RETREAD AND REPAIR MATERIALS GLOSSARY OF TERMS

ABRASION - The rapid wearing away of a tire in-service by scraping or rubbing.

ABRASION, SIDEWALL - An injury to the tire caused by scraping or rubbing it against another material or structure.

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

ACTIVATOR - Chemicals added to rubber compounds to activate accelerators to speed up the vulcanization process.

ADHESION - Bond between two cured surfaces.

ADHESIVE - See CEMENT.

AFTER CURE - The process of cool down after the rubber product is removed from direct heat vulcanization.

AGING - Evolution or change of physical and chemical properties of rubber by oxidation, heat, operating stresses or moisture 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 a tire, expressed in pounds per square inch (psi), kilopascals (kPa) or bars.

AIRBAG - An inflated flexible bag used to impart positive pressure on the article being vulcanized.

ALIGNMENT - The requirement to have all wheels on a vehicle running in the same direction. This is accomplished by adjusting various parts of the vehicle's suspension system to ensure proper handling stability and to minimize abnormal treadwear.

AMBIENT TEMPERATURE - Temperature (°F or °C) of immediate surroundings, usually room temperature.

ANTIOXIDANT - A chemical used to retard deterioration due to heat, light, oxygen or combinations thereof.

ARAMID - A class of heat resistant, high-strength synthetic fiber-type material used to form a ply cord.

ARC - See TREAD RADIUS.

ASPECT RATIO - Ratio of the section height to the section width of a tire.

ASYMMETRIC - A tread pattern or crown plies that differ in aspect or construction between the outer and inner shoulder areas of a tire. Such tires are directional.

AUTOCLAVE - A heated pressurized vessel used for vulcanizing rubber products.

AWL - A pointed, round or flat tool used to probe punctures and/or other injuries.

AWLING - See VENTING.

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

BALANCING - A process to correct for heavy or light areas of weight of a tire and/or tire/rim/wheel and wheel end assembly.

BALLAST - The addition of fluids inside a tire or external weights applied to a vehicle to increase the load of drive axles on vehicles.

BANBURY - An enclosed machine for mixing rubber and compounds.

BAND LUGGING - A method of retreading earthmover tires using hand built-up extruded lugs and autoclave cure.

BAR - Measure of pressure in international units. 1 bar = 0.9869 atm = 14.50 psi = 100 kPa. See USEFUL CONVERSION FORMULAS at the end of this document.

BASE WIDTH - A measurement of the width of the tread rubber which joins to the buffed surface of the tire.

BEAD - The anchoring part of the tire which is shaped to fit the rim/wheel; made of high tensile steel wires wrapped and reinforced by the plies.

BEAD AREA (Non-Repairable) - a specific measured dimension, based on a tire size, where an injury through the body ply material should not be repaired. These dimensions are generally found on repair material manufacturers wall charts.

BEAD AREA COVERING - The outermost material protecting the bead area while providing a tapered seat to fit the rim configuration.

BEAD BUNDLE (Non-Repairable) - Central core of the bead. A high strength, high tensile, brass plated carbon steel wire wound from a continuous strand into a high strength unit. This major structural unit provides the anchor of the tire to the rim.

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

RETREAD AND REPAIR MATERIALS GLOSSARY OF TERMS

BEAD FACE/LEDGE/SOLE - The flat portion of the bead between the heel and toe that contacts the rim/wheel.

BEAD FILLER - Sometimes called an “apex”, it is designed to provide stiffness, stability, and durability in the bead area.

BEAD HEEL - The rounded portion of the bead that contacts the rim/wheel between the bead seat and flange.

BEAD PLATE- Ring-shaped plates in molds which may be adjusted to alter the cross section of tires.

BEAD REINFORCE - May be steel, fabric or a combination of reinforcing materials to give the bead stability and strength. See CHAFER.

BEAD SEALING AREA - The face/ledge/sole and heel of the bead that contacts the rim. With tubeless tires, the bead seals to the rim and rim flange to retain air.

BEAD SEAT - The flat portion of the rim/wheel on which the bead face/ledge/sole rests.

BEAD SEPARATION - Separation between components in the bead area.

BEAD-TO-BEAD MEASUREMENT - The distance from the heel of one bead, straight up at 90°, over the crown and down the other side to a position on the heel of the other bead directly opposite the starting point. Measurement is used before retreading to predetermine the correct buffing dimensions, rubber size, and curing matrix to be used in the processing.

BEAD-TO-BEAD RETREADING - A retreading process which includes veneering of the sidewall from the shoulder to the bead.

BEAD TOE - The pointed part of the bead, opposite the heel, which faces the inside of the tire.

BEAD WIDTH - Measurement commonly used for the proper fit (bead spread) during buffing process.

BEAD WIRE - See BEAD BUNDLE.

BELT - A reinforced cord layer located circumferentially around the tire and under the tread.

BELT EDGE FILLER - A special rubber covering over steel belt edges to resist belt edge fatigue.

BELT EDGE INSERT - Helps optimize belt and body ply contours.

BELT OVERLAY - A reinforced fabric layer extending over the belts to reinforce the belt package.

BELT SEPARATION - Separation of the belts from the plies or tread, or from each other.

BELTED BIAS - See TIRE, BELTED BIAS.

BEVEL CUT - An angle cut used on tread or other splices.

BEVELED SPLICE - An approximately 45° angle cut through the gauge which allows the tread ends to diagonally overlap themselves.

BIAS PLY (DIAGONAL PLY) - See TIRE, BIAS PLY.

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

BLOW - A porous condition caused by a loss of pressure or undercure. See POROSITY.

BLOW OUT - Rapid loss of air due to rupture.

BLOW POINT - The curing time which is just less than that needed to develop a non-porous cure.

BLUE TRIANGLE - A bulge due to a section repair is allowed not to exceed 3/8” (10 mm) in height. This bulge may sometimes be identified by a blue triangular label in the immediate vicinity.

BODY - Tire structure excluding tread and sidewall rubber.

BODY PLY(IES) - Layers of rubber-coated parallel cords extending from bead to bead that encase both bead bundles and provide strength to withstand inflation pressures and tire dimensions.

BODY PLY INSERT - An additional layer of rubber on top of the body ply to add to body ply durability.

