

Australian Standard®

**Pneumatic tyres—Passenger car,
light truck, and truck/bus—
Retreading and repair processes**

This Australian Standard was prepared by Committee ME/56, Automotive Tyres. It was approved on behalf of the Council of Standards Australia on 17 August 1993 and published on 15 November 1993.

The following interests are represented on Committee ME/56:

Australia Post
Australian Automobile Association
Australian Consumers Association
Australian Chamber of Commerce and Industry
Australian Federation of Consumer Organizations
Australian Tyre Manufacturers Association
Department of Consumer Affairs, N.S.W.
Department of Transport and Communications, Australia
Federal Chamber of Automotive Industries, Australia
Institute of Automotive Mechanical Engineers, Australia
Motor Traders Association of New South Wales
Motor Trades Association of Australia
New Zealand Automotive Component Manufacturers Federation
New Zealand Tire Retreaders Association
Railways of Australia Committee
Service Station Association of New South Wales
State Transport Authority, S.A.
Telecom Australia
The Commercial Vehicle Industry Association of Australia
Tyre and Rim Association of Australia

Additional interests participating in preparation of Standard:

Tyre repair material manufacturers

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Australian Standard[®]

**Pneumatic tyres—Passenger car,
light truck, and truck/bus—
Retreading and repair processes**

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PREFACE

This Standard was prepared by the Joint Australia/New Zealand Standards Committee ME/56 on Automotive Tyres, to supersede AS 1973—1985, *Retreaded pneumatic passenger car and light truck tyres*.

Of the interests listed on the inside front cover, the Australian Tyre Manufacturers Association and the Tyre and Rim Association of Australia, both representing manufacturers of new tyres, did not approve the publication of the Standard.

The retreading practice used in New Zealand is somewhat different to that used in Australia and this resulted in the Standard being applicable for use in Australia only.

This edition has been extended to cover retreading of truck/bus tyres, and requirements applicable to the repair of tyres.

The Standard has been thoroughly reviewed to accommodate recent changes in technology and is significantly different from the previous edition in the following areas:

- (a) The Scope, Definitions, and Referenced Documents Clauses have been revised to suit the additional requirements of retreading of truck/bus tyres, and for the repair of tyres.
- (b) Requirements for bias-belted tyres have been deleted, as these tyres are obsolete.
- (c) It is now specified that passenger car tyres which have previously been retreaded shall not be retreaded.
- (d) The speed rating of retreaded radial ply passenger car tyres has been marginally increased to 140 km/h.
- (e) The speed rating of retreaded light truck and truck/bus tyres has been added, based on the speed rating of the original new tyre.
- (f) The inspection requirements make it mandatory that all tyres be removed from the rim before examination. Tyres that have been treated with a liquid puncture sealant and exhibit any penetration damage through the innerliner are unsuitable for retreading or repair. The requirements have been reviewed, with minor changes.
- (g) Provision has been made for rebelted of radial ply truck/bus tyres during the retreading process, where applicable.
- (h) Venting of tyres is permitted, but discouraged for radial ply tyres.
- (i) The Marking Clause specifies that 'REBELTED' and 'REGROOVABLE' be indicated on truck/bus tyres after retreading, as applicable.
- (j) Only tyres marked regroovable are permitted to be regrooved.
- (k) Adhesion testing is specified in more detail, with minor changes.
- (l) The table of repair limits applicable during retreading has been expanded into sections covering repair limits for all applicable tyre repairs, either during, or independent of the retreading process.
- (m) The previous specific retread rubber polymer requirement for retreading tyres has been deleted.

The term 'normative' has been used in this Standard to define the application of the appendix. A 'normative' appendix is an integral part of a Standard.

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STANDARDS AUSTRALIA

Australian Standard

**Pneumatic tyres—Passenger car,
light truck, and truck/bus—Retreading and repair processes**

SECTION 1 SCOPE AND GENERAL

1.1 SCOPE This Standard sets out a code of practice for the retreading of pneumatic diagonal and radial ply tyres, including requirements for initial inspection, processing, marking and final inspection. It also sets out requirements for in-service repairs to tyres and repairs made in conjunction with the retreading process.

NOTES:

- 1 It is a fundamental requirement of this Standard that all retreaded tyres be marked to identify the retreader, and that all repairs be identified and marked by the repairer (which may be a retreader where the tyre is repaired concurrently with retreading) (see Section 9).
- 2 Temporary repairs including the use of externally applied plugs or liquid puncture sealants are not included in this Standard.

