

Evolution of UN Regulations and International Standards for Tyres

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JAPAN AUTOMOBILE STANDARDS INTERNATIONALIZATION CENTER



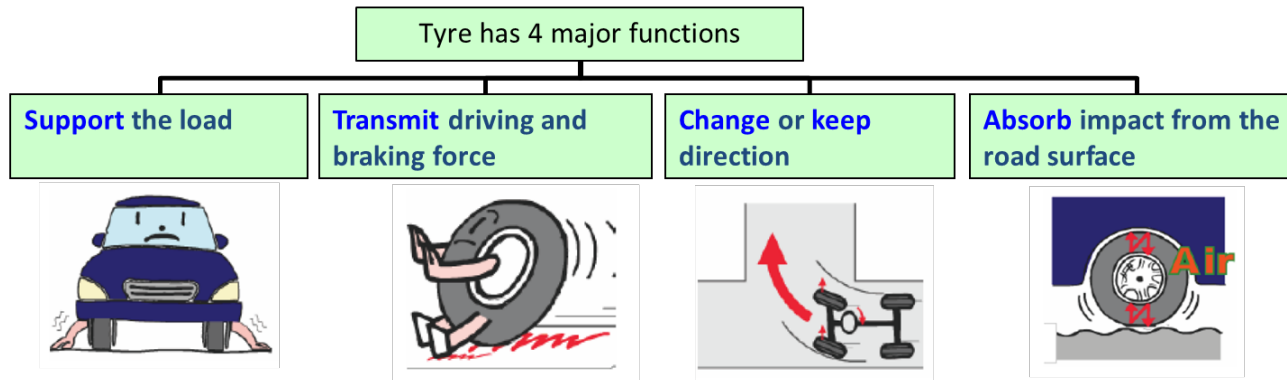
The Japan Automobile Tyre Manufacturers Association

1. Tyre is one of important vehicle parts
2. UN Regulations for Tyres are Accepted Globally
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4. Evolution of UN Regulations and International Standards for Tyres
 - (1) Exclusion of measurement of the outer diameter from radial tyre/ run flat tyre after the load/speed performance test
(UN R30/R54/R75)
 - (2) The removal of technical limitation for marking on the tyre sidewall
(UN R30/R54/R75/R106/R117)
 - (3) Elimination of Bead Unseating and Plunger Energy
(ISO 10191)
5. Summary

1. Tyre is one of Important Vehicle Parts

Pneumatic tyre is one of important vehicle parts to support vehicle dynamic behavior.

