

CPC COOPERATIVE PATENT CLASSIFICATION

B PERFORMING OPERATIONS; TRANSPORTING

(NOTES omitted)

TRANSPORTING

B60 VEHICLES IN GENERAL

(NOTE omitted)

B60C VEHICLE TYRES; TYRE INFLATION; TYRE CHANGING; CONNECTING VALVES TO INFLATABLE ELASTIC BODIES IN GENERAL; DEVICES OR ARRANGEMENTS RELATED TO TYRES

NOTES

1. In this subclass, the term "tyre" is to be understood as a separate ground-engaging, continuous element outside the periphery of the wheel rim and includes the tyre casing, cover, or jacket and any insert, e.g. inner tube. In the groups relating to repair or connection of valves, the term "tyre" is to be understood to include also inflatable elastic bodies other than tyres or inner tubes
2. Attention is drawn to the note following the title of class [B60](#).

WARNINGS

1. The following IPC groups are not in the CPC scheme. The subject matter for these IPC groups is classified in the following CPC groups:
[B60C 11/113](#) covered by [B60C 11/0311](#)
[B60C 11/117](#) covered by [B60C 11/032](#)
2. {In this subclass non-limiting references (in the sense of paragraph 39 of the Guide to the IPC) may still be displayed in the scheme.}

1/00	Tyres characterised by the chemical composition or the physical arrangement or mixture of the composition	5/00	Inflatable pneumatic tyres or inner tubes (B60C 1/00 , B60C 9/00 - B60C 17/00 take precedence)
	NOTE		
	Tyres characterised by compositions only, i.e. having no significant tyre structure, are classified only with the compositions, e.g. C08K , C08L		
1/0008	. {Compositions of the inner liner}	5/001	. {filled with gas other than air}
1/0016	. {Compositions of the tread}	5/002	. {filled at least partially with foam material}
1/0025	. {Compositions of the sidewalls}	5/004	. {filled at least partially with liquid (B60C 19/12 takes precedence)}
2001/0033	. {Compositions of the sidewall inserts, e.g. for runflat}	5/005	. . {Ballast tyres}
1/0041	. {Compositions of the carcass layers}	5/007	. {made from other material than rubber}
2001/005	. {Compositions of the bead portions, e.g. clinch or chafer rubber or cushion rubber}	5/008	. {Low pressure tyres, e.g. for all terrain vehicles}
2001/0058	. . {Compositions of the bead apexes}	5/01	. without substantial cord reinforcement, e.g. cordless tyres, cast tyres
2001/0066	. {Compositions of the belt layers}	5/02	. having separate inflatable inserts, e.g. with inner tubes; Means for lubricating, venting, preventing relative movement between tyre and inner tube (B60C 5/20 takes precedence)
2001/0075	. {Compositions of belt cushioning layers}	5/025	. . {separated by a part of the tyre (inflatable inserts with several inflatable chambers B60C 5/20)}
2001/0083	. {Compositions of the cap ply layers}	5/04	. . Shape or construction of inflatable inserts (B60C 5/10 takes precedence)
2001/0091	. {Compositions of non-inflatable or solid tyres}	5/08	. . . having reinforcing means
3/00	Tyres characterised by the transverse section	5/10	. formed as a single discontinuous ring with contiguous ends which may be connected together
2003/005	. {Twin tyres}	5/12	. without separate inflatable inserts, e.g. tubeless tyres with transverse section open to the rim (B60C 5/20 takes precedence)
3/02	. Closed, e.g. toroidal, tyres	5/14	. . with impervious liner or coating on the inner wall of the tyre
3/04	. characterised by the relative dimensions of the section, e.g. low profile (B60C 3/06 takes precedence)	5/142	. . . {provided partially, i.e. not covering the whole inner wall}
3/06	. asymmetric	2005/145	. . . {made of laminated layers}
3/08	. collapsible into storage or non-use condition, e.g. space-saving spare tyres	2005/147	. . . {characterised by the joint or splice}