BONDING - The joining of two materials by use of adhesives or vulcanization.

BRAND NUMBER - A number branded into one or both sidewalls of a tire for identification purposes.

BREAK - A surface opening and/or damage extending into or through the cord.

BREAKER (BELT OR STRIP) - In bias/diagonal tires, 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.

BUFF CONTOUR - The specified shape of a buffed area.

BUFF(ING) - Removal of the previously vulcanized rubber surface.

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

BUFFED RADIUS - A measurement of the buffed surface curvature from shoulder to shoulder.

BUFFED SURFACE - A specifically prepared surface of a tire casing or repair area to provide proper texture to help promote adhesion to the new rubber.

BUFFED TEXTURE - That surface produced by buffing, rasping or cutting.

BUFFER - A machine used to rasp the old tread from the casing. A powered rotary rasp provides a clean, even surface for adhesion of the new tread rubber.

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

BUILD-UP - Application of tread rubber or repair rubber to a casing.

BUILDER - A machine used to apply and stitch tread rubber to a casing.

BULGE - A protrusion or raised area, usually in the tire sidewall.

BUMPING - Opening and closing of mold to center a tire, allow rubber to flow, and gases to escape.

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

BUTTONHOLE - Circular hole made at the end of an injury (usually a tear or split) that may help prevent propagation of the injury.

BUTYL RUBBER - A general purpose synthetic elastomer (rubber) produced by copolymerizing isobutylene with small amounts of isoprene. Butyl rubber has a high resistance to chemicals and low permeability to gases. Its permeability to air is 70% better than that of natural rubber and for this reason is superior for tire tubes and for tubeless tire inner liners.

BUZZ-OUT - See SKIVE.

CABLE - See CORD.

CAD/CAM (CADAM) - A computer programmed system that aids in the design and manufacture of tires, equipment or facilities.

CALCIUM CHLORIDE ($CaCl_2$) - Chemical added to prevent freezing of water ballast in farm tires.

CALENDER - A multi-rolled machine which impregnates fabric or cord with rubber and/or forms a thin-layered sheet of rubber or other material.

CALIBRATE - To measure against and adjust to a standard.

CALIPER - A device for measuring inside or outside dimensions.

CAMELBACK - Former name for die-size rubber used in retreading. See DIE-SIZE (UNCURED RUBBER).

CARBIDE CUTTER / CARBIDE BURR - A rotary cutting tool. Carbide is a hard, metallic material.

CASING - A used tire to which additional tread may be attached for the purpose of retreading.

CASING DISTORTION - Processing defect in which the natural shape of the tire is deformed by constriction in matrix during the retreading process.

CASING PLY - See BODY PLY(IES).

CAUTION - Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury; may also be used to alert against unsafe practices (ANSI Z535.3, Environmental and Facility Safety Signs).

CEMENT - An adhesive rubber compound usually dissolved in solvent used to provide building tack and cured adhesion. May be brushed or sprayed on the buffed surface. Some cements may be water-based.

CENTERLINE - Circumferential line at the center of the tire's crown area; aids in centering of the new tread.

CHAFER - Reinforcing material (rubber or fabric) in the rim flange area to prevent chafing of the tire by the rim parts. See BEAD REINFORCE.

CHAMBER - See AUTOCLAVE.

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

CHECK TEMPLATE - A precut pattern used to determine the contour of a buffed tire to check compatibility to a matrix.

CHECK VALVE - A one-way valve used to prevent pressure loss or back flow.

CHEMICAL CLEANER - A rapid-drying rubber solvent for removing matrix lubricant, dirt, and other foreign material.

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

CHEMICAL DAMAGE - Damage from petroleum products causing a softness or degradation in the sidewall rubber of the tire or in the liner.

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

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

CHEMICAL RUBBER GUM - An especially compounded repair gum which cures at room temperature by chemical action.

CHEMICAL VULCANIZING CEMENT (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.

CHLOROBUTYL (BROMOBUTYL) - Butyl rubber with a chlorine atom bonded to the butyl backbone. Chloro-butyl has a high air retention and good heat stability; is frequently used in tire innerliner compounds. Bromobutyl is another polymer used with equivalent properties.

CHUNKING - Also known as “chipping” or “chip chunk”. The breaking away of pieces of the tread.

CIRCUMFERENTIAL BREAK - A break parallel to the beads in the sidewall area.

CIRCUMFERENTIAL CRACKS - Continuous cracking on the tire or in the grooves of the tire tread running parallel to the beads.

COLD INFLATION PRESSURE - The pressure that exists when the tire has not been run for at least three hours or has been driven less than one mile at moderate speed. These are the recommended conditions at which to measure tire pressure and reflects the reference pressure(s) used by industry standardizing bodies.

COLD PATCH - See REPAIR UNIT and CHEMICAL CURE.

COLD PROCESS RETREADING - See PRECURE PROCESS.

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, which exerts pressure on the tire interior.

COMPOUND - A thorough mixture of natural and/or synthetic polymers and various ingredients designed for specific components of the tire.

CORD - The fabric or steel filaments forming the reinforcement structure in the tire.

CORD ANGLE - The angle at which the cord(s) within a tire crosses the centerline of the tread face.

CORROSION - The oxidation of steel cords and/or rim components.

COST-PER-MILE - Total cost including repairs and retreads, if any, divided by total mileage obtained from tire. In some cases “down time” may be taken into consideration.

CRACKING (TREAD or GROOVE) - Any tearing within the tread or tread grooves.

CROSS PLY - Sometimes used to refer to a bias ply tire. See TIRE, BIAS PLY.

CROSS RIB TIRE - A deep tread, drive wheel position tire with deep molded grooves that extend radially from near the center of the tread into the shoulder area.

CROSS-SECTION - A section or piece of the tire cut off at right angles to the bead.

CROSS-SECTION SIZE - External sidewall to sidewall measure of tire exclusive of ribs.

CROSS-SECTION WIDTH - See SECTION WIDTH.

CROWN - The middle part of the tread. It is the section between the should areas of a tire.

CROWN PLY - A layer or layers of ply material underneath the tread surface that stabilizes the tread area and restricts growth of the tire casing.

CROWN RADIUS - See TREAD RADIUS.

