



SURFACE VEHICLE RECOMMENDED PRACTICE	J2013™	JUL2022
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Superseding J2013 APR2013		
(R) Military Tire Glossary		

RATIONALE

This SAE Recommended Practice was developed to serve as a supplement to SAE J2014 to assure that terms used by the military and tire and rim industry are commonly understood. This revision is to update the information within the Recommended Practice to reflect current state of the art terminology.

1. SCOPE

This glossary of tire military/industry represents the latest state-of-the-art terms and definitions for military use.

This SAE Recommended Practice shall remain open for comments from the reader and shall also be reviewed and updated periodically. Many similar terms and definitions were reviewed from which the ones best applied to military use were selected. It is the purpose of this task force to provide technical definitions in present day use.

2. REFERENCES

2.1 Applicable Documents

The following publications form a part of this specification to the extent specified herein. Unless otherwise indicated, the latest issue of SAE publications shall apply.

2.1.1 Tire and Rim Association Publications

Available from The Tire and Rim Association, Inc., 4000 Embassy Parkway, Suite 390, Akron, OH 44333, www.us-tra.org.

The Tire and Rim Association Yearbook

The Tire and Rim Association Engineering Design Information

The Tire and Rim Association Military Supplement

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For more information on this standard, visit
https://www.sae.org/standards/content/J2013_202207/

2.1.2 European Tyre and Rim Technical Organisation Publications

Available from the European Tyre and Rim Technical Organisation, Rue Defacqz 78/80, Brussels, Belgium, Tel: 32-2-344-4059, www.etrto.org.

ETRTO Standards Manual

2.1.3 Japanese Automobile Tyre Manufacturers Association Publications

Available from the Japanese Automobile Tyre Manufacturers Association, No. 33 Mori Bldg. 8th Floor, 3-8-21 Toranomom, Minato-Ku, Tokyo, Japan, 105-0001, Tel: 81-3-3435-9094.

JATMA Year Book

2.1.4 Scandinavian Tire and Rim Organization Publications

Available from the Scandinavian Tire and Rim Orgnaization, Rådhusgatan 15, 742 43 Öregrund, Tel: +46 173 30273.

STRO Data Book

2.1.5 Tyre and Rim Association of Australia Publications

Available from the Tyre and Rim Association of Australia, C/- Coghlan Corporate Services Pty Ltd, Suite 1, Hawthorn House, 795 Glenferrie Road, Hawthorn, Victoria, 3122, Australia, Tel: +61 3 9818 0759, www.tyreandrim.org.au.

Standards Manual

2.1.6 SAE Publications

Available from SAE International, 400 Commonwealth Drive, Warrendale, PA 15096-0001, Tel: 877-606-7323 (inside USA and Canada) or +1 724-776-4970 (outside USA), www.sae.org.

SAEJ670 Vehicle Dynamics Terminology

SAE J2047 Tire Performance Terminology

2.1.7 ISO Publications

Available from International Organization for Standardization, ISO Central Secretariat, 1, ch. de la Voie-Creuse, CP 56, CH-1211 Geneva 20, Switzerland, Tel: +41 22 749 01 11, www.iso.org.

ISO 2631 Mechanical vibration and shock - Evaluation of human exposure to whole-body vibration

ISO 18106 Passenger car, commercial vehicle, truck and bus tyres – Methods for measuring snow grip performance – Loaded new tyres

2.1.8 U.S. Tire Manufacturers Association (USTMA) Publications (Formerly Rubber Manufacturer's Association <RMA>)

Available from the U.S. Tire Manufacturers Association, 1400 K Street, NW, Suite 900, Washington, DC 20005, Tel: 202-682-4800; www.ustires.org.

Tire Information Service Bulletin TISB 10 – USTMA Snow Tire Definitions for Passenger and Light Truck Tires

Tire Information Service Bulletin TISB 37 – USTMA Definition for Passenger and Light Truck Tires for Use in Severe Snow Conditions

Tire Information Service Bulletin TISB 50 – USTMA Definition for Truck and Bus Tires for Use in Severe Snow Conditions

2.1.9 ASTM Publications

Available from ASTM International, 100 Barr Harbor Drive, P.O. Box C700, West Conshohocken, PA 19428-2959, Tel: 610-832-9585, www.astm.org.

- ASTM 1016 Standard Practice for Linear Tire Treadwear Data Analysis
- ASTM E1136 Standard Specification for P195/75R14 Radial Standard Reference Test Tire
- ASTM F1805 Standard Test Method for Single Wheel Driving Traction in a Straight Line on Snow and Ice-Covered Surfaces
- ASTM F2493 Standard Specification for P225/60R16 97S Radial Standard Reference Test Tire
- ASTM F2803 Standard Test Method for Evaluating Rim Slip Performance of Tires and Wheels
- ASTM F2870 Standard Specification for 315/70R22.5 154/150L Radial Truck Standard Reference Test Tire
- ASTM F2871 Standard Specification for 245/70R19.5 136/134M Radial Truck Standard Reference Test Tire
- ASTM F2872 Standard Specification for 225/75R16C 116/114S M+S Radial Light Truck Standard Reference Test Tire

2.1.10 Recreational Off-Highway Vehicle Association (ROHVA) Publications

Available from the Recreational Off-Highway Vehicle Association (ROHVA), 2 Jenner, Suite 150, Irvine, CA, 92618-3806, Tel: (949) 255-2560, www.rohva.org.

American National Standard for Recreational Off-Highway Vehicles (ANSI-ROHVA)

2.1.11 U.S. Army Combat Capabilities Development Command Publications

Available from the U.S. Army Combat Capabilities Development Command (CCDC) Ground Vehicle Systems Center (GVSC), Special Systems and Component Engineering-Tires FCDD-GVS-ES (MS-268), 6501 East 11 Mile Road, Warren, MI 48397-5000.

Administrator's Manual for use with SAE J2014, (R) Pneumatic Tire/Wheel/Runflat Assembly Qualifications for Military Tactical Wheeled Vehicles

2.1.12 Defense Technical Information Publications

Available from Defense Technical Information Center, 8725 John J. Kingman Rd., STE 0944, Ft. Belvoir, VA, 22060-6218.

Test Operations Procedure (TOP) 01-1-010A Vehicle Test Course Severity (Surface Roughness)

2.1.13 Finabel European Army Interoperability Centre Publications

Available from European Army Interoperability Centre, Quartier Reine Elisabeth, Rue d'Evere 1, B-1140 Brussels, Belgium, Tel: +32 (0)2 441 79 38.

FINABEL Agreement No. A.20.A

3. DEFINITIONS

ABRASION: Wearing away by scraping or rubbing; the progressive wearing away of a tire in-service.

ABS: Anti-lock braking system provides automatic control of the vehicle braking system to regulate the amount of wheel lock up during braking.

ACCELERATOR: A chemical that affects the rate of vulcanization of the tread rubber compounds.

AGING: Deterioration of physical and chemical properties of rubber by oxidation and/or heat over a period of time.

AIR INJECTION: An inspection method using a high pressure air probe to detect separation.

AIR PRESSURE: Force exerted by air within tire, expressed in pounds per square inch, bars, or kilopascals.

AIRLESS TIRE: A tire assembly which performs the same function as a pneumatic tire but is designed and constructed to not require the use of inflation pressure.

ALIGNMENT: See Wheel Alignment.

ALL SEASON TIRE (A/S): A tire providing dry, wet and snow traction performance for year round use.

ALL TERRAIN TIRE (A/T): A tire with an aggressive lug pattern for use on vehicles where a substantial portion of the driving will be off-road on trails and cross country type terrain. It provides good off-road performance with respect to mud, sand, and snow traction.

AM: TACOM Administrator's Manual for use with SAE J2014.

ANSI: American National Standards Institute.

ANSI/ROHVA: American National Standard for Recreational Off-Highway Vehicles – voluntary standard addressing the design, configuration, and performance aspects of ROVs.

ANTISKID: The wiping or biting edges of a tread design offering resistance to skidding. (See also Tread Groove Depth.)

ASPECT RATIO: The ratio of the section height to the section width of the tire times 100.

AT (tire size prefix): See 4.1.

ATV: All terrain vehicle.

AWL: A pointed or flat tool used to probe nail holes and injuries.

BACKING: A removable protective material used on the application side of tread rubber and repair materials to preserve cleanliness and tackiness.

BALANCING: A process to correct for heavy or light areas of a tire.

BANBURY: An automatic machine for mixing rubber and compounds.

BAND LUGGING: A method of retreading earthmover design tires using hand buildup and kettle cure.

BEAD/BEAD-WIRE BUNDLE (OTHER INEXTENSIBLE MATERIAL): Strand or multiple strands formed into a "hoop" of the appropriate size to fit the bead area of the tire to the rim.

BEAD AREA: The part of the tire shaped to fit the rim and having a core made of one or several essentially inextensible strands with the plies anchored to the core.

BEAD CENTERING PLATE: An alignment device used to reduce tire diameter, and center the casing in the retread matrix.

BEAD FACE: The portion of the bead area that interfaces with the rim flange (see Figure 1).

BEAD SOLE/LEDGE: The portion of the bead area between the bead heel and toe (see Figure 1).

BEAD SOLE/LEDGE WIDTH: The horizontal distance between the bead heel and bead toe.

BEAD HEEL: The rounded portion of the bead fitting at the junction of the rim flange and bead seat (also see heel).

BEAD LOCK: A device mounted inside the tire chamber that fits between the bead areas to prevent bead unseating and tire rotation on the rim.

BEAD PROFILE MEASUREMENT: The horizontal widths of the bead area "cross-section" starting at the bead heel measured in 5 mm (0.20 inch) increments. Normally used for correct sizing of tire runflat device (see Figure 2).

BEAD SEAT: That part of the rim which provides radial support to the tire.

BEAD SEPARATION: A breakdown of bond between components in the bead area.

BEAD SPACER: A device mounted inside the tire that fits between the beads to prevent bead unseating, but does not prevent tire rotation on the rim.

BEAD-TO-BEAD MEASUREMENT: The method of measuring a tire before retreading to predetermine the correct buffing dimensions, tread rubber size, and curing matrix to be used in the processing from the heel of one bead straight up at 90 degrees, to the bead over the crown and down the other side to a position on the heel of the other bead.

BEAD TOE: The pointed area of the bead (see Figure 1).