5/16	. . Sealing means between beads and rims, e.g. bands	9/005	. {Reinforcements made of different materials, e.g. hybrid or composite cords}
5/18	. Sectional casings, e.g. comprising replaceable arcuate parts	9/0057	. {Reinforcements comprising preshaped elements, e.g. undulated or zig-zag filaments}
5/20	. having multiple separate inflatable chambers	9/0064	. {Reinforcements comprising monofilaments}
5/22	. . the chambers being annular	2009/0071	. {characterised by special physical properties of the reinforcements}
5/24	. . the walls of the chambers extending transversely of the tyre	2009/0078	. . {Modulus}
7/00	Non-inflatable or solid tyres (B60C 1/00 takes precedence)	2009/0085	. . {Tensile strength}
2007/005	. {made by casting, e.g. of polyurethane}	2009/0092	. . {Twist structure}
7/02	. made from ropes or bristles	9/02	. Carcasses
7/04	. made of wood or leather	9/0207	. . {Carcasses comprising an interrupted ply, i.e. where the carcass ply does not continuously extend from bead to bead but is interrupted, e.g. at the belt area, into two or more portions of the same ply}
7/06	. made of metal	2009/0215	. . {Partial carcass reinforcing plies, i.e. the plies neither crossing the equatorial plane nor folded around the bead core}
7/08	. built-up from a plurality of arcuate parts	2009/0223	. . {comprising a cushion layer between adjacent carcass plies}
7/10	. characterised by means for increasing resiliency	9/023	. . {built up from narrow strips, individual cords or filaments, e.g. using filament winding}
7/101	. . {Tyre casings enclosing a distinct core, e.g. foam (enclosed chambers defined by a distinct core B60C 7/121)}	9/0238	. . {characterised by special physical properties of the carcass ply}
7/1015	. . . {using foam material}	2009/0246	. . . {Modulus of the ply}
7/102	. . {Tyres built-up with separate rubber parts}	2009/0253	. . . . {being different between adjacent plies}
7/105	. . {using foam material (B60C 7/1015 takes precedence)}	2009/0261	. . . . {being different within the same ply}
7/107	. . {comprising lateral openings}	2009/0269	. . {Physical properties or dimensions of the carcass coating rubber}
7/12	. . using enclosed chambers, e.g. gas-filled	2009/0276	. . . {Modulus; Hardness; Loss modulus or "tangens delta"}
7/121	. . . {enclosed chambers defined by a distinct core}	2009/0284	. . . {Thickness}
7/125	. . . {enclosed chambers defined between rim and tread}	9/0292	. . {Carcass ply curvature (sidewall curvature B60C 13/003)}
7/14	. . using springs	9/04	. . the reinforcing cords of each carcass ply arranged in a substantially parallel relationship
7/143	. . . {having a lateral extension disposed in a plane parallel to the wheel axis}	2009/0408	. . . {Carcass joints or splices}
7/146	. . . {extending substantially radially, e.g. like spokes}	2009/0416	. . . {Physical properties or dimensions of the carcass cords}
7/16	. . . of helical or flat coil form	2009/0425	. . . . {Diameters of the cords; Linear density thereof}
7/18	. . . . disposed radially relative to wheel axis	2009/0433	. . . . {Modulus}
7/20	. . . . disposed circumferentially relative to wheel axis	2009/0441	. . . . {Density in width direction}
7/22	. having inlays other than for increasing resiliency, e.g. for armouring	2009/045	. . . . {Tensile strength}
7/24	. characterised by means for securing tyres on rim or wheel body	2009/0458	. . . . {Elongation of the reinforcements at break point}
7/26	. . using bolts	2009/0466	. . . . {Twist structures}
7/28	. . using straps or the like, e.g. vulcanised into the tyre	2009/0475	. . . . {Particular materials of the carcass cords}
9/00	Reinforcements or ply arrangement of pneumatic tyres (inserts having reinforcing means B60C 5/08; bead structure, e.g. turnout or overlap construction, B60C 15/00)	2009/0483	. . . . {Different cords in the same layer}
	NOTE	2009/0491	. . . . {with special path of the carcass cords, e.g. sinusoidal}
	When classifying in this group, classification is also made in subclass B32B insofar as any layered product is concerned	9/06	. . . the cords extend diagonally from bead to bead and run in opposite directions in each successive carcass ply, i.e. bias angle ply (B60C 9/07, B60C 9/09 take precedence)
9/0007	. {Reinforcements made of metallic elements, e.g. cords, yarns, filaments or fibres made from metal}	9/07	. . . the cords curve from bead to bead in plural planes, e.g. S-shaped cords
2009/0014	. . {Surface treatments of steel cords}	9/08	. . . the cords extend transversely from bead to bead, i.e. radial ply (B60C 9/07 takes precedence)
2009/0021	. . {Coating rubbers for steel cords}		
9/0028	. {Reinforcements comprising mineral fibres, e.g. glass or carbon fibres}		
2009/0035	. {Reinforcements made of organic materials, e.g. rayon, cotton or silk}		
9/0042	. {Reinforcements made of synthetic materials}		