1.2 APPLICATION This Standard is intended to be used by repairers and retreaders of passenger car, light truck, and truck/bus tyres intended primarily for on-road use (see Note). Unless otherwise specified, the requirements apply to both tube type and tubeless tyres but do not permit major repairs in passenger car tyres of speed category 'V', or higher. This Standard does not apply to pneumatic tyres or tyre/wheel assemblies of the 'limited-run-flat' type, the temporary spare, or moped and motorcycle tyres, or to tyres designed primarily for earthmoving, agricultural, industrial, or aviation application.

NOTE: The tyres covered by this Standard are those listed in The Tyre and Rim Association of Australia Standards Manual (Passenger, Truck/Bus Section), or in the equivalent sections of the following documents of overseas organizations:

- (a) The Tyre and Rim Association, Year Book.
- (b) The Japan Automobile Tyre Manufacturers Association, Year Book.
- (c) The European Tyre and Rim Technical Organization, Standards Manual.

1.3 REFERENCED DOCUMENTS The following documents are referred to in this Standard:

AS

- | | |
|----------|---|
| 1680 | Interior lighting |
| 1680.2.0 | Part 2: Recommendations for specific tasks and interiors |
| 3802 | Data elements and interchange formats—Information interchange—Representation of dates and times |

AS/NZS

- | | |
|------|---|
| 3889 | Rubber and plastics—Analysis of multi-peak traces obtained in determinations of tear strength and adhesion strength |
|------|---|

1.4 DEFINITIONS For the purpose of this Standard, the definitions below apply (see also Figures 1.1, 1.2, and 1.3).

1.4.1 Asymmetric tyres—a tyre which, through tread pattern or construction, is required to be fitted to a vehicle so that one particular sidewall faces outwards.

1.4.2 Bead—the part of the tyre made of steel bead wires, wrapped or reinforced by ply cords, that is shaped to fit the rim.

1.4.3 Bead area—the area of a tyre between the fitting line (at the bottom of the sidewall) and the bead toe.

NOTE: This area involves both the exterior and the corresponding interior surface of the tyre.

1.4.4 Bead toe—the innermost part of the bead opposite the heel.

1.4.5 Belts—two or more layers of substantially inextensible cord material embodied circumferentially within a tyre immediately outside the carcass plies and under the tread. The cord angle relative to the tyre circumference is lower than that for the carcass plies. Belts are used in radial ply tyres and form an integral structural component of the tyre construction.

1.4.6 Belt edge cover ply—one or more layers of cord fabric, (e.g. nylon) applied circumferentially over the belt edges of some radial ply tyres.

1.4.7 Bias ply tyre—*see* Diagonal ply tyre (Clause 1.4.24).

1.4.8 Breakers—the one or more layers of cord material embodied circumferentially within a tyre immediately under the tread. Breakers protect the carcass plies of diagonal ply tyres, or the structural belts of radial ply tyres against service damage, and are not intended to provide additional carcass strength.

NOTE: Other terms may be used within the industry for breakers in radial ply tyres, e.g. protective ply, protective belt.

1.4.9 Buffing—the preparation of the surface of the tyre prior to the application of cement and rubber.

1.4.10 Building—the application of tread rubber to the buffed and cemented surface of the casing.

1.4.11 Camelback tread rubber—an extruded length of uncured tread rubber with a cross-sectional profile to suit the dimensions of the buffed tyre casing and the retread mould.

1.4.12 Carcass—the tyre structure except tread rubber and sidewall rubber, as applicable.

1.4.13 Carcass ply—one or more layers of ply cords which lie below the circumferential belt of a radial ply tyre (see Clause 1.4.41).

1.4.14 Carcass separation—the parting of rubber compound between adjacent layers of cords within the tyre carcass.

1.4.15 Casing—a worn tyre to which new tread rubber is attached by retreading.

1.4.16 Cement—a solution of rubber, capable of being cured, compatible with the process in use, and used as a bonding agent in the repair and retreading of tyres.

1.4.17 Cementing—the application of rubber cement to the buffed surface of the tyre.

1.4.18 Chafer—the material in the bead area to protect the carcass against rim chafing.

1.4.19 Cords—the individual reinforcement strands forming the carcass plies, breakers, and belts in the tyre.

1.4.20 Cross ply tyre—*see* Diagonal ply tyre (Clause 1.4.24).

1.4.21 Crown—the portion of the tread between the shoulders of a tyre.

1.4.22 Curing—the application of controlled temperature and pressure for the duration necessary to transform the rubber from its plastic state to its elastic state.

1.4.23 Cushion gum—an uncured rubber compound used to assist adhesion between the buffed casing and the new tread.

1.4.24 Diagonal ply tyre—a pneumatic tyre in which the ply cords in the tyre carcass are laid at alternate angles that are substantially less than 90 degrees to the centre-line of the tread.

NOTE: Alternatively known as a 'cross ply' or 'bias ply' tyre.