BEAD WIDTH: A horizontal measurement from the outside to inside of the bead through the bead wire centerline (see Figure 1).

BELT(S): Layer(s) of material underneath the tread, laid substantially in the direction of the tread centerline, that restricts the casing circumferentially.

BELT SEPARATION: A breakdown of bonding between the belts and/or plies or tread.

BEVEL CUT: The angle cut used on tread and other splices and in the skiving of a tire for repair.

BIAS BELTED: Structure of diagonal (bias) ply tire in which the casing is restricted by a belt comprising two or more layers of substantially inextensible cord material.

BIAS (DIAGONAL) PLY TIRE: A pneumatic tire in which the ply cords extending to the beads are laid at alternate angles substantially less than 90 degrees to the centerline of the tread.

BLADDER CURE: A method of shaping and curing a tire using an expandable cylindrical rubber membrane.

BLISTER: A separation or void within the structure of the tire typically filled with the inflation medium.

BOLT TOGETHER DIVIDED WHEEL: A wheel that has a removable portion which is attached to the fixed portion by clamp bolts and nuts (see Figure 3).

BRAND NUMBER: A code branded into one or both sidewalls of a tire by the customer for identification purposes.

BREAK: A rupture extending into or through the fabric. Example: An impact break is usually in the shape of an X, Y, or star, and can be seen from the inside of the tire. A flex or circumferential break runs parallel to the beads.

BREAKER (BIAS/DIAGONAL TIRE): A band or strip of rubber coated bias cut tire cord placed circumferentially around the tire between the last ply of casing fabric and tread. Sometimes called the impact or shock ply.

BUCKLE: Tire distortion caused by improper molding, evidenced by wrinkling on the inside of the casing.

BUCKLING: The wrinkling of the tire sidewall caused by applied torque.

BUFF: The preparation of the surfaces of a tire during either the repairing or retreading process where the old rubber is removed and the casing is cleaned, profiled, and textured.

BUFF CONTOUR: The specified shape of a buffed tire.

BUFF LINE: The dividing line in the cross section of a tire between the buffed surface of the original tire and the retread rubber.

BUFFED SURFACE: The specially prepared surface of a tire casing to provide proper texture for the previously vulcanized casing to help promote adhesion to the new rubber.

BUFFER: A machine used to rasp the old tread from the tire.

BUFFING TEMPLATE: A machined device of a specified shape used to obtain the required buffed contour.

BUILDER: A machine used to apply tread rubber to a casing.

BUILDUP: The application of retread or repair rubber.

BUZZ OUTS: See Skiving.

C-1, C-2: Compactor tire type codes. See Section 4.

CARCASS: That part of a tire other than the tread and sidewall rubber which, when inflated, bears the load.

CALENDER: A machine used to coat one or both sides of cord fabric with rubber.

CASING (CARCASS): That part of a tire other than the tread and sidewall rubber which, when inflated, bears the load.

CEMENT: An adhesive rubber compound dissolved in solvent used to provide building tack and cured adhesion. May be brushed or sprayed on the buffed surface.

CENTERLINE: A circumferential inked line or indentation applied during extrusion to the center of the tread rubber to aid in positioning the tread.

CENTRAL TIRE INFLATION SYSTEM (CTIS): An onboard adjustable tire pressure system where the vehicle driver from the cab position is capable of selecting tire pressures based on terrain and payload conditions.

CHAFER: Reinforcing material around the bead in the rim flange area to prevent chafing of the tire by the rim parts.

CHANNELING: Voids in the shoulder area between the tread and the buffed surface.

CHECKING: Minute cracking in surface of rubber caused by aging and/or oxidation.

CHECK VALVE: A one-way valve used to prevent pressure loss.

CHEMICAL CLEANING: A rapid drying rubber solvent for removing mold lubricant, dirt, and other foreign material before mechanical buffing.

CHEMICAL CURE: Vulcanization at room temperature activated by chemical agents without application of heat from outside source.

CHEMICAL CURE REPAIR UNIT: Tube or innerliner repair unit applied without heat.

CHEMICAL LEAK DETECTOR: A liquid capable of detecting air seepage not discernible by visual inspection.

CHEMICAL RUBBER GUM: A special compound repair gum which cures at room temperature by chemical reaction.

CHEMICAL RUBBER COMPOUND: A two-part rubber putty, when mixed together thoroughly, begins curing at room temperature.

CHEMICAL VULCANIZING CEMENT (ALSO CHEMICAL CURE CEMENT): Cement which, when used with compatible materials, will produce a chemical cure.

CHIPPER: A narrow band of fabric or steel cord located in the bead area whose function is to reinforce the bead area and stabilize the lower sidewall.

CHUNKING: The breaking away of pieces of the tread.

CIRCUMFERENTIAL BREAKS: A tire injury running parallel to the bead.

CIRCUMFERENTIAL TREAD CRACKS: Cracks in the grooves of the tread running parallel to the beads.

CIRCUMFERENTIAL RIB: Rib extending around circumference of tire.

CI: See Cone Index

CL: Unified Soil Classification System classification of clay.

CLEATED TREAD: See Lug.

COLD INFLATION PRESSURE: The pressure inside a tire when the tire is at the prevailing atmospheric temperature and does not include any inflation pressure build-up due to vehicle operation.

COLD PATCH: Chemical cure repair unit.

COLLAPSIBLE RIM: A rim used in retreading that can be folded and unfolded for insertion into the tire where it holds the curing tube in place and exerts pressure on the tire sidewalls.

COMBAT SUPPORT VEHICLE: A self-propelled, boosted, or towed conveyance for transporting a burden on land, sea, or through the air or space assigned to combat support elements to furnish operational assistance to combat elements.

COMBAT VEHICLE: A vehicle, with or without armor, designed for a specific fighting function.

COMMERCIALLY AVAILABLE MILITARY TIRES: Tires that may be used to meet military requirements in accordance with military specifications and are available as off-the-shelf purchase items.

COMMERCIAL TIRES: Tires designed for the commercial (civilian) marketplace for passenger cars, light trucks, heavy trucks, construction, and material handling equipment, etc. These tires are suitable for military vehicles with a mission profile similar to that of their commercial counterpart.

COMPOUND: A thorough mixture of natural and/or synthetic rubbers with various ingredients necessary for each tire part.

CONE INDEX (CI): An index of the combined shear and compressive strength (bearing capacity) of a medium with a single instrument, a cone penetrometer.

CONICITY FORCE: See Lateral Force Offset.

CONTACT AREA (FOOTPRINT): The total area of the tire tread in contact with a flat surface, including the area of grooves or other depressions (load and inflation dependent).

CORDS: Textile or non-textile strands (threads) used in various components of the tire casing, plies, belts breakers, etc.

CORD SEPARATION: Cords parting away from adjacent rubber compounds.

CORROSION: Degradation of steel reinforcing cords.

CRACKING: Any parting within the tread, sidewall, or innerliner of the tire extending to cord material.

CREW LOADED WEIGHT: The minimum planned operational weight of the vehicle. This configuration includes driver and all crew required to operate the vehicle with their individual combat loads and additional days of supply as may be defined for the system. Crew loaded weight represents the minimum operational configuration of the system.

CROSS COUNTRY: See Section 5.

CROSS RIB TIRE: A deep tread drive wheel position tire with deep molded grooves that extend essentially radially into the shoulder.

CROSS SECTION: See Section Width (see Figure 1).

CROWN: See Tread.

CROWN ARC: See Tread Arc.

CROWN RADIUS: See Tread Radius (see Figure 1).

CROWN WIDTH: See Tread Width (see Figure 1).

COMPLIANCE TESTING INCORPORATED (CTI) Gauge: Tool utilized to measure snow surface compaction properties.

CTI: See Compliance Testing Incorporated Gauge.

CTI Gauge: Snow Compaction Gauge.

CTIS: See Central Tire Inflation System.

CURE: The process of vulcanization of rubber by applying heat and pressure over a period of time.

CURE RATE: The speed at which a compound cures and develops its physical properties.

CURE TIME: The length of time an article is cured (see Optimum Cure).

CURED-ON-SOLID TIRES: Tires that are cured directly onto operating wheels.

CURING RIM: The rim used to support the tire and keep the curing tube in place while curing.

CURING TUBE: Special, heavy-duty tube placed within the tire while curing the retread or repair. This tube, when inflated, forces the tread rubber into the matrix, forming the tread design.

CUSHION GUM: A fast curing tacky rubber compound used for adhesion of tread rubber for undertread repair, and buildup of other repairs (also see Precured Tread Cushion Gum).

CUT GROWTH: The enlargement of tire cuts as a result of flexing action. Usually found in the grooves of the tread.

CUTOFF RIB: An indentation molded into a retreaded tire to produce a sharp ending at the edge of the new retread rubber (see Flow Stop, Stop Ring).

DEBAGGER: A machine for inserting and removing curing tubes from a tire.

DEFLECTION (STATIC): The difference between the unloaded and the loaded section heights when the tire is stationary (See Figure 4).

DELUGGER: A machine to cut the lugs from tires prior to buffing.

DESIGN RIM WIDTH: The specific rim width assigned to each tire size designation to determine basic tire dimensions.

DETREADER: A machine that delugs and buffs a used tire.

DH (tire size prefix): See 4.1.

DIE SIZE: A coded description of the dimensions of tread rubber for retreading. (Example: 40-80-14.) The first number gives the width of the crown in 1/8 of an inch. The second number gives the width of the base in 1/8 of an inch. The third number gives the gauge of the stock in 1/32 of an inch.

DIRECTIONAL TREAD: Tread design in which performance is dependent on direction of rotation (rear farm tractor tires are an example).

D.O.T. TIRE IDENTIFICATION NUMBER (TIN): Department of Transportation (DOT) tire identification number that must be used by all tire manufacturers on all over-the-highway tires (in the USA), consisting of letters and numbers molded in the tire sidewall identify the manufacturer, the manufacturing plant, the tire size and type, and the week of manufacture. Example: DOT MA 9T xxxx0309. The symbol "DOT" means the tire meets or exceeds Department of Transportation Federal Motor Vehicle Safety Standards 109, 119, or 139. "MA" is the code number assigned by DOT to the manufacturing plant. 9T is the tire size; in this case, for example, 365/80R20. "xxxx" is a group of up to four symbols, optional with the manufacturer, to identify the type, brand, or other significant characteristics of the tire. The "0309" means the tire was made during the third week of 2009. The first two numbers identify the week and the last two numbers identify the year (refer to current 49CFR574).