9/09	. . . . combined with other carcass plies having cords extending diagonally from bead to bead, i.e. combined radial ply and bias angle ply	2009/2048	. . . . {characterised by special physical properties of the belt plies}
9/10	. . the reinforcing cords within each carcass ply arranged in a crossing relationship	2009/2051	. . . . {Modulus of the ply}
9/11	. . . Woven, braided, or knitted plies	2009/2054	. . . . . {being different within the same ply}
9/12	. . built-up with rubberised layers of discrete fibres or filaments	2009/2058	. . . . . {being different between adjacent plies}
9/13	. . . with two or more differing cord materials	2009/2061	. . . . {Physical properties or dimensions of the belt coating rubber}
9/14	. . built-up with sheets, webs, or films of homogeneous material, e.g. synthetics, sheet metal, rubber	2009/2064	. . . . . {Modulus; Hardness; Loss modulus or "tangens delta"}
2009/145	. . . . {at the inner side of the carcass structure}	2009/2067	. . . . . {Thickness}
9/16	. . built-up with metallic reinforcing inlays	2009/207	. . . . . {Double layers, e.g. using different rubbers in the same belt ply}
9/17	. . asymmetric to the midcircumferential plane of the tyre	2009/2074	. . . . {Physical properties or dimension of the belt cord}
9/18	. Structure or arrangement of belts or breakers, crown-reinforcing or cushioning layers	2009/2077	. . . . . {Diameters of the cords; Linear density thereof}
9/1807	. . {comprising fabric reinforcements}	2009/208	. . . . . {Modulus of the cords}
2009/1814	. . . . {square woven}	2009/2083	. . . . . {Density in width direction}
9/1821	. . {comprising discrete fibres or filaments}	2009/2087	. . . . . {with variable density in the same layer}
2009/1828	. . {characterised by special physical properties of the belt ply}	2009/209	. . . . . {Tensile strength}
9/1835	. . {Rubber strips or cushions at the belt edges}	2009/2093	. . . . . {Elongation of the reinforcements at break point}
2009/1842	. . . . {Width or thickness of the strips or cushions}	2009/2096	. . . . . {Twist structures}
9/185	. . . . {between adjacent or radially below the belt plies}	9/22	. . . . the plies being arranged with all cords disposed along the circumference of the tyre
2009/1857	. . . . {radially above the belt plies}	9/2204	. . . . . {obtained by circumferentially narrow strip winding}
2009/1864	. . . . {wrapped around the edges of the belt}	2009/2209	. . . . . {characterised by tension of the cord during winding}
2009/1871	. . {with flat cushions or shear layers between belt layers}	2009/2214	. . . . . {characterised by the materials of the zero degree ply cords}
2009/1878	. . {with flat cushions or shear layers between the carcass and the belt}	2009/2219	. . . . . {with a partial zero degree ply at the belt edges - edge band}
2009/1885	. . {with belt ply between adjacent carcass plies}	2009/2223	. . . . . {with an interrupted zero degree ply, e.g. using two or more portions for the same ply}
2009/1892	. . {with belt ply radial inside the carcass structure}	2009/2228	. . . . . {characterised by special physical properties of the zero degree plies}
9/20	. . built-up from rubberised plies each having all cords arranged substantially parallel	2009/2233	. . . . . {Modulus of the zero degree ply}
9/2003	. . . . {characterised by the materials of the belt cords}	2009/2238	. . . . . {Physical properties or dimensions of the ply coating rubber}
9/2006	. . . . . {consisting of steel cord plies only}	2009/2242	. . . . . {Modulus; Hardness; Loss modulus or "tangens delta"}
9/2009	. . . . . {comprising plies of different materials}	2009/2247	. . . . . {Thickness}
2009/2012	. . . . {with particular configuration of the belt cords in the respective belt layers}	2009/2252	. . . . . {Physical properties or dimension of the zero degree ply cords}
2009/2016	. . . . . {comprising cords at an angle of 10 to 30 degrees to the circumferential direction}	2009/2257	. . . . . {Diameters of the cords; Linear density thereof}
2009/2019	. . . . . {comprising cords at an angle of 30 to 60 degrees to the circumferential direction}	2009/2261	. . . . . {Modulus of the cords}
2009/2022	. . . . . {comprising cords at an angle of 60 to 90 degrees to the circumferential direction}	2009/2266	. . . . . {Density of the cords in width direction}
2009/2025	. . . . . {with angle different or variable in the same layer}	2009/2271	. . . . . {with variable density}
2009/2029	. . . . . {with different cords in the same layer, i.e. cords with different materials or dimensions}	2009/2276	. . . . . {Tensile strength}
2009/2032	. . . . . {characterised by the course of the belt cords, e.g. undulated or sinusoidal}	2009/228	. . . . . {Elongation of the reinforcements at break point}
2009/2035	. . . . {built-up by narrow strips}	2009/2285	. . . . . {Twist structures}
2009/2038	. . . . {using lateral belt strips at belt edges, e.g. edge bands}	2009/229	. . . . . {characterised by the course of the cords, e.g. undulated or sinusoidal}
2009/2041	. . . . {with an interrupted belt ply, e.g. using two or more portions of the same ply}	2009/2295	. . . . . {with different cords in the same layer}
2009/2045	. . . . {with belt joints or splices}	9/24	. . built-up of arcuate parts
		9/26	. . . . . {Folded plies}
		9/263	. . . . {further characterised by an endless zigzag configuration in at least one belt ply, i.e. no cut edge being present}
		2009/266	. . . . . {combined with non folded cut-belt plies}

