, et conditions de mise hors service

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Foreword

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The committee responsible for this document is ISO/TC22/SC33/WG5

Introduction

The purpose of this International Standard is to ensure the safe operation of vehicles. The wheel is a highly stressed component of the vehicle that may be subject in service to extreme forces. Therefore, it is absolutely necessary to handle these parts with care and to pay particular attention to their mounting, removal and maintenance in order to ensure safe operations and to prevent servicing accidents.

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Road vehicles — Wheels and rims — Use, general maintenance and safety requirements and out-of-service conditions

1 Scope

This International Standard specifies requirements for the use, and general maintenance and safety of wheels and rims including multi-piece wheels and rims. and defines their out-of-service conditions, such as cracked, worn and bent wheels and rim components. It is applicable to wheels intended for use on road as defined in ISO 3833 and off road vehicles. This standard does not include mopeds and motorcycles.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 3833, Road vehicles — Types — Terms and definitions

ISO 3911, Wheels and rims for pneumatic tyres — Vocabulary, designation and marking

3 Terms and definitions

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https://standards.iteh.ai/catalog/standards/sist/47fd93e9-9b31-48f3-99fa-For the purposes of this document, the terms and definitions given in ISO 3911 apply

4 Use and general maintenance requirements

WARNING — On multi-piece rims, the use of the wrong ring components can result in catastrophic wheel failure.

4.1 Wheel and wheel components

Wheels or parts of wheels which cannot be identified shall not be used even if they seem to have the correct functions and the identical dimensions. The characteristics of the wheel centre shall exactly correspond to vehicle parts, especially the axle hub and the brake, in order to guarantee a proper fitting and an effective load transmission.

A neutral non-aggressive mounting paste or liquid shall be used to lubricate the tyre beads. The hub, studs, nuts and the wheel attachment face shall be carefully cleaned. In the case of multi-piece wheels, all contact surfaces shall be cleaned.

Inspect parts for out-of-service conditions, see <u>Clause 6</u>. If cleaning does not restore the original condition for the mating surfaces or if the parts have any of the conditions described in <u>Clause 6</u>, the parts shall be replaced.

4.2 Wheel mounting and removal

Mounting and removal of wheels shall be carried out by trained personnel only. Only the correct tools shall be used to carry out the various operations.

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On multi-piece rims, prior to inflation of the tyre, the correct positioning of the lock ring, the loose flange ring and rubber O-rings, or sealing rings if applicable, shall be carefully checked, always avoiding any correction by means of a hammer. In the case of incorrect positioning, all the air shall be let out of tyre and the whole mounting procedure repeated.

When inflating tyres, the wheel shall be placed in a safety cage or else safety chains shall be put round the wheel. The operator shall not stay in the near dangerous areas or trajectories. *Trajectory* means any potential path or route that a rim wheel component can travel during an explosive separation, or the sudden release of the pressurized air, or an area at which an airblast from a single piece rim wheel can be released. Examples of such trajectories are shown by shaded areas in Figure 1. The correct air pressure specified for the tyre shall be maintained and regular checks shall be made; otherwise, damage to tyre and/or wheel rim can occur.

Where multi-piece rims and divided (bolted) type wheels are involved, for safety reasons the tyres shall be fully deflated before the unbolting of the wheel and tyre assembly from the vehicle axle is started. This safety requirement applies to both tyres in a dual wheel application.



NOTE Under some circumstances, the trajectory can deviate from its expected path.

Figure 1 — Trajectories

4.3 Studs and nuts

All mounting parts such as studs and nuts (with flat captive washer or with spherical or conical seats) shall fit exactly to the wheel being mounted.

NOTE Any incorrect interchangeability or confusion can cause the wheel centre to fail.

Studs and nuts of all wheels shall be fastened, preferably using a torque wrench or in any case by means of a suitable tool capable of reaching the torque value specified by the vehicle manufacturer. The sequence is across and not round the wheel centre. The exact sequence shall conform to that given in the manual of the vehicle manufacturer.

On the new vehicle and always after a wheel replacement, the mounting torque shall be verified after approximately 50 km of running and, where necessary, the wheel nuts shall be retightened. Periodic checks should also be carried out.

5 General safety requirements

After removal, wheels, rims, studs and nuts shall be checked closely to ensure that they are in good condition: namely that any fracture, crack, deformation, corrosion, heavy wear or other kind of non-conformity are not present.

Moreover, no technical modification on the wheel shall be made. Repair by means of welding or by the addition of material on rims or wheel centres having breakage, fissures, cracks or high wears, shall not be made, as they can introduce additional stresses in the critical areas.

NOTE Further detailed information regarding safety recommendations can be found in the technical catalogues of the wheel and/or vehicle manufacturers.

6 Out-of-service conditions

Typical out-of-service conditions of wheels, rims and components are shown in the following tables and figures. The conditions of wheel centres are shown in <u>Table 1</u> and <u>Figures 2</u> to <u>14</u>, and the conditions of rims and components are shown in <u>Table 2</u> and <u>Figures 15</u> to <u>29</u>.

Before checking, wheels shall be cleaned of mud and dirt.

Wheels, rims and components in such conditions shall be removed from service and discarded. Rubber components (valves, sealing rings and O-rings) with excessive ageing, brittleness or cracks shall be removed from service and discarded.

Туре	Appearance	Probable cause	See Figure
Crack	Bolt-hole cracks	Insufficient tightening torque, loose nut	2
	https://standards.iteh.ai/catal	og/starkmpropen installation procedure	
	a728b:	529b10seofimproper bolt/nut	
		 Mounting surface not flat 	
		— Excessive load	
		 Damaged or worn nut seat 	
		— Inequality of tightening torque between the nuts	
	Bolt-hole-to-bolt-hole cracks	— Insufficient tightening torque	3
		— Insufficient attachment face [hub] backup	
		— Improper installation procedure	
		— Mounting surface or attachment face [hub] not flat	
		— Use of improper bolt/nut	
		— Worn mounting surface/attachment face [hub]	
		— Excessive load	
	Bolt-hole-to-centre-hole cracks	 Insufficient tightening torque 	4
		 Foreign material between mounting surface and attachment face [hub] which prevents flush contact 	
	Bolt-hole-to-hand-hole cracks	— Excessive load	5
	Hand-hole cracks	— Excessive load	6
		 Dent, bruise, sharp edge around hand hole 	

Table 1— Typical out-of-service conditions of wheel centres