DRAWBAR PULL: Method used for tire traction testing.

DRIVE AXLE TIRE (D/A): Tires with more aggressive lug treads. The lug tread design provides driving traction for the drive axles.

DRYER - DRYING ROOM: Equipment or an enclosed space used to remove moisture from casings prior to inspection and processing.

DUROMETER: A device to measure the indentation hardness of rubber. The term is also applied to the readings obtained with this device; for example, a tire tread may be defined as 60A durometer, which means that it shows this degree of hardness when measured with the durometer.

DYNAMIC RADIUS: Vertical distance from the axle horizontal centerline to the road under any given condition of load, speed, and inflation.

DYNAMIC RESISTANCE: Dynamic resistance of the free-rolling tire is the scalar sum of all contact forces tangent to the test surface and parallel to the wheel plane of the tire.

DYNAMOMETER: A machine used to measure torque and rotational speed (rpm) from which power produced by an engine, motor, or other rotating prime mover can be calculated.

E-1, E-2, E-3, E-4: Tire type codes for earthmover tires. See Section 4.

ECE: Economic Commission for Europe provides tire regulations for Europe.

ENDURANCE (D.O.T. TEST): An operational or laboratory measurement of the fatigue life of a tire casing. Not related to tire wear or puncture resistance.

ENVELOPE: A flexible covering used to encompass a precured tread during the bonding process.

ERDC: U.S. Army Engineer Research and Development Center.

ERDC GSL: U.S. Army Engineer Research and Development Center Geotechnical and Structures Laboratory.

ERDC/GSL SR-13-2: Procedures for One-Pass Vertical Cone Index.

EROSION WEAR: Tread wear that occurs along the edges of a rib due to rib spread during load cycle. Also known as channel wear or river wear.

ESC: Electronic Stability Control – a system that augments vehicle directional stability by applying and adjusting the vehicle brakes individually to induce correcting yaw torques to the vehicle; a computer-controlled system which uses a close-loop algorithm to limit understeer and oversteer of the vehicle when appropriate; has a means to determine vehicle yaw rate and

to estimate its sideslip; has a means to monitor driver steering input and is operational over the full speed range of the vehicle (except below a low-speed threshold where loss of control is unlikely).

ETRTO: The European Tyre and Rim Technical Organisation.

EXTRUDER: A machine that heats and shapes a rubber compound, by the process of extruding, into a usable form (that is, strip or die size).

FABRIC FATIGUE: Fabric degradation and resultant tire cord loss of strength due to repeated flexing. Accentuated by overloading and/or underinflation.

FACTORY-BUILT REPAIRS: Factory-assembled repair units made of layers of cord, fabric, and cushion gum, which are cured or semicured and used to reinforce damaged areas (also see Hand-Built Repairs).

FILLER STRIP: A free-flowing rubber compound used under the tread when added thickness is required in retreading.

FILLER GUM (Filling Stock): A soft-rubber compound (usually fast curing) used to fill in low spots on a casing before applying retread compound during retreading.

FINABEL: European Army Interoperability Centre.

FIXED WHEEL PORTION: The portion of a bolt together divided wheel that fastens to the vehicle axle hub flange (see Figure 3).

FLANGE: That part of the rim which provides lateral support to the tire.

FLANGE HEIGHT: Measurement from the base of the flange vertically to its top as standardized by TRA or ETRTO (see Figure 4).

FLAP: Rubber strip that fits inside the tire to protect tube from pinching by the beads or rubbing on the rim. Normally used with tube-type tires on multi-piece rims.

FLASH: Fin produced by excess rubber squeezed out between edges of mold during curing process.

FLIPPER: Reinforcing fabric around the bead wire for strength and to attach the bead to the tire body.

FLOTATION: Ability of a tire to resist sinkage on soft, yielding terrain.

FLOW CRACK: A surface crack caused by excessive stock movement when tire is shaped into curing mold.

FLOW STOP: See Cutoff Rib.

FOOTPRINT: Graphic display of tread contact area (see Contact Area).

FRT (tire size suffix): See 4.1.

FULL CAP/TREADS: Application of new tread rubber to include not only the tread area but also the shoulder area.

G-1, G-2, G-3: Tire type codes for grader tires. See Section 4.

GAUGE: The thickness of tread rubber measured in 1/32 of an inch.

GAWR: See Gross Axle Weight Rating.

GCVW: See Gross Combined Vehicle Weight or Gross Combination Vehicle Weight.

GOUGING: Chisel-like action of rocks or other foreign objects on tires.

GROOVE: The space between two adjacent ribs or lugs.

GROOVE CRACKING: Crack(s) in the groove(s) of the tread.

GROSS AXLE WEIGHT RATING (GAWR): The value specified by the manufacturer as the maximum permissible loaded weight on an axle.

GROSS COMBINED VEHICLE WEIGHT or GROSS COMBINATION VEHICLE WEIGHT (GCVW): Loaded weight of a combination motor vehicle plus the weight of the towed load.

GROSS VEHICLE WEIGHT (GVW): the curb weight of the vehicle plus the crew load as defined in crew loaded weight plus the maximum payload or mission load configuration. The GVW includes the weight of the inherent armor and kits plus the weight of any add on armor and kits as required by the mission package.

GROSS VEHICLE WEIGHT RATING (GVWR): The maximum available total weight of the vehicle, which does not exceed the published maximum allowable weight, which can be supported by the load bearing components.

GVW: See Gross Vehicle Weight.

GVWR: See Gross Vehicle Weight Rating.

GROWN TIRE: A tire that has undergone expansion due to use in-service.

GUTTER: A recessed area of a rim that accepts a locking ring or flange.

HAND-BUILT REPAIRS: Repair units built using uncured cord fabric, and cushion gum, usually assembled for a specific tire.

HC (tire size suffix): See 4.1.

HC (related to vehicle ride quality testing): High measure of uniformity between right and left wheel paths, i.e., left and right wheels are in-phase and exposed to the same road disturbance such as a speed bump at the same time.

HEAT BOOSTER/PAD: An electric heating unit which, when placed between the air bag or curing tube and the casing of the tire, provides internal heat and aids in the curing of repairs and retreads.

HEAT BUILDUP (TIRE): Increase in heat of tire while in use in excess of heat dissipated.

HEAT DISSIPATION (TIRE): Removal of heat from a tire by conduction, convection, and radiation from the surface.

HEEL: The rounded portion of the bead fitting at the junction of the rim flange and the bead seat (also see bead heel).

HEEL AND TOE WEAR: A type of irregular treadwear characterized by different wear rates at the leading and trailing edges of a tread element.

HIGHWAY: See Section 5 Primary Roads.

HOP: The vertical oscillatory motion of the tire/wheel assembly (unsprung mass) between the travel surface and the vehicle (sprung mass).

HOT PATCH: Repair units vulcanized with heat.

HYDROPLANING: The lifting action on a tire when water pressure forces the tire upward.

IMPACT BREAK: Rupture in tire casing due to sudden shock.

IMPACT RESISTANCE: Ability of tire to withstand sudden shock.

IND-3, IND-4, IND-5: Tire type codes for industrial tires. See Section 4.

INFLATION: The internal pressure of the tire cavity.

INNERLINER: The innermost layer(s) of a tubeless tire that limit(s) diffusion of the inflation medium into the casing.

INNERLINER REPAIR MATERIAL: A special repair material for repair of inner liners.

INNERLINER SEPARATION: The parting of the innerliner from cord material in the casing.

INSIDE CURING RIM: A metal support for a curing tube, fitting inside the tire, not intended for vehicle use.

JLTV: Joint Light Tactical Vehicle.

K (compactor tire suffix): See 4.1.

KETTLE CURE: Cure method employing steam and air for the heat and pressure required in vulcanizing.

LATERAL FORCE OFFSET: The average lateral force of a free straight-rolling tire. The two components of this force are as follows:

- a. Conicity Force: The component of lateral force offset which does not change sign with a change in direction of rotation.
- b. Ply Steer Force: The component of lateral force offset which changes sign with a change in direction of rotation.

LC (related to vehicle ride quality testing): Low measure of uniformity between the left and right wheel paths typically inducing lateral acceleration, roll, and yaw to the vehicle dynamics.

LINER: See Innerliner.

L-2, L-3, L-4, L-5: Loader and dozer tire type codes. See Section 4.

L-3S, L-4S, L-5S: Loader and dozer tire with smooth tread patterns type codes. See Section 4.

LOAD INDEX: A numerical code associated with the maximum load a tire can carry at the speed indicated by its Speed Symbol under specified service conditions.

LOAD RANGE: The term "load range" with a letter (A, B, C, etc.) in tire identification is used to identify a given size tire with its load and inflation limits when used in a specific type of service, as defined in the heading of TRA tables and required by FMVSS 119.

LOAD RATING: See Maximum Tire/Wheel Load Rating.

LOCKING RING: Removable, split, rim locking ring that holds rim flange in place on a multipiece rim.

LOW PROFILE TIRE: A tire that has a section height that is less than 85% of its nominal section width. For example, a tire with an aspect ratio (H/W) of less than 0.85.

LOW TEMPERATURE GUM: A rubber compound that cures at a lower than standard temperature.

LT (tire size prefix or suffix): See 4.1.

LUG: Tread bar running across the tire tread rather than circumferentially as with a rib (also known as cleated tread).

LUG-BASE TIRES (INDUSTRIAL): Tires with lugs on the rim-mating surface that correspond to indentation in the rim.

LUG REINFORCEMENT: Supporting bar or buttress designed to reinforce tread lugs or cleats.

LUG TEARING: Ripping of the lug, sometimes resulting in removal, can result from violent operation or mechanical interference.

LVSR: Logistic Vehicle System Replacement

MANDREL: A curved support inserted in a tire to prevent the casing from collapsing while curing a repair.

MATRIX: Aluminum or steel rings or segments that form the cavity in which the tire is actually cured and from which the tread design is formed.

MATRIX SKIRT: The sidewall flange of the matrix. In a short skirt matrix, the flange extends from the shoulder to the flow stop and in a long skirt matrix, it extends below the flow stop.

MAXIMUM PERMISSIBLE INFLATION PRESSURE: The maximum cold inflation pressure of the tire or the maximum rated pressure of the wheel, whichever is lower.