9/28	. . characterised by the belt or breaker dimensions or curvature relative to carcass (B60C 9/30 takes precedence)	2011/0355	. . . . . {characterised by depth}
2009/283	. . . {characterised by belt curvature}	2011/0358	. . . . {Lateral grooves, i.e. having an angle of 45 to 90 degrees to the equatorial plane}
2009/286	. . . . {being substantially flat}	2011/036	. . . . . {Narrow grooves, i.e. having a width of less than 3 mm}
9/30	. . asymmetric to the midcircumferential plane of the tyre	2011/0362	. . . . . {Shallow grooves, i.e. having a depth of less than 50% of other grooves}
11/00	Tyre tread bands; Tread patterns; Anti-skid inserts	2011/0365	. . . . . {characterised by width}
11/0008	. {characterised by the tread rubber}	2011/0367	. . . . . {characterised by depth}
2011/0016	. . {Physical properties or dimensions}	2011/0369	. . . . . {with varying depth of the groove}
2011/0025	. . . {Modulus or tan delta}	2011/0372	. . . . . {with particular inclination angles}
2011/0033	. . . {Thickness of the tread}	2011/0374	. . . . {Slant grooves, i.e. having an angle of about 5 to 35 degrees to the equatorial plane}
11/0041	. {comprising different tread rubber layers}	2011/0376	. . . . . {characterised by width}
11/005	. . {with cap and base layers}	2011/0379	. . . . . {characterised by depth}
11/0058	. . . {with different cap rubber layers in the axial direction}	2011/0381	. . . . {Blind or isolated grooves}
11/0066	. . . . {having an asymmetric arrangement}	2011/0383	. . . . . {at the centre of the tread}
11/0075	. . . {with different base rubber layers in the axial direction}	2011/0386	. . . {Continuous ribs}
11/0083	. {characterised by the curvature of the tyre tread}	2011/0388	. . . . {provided at the equatorial plane}
2011/0091	. {built-up by narrow strip winding}	2011/039	. . . . {provided at the shoulder portion}
11/01	. Shape of the shoulders between tread and sidewall, e.g. rounded, stepped or cantilevered	2011/0393	. . . . {Narrow ribs, i.e. having a rib width of less than 8 mm}
2011/013	. . {provided with a recessed portion}	2011/0395	. . . . . {for linking shoulder blocks}
2011/016	. . {different rubber for tread wings}	2011/0397	. . . . {Sacrificial ribs, i.e. ribs recessed from outer tread contour}
11/02	. Replaceable treads	11/04	. . in which the raised area of the pattern consists only of continuous circumferential ribs, e.g. zig-zag (B60C 11/12, B60C 11/13 take precedence)
11/03	. Tread patterns	11/042	. . . {further characterised by the groove cross-section}
11/0302	. . {directional pattern, i.e. with main rolling direction}	11/045	. . . . {the groove walls having a three-dimensional shape}