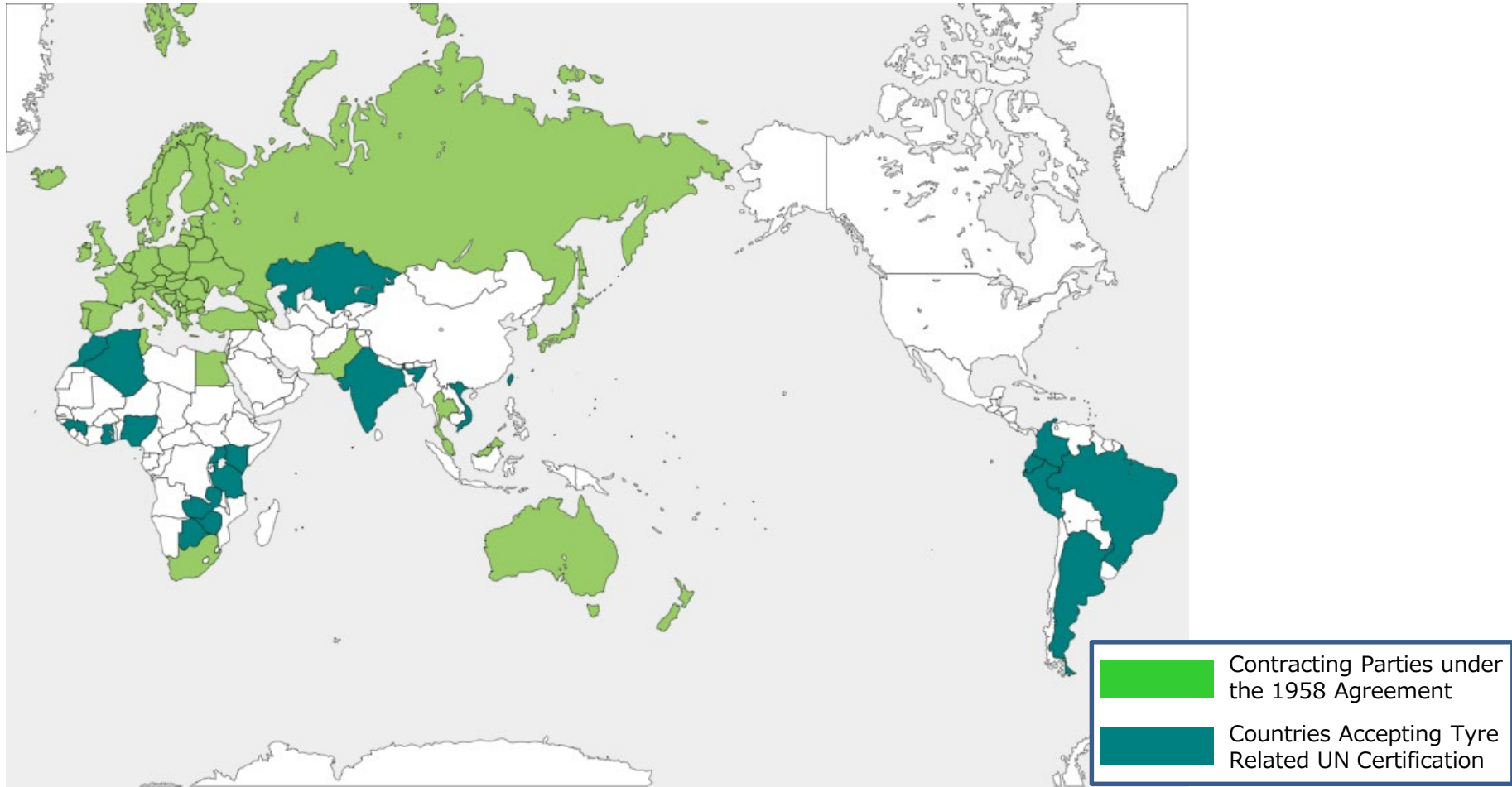
■ Main Function of Tyre



In order to keep vehicle safety, Safety Regulation related tyre was developed under the 1958 Agreement.



2. UN Regulations for Tyres are Accepted Globally



UN Regulations for tyres are major regulations in the world. Not only the Contracting Parties under the 1958 Agreement but also many other countries accept UN Certification for tyres.

3. UN Regulations for Tyres for ASEAN MRA

UN Regulations for tyres are also required for International Whole Vehicle Type Approval (IWVTA).

Also, three UN Regulations for tyres are nominated for ASEAN MRA.

Tyre UN Regulation		Vehicle Category	ASEAN MRA Candidate	IWVTA (M1 category vehicle)
Safety Regulation	UN R30	M1, N1, O1 and O2	Yes	Yes
	UN R54	M2, M3, N, O3 and O4	Yes	Yes
	UN R75	L	Yes	
Environmental Regulation	UN R117	M, N, and O		Yes

Vehicle Category (ECE/TRANS/WP.29/78/Rev.2)

M Passenger Cars

	Max Passenger seats (S) (including for Driver)	Vehicle weight (W)
M1	$S \leq 9$	—
M2	$S \geq 10$	$W \leq 5$ tonnes
M3		$W > 5$ tonnes

N Commercial Vehicle

	Vehicle weight (W)
N1	$W \leq 3.5$ tonnes
N2	$3.5 < W \leq 12$ tonnes
N3	$W \geq 12$ tonnes

O Trailers (including semi-Trailer)

	Vehicle weight (W)
O1	$W \leq 0.75$ tonnes
O2	$0.75 < W \leq 3.5$ tonnes
O3	$3.5 < W \leq 10$ tonnes
O4	$W \geq 10$ tonnes

We continue to explain how UN Regulation for tyres are useful and robust enough in this Public and Private Joint Forum in Asian Region.

Today, we would like to present evolution of UN Regulation and International Standards (ISO) for tyres.

- (1) Exclusion of measurement of the outer diameter from radial tyre/
run flat tyre after the load/speed performance test
(UN R30/R54/R75)
- (2) The removal of technical limitation for marking on the tyre
sidewall (UN R30/R54/R75/R106/R117)
- (3) Elimination of Bead Unseating and Plunger Energy (ISO 10191)

4. Evolution of UN Reg. and ISO for Tyres

(1) Exclusion of measurement of the outer diameter from radial tyre/run flat tyre after the load/speed performance test

Tyre Industry studied the actual difference of outer diameter before and after the test.