MAXIMUM TIRE/WHEEL LOAD RATING: The maximum load a tire is rated to carry at a specified maximum speed and operating condition. The maximum load rating of the wheel must be considered when determining the maximum load rating of a tire and wheel system.

MIL (tire size prefix): See 4.1.

MILL: Machine composed of two large iron or steel, counter-rotating rolls, used to warm, mix, and blend rubber and plastic stocks.

MISALIGNMENT: Maladjustment of one or more parts of steering or suspension mechanism.

MISSION PROFILE DESCRIPTORS: See Section 5.

ML (tire size suffix): See 4.1.

ML: Unified Soil Classification System classification of silt.

MOBILITY (VEHICLE MOBILITY): The overall capability of a vehicle to move from place to place while retaining its ability to perform its primary mission.

MOISTURE BLOWS: Ply separations caused by the presence of moisture in the casing which, when subject to heat, becomes steam and expands.

MOLD: The heated cavity in which tires and retreads are vulcanized. Includes the curing chamber, matrices, and adjusting devices.

MOLD LUBRICANT: Material used as a mold release to facilitate removal of the tire from the mold after curing.

MOUT: Military Operations in Urban Terrain (see Section 5).

MPT (Multi-purpose Trucks): Defined by the ETRTO as a special use tire designed for multipurpose trucks (on- and off-road) and agricultural service.

MPT (tire size suffix): See 4.1.

MTVR: Medium Tactical Vehicle Replacement.

MUD AND SNOW OR WINTER SERVICE TIRE (PASSENGER AND LIGHT-TRUCK TIRES ONLY): Per USTMA TISB 10, passenger and light truck (LT) tires meeting the following criteria are labeled on at least one sidewall with the letters "M" and "S" (e.g., MS, M/S, M&S, M+S, etc.). These tires have been design to provide better starting, stopping, and driving performance in snow conditions than non-M&S tires, and have the following general characteristics:

1. New tire treads shall have multiple pockets of slots in at least one tread edge that meet the following requirements based on mold dimensions:
 - a. Extend toward the tread center at least 12.7 mm (0.5 inch) from the footprint edge, measured perpendicularly to the tread centerline.

- b. A minimum cross-sectional width of 1.588 mm (0.0625 inch).
 - c. Edges of pockets or slots at angles between 35 degrees and 90 degrees from the direction of travel.
2. The new tire tread contact surface void area will be a minimum of 25% based on mold dimensions.

NHS (tire size suffix): See 4.1.

NONDIRECTIONAL TREAD: Tread design that is equally effective in either direction of rotation.

NONFILL: Failure of the tread rubber to properly fill the matrix during cure, resulting in imperfectly formed tread elements and rounded lug edges.

NONSKID: See Tread Depth.

NONTACTICAL VEHICLE: Motor vehicles used in support of general transportation services and facility and equipment maintenance functions not directly connected with combat or tactical operations. The nontactical wheeled vehicle fleet contains passenger carrying, general purpose, and special purpose vehicles.

OE: Original equipment.

OFF-THE-ROAD TIRES: Tires designed primarily for use over unpaved roads or where no roads exist.

ON/OFF HIGHWAY TIRES (O/O): Tires which are used on highway and off highway on dirt and gravel roads. Available in both steer and drive axle versions, these tires provide good traction in mud and snow and offer bruise, cut, and puncture resistance. On/off highway tires are superior to all-terrain tires in these areas, but are less effective when used cross-country.

OPEN SPLICE: Any parting at any junction of tread, sidewall, or innerliner.

OPTIMUM CURE: That state of cure at which the rubber compound exhibits the most satisfactory physical properties. Usually expressed in minutes curing time at a reference temperature.

OVERALL DIAMETER: The diameter of an inflated tire at the outermost surface of the tread, including 24 hours inflation growth (see Figure 4).

OVERALL DIAMETER (OD) BUFFED: A measurement used to size a buffed tire, on an inflated tire using calipers or a diameter tape rule.

OVERALL WIDTH: The width of a new tire, including 24 hours inflation growth, and including protective side ribs, bars, and decorations (see Figure 1).

OVERCURE: Curing in excess of optimum cure.

OVERFLOW: Spew-out of tread compound at the mold parting line or at the edge of the matrix skirt during curing, which should be trimmed or buffed off the finished product.

OVERINFLATION: Tire inflation above the manufacturer's recommended pressure for the specific load, speed, and terrain conditions.

OVERLAY: A layer of rubber coated cords at typically zero degrees placed on top of belts to primarily increase the speed capability.

OVERLOADING: Loads over and above the maximum load limits for speed, tire size, inflation pressure, and operating conditions. Tire overloading can be dangerous and is not recommended. However, note that tire load capacity can be increased in certain cases by increased inflation or control to lower speeds (refer to information under Tire and Rim Association Yearbook).

OVERSIZING: Mounting larger tires than size specified for a vehicle to support heavier loads or to provide increased flotation.

OVERSTEER: A vehicle handling property in which the steer angle required to negotiate a given curve decreases with an increase in vehicle forward speed. This condition exists when the tire slip angles on the front tires are less than that of the rear tires.

OZONE (O₃): A form of oxygen which accelerates aging and weathering in tires.

OZONE CHECKING: Formation of fine cracks in surface of rubber due to ozone in air.

P (passenger car tire size prefix): See 4.1.

PADDING GUM: Heat resistant rubber used under tread rubber to build up its size for mold fit (also see Filler Gum).

PASS: One trip of a vehicle over a test course.

PERCENT CARCASS DEFLECTION: The tire deflection divided by the undeflected section height (minus the tread depth) over the flange, expressed as a percentage. This term must be used in U.S. Army (ERDC) VCI calculations (see Figure 4).

PERCENT TIRE DEFLECTION: The tire deflection divided by the undeflected section height over the flange, expressed as a percentage. This is a TRA and commercial industry term and must not be used for U.S. Army (ERDC) VCI calculations (see Figure 4).

PLASTICIZER: A chemical added to rubber compounds to impart softness, flexibility, or resiliency.

PLY: A layer of rubber-coated parallel cords.

PLY ADHESION: Force required to pull apart two adjacent layers.

PLY RATING: The term is used to identify a given tire with its maximum recommended load when used in a specific type of service. It is an index of tire strength and does not necessarily represent the number of cord plies in the tire.

PLY SEPARATION: A parting of rubber compound between adjacent plies.

PNEUMATIC TIRES: Tires that are inflated to pressures higher than atmospheric pressure.

POR (PPROFESSIONAL OFF ROAD TIRE) – Special use tire primarily used for service in severe off-road conditions (ETRTO). POR marking can be used if the tire meets certain requirements including tire size, tread depth, tread void to fill ratio and maximum speed rating.

POTENTIOMETER: A voltmeter that reads the extremely low voltage developed at the thermocouple junction and, thus, shows the temperature. Usually, they read directly in degrees of temperature.

PRECURED TREAD: Tread which is vulcanized with the tread configuration molded into it prior to being placed on the buffed casing.

PRECURED TREAD CUSHION GUM: A fast-curing tacky rubber compound used to bond the precured tread to the buffed surface; may be used for repairs.

PRESS (LOADING): A machine designed to open and close a matrix, load and eject retreaded tires.

PRESS PLATE: Ring-shaped plates in molds that may be adjusted to alter the cross section of tires.

PRESSED-ON SOLID TIRES: Tires that are cured on circular metal bands which are then pressed onto mating wheels.

PRESSURE BUILDUP: Increase of air pressure in tire caused by temperature rise of the contained air.

PRIMARY ROAD: See Section 5.

PUSHER AXLE: A nonpowered, load-carrying axle preceding in tandem with a powered axle.

PUNCTURE: A penetration through a tire, made by a nail or other similar small object.

PUNCTURE REPAIR: See Repaired Tire.

PYROMETER: An instrument to measure temperature, usually by the generation of electric current by a thermocouple when acted on by direct heat. Commonly used to measure mold surface temperatures or (if a penetrating needle is used) tread rubber temperatures.

RADIAL CRACKING: Surface openings, generally in shoulder or sidewall of tire, running perpendicular to the beads.

RADIAL RUNOUT: Total indicator reading in the radial direction, taken at the rim bead seat, for one revolution, with the wheel located on the specified datum.

RADIAL (PLY) TIRE: A pneumatic tire in which the ply cords which extend to the beads are laid substantially at 90 degrees to the centerline of the tread, the casing being stabilized by an essentially inextensible circumferential belt.

RASP: A tool with raised points forming the cutting prominences, used for roughening rubber surfaces.

RATING CONE INDEX (RCI): The product of the RI (remolding index) and the average of the measured insitu CI (Cone Index) for the same layer of soil. (Not to be confused with Rolling Circumference Index for agricultural tires.)

REDUCING VALVE: Pressure regulating device used for controlling steam or air pressure at desired level.

REGROOVABLE Tire: A tire with sufficient undertread so that grooves can be cut in the worn tire, thereby extending tire life.

REGROOVING (RE CUTTING): The cutting of a tread design into tread rubber where a design does not already exist or the cutting into an existing tread design to a depth greater than that provided by the new tire manufacturer or retreader.

REINFORCEMENT: Any material, usually rubber and fabric, vulcanized to the tire to add strength to the cord body at an injury.

REINFORCEMENT REPAIR: See Repaired Tire.

RELUGGING: A method of retreading large off-the-road tires using handle buildup and kettle cure.

REMOLDING INDEX (RI): A ratio that expresses the proportion of the original strength of a soil that will be retained after traffic of a moving vehicle.

REMOVABLE WHEEL PORTION: The portion of a bolt together divided wheel which can be removed from the fixed wheel portion in order to service the tire (see Figure 3).

REPAIR GUM: Material used for filling voids or covering reinforcing material in a tire repair.

REPAIR PLUG: Rubber compound used to fill the cavity of an injury in a tire. Should be applied from inside the tire.