11/0304	. . {Asymmetric patterns}	11/047	. . . . {the groove bottom comprising stone trapping protection elements, e.g. ribs}
11/0306	. . {Patterns comprising block rows or discontinuous ribs}	11/11	. . in which the raised area of the pattern consists only of isolated elements, e.g. blocks (B60C 11/12, B60C 11/13 take precedence)
11/0309	. . . {further characterised by the groove cross-section}	11/12	. . characterised by the use of narrow slits or incisions, e.g. sipes
11/0311	. . {Patterns comprising tread lugs arranged parallel or oblique to the axis of rotation}	11/1204	. . . {with special shape of the sipe}
2011/0313	. . . {directional type}	2011/1209	. . . . {straight at the tread surface}
11/0316	. . . {further characterised by the groove cross-section}	2011/1213	. . . . {sinusoidal or zigzag at the tread surface}
11/0318	. . {irregular patterns with particular pitch sequence}	11/1218	. . . . {Three-dimensional shape with regard to depth and extending direction}
11/032	. . {Patterns comprising isolated recesses}	11/1222	. . . . {Twisted or warped shape in the sipe plane}
11/0323	. . . {tread comprising channels under the tread surface, e.g. for draining water}	2011/1227	. . . . {having different shape within the pattern}
11/0327	. . {characterised by special properties of the tread pattern}	2011/1231	. . . . {being shallow, i.e. sipe depth of less than 3 mm}
11/033	. . . {by the void or net-to-gross ratios of the patterns}	11/1236	. . . {with special arrangements in the tread pattern}
11/0332	. . . {by the footprint-ground contacting area of the tyre tread}	11/124	. . . . {inclined with regard to a plane normal to the tread surface}
2011/0334	. . . {Stiffness}	2011/1245	. . . . {being arranged in crossing relation, e.g. sipe mesh}
2011/0337	. . {characterised by particular design features of the pattern}	11/125	. . . . {arranged at the groove bottom}
2011/0339	. . . {Grooves}	2011/1254	. . . . {with closed sipe, i.e. not extending to a groove}
2011/0341	. . . . {Circumferential grooves}	11/1259	. . . {Depth of the sipe}
2011/0344	. . . . . {provided at the equatorial plane}	11/1263	. . . . {different within the same sipe}
2011/0346	. . . . . {with zigzag shape}	2011/1268	. . . . {being different from sipe to sipe}
2011/0348	. . . . . {Narrow grooves, i.e. having a width of less than 4 mm}	11/1272	. . . {Width of the sipe}
2011/0351	. . . . . {Shallow grooves, i.e. having a depth of less than 50% of other grooves}	2011/1277	. . . . {being narrow, i.e. less than 0.3 mm}
2011/0353	. . . . . {characterised by width}		