1.4.25 Fullcapping—a retreading process in which new tread rubber is applied to the area of the casing normally in contact with the road and extending over the shoulder area.

1.4.26 Heel—the outermost part of the bead opposite the bead toe.

1.4.27 Inner-liner—the layer which forms the inside surface of a tyre, and in a tubeless tyre retains the inflating medium within the tyre.

1.4.28 Light truck tyres—a tyre having the marking 'LT', 'Light Truck', or 'C' on its sidewall at the time of manufacture, or as otherwise identified.

1.4.29 Limited-run-flat tyres—a tyre or tyre/wheel assembly (clearly identified) which is designed to run safely for a limited distance in a deflated or semi-inflated condition following damage to its structure.

1.4.30 Load index—a numerical code associated with the maximum load rating assigned to the tyre.

NOTE: The load index is specified in the Australian and overseas reference manuals listed in the Note to Clause 1.2.

1.4.31 Major repair—repair to a tyre following the principles detailed in Clause 4.3.4.

1.4.32 Maximum load rating—the maximum load or loads which the tyre is designed to carry in single or dual configuration. The maximum load rating may be identified on the tyre sidewalls in kilograms (or pounds), or by means of a ply rating or a service description.

NOTE: Maximum load ratings are specified in the Australian and overseas reference manuals listed in the Note to Clause 1.2.

1.4.33 Minor repair—repair to a tyre following the principles detailed in Clause 4.3.3.

1.4.34 Mushroom plug—a combination plug and patch being a shaped and moulded unit combining a tyre patch and a stem protruding from the centre of the bonding face, and used for the dual purpose of sealing and filling penetration damage in a tyre.

NOTE: Other terms may be used within the industry for mushroom plugs, e.g. stem and cap, stem and patch, combination plug-patch.

1.4.35 Optional—a choice, made by the retreader.

1.4.36 Patch—*see* Mushroom plug (Clause 1.4.34) and the following:

1.4.36.1 Reinforced patch—a tyre repair patch that consists of rubber compound with cord material within, which, when bonded to the inside of the tyre carcass, imparts additional strength, seals the penetration, and has the ability to flex compatibly in normal service.

1.4.36.2 Unreinforced patch—a rubber only patch used for minor repairs in tyres.

1.4.37 Ply—a layer of substantially parallel, rubber-coated cords forming a structure which is part of the tyre carcass.

1.4.38 Ply rating—an obsolescent term used to identify a given tyre with its maximum recommended load when used in a specific type of service. It is an index of tyre strength, and does not necessarily represent the number of cord plies in a tyre.

1.4.39 Precured retreading—a process by which a previously cured and patterned tread is cured to the casing.

1.4.40 Protective breaker/Protective belt/Protective ply—*see* **Breakers** (Clause 1.4.8).

1.4.41 Radial ply tyre—a pneumatic tyre in which the ply cords, which extend from bead to bead, are laid at substantially 90 degrees to the centre-line of the tread, the carcass being stabilized by circumferential belts comprising two or more layers of substantially inextensible cord material.

1.4.42 Rebelting—a process of replacing structural belts in radial ply truck/bus tyres.

1.4.43 Remoulding—a retreading process in which new rubber is applied to the casing extending from bead area to bead area.

1.4.44 Retreading—a process of reconditioning a worn tyre by topcapping, fullcapping, remoulding, or the application of pre-cured tread.

1.4.45 Service description—a combination of ‘load index’ and ‘speed category’ symbols.

1.4.46 Shall—indicates that a statement is mandatory.

1.4.47 Should—indicates a recommendation.

1.4.48 Shoulder—the transitional area of a tyre between the sidewall and the crown.

1.4.49 Sidewall—the portion of a tyre between the shoulder and the bead area.

1.4.50 Sidewall rubber—a layer of rubber to protect the ply cords of the tyre carcass from service damage.

1.4.51 Skiving—

(a) when retreading; a bevelled cut; and

(b) when repairing, the removal of damaged material by means of a bevelled cut.

1.4.52 Speed category—a symbol assigned to a tyre by a tyre manufacturer to denote the maximum vehicle speed for which the use of the tyre is rated.

NOTE: The speed category is specified in the Australian and overseas reference manuals listed in the Note to Clause 1.2.

1.4.53 Structural belt—*see* **Belts** (Clause 1.4.5).

1.4.54 Topcapping—a retreading process in which new tread rubber is applied only to the tread area of the buffed casing.

1.4.55 Tread—the portion of the tyre which comes into contact with the road.

1.4.56 Tread pattern depth—the distance from the bottom of the tread grooves to the top of the tread (excluding the tread wear indicators).

1.4.57 Tread rubber—a rubber compound specifically formulated to have the properties of wear resistance and grip with the road surface.