REPAIRED TIRE: Any tire with punctures, cuts, or other types of injuries that have been reconditioned as required to provide additional service life. Common repair types are:

- a. **Puncture Repairs:** Tread punctures, nail holes, or cuts in the tread and shoulder area, repaired from inside the tire which seal the inner liner and fill the injury. Injury limits are up to and including 1/4-inch diameter for automobile and light truck tires, and 3/8 inch for truck tires. Larger punctures must be referred to a full-service repair facility.
- b. **Spot Repairs:** Repairs made by vulcanizing rubber to a tire without replacing cord.
- c. **Reinforcement Repairs:** Repairs made to the casing when an injury has extended through more than 25%, but less than 75%, of the tire body, requiring both hole-filling material and reinforcing patches.
- d. **Section Repairs:** Repairs, other than nail-hole type, made to the casing when an injury has extended through 75% or

more of the actual plies, or completely through the casing in the tread or sidewall areas. The damaged cord is removed, and new cord is replaced in the form of a repair unit.

REPAIR UNIT (PATCH): The material used to seal and/or reinforce the injury in a tire or tube.

RESILIENCE: Capacity of rubber to recover its original size and shape after deformation.

RETREAD SEPARATION: Tread pulling away from the tire at interface of new tread and buffed surface.

RETREADED TIRE: A casing to which tread rubber has been affixed to extend the usable life of the tire.

RETREADING (RECAPPING): The process of renewing the tread on a tire by buffing the old surface and applying a new tread.

REVERSION: Excessive heating of a cured rubber compound leading to deterioration of its physical properties.

REVOLUTIONS PER MILE: The number of revolutions that the mounted tire will make in 1 mile at a specified load and inflation.

RIB TREAD TIRE (R/T): A tire with a tread comprised of sections running circumferentially around tire. They are designed primarily for highway use and provide excellent mileage and steering qualities and moderate traction performance on pavement.

RIBS: Tread sections running circumferentially around tire.

RIM: That part of the wheel on which the tire is mounted and supported.

RIM CENTERING RIB (BEAD ALIGNMENT RING/GG RING): Rib running around the lower sidewall of the tire just above the bead. This should appear evenly above the flange when the tire is properly mounted.

RIM DIAMETER CODE: Nominal (named) rim diameter for tire/rim matching.

RIM FLANGE: That part of the rim which provides lateral support to the tire.

RIM SLIP: Circumferential movement of the mounted tire relative to the rim (see TIRE INDEXING).

RMS: Root mean square – used to describe surface roughness. The RMS value represents the area under the curve of the WNS profile of the course being measured.

ROAD WHEEL (STEEL TEST WHEEL): A rotating device to apply load and speed to a tire/wheel assembly for test purposes.

ROCK (STONE) DRILLING: A condition in which the tread of a tire is penetrated by a rock (object). During use of the tire, the embedded rock continues to be forced down through the tread rubber or casing of the tire.

ROLLING CIRCUMFERENCE: The distance that the (axle) center of the tire moves in one revolution of the tire at a given load, speed, and inflation.

ROLLING RADIUS: Vertical distance from the axle horizontal centerline to the road at a given condition of load, speed, and inflation.

ROLLING RESISTANCE: The scalar sum of all tire contact forces tangent to the test surface and parallel to the wheel plane of the tire.

ROLLING RESISTANCE COEFFICIENT: A numeric value which describes the amount of energy needed to make a tire roll as a function of the load placed on the tire. Typically expressed as a ratio of the rolling resistance force in kilograms to the vertical force on the tire in metric tons (kg/T).

ROHVA: Recreational Off Highway Vehicle Association.

ROV: Recreational off-highway vehicle – motorized off-road vehicles designed to travel on four or more non-highway tires, with a steering wheel, non-straddle seating, seat belts, an occupant protective structure and engine.

RUBBER (NATURAL): Substance derived from latex of rubber trees and certain shrubs.

RUBBER CEMENT: An adhesive composed chiefly of rubber dissolved in a suitable solvent.

RUNFLAT DEVICE: An insert for a pneumatic tire designed to carry the load for a limited distance if the tire is deflated.

RUNFLAT TIRE: A pneumatic tire designed to carry the load for a limited distance if the tire is deflated.

RUST: See Corrosion.

SAFETY CAGE (OR DEVICE): Safety devices designed to reduce the hazard when tires are initially inflated.

SCORCHING OF RUBBER: Premature vulcanization of rubber caused by heat during processing.

SECONDARY ROAD: See Section 5.

SECTION BAG (AIR-STREAM): A rubberized fabric bag made in 1/4, 1/5, or 1/6 of a circle with valves at both ends. When inflated inside a tire in a sectional mold, it applies pressure in the vicinity of the injury.

SECTION HEIGHT: Half the difference between the overall diameter and the nominal rim diameter on either side (see Figures 1 and 2).

SECTION REPAIR: See Repaired Tire.

SECTION WIDTH: The width of a new tire, including 24 hours inflation growth and including normal sidewalls but not including protective side ribs, bars, or decorations (see Figure 1).

SELF-CLEANING: The ability of a tire tread design to eject dirt and mud by natural flexing action of tire.

SELF-SEALING TIRE: A tubeless pneumatic tire lined from shoulder to shoulder with a self-sealing polyurethane polymer that will seal penetrations up to the diameter specified by the manufacturer.

SELF-VULCANIZATION: See Chemical Cure.

SEMIPNEUMATIC TIRES: Hollow center tires that operate at atmospheric pressure.

SEPARATION: Pulling apart (delamination) such as ply separation (from each other) or tread separation (from plies).

SERIAL NUMBER: Numbers cured onto tire sidewall for identification.

SERVICE DESCRIPTION: Tire identification which consists of a Load Index (or two Load Indices in the case of single/dual fitments) and a Speed Symbol, e.g., 174G or 164/160J.

SETUP: Premature vulcanization of a rubber compound during processing or storage.

SEVERE SNOW TIRES (S/S/T): Tires designed for use in severe snow conditions that generally have tread patterns, structure, and materials to give superior performance in snow. USTMA TISB 37 provides specific snow grip requirements for passenger and light truck tires and USTMA TISB 50 provides snow grip requirements for truck and bus tires utilizing standard testing methods.

Tires designed for severe snow conditions which meet the respective criteria within the USTMA TISBs qualify for marking on at least one sidewall with the letters "M" and "S" (e.g., MS, M/S, M&S, M+S, etc.), plus a pictograph of a mountain with a snowflake. An example of the mountain/snowflake is in Figure 6. The described sidewall markings are used to identify Severe Snow Tires.

SHAPING: Buffing the casing to shape it to properly fit the size and contour of the matrix cavity.

SHELF LIFE: Refers to the accepted length of time that a perishable product may remain in stock.

SHOULDER AREA: Outer edges of tread (see Figure 1).

SHOULDER RADIUS: Small radius (generally) that joins the primary tread radius to the shoulder contour.

SIDEWALL: That portion of a tire between the shoulder area and the bead area (see Figure 1).

SIDEWALL AREA: The portion of a tire between the shoulder area and the bead area per side (see Figure 1).

SIDEWALL SEPARATION: Sidewall separation means the parting of the rubber compound from the cord material in the sidewall.

SIPE: Relatively small straight, angular, or curved slots, other than grooves, molded in the tread surface of a tire.

SIZE FACTOR: The sum of the section width and overall diameter of an inflated tire.

SIZING: Measuring the tire casing to determine proper matrix fit. Usually, a combination of bead to bead or cross section and tire circumference is used.

SKID DEPTH: See Tread Depth.

SKID RESISTANCE: Ability to maintain grip on road to resist slide or slip, either directionally or laterally.

SKIM COAT: Coat of rubber applied to ply fabric by heat and pressure (see Calendar).

SKIVING: The removal of damaged material prior to making a repair.

SLAB STOCK: Rubber compound cut and taken from a mill in wide, thick strips.

SLIP: The vector difference between total displacement and rolling displacement.

SLIP ANGLE: The angular displacement of the tire centerline and direction of travel.

SMOOTH FLOORS AND RUNWAYS: Paved or protected operating surfaces which are free of undulations, obstructions, or discontinuities.

SOAPSTONE: A soft talc-like powder used as a lubricant on the inside of a casing to prevent the tube from sticking.

SOLID TIRES ON PNEUMATIC TYPE RIMS: Solid tires that are designed to mount on multipiece pneumatic type rims.

SP: Unified Soil Classification System classification of sand.

SPACER RING: A ring inserted between two halves of a matrix, which enables the matrix to handle tires of the same diameter, but with greater tread widths and larger cross sections.

SPEED RATING: Maximum speed that the tire is rated by the manufacturer for a specific operation.

SPEED SYMBOL: A symbol indicating the speed category at which the tire can carry a load corresponding to its Load Index under specified service conditions. See Figure 7.

SPLICE BEVEL: An angled cut across the tread crown and through the gauge which permits full matching of the tread ends when they meet.

SPLICE BUTT: A 90 degree angle cut across the tread crown and through the gauge which permits full matching of the tread ends when they meet.

SPLIT RIM: Rim divided circumferentially into two or more sections.

SPOT REPAIR: See Repaired Tire.

SPOTTER (SPOT PRESS): A heat vulcanizing unit used in spot repairs, with a metal curing plate for either (or both) outside or inside tire surface.

SPREADER: Device for spreading beads of tire to examine or obtain access to inside.

SPUD: Base portion of metal valve anchored inside tube or rim.

SQUIRM: The rubbing motion of the tread as the loaded tire rotates.

SRTT: Standard Reference Test Tire – tire for which the construction and performance criteria are established by ASTM standards which is used as a reference in tire testing. ASTM F2870, F2871, F2493, and F2872 establish these standard tires for truck, light truck, and passenger car tires.

SS (tire size suffix): See 4.1.

ST (tire size suffix): See 4.1.

STABILITY: Ability of tires to maintain direction of vehicle on curve without causing excessive sway.

STANDARD RIM: A rim that meets the dimensions specified by Tire and Rim Association, Inc., the European Tyre and Rim Technical Organization, or other recognized standardizing bodies.

STATIC LOADED RADIUS: Vertical distance from the axle horizontal centerline to the road under any given condition of load and inflation while stationary (see Figure 4).

STEEL WIRE CORD: A tire cord made from many steel wires which are twisted together.

STITCHING: The process of rolling tread rubber or repair material in order to remove trapped air and also to obtain adhesion.

STOP RING: See Cutoff Rib.

STRIP RUBBER: Tread rubber in strip form most commonly used in cold feed extruders.

STRIPPING STOCK: A rubber stock used to make or extend the tapered edge of the tread rubber.

TACK: Surface adhesiveness of a rubber compound before cure.