CROWN WIDTH - Term used as one of the three measure-ments of die size rubber. Also referred to as TREAD WIDTH.

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

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

CURE RATE FACTOR (CFR) - Used in curing calculations.

CURE TIME - The length of time established to achieve a desired cure state.

CURING RIM - The rim used to support the tire and/or the tube in place while curing. Not intended for vehicle/road use.

CURING TUBE - A special, heavy-duty tube placed within the tire while curing the retread or repair.

CUSHION GUM (BONDING GUM) - A tacky, rubber compound used for adhesion of tread rubber, undertread repair, build-up of other repairs or on the bottom of some repair units.

CUT-OFF RIB - The rubber pattern left on the casing as a result of the mold’s stop or flow ring. See FLOW STOP and STOP RING.

DANGER - Indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury; limited to the most extreme situations (ANSI Z535.2, Environmental and Facility Safety Signs).

DEBAGGER - A device for inserting and removing curing tubes from a retreaded tire.

DEFLATION - When a tire is in a state of collapse due to the absence of inflation pressure.

DELAMINATION - A somewhat smooth separation between layers of material.

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

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

DETREADER - A machine that delugs and buffs a tire.

DIAPHRAGM - See ENVELOPE.

DIE - Two piece metal plate with an orifice through which rubber compounds are shaped when forced through the opening by an extruder.

DIE SIZE (UNCURED RUBBER) - Dimensional size designation for retread rubber. (Example -72-76-18) First two digits are crown width in inches and 8ths. Second two digits give base width in inches and 8ths. Third number is thickness in 32nds of an inch.

DIE SIZER - Machine used to extrude tread rubber and build tires for retreading.

DIE SWELL - Swelling or expansion of rubber during extrusion.

DOT - The letters "DOT" (Department of Transportation) precedes the tire identification number (TIN) and must be molded into the sidewall of all over-the-highway tires produced by tire manufacturers and retreaders that distribute and sell tires in the U.S. This mark certifies that the tire meets or exceeds all applicable safety standards established by the Code of Federal Regulations, Federal Motor Vehicle Safety Standards.

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

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

DUROMETER HARDNESS - A numerical value obtained from the durometer that measures the resistance to indentation (hardness) of the rubber.

EDGE LIFTING - A separation of the outer edge of the tread from the casing's shoulder.

ENCAPSULATED - One material enclosed by another material.

ENVELOPE - A flexible rubber covering used to cover and retain air for a tire being retreaded.

ETRTO - European Tyre and Rim Technical Organisation. This group develops European standards for tires, rims, and valves.

EXTRUDATE - Uncured rubber compound after being passed through the die of an extruder.

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

EXTRUDER GUN - A small hand-held portable extruder used for spot application of heated rubber to the casing.

EXTRUDING - Process of forming uncured rubber compound into a given shape by passing through an extruder.

FABRIC FATIGUE - Fabric degradation and resultant loss of tire cord strength due to repeated flexing, accentuated by overloading and/or under inflating.

FAST-CURE GUM - Rubber compound which cures at a faster rate than retread rubber, and is tested at 260°F (127°C).

FEATHERING - Reduction in thickness to allow a smooth transition to match the contour of the adjacent material.

FILLER PLUG - See REPAIR PLUG.

FILLER STRIP - An uncured calendered rubber strip (usually fast-curing) used under the tread when added thickness is needed in retreading.

FILLER GUM (FILLING STOCK, REPAIR GUM) - An uncured rubber compound (usually fast-curing) used to fill in low spots or repairs on a casing.

FINGER BULGE - A localized distortion normally in the sidewall indicating a slight opening between body cord spacing or can be caused by a penetrating injury.

FINISHED BUFF - See BUFFED TEXTURE.

FLAP - A cured, shaped rubber strip which fits inside the tire to protect the tube from pinching by beads or rubbing on rim. Normally used with tube-type tires.

FLASH - Excess rubber squeezed out between edges of mold during curing process.

FLEX AREA - Circumferential area in a tire where maximum bending or flexing occurs.

FLEX BREAK - A circumferential break in fabric cords usually parallel to the beads in the mid-sidewall area.

FLEX CURE - Proprietary system using uncured tread rubber and flexible rubber molds to produce a retread in a pressure curing chamber.

FLEX ZONE - Reference to the area of a radial tire from the shoulder apex to mid-sidewall where only the body ply supports the casing profile.

FLOW CRACK(ING) - A surface crack caused by improper rubber flow when a tire (or retread rubber) is shaped in the curing process.

FLOW STOP - A design feature in the mold which stops the flow of new retread rubber. See STOP RING.

FOOTCANDLE (FC) - A unit of illuminance or illumination, equivalent to the illumination produced by a source of one candle at a distance of one foot and equal to one lumen incident per square foot.

FULL CAPPING/TREADING - A mold cure process that replaces the sidewall shoulder area and the tread area. This process would cover to the stop ring of the mold or matrix.

FULL-CIRCLE MATRIX (MOLD) - Mold or curing band for retreading made in a continuous circle as opposed to a segmented mold.

FULL-SERVICE REPAIR FACILITY - A facility with the proper equipment, repair materials, and trained personnel to perform a full range of tire repairs -- such as puncture, spot, reinforcement, and section -- off the rim.

GAUGE - Thickness, usually expressed in 32nds of an inch for tread rubber or by the decimal system for repair gums (millimeters for metric system). See TREAD DEPTH GAUGE.

GG RING - See GUIDE RING (RIB).

GLYCERINE - A syrupy liquid used in air bags to help prolong the life of the rubber. It should only be used if specifically prescribed on the instruction tag from the air bag manufacturer.

GREEN TIRE - A built tire (new or retreaded) before being cured.

GROOVE - Space between two adjacent tread ribs or lugs.

GROOVE CRACKING - See CRACKING.

GROOVE VOID DEPTH - Measurement of the perpendicular distance from a real or calculated reference, defined by edges of two adjacent ribs (lugs) to the lowest point of contact in the groove (void).

GROOVING (SCULPTING) - The cutting of a tread design into tread rubber when a design does not already exist.

GUIDE RING (RIB) - A rib of raised rubber running around a tire just above the bead to indicate proper mounting and seating of the tire on the rim.