Tyre	Structure	Number of tyres	Average diameter increase	minimum	maximum
PC tyres	Radial	86	0,39%	-0,08%	1,15%
	Run flat	53	0,14%	0,00%	1,31%
LT tyres	Radial	51	0,14%	-0,39%	0,78%
TB tyres	Radial	33	0,14%	0,07%	0,79%
MC tyres	Radial	184	0,14%	-0,24%	1,08%

The results shows that average diameter increase of radial/run flat tyre is quite small and very far from tolerance (+/- 3.5 percent) in Regulation.

4. Evolution of UN Reg. and ISO for Tyres

Based on this results, tyre industry proposed to GRBP to amend the UN Regulations No. 30, 54 and 75.

	Amendment
UN R30	Except for tyres with radial structure or for run flat tyres, the outer diameter of the tyre, measured at least six ours after the load/speed performance test, must not differ by more than ± 3.5 per cent from the outer diameter as measured before the test.
UN R54	Except for tyres with radial structure, the outer diameter of the tyre, measured at least six ours after the load/speed performance test, must not differ by more than ± 3.5 per cent from the outer diameter as measured before the test.
UN R75	Except for tyres with radial structure, the outer diameter of the tyre, measured at least six ours after the load/speed performance test, must not differ by more than ± 3.5 per cent from the outer diameter as measured before the test.

- Proposal to amend R30 was adopted as Suppl. 22 to 02 series in 182nd WP.29 session (Nov/2020).
- Proposal to amend R54 and R75 was submitted to the 183rd WP.29 session (Mar/2021).

4. Evolution of UN Reg. and ISO for Tyres

(2) The removal of technical limitation for marking on the tyre sidewall

The use of wording “moulded” is a technical limitation linked to the technology available at the time of the first issue of the Regulations, but now is only one the various technical solution.

The removal of this technical limitation would be advisable following the principle of not stopping the technical innovations.

Tyre industry propose to amend all UN Regulation for tyres to allow tyre marking methods other than moulding by keeping the following criteria.

- Any technical solution alternative to the "moulding" shall guarantee that the markings on the tyre sidewall is clearly legible and indelible.
- It shall be made sure that the marking of the manufacturing date will be done within 24 hours after de-moulding of the tyre (like in the United States of America Code of Federal Regulations 49 CFR 574.5).

4. Evolution of UN Reg. and ISO for Tyres

Example : Amendment proposal to UN R30

Paragraph 3.4., amend to read:

“3.4. The markings referred to in paragraph 3.1. and the approval mark prescribed in paragraph 5.4 of this Regulation ~~shall be moulded on to or into the tyres. They shall be clearly legible, indelible and raised above or sunk below the tyre surface. and situated in the lower area of the tyre on at least one of its side walls, except for the inscription mentioned in paragraphs 3.1.1., 3.1.2. and 3.1.12.~~”

Paragraph 3.4.1., amend to read:

“3.4.1. **The markings shall be situated in the lower area of the tyre on at least one of its sidewalls, except for the inscriptions mentioned in paragraphs 3.1.1., 3.1.2. and 3.1.12.**

However, for tyres identified by the "tyre to rim fitment configuration" (see para. 2.27.1.), symbol "A" or "U", the markings may be placed anywhere on the outside sidewall of the tyre.”

Insert a new paragraph 3.4.2., to read:

“3.4.2. **In the case that the date of manufacture is not moulded, it shall be applied not later than 24 hours after the tyre is removed from the mould.**”

Reference information



“Laser etching machine” in tyre manufacturing area is already available.



Example of Laser etching

- Proposal to amend R30, R54, R75, R106, R117 was submitted to the 183rd WP.29 session (Mar/2021).

4. Evolution of UN Reg. and ISO for Tyres

(3) Elimination of Bead Unseating and Plunger Energy

Bead Unseating test and Plunger Energy test is included in ISO10191
(Passenger car tyres — Verifying tyre capabilities — Laboratory test methods)

Bead Unseating

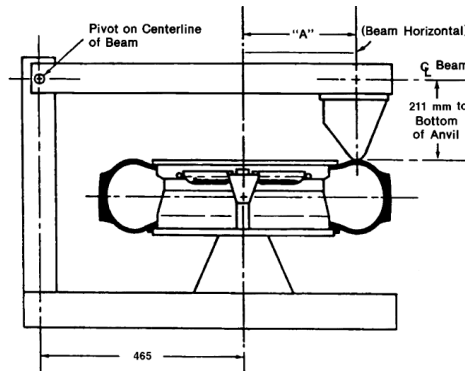


Figure 1.—Bead Unseating Fixture
All Dimensions in Millimeters (mm)