TACOM Administrator's Manual for use with SAE J2014, Pneumatic Tire/Wheel/Runflat Assembly Qualifications for Military Tactical Wheeled Vehicles – designed to be used with SAE J2014 and contains the information needed to evaluate and measure tire/wheel/runflat assembly and tire/wheel/runflat-vehicle related performance.

TACTICAL VEHICLES: Motor vehicles used in direct support of combat or tactical operations including vehicles in combat, combat support, and combat service support table(s) of organization and equipment. The tactical vehicle fleet contains both military design and commercial vehicles.

TAG AXLE: A nonpowered load carrying axle following in tandem with a powered axle.

TALC: Powder lubricant to prevent sticking between tube and tire.

TEMPLATE (BUFFING TEMPLATE): A pattern, or gauge, used as a guide in repairing and retreading tires. In repairing, it is used to outline the area to be buffed inside the casing. In retreading, it is used to determine correct contour of the buffed tire for perfect fit in the mold.

TANDEM AXLES: Two or more sets of axles set one behind the other.

TAPERED BEAD: Tires with a taper on the base of the bead for compression on the rim to seal tubeless tires and to prevent tire to rim slip.

TBLS: Tubeless tire.

THERMOCOUPLE TEST: A heat study which uses special wire probes. Temperature is measured by a potentiometer or pyrometer. By following the heat developed, time and temperature to cure a specific tire in a given cure system are determined.

TIRE PAINT: A paint compatible to tire bodies used to enhance the appearance of a tire.

TOP: Test Operations Procedure (U.S. Department of Defense).

TOP CAP (TOP TREADING): A retread that covers the crown or top of a tire.

TG (tire size suffix): See 4.1.

TIRE INDEXING: Circumferential movement of the mounted tire relative to the rim (See RIM SLIP).

TIRE/WHEEL ASSEMBLY BALANCING: Adding external weights to compensate for unequal distribution of tire and wheel weight.

TIRE OVERLOADING: Applying a load to a tire which exceeds the tire rating for its operating condition.

TIRE SIZE DESIGNATIONS: See Figure 5.

TIRE STUD: A hard metal or nonmetallic rivet that is inserted into a tire tread surface for the purpose of improving traction on ice or hard packed snow.

TL: Tubeless tire.

TOE-IN: Alignment of wheels on an axle so that they are closer together at the front than at the rear.

TOE-OUT: Alignment of wheels on an axle so that they are closer together at back than at front.

TON MILE PER HOUR (TMPH): A measure of work per unit time of tires as limited by the tire's internal operating temperature.

TONNE KILOMETER PER HOUR (TKPH): A measure of work per unit time of tires as limited by the tire's internal operating temperature (refer to SAE J1015).

TPI: Tire Performance Index.

TPMS (TIRE PRESSURE MONITORING SYSTEM): Electronic system designed to monitor the pressure inside a tire and report that information to the vehicle operator.

TR (tire size suffix): See 4.1.

TR VALVE NUMBER: Code number of tube valves and rim valves set by TRA.

TRA: Tire and Rim Association.

TRACKING: Tracking is when the rear wheels of a vehicle follow the same line as the front wheels.

TRACTION: The grip or friction, pull, or bite between tire and ground.

TRACTIVE EFFORT, NET: The total force output of the traction device acting parallel to the surface of the ground and in the direction of travel of a driving wheel.

TRAILER ONLY TIRE (T/O): Tires that are designed for use on trailers only. Most trailer tires are designed for highway use and have a rib tread to reduce rolling resistance when towed.

TREAD: That portion of a tire that comes in contact with the road.

TREAD ARC: The distance from shoulder-to-shoulder measured along the contour of the tread (see Figure 1).

TREAD DEPTH: The (nominal) distance measured from the tread surface to a reference point at the bottom of the grooves in a tire.

TREAD DESIGN: The pattern of the tread area.

TREAD ELEMENTS: The parts of the tread design which are separated from each other and made distinct by the sipes and rib or lug design molded into the tire.

TREAD GUM: A rubber compound, usually 1/16 inch in gauge, used to repair spots in the tread casing or to replace that rubber removed from the casing when making a sectional repair.

TREAD LIFE: Length of service in kilometers (miles) before tread wears out.

TREAD RADIUS: The measurement of curvature of a tire tread between the shoulders of the tire (see Figure 1).

TREAD RIB: A tread section running circumferentially around a tire.

TREAD ROLLER: A roller, either manual or power, used to help apply the tread rubber, remove trapped air, and obtain adhesion.

TREAD RUBBER (TREAD STOCK): Rubber material that will replace the worn off tread portion of a tire.

TREAD SEPARATION: Tread pulling away from body of tire.

TREAD TEARING: A tearing away of a portion of the tread design.

TREAD WEAR INDICATORS: Raised portion of the base of the tread groove which appears locally smooth when the tread is worn to a predetermined depth indicating time for removal of tire from service.

TREAD WIDTH: The distance from shoulder to shoulder of a tire. (See Figure 1.)

TT: Tube-type tire.

TUBE (INNER): A relatively impermeable rubber device placed inside a tube-type tire casing that contains the inflating medium.

TUBE PLATE: A heated metal plate with a smooth surface used in making tube repairs.

TUBER (EXTRUDER OR TUBING MACHINE): Device to extrude or force uncured rubber through die of any size or shape by use of heat and pressure. The rubber stock is fed into the tuber and extruded through a die that shapes it to the size needed for the tires on which it will be applied.

UNDERCURE: A condition that describes less than acceptable vulcanization or curing.

UNDERINFLATION: Tire having less than recommended air pressure for the specific load, speed, and terrain conditions.

UNDERTREAD: Tread material between bottom of tread grooves and casing.

UNDERSTEER: A vehicle handling property in which the steer angle required to negotiate a given curve increases with vehicle speed. This condition exists when the slip angle of the front tire is greater than the slip angle of the rear tires.

USCS: Unified Soil Classification System.

USTMA: U.S. Tire Manufacturers Association.

UTV: Utility Task Vehicle.

VA (tire size suffix): See 4.1.

VEHICLE CURB WEIGHT (VCW): The weight of an empty (no payload or personnel) vehicle with full petroleum, oils, and lubricants, coolant and other stowed fluids, all Stock List Items, Components List Items, Basic Issue Items, weapons systems (if applicable) and inherent armor. The vehicle is fully functional in this configuration.

VEHICLE CONE INDEX (VCI): Minimum soil strength in the critical soil layer, in terms of rating cone index for fine grain soil (clay) or in cone index for coarse grain soils (sands), required for a specific number of passes of a vehicle, usually one pass (VCI₁) or 50 passes (VCI₅₀).

VENT HOLE: Small holes in the tread area of the matrix allows the rubber to flow and fill out the tread design.

VENTING (AWLING): The act of partially perforating a tire above the beads which allows trapped gas or moisture to escape safely and without loss of tire air retention ability.

VIRGIN SNOW: Snow, regardless of age or other quantifiable attribute, which has not been disturbed or altered from its natural state as the result of any contact with a man-made object.

VOID(S): A condition whereby the tread rubber flow fills the tread design, but does not completely fill the space between the tire casing and matrix, thereby leaving portions of the base in an unfilled condition.

VULCANIZATION: A chemical reaction that takes place under appropriate curing time, temperature, and pressure, and develops usable (tire) characteristics.

VULCANIZING CEMENT: See Cement.

WEATHER CHECKING: Fine hairline cracks caused by oxidation and other atmospheric (ozone) effects, generally observed in the sidewall surface of a tire.

WHEEL: Rotating load-carrying member between the tire and the axle, usually consisting of two major parts, the rim and the wheel disc, which may be integral, permanently attached, or detachable.

WHEEL ALIGNMENT: Adjustment of suspension and steering components to allow the tires to run in a precise manner.

WHEEL CONFIGURATION FOR NON-PNEUMATIC (AIRLESS) ASSEMBLIES:

1. An integral wheel assembly simulating a conventional pneumatic pressurized tire/wheel assembly for on/off-road use, being vehicle mounted and used as a drive or driven (trailer) wheel.
2. Configurations:
 - a. Non-Pneumatic Assembly (NPA)
 - b. Non-Pneumatic Tire (NPT)
 - c. Airless Tires.
3. Criteria for all NPA, NPT and Airless Tires shall meet equivalent size and load ratings of conventional wheel assemblies.
4. This definition does not apply to solid tires or pneumatic tires filled with a non-pneumatic medium.

WHEEL CLAMP BOLT: An externally threaded fastener which, when used with clamp nuts, serves to secure the removable wheel portion to the fixed wheel portion of a bolt together divided wheel (see Figure 3).

WHEEL CLAMP NUT: An internally threaded fastener which, when used with clamp bolts, serves to secure the removable wheel portion of a bolt together divided wheel (see Figure 3).

WICKING MATERIAL: Cord used to allow gas or moisture to escape from the tire casing.

WNS: Wave Number Spectrum. Equation describing the surface roughness in both amplitude and spatial frequency.

4. OFF-THE-ROAD TIRE TYPE CODES (SERVICE-TREAD TYPE)

C-1, C-2: Compactor tires.

E-1, E-2, E-3, E-4: Earthmoving tires designed for haulage service.

G-1, G-2, G-3: Grader tires.

IND-3, IND-4, IND-5: Industrial tires.

L-2, L-3, L-4, L-5: Loader and dozer tire designed for slow speed service.

L-3S, L-4S, L-5S: Loader and dozer tires with smooth tread patterns.

4.1 Prefix and Suffix Letters Used in Tire Size Designations

Prefix and suffix letters are included, when necessary, as part of tire size designations to differentiate between tires for service conditions which may require different loads and inflations and/or tires which must be used on different types of rims.

AT Prefix used to identify a tire intended for service on All-Terrain Vehicles.

DH Prefix used to identify a tire intended for agricultural and logging service which must be mounted on a DH drop center rim.

FRT Suffix used to identify a tire designed for free-rolling service.

HC Suffix to identify a 17.5 rim diameter tire for use on low platform trailers.

K Suffix used to identify a Compactor tire for use on 5 degree drop center or semi-drop center rims having bead seats with nominal -0.032 inch diameter.

LT Prefix used to identify radial, light truck tires for service on trucks, buses, trailers and multipurpose vehicles used in normal highway service. Also used as a suffix to identify a tire diagonal (bias) ply tire intended for service on light trucks.