GUM STRIP - A thin gauge piece of rubber normally wrapped around the end of a cut fabric or steel belt ending to relieve stress.

HARDNESS TEST - Measure of resistance to penetration of rubber by use of durometer. See DUROMETER HARDNESS.

HEAT CURE - Repair unit activated by heat and pressure.

HEAT PAD (HEAT BOOSTER) - An electric heating unit which provides heat to cure repairs.

HEEL - See BEAD HEEL.

HOLLAND CLOTH - A completely filled, woven fabric with a smooth finish on both sides, used to separate rubber from adjacent materials.

HOT CAPPING - See MOLD CURE RETREAD PROCESS.

HYSTERESIS - Measure of energy loss expressed in degree of temperature build up.

IMPACT BREAK - In a tire, a break usually in the shape of an “X”, “Y” or star, which can be seen from the inside of the tire, or a break usually in the shape of an “I” which can be seen from outside of the tire.

INFLATION (PRESSURE) - The minimum cold tire inflation pressure required for specific load and speed conditions. See COLD INFLATION PRESSURE.

INJURY (INJURIES) - Any damage caused by a penetrating object or severe scuff or impact.

INJURY SIZE - Widest opening in the cord body after skiving and buffing.

INNER LINER (LINER) - The layer(s) forming the inside surface of a tubeless tire that contains the inflating medium within the tire.

INNER LINER REPAIR MATERIAL - A special repair material specifically for inner liners.

INNER LINER SEALANT - Liquid or semi-solid material which is used to coat the inner liner.

INNER LINER SEPARATION - The parting of the inner liner from the body ply material.

INNER TUBE (TUBE) - An airtight rubber membrane (bladder) placed inside the casing of a pneumatic tire to hold air.

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

INSPECTION (TIRE) - The process of checking and assessing the suitability of a tire or casing for further stage of manufacturer or service.

INTERNATIONAL TIRE AND RUBBER ASSOCIATION (ITRA)- Formerly the ARA. See TIRE INDUSTRY ASSOCIATION.

JATMA - Japan Automobile Tyre Manufacturers Association. This group develops Japanese standards for tires, rims and valves.

KETTLE CURE - See AUTOCLAVE.

KEVLAR - A high-strength synthetic fiber-type material used to form a ply cord and is a registered trademark of DuPont.

KILOPASCAL (kPa) - A unit of pressure. 1 kPa = 0.1450 psi. See USEFUL CONVERSION FORMULAS at the end of this document.

KINKED BEAD(S) - Damage resulting in a sharp permanent bend in the bead wire at one or more points around the circumference of the bead.

LIGHT TREAD - Failure of tread stock to completely fill the mold, especially at the edges of design elements.

LINER - This term can also refer to protective poly materials used for packaging precured tread rubber. See INNER LINER.

LIQUID BALLAST - A liquid solution (usually calcium chloride) placed inside a tire to add unsprung weight.

LOAD INDEX - A numerical code associated with the maximum load a tire can carry at the speed indicated by its speed symbol under specified conditions.

LOAD RANGE - A letter designation (example A, B, C, D, E, etc.) following tire size designation, 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 Tire and Rim Association, Inc. tables.

LOAD RATING - The maximum load a tire is rated to carry for a given usage at a specified cold inflation pressure.

LOCAL SERVICE - An application in which operation is limited to speeds not to exceed 55 mph for not more than 60 continuous minutes.

LOW PROFILE (ASPECT RATIO) - A tire in which the ratio of cross-section height to section width (80% or less) is lower than that of a conventional tire.

LOW-TEMPERATURE GUM - A rubber compound which cures at a faster rate than fast-cure gum, usually tested at 260°F (127°C) or 200°F (93°C).

LUBRICANT - A substance that lessens or prevents friction or difficulty and eases release.

LOCK RING - Removable, split rim locking ring that holds rim flange on a multi-piece rim.

LUG - A discontinuous tread element.

LUG REINFORCEMENT - Supporting tie bar or buttress designed to reinforce tread elements.

LUG TEARING - Ripping of the lug, sometimes resulting in removal by violent operation or mechanical interference.

LUX (LX) - A unit of illumination, equivalent to 0.0929 foot-candle and equal to the illumination produced by luminous flux of one lumen falling perpendicularly on a surface one meter square.

"M" DIAMETER - Diameter at the base of the tread design; matrix undertread diameter.

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

MANUFACTURER (TIRE) - The name of a company or wholly owned subsidiary making the tire.

MASTER BATCH - Homogeneous mixture of rubber and other materials for use as raw material to produce tread compound.

MATRIX (MATRICES) - Aluminum or steel rings or segments which form the cavity in which the retread 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.

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

MILLIMETER (mm) - A metric unit of measure. 1 mm = 0.039 inches (or 25.4 mm = 1 inch). See USEFUL CONVERSION FORMULAS at the end of this document.

MILLING - Process of breaking down raw rubber and blending with curative ingredients and other compounds.

MODULE - Small pressure chamber used in precure systems holding one to four tires at a time.

MODULUS - The force expressed in pounds per square inch (or kilograms per square centimeter) required to stretch a piece of rubber to a given elongation.

MOISTURE BLOWS - Ply separations caused by the expansion of moisture in the casing when heated during curing; usually shows up when removed from matrix.

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

MOLD BLOW - A porous condition caused by a loss of pressure or under cure.

MOLD CURE RETREAD PROCESS - The fitment and vulcanizing of uncured tread rubber to a properly buffed and sized casing in a mold or matrix system.

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

MOLD SIZING - Measuring the tire casing to determine proper mold fit. Usually a combination of bead-to-bead or cross section and tire circumference is used.

MOLDING SHRINK - Shrinkage in rubber gauge as the rubber is vulcanized, usually within a 2-3% range.

MONSANTO RHEOMETER (ODR) - Instrument used to determine curing characteristics of rubber compounds.

MOONEY SCORCH - See SCORCH TIME.

MOONEY VISCOSITY - Common expression for uncured compound plasticity measured by a laboratory machine.

NAIL HOLE - See PUNCTURE.

NATIONAL TIRE DEALERS & RETREADERS ASSOCIATION (NTDRA) - See TIRE INDUSTRY ASSOCIATION (TIA).