11/1281	. . . . {different within the same sipe, i.e. enlarged width portion at sipe bottom or along its length}	11/246	. . {Tread wear monitoring systems}
2011/1286	. . . . {being different from sipe to sipe}	13/00	Tyre sidewalls; Protecting, decorating, marking, or the like, thereof (B60C 17/08 takes precedence; tyre shoulders B60C 11/01; removable tyre sidewall trim rings B60B 7/01)
2011/129	. . . {Sipe density, i.e. the distance between the sipes within the pattern}	13/001	. {Decorating, marking or the like}
2011/1295	. . . . {variable}	13/002	. {Protection against exterior elements}
11/13	. . characterised by the groove cross-section, e.g. for buttressing or preventing stone-trapping	13/003	. {characterised by sidewall curvature}
11/1307	. . . {with special features of the groove walls}	13/004	. . {of the internal side of the tyre}
11/1315	. . . . {having variable inclination angles, e.g. warped groove walls}	2013/005	. {Physical properties of the sidewall rubber}
11/1323	. . . . {asymmetric}	2013/006	. . {Modulus; Hardness; Loss modulus or "tangens delta"}
2011/133	. . . . {comprising recesses}	2013/007	. . {Thickness}
2011/1338	. . . . {comprising protrusions}	2013/008	. {built-up by narrow strip winding}
11/1346	. . . . {covered by a rubber different from the tread rubber}	13/009	. {comprising additional bead cores in the sidewall}
11/1353	. . . {with special features of the groove bottom}	13/02	. Arrangement of grooves or ribs
2011/1361	. . . . {with protrusions extending from the groove bottom}	13/023	. . {preventing watersplash}
11/1369	. . . {Tie bars for linking block elements and bridging the groove}	2013/026	. . {provided at the interior side only}
11/1376	. . . {Three dimensional block surfaces departing from the enveloping tread contour}	13/04	. having annular inlays or covers, e.g. white sidewalls
11/1384	. . . . {with chamfered block corners}	2013/045	. . {comprising different sidewall rubber layers}
11/1392	. . . . {with chamfered block edges}	15/00	Tyre beads, e.g. ply turn-up or overlap
11/14	. Anti-skid inserts, e.g. vulcanised into the tread band	15/0009	. {features of the carcass terminal portion}
2011/142	. . {Granular particles, e.g. hard granules}	15/0018	. . {not folded around the bead core, e.g. floating or down ply}
2011/145	. . {Discontinuous fibres}	15/0027	. . {with low ply turn-up, i.e. folded around the bead core and terminating at the bead core}
2011/147	. . {Foamed rubber or sponge rubber on the tread band}	15/0036	. . {with high ply turn-up, i.e. folded around the bead core and terminating radially above the point of maximum section width}
11/16	. . of plug form, e.g. made from metal, textile	15/0045	. . . {with ply turn-up up to the belt edges, i.e. folded around the bead core and extending to the belt edges}
11/1606	. . . {retractable plug}	15/0054	. . {with ply turn-up portion parallel and adjacent to carcass main portion}
11/1612	. . . . {actuated by fluid, e.g. using fluid pressure difference}	15/0063	. . {with ply turn-up portion diverging from carcass main portion}
11/1618	. . . . {actuated by temperature, e.g. by means of temperature sensitive elements}	15/0072	. . {with ply reverse folding, i.e. carcass layer folded around the bead core from the outside to the inside}
11/1625	. . . {Arrangements thereof in the tread patterns, e.g. irregular}	15/0081	. . {the carcass plies folded around or between more than one bead core}
11/1631	. . . {inclined with regard to the radial direction}	2015/009	. . {Height of the carcass terminal portion defined in terms of a numerical value or ratio in proportion to section height}
11/1637	. . . {Attachment of the plugs into the tread, e.g. screwed}	15/02	. Seating or securing beads on rims (sealing means between beads and rims of tubeless tyres B60C 5/16; means for securing solid tyres on rims B60C 7/24)
11/1643	. . . {with special shape of the plug-body portion, i.e. not cylindrical}	15/0203	. . {using axially extending bead seating, i.e. the bead and the lower sidewall portion extend in the axial direction (B60C 15/0206 takes precedence)}
11/165	. . . . {conical}	15/0206	. . {using inside rim bead seating, i.e. the bead being seated at a radially inner side of the rim}
11/1656	. . . . {concave or convex, e.g. barrel-shaped}	15/0209	. . {Supplementary means for securing the bead}
11/1662	. . . . {helical-shaped}	15/0213	. . . {the bead being clamped by rings, cables, rim flanges or other parts of the rim}
11/1668	. . . . {with an additional collar}	15/0216	. . . {the bead being pierced by bolts, rivets, clips or other elements}
11/1675	. . . {with special shape of the plug- tip}	15/022	. . . {the bead being secured by turned-in rim flanges, e.g. rim of the clincher type}
11/1681	. . . . {Spherical top portions}	15/0223	. . . {the bead being secured by clip-hook elements not forming part of the rim flange}
11/1687	. . . . {Multiple tips}		
11/1693	. . . {Attachment of the plug-tip within the plug-body}		
11/18	. . of strip form, e.g. metallic combs, rubber strips of different wear resistance (B60C 11/20 takes precedence)		
11/185	. . . {of metal comb form, lamellar shaped or blade-like}		
11/20	. . in coiled form		
11/22	. Tread rings between dual tyres		
11/24	. Wear-indicating arrangements		
11/243	. . {Tread wear sensors, e.g. electronic sensors}		