MIL Prefix used to identify a tire designed primarily intended for service on military tactical wheeled vehicles.

ML Suffix used to identify mining and logging tires used in intermittent highway service.

MPT Suffix used to identify special use tires primarily designed for service on multi-purpose commercial vehicles (on- and off-road).

NHS Suffix used to identify a tire not designed for highway service.

P Prefix used to identify a tire primarily intended for service on passenger cars.

SS Suffix used to differentiate tires designed for off-highway vehicles such as mini and skid-steer loaders from other tires which use similar size designations such as 7.00-15TR and 7.00-15NHS, but may use different rim bead seat configurations.

ST Prefix used to identify special tires for trailers in highway service.

- TG Suffix used to identify off-the-road tire designed for use on rims having bead seats with nominal +0.188 inch diameter (not for highway service).
- TR Suffix used to identify tires for service on trucks, buses and other vehicles with rims having specified rim diameter of nominal +0.156 inch or +0.250 inch. This suffix is intended to differentiate among tires for passenger car, light truck, and other vehicles or other services which use similar designations. Example: 7.00-15, 7.00-15LT, 7.00-15NHS, and 7.00-15TR.
- VA Prefix used to identify a tire intended for agricultural and logging service which must be mounted on a VA multipiece rim.

5. MISSION PROFILE DESCRIPTORS

The following terrain definitions are the current definitions used to describe the attributes of these terrain types found across ground vehicle operating environments.

Primary Roads: There are three types of primary roads, high quality paved, secondary pavement, and rough pavement. All may consist of two or more lanes, all weather, maintained, hard surface (paved) roads with good driving visibility used for heavy and high-density traffic.

Secondary Roads: There are three types of secondary roads; loose surface, loose surface with washboard and potholes, and Belgian block. These roads are one or more lanes, all weather, occasionally maintained, varying surface (e.g., large rock, crushed rock and gravel) intended for medium-weight, low-density traffic.

Trails: Trails are one lane, unimproved, seldom maintained loose surface roads, intended for low-density traffic. Trails have no defined road width and can include large obstacles (boulder, logs, and stumps) and no bridging.

Cross-country: Cross-country terrain is not subject to repeated traffic. No roads, routes, well-worn trails, or man-made improvements exist.

Military Operations in Urban Terrain (MOUT): Urban terrain includes normal city planning, such as curbs, speed bumps and speed humps, as well as obstacles caused by combat operations such as explosively formed craters and rubble piles from demolished buildings.

Winter Mission Profile Terrain Description

The Over-the-Snow Trail Mission Profile consists of an operational area including 10 to 20% grades, snow covered degraded pavement, snow covered gravel roads, snow and ice covered timber, and other naturally occurring obstacles that may be present in a winter environment. The mission profile is representative of snow-covered trail terrain with low vehicle traffic.

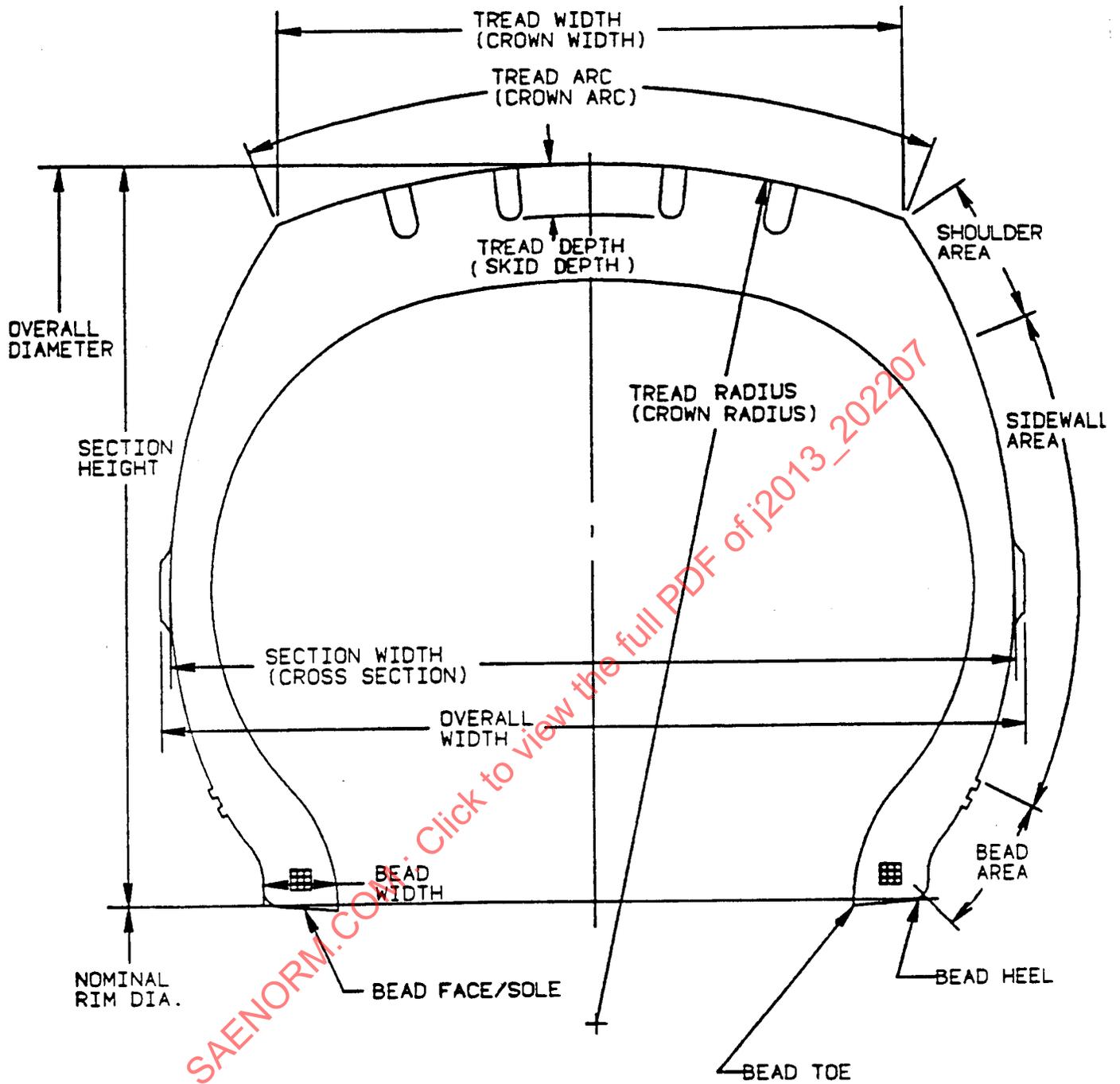


Figure 1 - Tire terminology

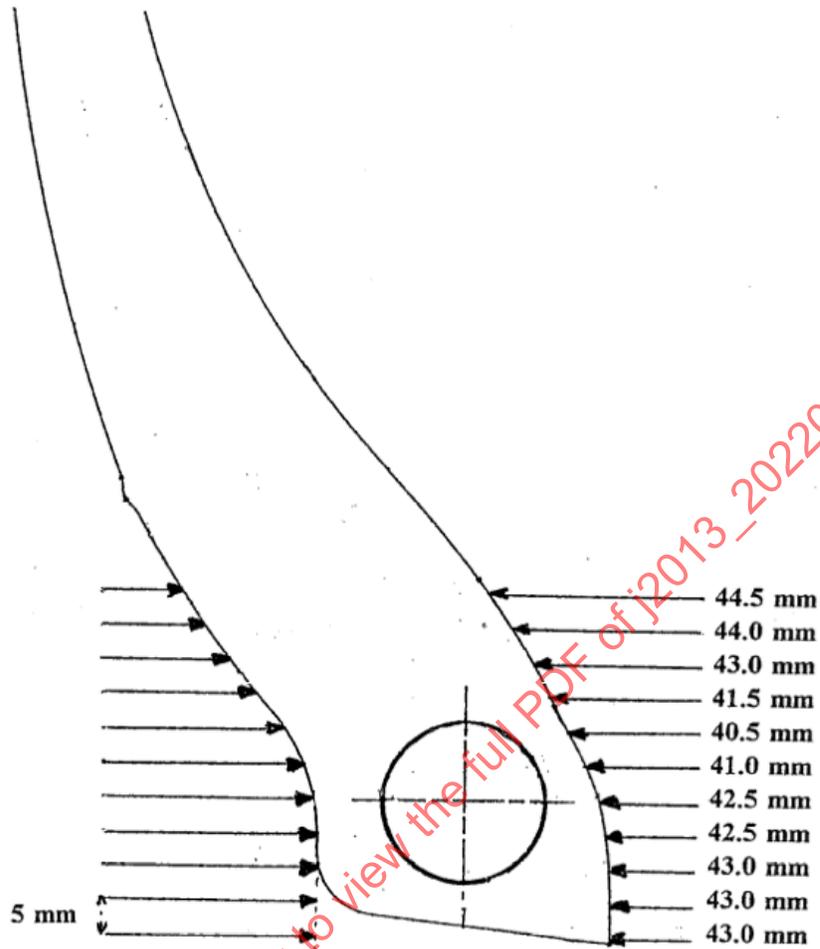
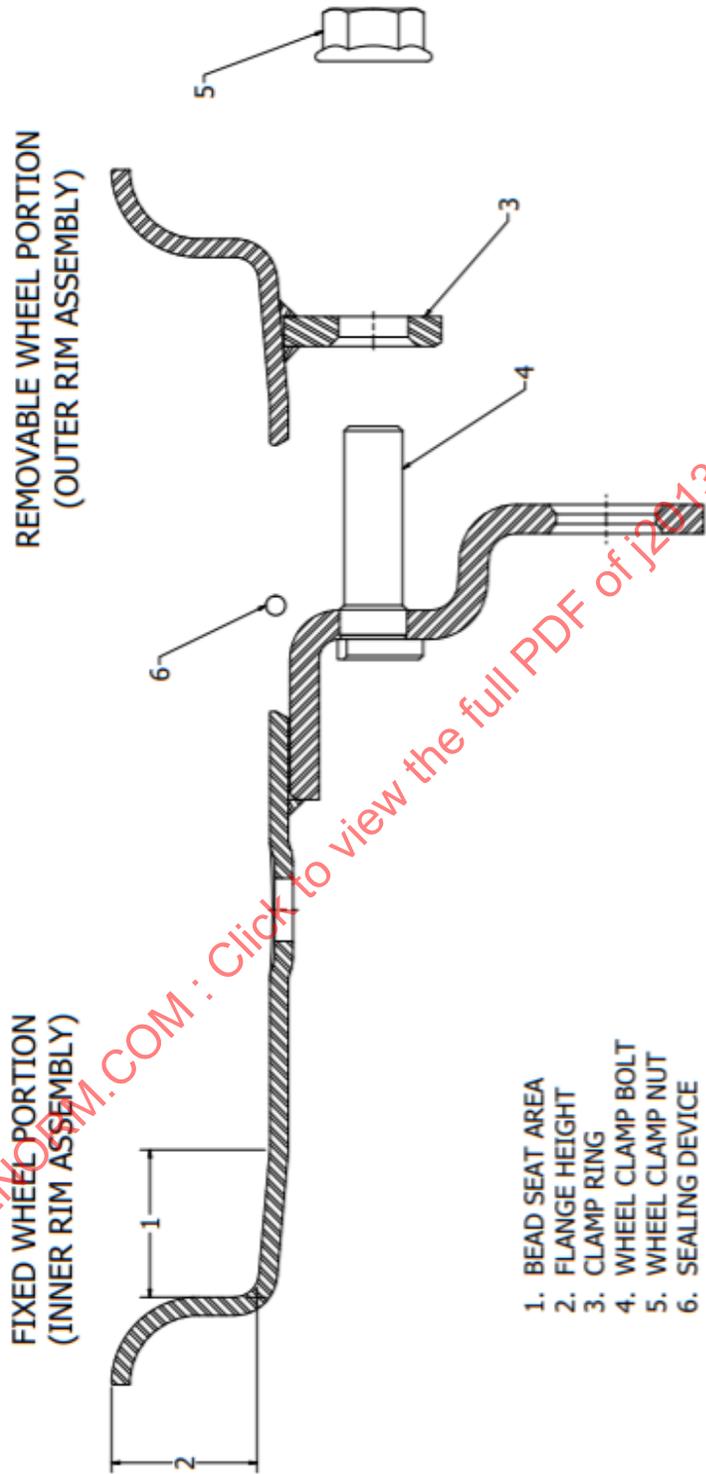