1.4.58 Tread separation—the parting of the tyre tread from the carcass and the following:

1.4.58.1 Original tread separation—the parting of the original tyre tread from the carcass.

1.4.58.2 Retread separation—the parting of the retread rubber from the buffed surface of the casing.

1.4.59 Tread wear indicator—a feature incorporated into the tread of a tyre to indicate when the tread has worn down to a predetermined minimum tread pattern depth.

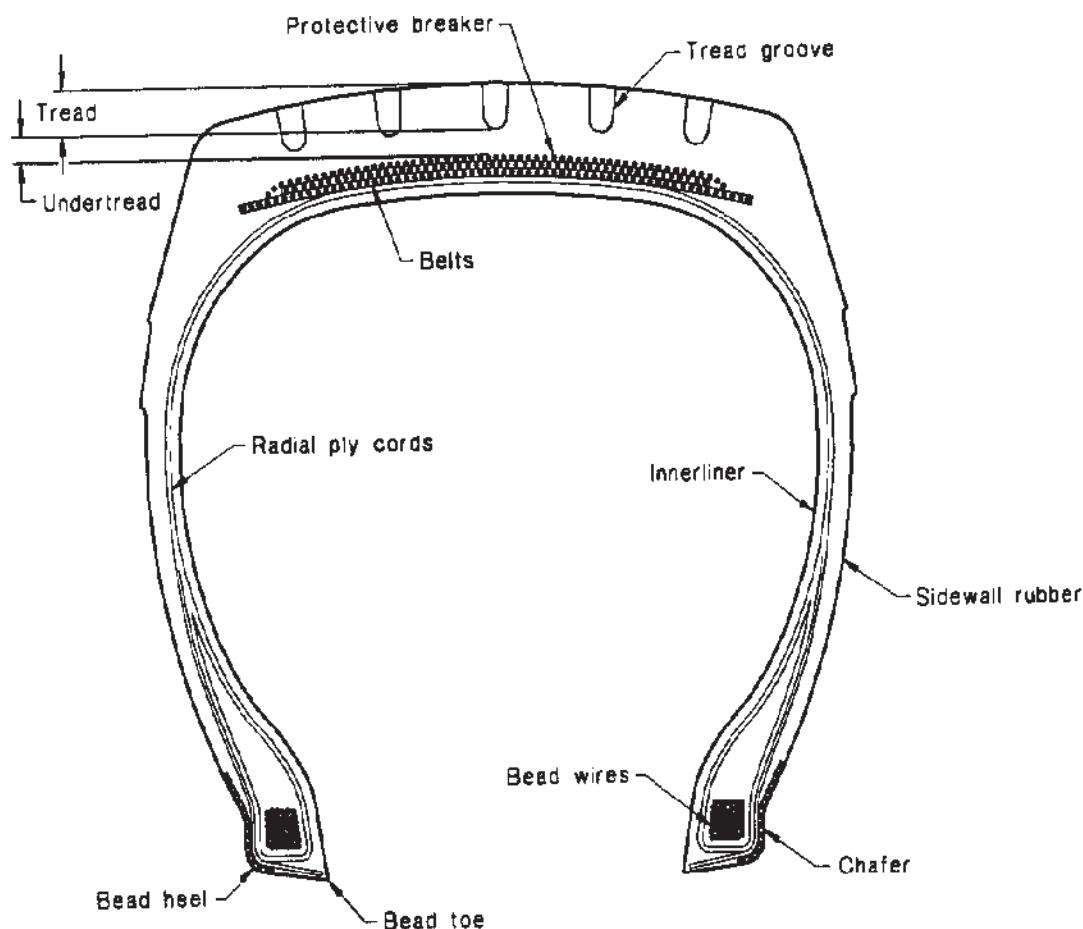
1.4.60 Tubeless tyre—a pneumatic tyre designed for use without an inner tube.

1.4.61 Undertread—the rubber between the bottom of the tread grooves and the outer layer of carcass reinforcing cord (i.e. ply, belt or breaker, depending upon the tyre construction).

1.4.62 Venting—a series of small diameter holes drilled into the carcass to relieve internal pressure build-up in the carcass.

1.4.63 Winter tread—a tyre with a tread pattern and a structure that is primarily designed to ensure a performance better than that of an ordinary (road) tyre in mud and fresh or melting snow. The tread pattern of a winter tread usually consists of groove (rib) or solid block elements, or both, which are more widely spaced than on an ordinary (road) tyre.

NOTE: Tyres having winter treads are also known as 'Mud and Snow', 'M & S', or 'Snow' tyres.



NOTE: Undertread is measured from the base of the tread grooves to the top of the protective breaker.

FIGURE 1.1 CROSS-SECTIONAL REPRESENTATION OF A RADIAL PLY TYRE