15/0226	. . . {the bead being secured by protrusions of the rim extending from the bead seat, e.g. hump or serrations}	15/0653	. . . {with particular configuration of the cords in the respective bead reinforcing layer}
15/023	. . . {the bead being secured by bead extensions which extend over and wrap around the rim flange}	2015/0657	. . . . {comprising cords at an angle of maximal 10 degrees to the circumferential direction}
15/0233	. . {Securing tyres without beads; Securing closed torus or tubular tyres}	2015/066	. . . . {comprising cords at an angle of 10 to 30 degrees to the circumferential direction}
15/0236	. . {Asymmetric bead seats, e.g. different bead diameter or inclination angle (asymmetric transverse section B60C 3/06)}	2015/0664	. . . . {comprising cords at an angle of 30 to 60 degrees to the circumferential direction}
15/024	. . Bead contour, e.g. lips, grooves, or ribs	2015/0667	. . . . {comprising cords at an angle of 60 to 90 degrees to the circumferential direction}
15/0242	. . . {with bead extensions located radially outside the rim flange position, e.g. rim flange protectors}	2015/0671	. . . . {the cord angle being different or variable within the same layer}
2015/0245	. . . {Bead lips at the bead toe portion, i.e. the axially and radially inner end of the bead}	2015/0675	. . . . {characterised by the course of the cords, e.g. undulated or sinusoidal}
15/0247	. . . {with reverse bead seat inclination, i.e. the axially inner diameter of the bead seat is bigger than the axially outer diameter thereof}	2015/0678	. . . {Physical properties of the bead reinforcing layer, e.g. modulus of the ply}
15/028	. . Spacers between beads (emergency load-supporting means B60C 17/00)	2015/0682	. . . {Physical properties or dimensions of the coating rubber}
15/032	. . . inflatable	2015/0685	. . . {Physical properties or dimensions of the cords, e.g. modulus of the cords}
15/036	. . Tyres permanently fixed to the rim, e.g. by adhesive, by vulcanisation	2015/0689	. . . . {Cord density in width direction}
15/04	. Bead cores	2015/0692	. . . {characterised by particular materials of the cords}
2015/042	. . {characterised by the material of the core, e.g. alloy}	2015/0696	. . {Asymmetric bead reinforcement, e.g. arrangement of bead reinforcing layer or apex}
2015/044	. . {characterised by a wrapping layer}	17/00	Tyres characterised by means enabling restricted operation in damaged or deflated condition; Accessories therefor
2015/046	. . {Cable cores, i.e. cores made-up of twisted wires}	17/0009	. {comprising sidewall rubber inserts, e.g. crescent shaped inserts}
2015/048	. . {Polygonal cores characterised by the winding sequence}	17/0018	. . {two or more inserts in each sidewall portion}
15/05	. . multiple, i.e. with two or more cores in each bead	17/0027	. . {comprising portions of different rubbers in a single insert}
15/06	. Flipper strips, fillers, or chafing strips {and reinforcing layers for the construction of the bead}	17/0036	. . {comprising additional reinforcements}
15/0603	. . {characterised by features of the bead filler or apex}	17/0045	. . {comprising grooves or ribs, e.g. at the inner side of the insert}
15/0607	. . . {comprising several parts, e.g. made of different rubbers}	2017/0054	. . {Physical properties or dimensions of the inserts}
2015/061	. . . {Dimensions of the bead filler in terms of numerical values or ratio in proportion to section height}	2017/0063	. . . {Modulus; Hardness; Loss modulus or "tangens delta"}
2015/0614	. . {characterised by features of the chafer or clinch portion, i.e. the part of the bead contacting the rim}	2017/0072	. . . {Thickness}
2015/0617	. . {comprising a cushion rubber other than the chafer or clinch rubber}	2017/0081	. {comprising special reinforcing means in the crown area}
2015/0621	. . . {adjacent to the carcass turnup portion}	17/009	. {comprising annular protrusions projecting into the tyre cavity}
2015/0625	. . . {provided at the terminal edge portion of a carcass or reinforcing layer}	17/01	. utilising additional inflatable supports which become load-supporting in emergency
15/0628	. . {comprising a bead reinforcing layer}	17/02	. . inflated or expanded in emergency only
15/0632	. . . {using flippers in contact with and wrapped around the bead core and, at least partially, in contact with the bead filler}	17/04	. utilising additional non-inflatable supports which become load-supporting in emergency
15/0635	. . . {using chippers between the carcass layer and chafer rubber wrapped around the bead}	17/041	. . {characterised by coupling or locking means between rim and support}
2015/0639	. . . {between carcass main portion and bead filler not wrapped around the bead core}	17/042	. . . {preventing sliding or rotation between support and rim}
2015/0642	. . . {between carcass turn-up and bead filler not wrapped around the bead core}	17/043	. . {made-up of an annular metallic shell}
2015/0646	. . . {at the axially inner side of the carcass main portion not wrapped around the bead core}	17/044	. . {Expandable supports}
2015/065	. . . {at the axially outer side of the carcass turn-up portion not wrapped around the bead core}	17/045	. . {Rotatable supports relative to the rim}
		17/046	. . . {by means of ball bearings}
		17/047	. . {comprising circumferential ribs}
		17/048	. . {comprising transverse ribs}
		17/06	. . resilient
		17/061	. . . {comprising lateral openings}
		2017/063	. . . {comprising circumferentially extending reinforcements}