Figure 2 - Bead profile measurement example

Describes thickness of the tire bead measured from the rim flange contact to the interior surface of the tire. Typically used for design of wheel accessories such as run flat or multi-function inserts.



TYPICAL BOLT-TOGETHER, DIVIDED WHEEL

Figure 3 - Wheel configurations

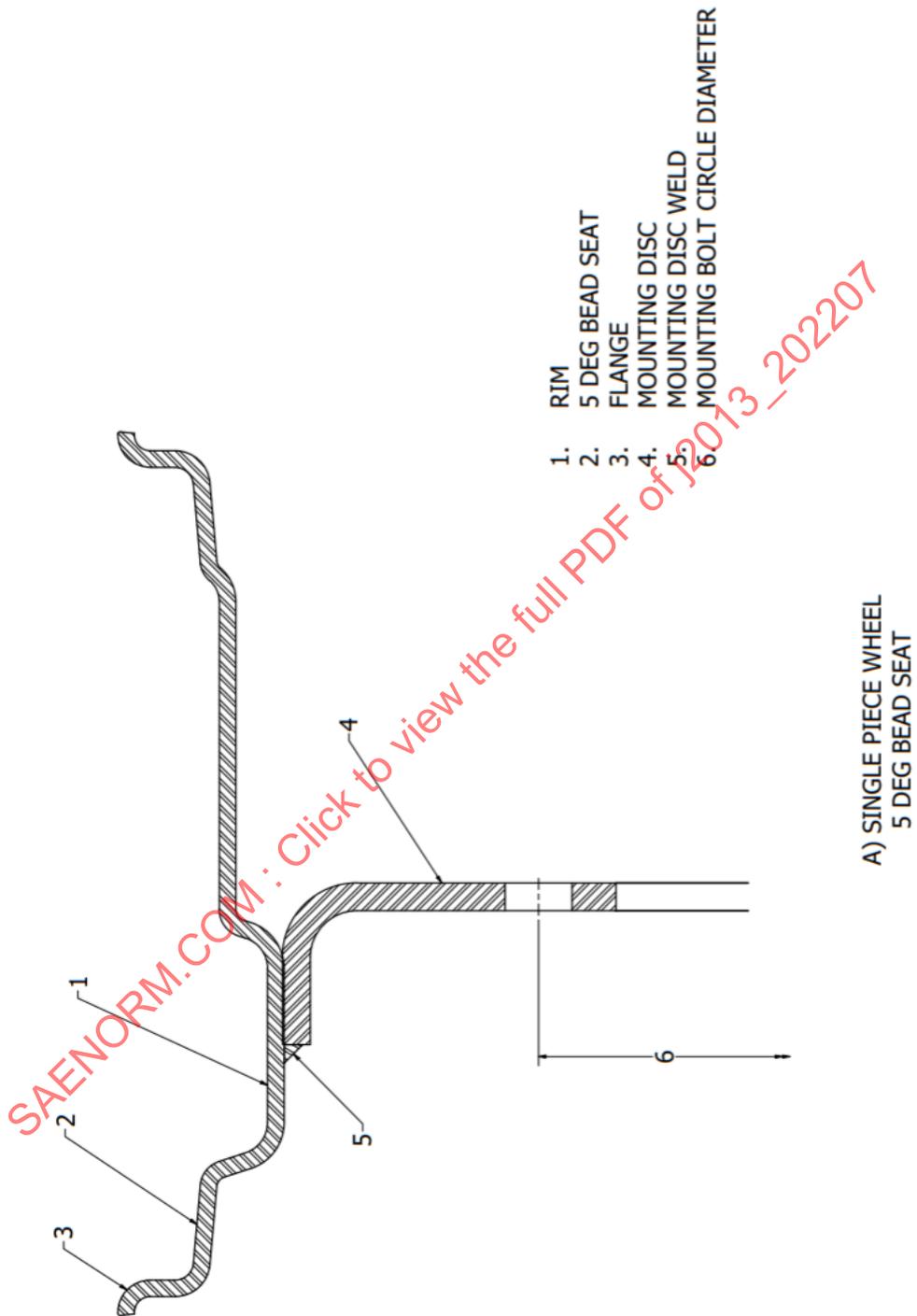


Figure 3 - Wheel configurations (continued)

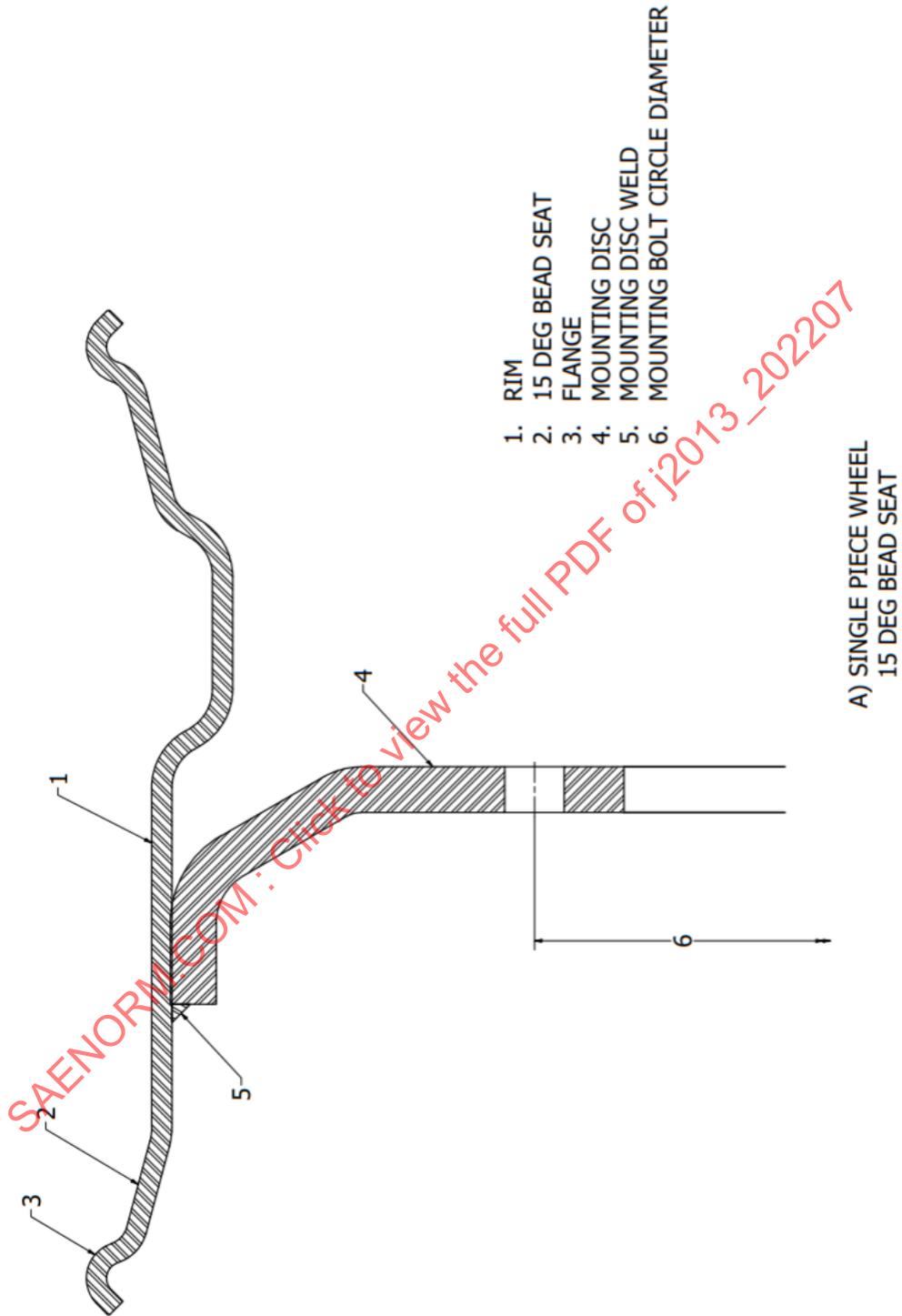


Figure 3 - Wheel configurations (continued)