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

NON-SKID DEPTH - See TREAD DEPTH.

OFF-CENTER TREAD - A tread that is not symmetrically distributed from the centerline of the casing; or lateral displacement of the tread with respect to the centerline of the casing.

OFF-REGISTER TREAD - A tread with the design off (i.e., not matching up) at the mold parting line either circumferentially or radially.

OPEN SPLICE - Any parting of a splice.

OPTIMUM CURE - That state of cure at which the rubber compound exhibits the most satisfactory physical properties.

OCCUPATIONAL HEALTH & SAFETY ADMINISTRATION (OSHA) - The federal agency responsible for establishing and enforcing safety and health regulations in the workplace.

ORBITREAD MACHINE - A combined tuber-builder that applies tread rubber to a tire in ribbon form, and in a spiral configuration.

OUT OF ROUND - The eccentricity of a tire or tire and wheel assembly.

OVERALL BUFF WIDTH - The specified amount of buff required to properly fit a tread to a casing.

OVERALL DIAMETER (O.D.) - Measurement of a tire when inflated and mounted on rim. Or, the measurement used to size a buffed tire (while the tire is inflated) usually checked by using a diameter tape rule.

OVERCURE - Curing in excess of optimum cure. Excessive overcure can result in the deterioration of certain physical properties. See REVERSION.

OVERFLOW - Excessive tread compound at the mold parting line or at the edge of the matrix skirt which should be trimmed or buffed off. See FLASH.

OVER INFLATION - Inflation of a tire beyond the tire's recommended pressure.

OVERLOADING (TIRE)- A condition in which the vehicle is carrying more weight than the tire is rated to carry at a specific inflation pressure. 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. See TIRE AND RIM ASSOCIATION YEARBOOK.

OXIDATION - The reaction of oxygen with rubber or steel, usually evidenced by a change in the appearance (discoloration) of the surface, a change in physical properties, corrosion or wire rust.

OZONE - 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 the environment.

PADDING GUM - Heat resistant rubber used under tread rubber to build up its size for mold fit. See FILLER GUM.

PANTOGRAPHING - Angular movement of diagonal plies in tire shaping or deflecting.

PATCH - See REPAIR UNIT.

PATCH-PLUG - Combination of a patch repair unit and a repair plug. See REPAIR UNIT.

PEAKING - A condition, usually in the cushion, resulting from local material starvation and excessive flow from adjacent areas.

PENETRATION - Damage to a tire caused by a piercing object that may or may not puncture the inner liner of the tire casing.

PERFORATED POLY - Polyfilm that covers the tread to create lubrication between the tread and envelope during curing.

PERFORATION - Damage completely through a tire caused by a piercing object.

PERMANENT TIRE REPAIR - An off-the-wheel tire repair performed by a trained technician. The tire is fully inspected and a repair, which meets the manufacturers' recommendations for injury size and is completed using industry approved procedures, is installed on the inner liner of the tire after the penetrating injury is filled with rubber.

PLASTICITY - Resistance of an uncured rubber compound to distort or flow under pressure.

PLASTICIZER - A chemical compound added to natural and synthetic rubber to impart softness, flexibility or resiliency.

PLY (PLIES) - A layer of rubber-coated parallel cords.

PLY ADHESION - Strength of bonding between adjacent plies, usually expressed as the force required to separate them.

PLY RATING - An indication of tire casing strength and load-carrying capacity, expressed as numbers, letters, and/or symbols; does not necessarily represent the

number of cord plies in the tire. See LOAD INDEX and LOAD RANGE.

PLY SEPARATION - The loss of adhesion between adjacent plies.

PLY TURN-UP - The part of the body ply that wraps under the bead bundle and ends in the tire sidewall.

PNEUMATIC PRESSURE - Air pressure.

POLYFILM - A thin strip of polyethylene applied to the precure tread surface, after building, that helps to extend the life of an envelope and helps eliminate sticking to the cushion.

POROSITY - Small air bubbles created when rubber is cured at insufficient pressure and/or time.

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

POUNDS PER SQUARE INCH (psi) - A measurement of pressure. 1 psi = 6.895 kPa (or 1 kPa = 0.1450 psi). See USEFUL CONVERSION FORMULAS at the end of this document.

PRECURE PROCESS - The process of using precured tread and bonding it to a prepared casing with a thin layer of cushion gum (compound reach in natural rubber). Temperatures used range from 210°F (100°C) to 320°F (161°C).

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 tacky rubber compound used to bond the precured tread to the prepared surface.

PRE-DRYING - Drying of a tire in a heated room, chamber or device to remove moisture before retreading. See DRYER**.**

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

PRESSURE TREAD - Proprietary system for applying extruded, patterned, uncured tread onto a buffed casing, without use of molds, in a single operation.

PROCESSING - Various stages in the production of a new or retreaded tire.

PROFILE DIE - An extruded die size configuration other than a rectangle.

PROTECTOR PLY/BELT - A ply added primarily to protect the structural belts, which may be removed during retreading (if extensively damaged).

PUNCTURE - A penetration through the tire, made by a small object.

PUNCTURE REPAIR - See REPAIRED TIRE.

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

R.A.R. - Returned As Received. A casing rejected for retreading.

RADIAL CRACKING/CRACKS - Cracks in the shoulder or sidewall of a tire, running perpendicular to the beads.

RADIAL PLY - See TIRE, RADIAL.

RADIAL RUNOUT - A measure of out-of-roundness; tested by rotating the inflated tire and observing or measuring how far the surface of the tread varies from a true circle.

RADIAL SPLIT - See BREAKS.

RADIAL SPLIT BREAK - A break of the sidewall perpendicular to the beads that has not damaged the cords.

RADIAL TIRE - See TIRE, RADIAL.

RAM EXTRUDER - Hydraulically operated batch loading machine for producing various extruded shapes of rubber.

RASP - A tool with raised points used for removing and texturizing rubber surfaces.

REAM - To clean an injury or hole prior to repair.

RECAPPING - An improper term for retreading. Often refers to process known as “top-capping” in which rubber is applied to tread surface only.

REGULATOR (REDUCING VALVE) - Pressure-regulating device used for controlling steam or air pressure to a desired level.