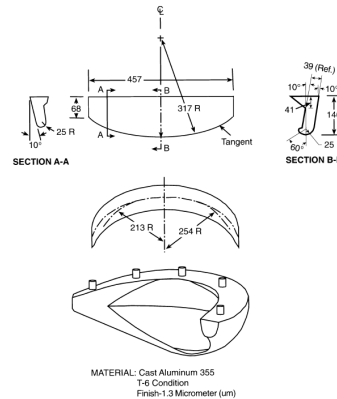
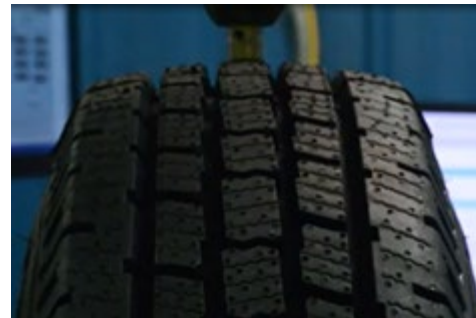
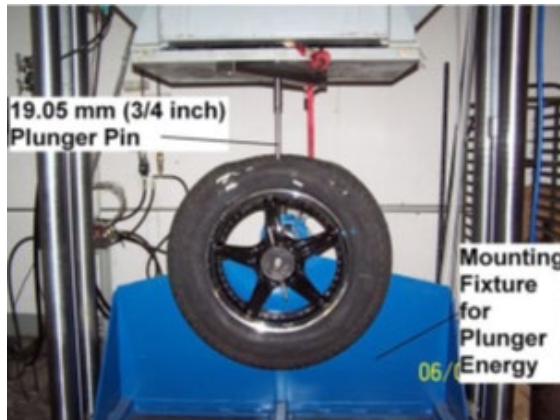


Figure 2A. DIAGRAM OF BEAD UNSEATING BLOCK
All dimensions in millimeters (mm)



Plunger Energy



The tyre testing standards for Bead Unseating and Plunger Energy, first promulgated in 1967, were designed to assure the performance of tubeless bias ply tyres when tubes were eliminated from use.

These standards are obsolete and are not necessary to assure the performance of today's modern tyres (i.e. radial construction).

Therefore, ISO Technical Committee 31 is now working to eliminate Bead Unseating test and Plunger Energy test from radial tyres in ISO 10191.

The DIS (Draft International Standard)* is under voting.

In addition to the ISO activity, Tyre Industry in U.S. proposed to National Highway Traffic Safety Administration (NHTSA) to eliminate Bead Unseating and Plunger Energy from radial PC/LT tyres.

* : Parasitic Tread Block Chunking (PTBC) will be removed from criteria of failure mode in Endurance test.

Based on presented three subjects, we are confident that UN Regulation for tyres are already useful and robust enough for ASEAN Countries also.

We hope that ASEAN Countries will adopt UN Regulation for tyres in ASEAN MRA soon.

Thank you!

Outline of main UN Regulations on tyre safety

UN Reg. 30-02	Pneumatic Tyres for Motor Vehicles and Their Trailers
Scope	New pneumatic tyres designed primarily for vehicles of categories M ₁ , N ₁ , O ₁ and O ₂
Requirement	Dimensions, Marking, Load/speed performance test (High speed test / Runflat endurance test), Tread Wear Indicator
Issued date	15/Mar/1981
Latest version	Supplement 21 (Date of entry into force: 11 January 2020)
UN Reg. 54-00	Pneumatic Tyres for Commercial Vehicles and Their Trailers
Scope	New pneumatic tyres designed primarily for vehicles of categories M ₂ , M ₃ , N, O ₃ and O ₄
Requirement	Dimensions, Marking, Load/speed endurance test (High speed test / Endurance test)
Issued date	1/Mar/1983
Latest version	Supplement 23 (Date of entry into force: 29 December 2018)
UN Reg. 75-00	Pneumatic Tyres for L-Category Vehicles
Scope	New pneumatic tyres for vehicles of category L
Requirement	Dimensions, Marking, Load/speed performance test (High speed test), Dynamic growth of tyres
Issued date	1/Apr/1988
Latest version	Supplement 18 (Date of entry into force: 11 January 2020)