REGROOVING - The cutting into an existing tread design to a depth greater than that provided by the new tire manufacturer or retreader. 49 CFR Federal Motor Vehicle Safety Standards Part 569 regulations apply.

REINFORCED SHOULDER REPAIR (RSR) - Procedure guidelines for size selection and placement of repairs for penetrations up to 5/16” in the shoulder of truck tires.

REINFORCEMENT - Material, usually rubber and fabric, vulcanized to the tire to add strength to the tire cord body at an injury.

REINFORCEMENT REPAIR - See REPAIRED TIRE.

RELUGGING - A method of retreading agricultural and off-the-road tires using hand-applied preformed lugs and kettle cure. See BAND LUGGING.

REMOLDING - A bead-to-bead retreading process by which tread and sidewalls are renewed to give a new tire appearance.

REPAIR GUM - A soft, tacky, usually fast-curing rubber compound used in tire repairing; available in sheet, strip and rope form. Typically used in section and spot repairs.

REPAIR MATERIAL - Specifically designed material (repair units, repair gums, cements, etc.) used during the repair process of a tire or tube.

REPAIR PLUG - Specifically designed material (stems, repair gums, cements, etc.) used during the repair process of a tire.

REPAIR SEALANT - Liquid or semi-solid materials used to cover over-buffed areas around repair units.

REPAIR UNIT (PATCH, PLUG, PATCH/PLUG COMBO) - A specially designed unit made of fabric and/or rubber that is applied to a tire or tube to restore tire and/or tube integrity.

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:

Puncture Repair: Off-the-wheel repair(s) of any injury caused by a penetrating object. (NOTE: The type of repair is determined by size, depth and location of injury.)

Reinforcement Repair: Repairs, larger than a reinforced puncture repair, made to the casing when an injury has extended through 25% but less than 75% of the tire body, requiring both filling material and reinforcing patch.

Section Repair (Bias/Radial Tire): Repairs, larger than a reinforced puncture repair, 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 patch. (NOTE: The type of repair is determined by size, depth and location of injury.)

Spot/Surface Repair (Bias Tire): Repairs made to the casing by vulcanizing rubber to a tire without using reinforcing materials and the injury penetrates less than 25% of the body plies.

Spot/Surface Repair (Radial Tire): Repairs made to the casing by vulcanizing rubber to a tire without using reinforcing materials and the injury does not extend to the cords.

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

RETREADABILITY - Ability of the tire casing to be retreaded and provide acceptable performance.

RETREAD TIRE (RETREADING) - A casing to which new tread rubber has been vulcanized to the prepared surface to extend the service life of the tire.

RETREAD SEPARATION - A separation between the tread rubber and the buffed tire casing.

REVERSION - Deterioration of a rubber compound's physical properties due to an excessive accumulation of heat history.

RIM - The outer support part of a wheel, usually metal, for a tire or a tire and tube assembly on which the tire beads are seated. See WHEEL.

RIM DIAMETER (NOMINAL) - The named rim diameter within 0.5 inch increments, (22", 22.5", 17.5", etc.).

RIM FLANGE - The part of the rim that supports the bead above the heel and resists lateral internal pressure.

ROLLING RESISTANCE - The resistance of a tire to free rolling.

ROPE RUBBER - Uncured repair gum supplied in continuous cylindrical form to be used in a hand-held extruder, generally for tire repairing.

RUBBER BUFFINGS (BUFFING DUST) - Loosened rubber particles from buffing the tire.

RUBBER CEMENT - See CEMENT.

RUBBER HARDNESS - Resistance of rubber to penetration by blunt point. Durometer "A" hardness tester is commonly used to measure hardness. See DUROMETER HARDNESS.

RUBBER MANUFACTURERS ASSOCIATION (RMA) - See US TIRE MANUFACTURERS ASSOCIATION (USTMA).

RUBBER SEPARATION - The lifting or parting of component parts from adjacent rubber parts of the tire.

RUN FLAT CONDITION - Tire damage resulting from operating with low or no air pressure, sometimes identified by repetitive liner cracking or discoloration.

RUN-FLAT TIRE - A pneumatic tire designed to carry the load for a limited distance if the tire is deflated.

RUST - See CORROSION.

SCORCH (CURED RUBBER) - A soft, tacky surface that occurs during the buffing or skiving processes due to excessive heat. Bonding/adhesion will be adversely affected by scorched rubber. See REVERSION.

SCORCH (GREEN RUBBER) - Premature vulcanization of rubber caused by excessive heat during processing. Scorched compounds will not mold properly nor develop satisfactory adhesive properties.

SCORCH TIME - Time (in minutes) as measured by a laboratory test instrument at which the compound starts

to cross-link or vulcanize. It relates to the shelf life and processability of the compound.

SCRAPER - A hand-held tool used to remove contaminants from the inner liner surface prior to mechanical buffing.

SECTION REPAIR - See REPAIRED TIRE.

SECTION WIDTH (CROSS-SECTION WIDTH) - The maximum width of the inflated tire including the normal sidewalls, but not including side ribs, scuff bars or decorations.

SECTIONAL BAG (AIR-STEAM) - A rubberized fabric bag, which is placed inside a tire and inflated in a section mold, that applies pressure for curing to the injured/repaired area.

SEGMENTED MOLD - Multi-piece mold segments which open to insert a tire and then close together to form a continuous circle.

SEPARATION - Lack of adhesion between any adjacent materials in a tire.

SET-UP - Premature vulcanization of a rubber compound during process or storage.

SHEAROGRAPHY - A non-destructive inspection method using laser technology.

SHELF LIFE - The recommended period of time (stated by the product's manufacturer) for which that product may be applied and/or utilized before it degrades and/or is no longer effective or serviceable.

SHOULDER AREA - Transitional area between the tread and sidewall (including the outer edge of the tread and uppermost sidewall area of the tire); in radial tires includes the outer edges of the belts.

SHOULDER RADIUS (BUFFED) - The buffed contour as applied to the shoulder area of the tire.

SIDEWALL AREA - That portion of a tire between the tread and bead area.

SIDEWALL RUBBER - A non-structural element designed to protect the body ply from contact with damaging objects or weathering.

SIDEWALL SEPARATION - A lack of adhesion between components in the sidewall.

SIPE - Relatively small straight, angular or curved slots, other than grooves, molded or cut in the tread surface.

SKID DEPTH - The distance between the tread surface and the deepest groove as measured in the mold. See TREAD DEPTH.

SKIM (SKIM COAT) - Rubber surrounding ply fabric or steel cords.

SKIRT - See MATRIX SKIRT.

SKIVE (SKIVING) - The removal of injured or damaged materials.

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

SOAPSTONE - A soft talc-like powder used as a mold release agent or as an anti-stick.

SOLVENT (RUBBER SOLVENT) - A liquid which will soften and dissolve uncured rubber, dilute cement, remove contaminants and increase the tackiness of uncured rubber surfaces.

SPACER RING (SPACERS) - 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.

SPECIFICATION - Written requirements for process or materials.

SPECIFIC GRAVITY - Ratio of the weight of a given volume of any substance to that of the same volume of water. The higher the specific gravity, the denser or heavier the substance.

SPLICE - The junction formed by joining the two ends of a tire component.

SPOT REPAIR (BIAS) - See REPAIRED TIRE.

SPOT REPAIR (RADIAL) - See REPAIRED TIRE.

SPOTTER (SPOT PRESS) - A small heat vulcanizing unit used in localized repairing tires and tubes.

SPREADER (TIRE SPREADER) - A machine used for spreading the beads of a tire during inspection and/or repairing.

STANDARD PROFILE (ASPECT RATIO) - Tube-type tires that are 100 aspect ratio; tubeless tires that are 90 aspect ratio.

STANDARD RIM - A rim that meets the precise measurements specified by the Tire and Rim Association, Inc., or other standardizing bodies.

STEAM TRAP - An automatic device for discharging the accumulated water of a steam pipe or vessel, while maintaining pressure.

STEEL BELT PACKAGE - The layering of multiple steel belts designed to stabilize the tread, provide strength, and protect the air chamber from punctures.

STICKLEBACK - A rounded metal hand tool with raised points used to clean and ream injuries in bias ply tires.

STIPPLE (STIPPLING) - To aggressively apply and work in cement with a brush to a buffed surface or exposed cords.

STITCHER - A hand held tool (or power equipment) used for stitching. See STITCHING.

STITCHING - A procedure of applying pressure to remove trapped air and improve rubber contact for better adhesion.

STOP RING - A design feature in the mold which stops the flow of new retread rubber. See FLOW RING.

STRIP RUBBER - Uncured rubber in strip form most commonly used in cold feed extruders.

STRIPPING STOCK - An uncured rubber stock used to extend or build up an area.

STRUCTURAL PLIES - Body and belt plies that contribute to casing strength.

TACK - Stickiness of a rubber surface.

TALC - See SOAPSTONE.

TECHNICIAN - A person who has undergone a formal, structured training program and demonstrates the ability and skill to perform specific technical functions.

TEMPLATE (BUFFING TEMPLATE) - A pattern used as a guide in repairing and retreading tires. In repairing, it serves to outline the area to be buffed inside the casing. In retreading, it is used to determine the correct contour of the buffed casing.

TEMPORARY TIRE FIX - A system capable of addressing a through-the-tire penetration (or puncture) by restoring and maintaining air pressure to provide temporary mobility of the tire. None of these methods are considered permanent tire repairs and may have speed or distance warnings on the package labels. Temporary tire fix methods include (but may not be limited to):

- Canisters containing pressurized foam which is applied through the valve stem.
- Sealant kits that include a compressor and liquid media applied through the valve stem.
- A rubberized string or rope 'plug' installed in the penetrating channel.

TEXTURE - See BUFFED TEXTURE.

THERMOCOUPLE TEST - A cumulative heat study using special equipment to determine the proper cure time.

TIE BARS - Bridge of rubber molded across base of tread groove to stabilize some designs.

TIRE - See below.

TIRE, BIAS PLY/DIAGONAL - A pneumatic tire in which the ply cords extending to the beads are laid at alternate angles substantially less than 90° angle to the center line of the tread.

TIRE, BELTED BIAS - A pneumatic tire with a bias ply casing and reinforcing belts extending from shoulder to shoulder (usually at about a 25° angle).

TIRE, RADIAL - A pneumatic tire structure in which the casing ply cords extend to the beads and are laid substantially at 90° angle to the center line of the tread, the casing being stabilized by an essentially inextensible circumferential belt.

TIRE AND RIM ASSOCIATION, INC. (TRA) - Industrial association of tire, rim and valve manufacturers. The purposes of TRA include the establishment and promulgation of interchangeability standards for tires, rims, and allied parts for the guidance of manufacturers of such products, designers and manufacturers of motor vehicles, aircraft and other wheeled vehicles and equipment, and governmental and other regulatory bodies.

TIRE ASSOCIATION OF NORTH AMERICA (TANA) - Formerly NTDRA. See TIRE INDUSTRY ASSOCIATION.

TIRE INDUSTRY ASSOCIATION (TIA) - TIA was created out of the merger between TANA and ITRA. This group represents all sectors of the North American replacement tire market and provides technical assistance and training to the tire and transportation industries in all areas relating to tires and wheels, including tire service, retreading, repairing, and rubber recycling.

TIRE PAINT - A black paint, compatible with the tire, used to enhance the appearance of a tire.

TIRE RETREAD AND REPAIR INFORMATION BUREAU (TRIB) - An industry-supported association dedicated to the recycling of tires through tire retreading and repairing.

TOLERANCE - The amount of variation allowed from a specification.

TOP CAPPING - A mold cure retread process where only the tread is replaced.

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

TREAD DEPTH - The distance measured from the tread surface to the bottom of the grooves in a tire.

TREAD DEPTH GAUGE - Instrument used for measurement of depth of tread design grooves in 32nds of an inch or in millimeters.

TREAD DESIGN - The pattern/design on the tire's tread.

TREAD GROOVES - The space between two adjacent tread ribs, lugs or bars.

TREAD GUM - A rubber compound designed to make a tread-area repair.

TREAD RADIUS - A measure of the tread surface curvature from shoulder to shoulder.

TREAD RIB - A continuous circumferential element of a tread design.

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

TREAD RUBBER - Compounded, natural or synthetic rubber which is placed on a buffed casing and vulcanized to provide a new wearing surface.

TREAD RUBBER EXTRUDER - A machine designed to convert strip rubber into the required profile for application directly to the prepared casing.

TREAD RUBBER (TREAD STOCK) - Rubber compound which will replace the worn tire tread.

TREAD RUBBER & TIRE REPAIR MATERIALS MANUFACTURERS GROUP (TRMG) - A national trade association for manufacturers of tread rubber and other retreading and repair materials.

TREAD SEPARATION - A lack of adhesion between the tread and the tire casing.

TREAD WEAR - The normal loss of tread rubber due to abrasion during tire service.

TREAD WEAR INDICATORS - Narrow bars of rubber molded at a height of 2/32-inch (2 mm) across the bottom of the tread grooves. Tire tread worn to 2/32nds must be removed from service.

TREAD WIDTH - The measurement across the tread face of a tire from shoulder edge, which defines the usable width of the tread pattern.

TUBELESS - A pneumatic tire that does not require an inner tube for air retention.

TUBE-TYPE - A pneumatic tire that requires an inner tube for air retention.

UNDERCURE - A condition which describes less than acceptable vulcanization.

UNDERINFLATION - Tire having less than recommended air pressure for the load being carried. Tire may build up excessive heat that may be dangerous and could result in sudden tire destruction.

UNDERTREAD - The gauge of the rubber between the bottom of the tread grooves and outermost ply or belt.

UNIFORMITY - A measure of the tire's ability to run smoothly and vibration free. Some examples of uniformity measurements are, tire balance, out of round condition or radial and lateral run-out.

UNSERVICEABLE - See R.A.R.

US TIRE MANUFACTURERS ASSOCIATION (USTMA) - The national trade association for the rubber products industry. Its membership includes the major domestic tire manufacturers in the U.S. as well as manufacturers of various rubber products including tires, hoses, belts, seals, molded goods, etc. USTMA represents the industry before legislative and regulatory bodies as well as provides consumer, scrap tire, statistical/market information analysis, technical, maintenance, and safety publications.

VALLEY DIE - An extruded die size configuration, which from a cross view shows the shoulders higher than the center portion.

VALVE STEM - Tube through which air flows in or out of a tube or tubeless tire.

VENEERING - Application of a thin layer of rubber materials used in bead-to-bead retreading to cover the prepared sidewall.

VENT HOLE - Small holes through the matrix, which allow air to escape and the rubber to flow and fill out the tread design.

VENTING - A procedure performed on bias tires to facilitate the evacuation of air.

VENTING, CASING - The act of partially perforating a bias tire through the outer rubber into the fabric, which allows trapped air to escape without loss of tire air-retention ability.

VENTING, REPAIR - Cord or string used to allow air to escape from the repaired area and the fabric tire casing to the exterior of the tire.

VISCOSITY - See MOONEY VISCOSITY and PLASTICITY.

VOIDS - Air pockets within the structure of a tire (Example: within or under the retread tread rubber.)

VULCANIZATION - A chemical reaction which takes place under appropriate time, temperature, and pressure. See CURE.

VULCANIZING CEMENT - See CEMENT and CHEMICAL VULCANIZING CEMENT for chemical curing.

WARNING - Indicates a potentially hazardous situation, which if not avoided, could result in death or serious injury (ANSI-535.2, Environmental and Facility Safety Signs).

WEATHER CHECKING - See OZONE CHECKING.

WHEEL - A combined rim and disk with a bolthole pattern for securing the tire assembly to the vehicle.

WICK (WICKING MATERIAL) - Material or device used in precured retread systems to allow free passage of air to atmosphere. In mold cure retreading, wicks may be built into tire using cord to allow trapped air in casing to escape during cure.

WICKING - An act of air escapement from the tire casing or from under an envelope by means of the wick.

WIRE BRUSH - A hand held tool (or attachment to a power tool) that is used to clean and texturize surfaces prior to retreading and/or repairing.

X-RAY - A non-destructive inspection method using electromagnetic radiation passed through an object to provide a photographic image.

ZIPPER RUPTURE - As a result of being operated significantly underinflated and/or overloaded, multiple ply cords break, thus creating a circumferential rupture in the upper sidewall area of a steel cord radial tire and is accompanied by instantaneous air loss and explosive force. (For inspection procedures, please see the RMA TISB Vol. 33 Inspection Procedures for Zipper Ruptures in Steel Cord Radial Medium or Light Truck Tires and accompanying wall chart.)

Useful Conversion Formulas

Tire Speed Rating
mph x 1.609344 = Kph Kph / 1.609344 = mph

Speed Symbol	F	G	J	K	L	M	N	P	Q	R	S	T	U	H	V	Z
MPH	50	55	62	68	75	80	87	93	99	105	112	118	124	130	150	150+
km/h	80	90	100	110	120	130	140	150	160	170	180	190	200	210	240	240+

Air Pressure
1 bar = 14.5 psi 1 bar = 100 kPa

psi	15	22	29	36	44	51	58	65	73	80	87	94	102	109	116	123	131	138	145	152	160
bar	1	1.5	2	2.5	3	3.5	4	4.5	5	5.5	6	6.5	7	7.5	8	8.5	9	9.5	10	10.5	11
kPa	100	150	200	250	300	350	400	450	500	550	600	650	700	750	800	850	900	950	1000	1050	1100

Temperature Chart
(Celsius) x 9 / 5 + 32 = Fahrenheit (Fahrenheit) - 32 x 5 / 9 = Celsius

Fahrenheit	-4	5	14	23	32	41	50	59	68	77	86	95	104	113	122	131	140	149	158	167	176	185	194	203	212
Celsius	-20	-15	-10	-5	0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100

Length Conversion
Inches x 25.4 = MM MM / 25.4 = Inches

Inches	0.25	0.50	0.75	1.00	1.25	1.50	1.75	2.00	2.25	2.50	2.75	3.00	3.25	3.50	3.75	4.00	4.25	4.50	4.75	5.00	5.25	5.50	5.75	6.00
Millimeters	6.3	12.7	19.0	25.4	31.7	38.1	44.4	50.8	57.1	63.5	69.8	76.2	82.5	88.9	95.2	101.6	107.9	114.3	120.6	127.0	133.3	139.7	146.0	152.4

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