17/065	. . . {made-up of foam inserts (tyres filled with foam B60C 5/002)}	23/0039	. . . {specially adapted for driven wheels}
17/066	. . . {made-up of plural spherical elements provided in the tyre chamber}	23/004	. . {the control being done on the wheel, e.g. using a wheel-mounted reservoir}
2017/068	. . . {comprising springs, e.g. helical springs}	23/005	. {Devices specially adapted for special wheel arrangements}
17/08	. Means facilitating folding of sidewalls, e.g. run-flat sidewalls	23/006	. . {having two wheels only}
17/10	. Internal lubrication	23/007	. . {having multiple wheels arranged side by side}
17/103	. . {by means of surface coating, e.g. PTFE}	23/008	. . {having wheels on more than two axles}
17/106	. . {Composition of the lubricant}	23/009	. . {having wheels on a trailer}
19/00	Tyre parts or constructions not otherwise provided for	23/02	. Signalling devices actuated by tyre pressure {(hand-held tyre pressure gauges G01L 17/00)}
19/001	. {Tyres requiring an asymmetric or a special mounting}	23/04	. . mounted on the wheel or tyre
19/002	. {Noise damping elements provided in the tyre structure or attached thereto, e.g. in the tyre interior}	23/0401	. . . {characterised by the type of alarm}
19/003	. {Balancing means attached to the tyre}	23/0403	. . . . {Mechanically generated audible signals, e.g. by buzzer or whistle signals}
2019/004	. {Tyre sensors other than for detecting tyre pressure}	23/0405	. . . . {Mechanically generated visible signals, e.g. by using a gauge needle}
2019/005	. {Magnets integrated within the tyre structure}	23/0406	. . . . {Alarms noticeable from outside the vehicle, e.g. indication in side mirror, front light or audible alarms (B60C 23/0403 , B60C 23/0405 take precedence)}
2019/006	. {Warning devices, e.g. devices generating noise due to flat or worn tyres}	23/0408	. . . {transmitting the signals by non-mechanical means from the wheel or tyre to a vehicle body mounted receiver}
2019/007	. . {triggered by sensors}	23/041	. . . . {Means for supplying power to the signal-transmitting means on the wheel}
2019/008	. {Venting means, e.g. for expelling entrapped air}	23/0411	. . . . . {Piezoelectric generators}
19/04	. Tyre with openings closeable by means other than the rim; Closing means therefor	23/0413	. . . . . {Wireless charging of active radio frequency circuits}
19/08	. Electric-charge-dissipating arrangements	23/0415	. . . . {Automatically identifying wheel mounted units, e.g. after replacement or exchange of wheels}
19/082	. . {comprising a conductive tread insert}	23/0416	. . . . . {allocating a corresponding wheel position on vehicle, e.g. front/left or rear/right}
19/084	. . {using conductive carcasses}	23/0418	. . . . {Sharing hardware components like housing, antenna, receiver or signal transmission line with other vehicle systems like keyless entry or brake control units}
19/086	. . {using conductive sidewalls}	23/042	. . . . . {cooperating with wheel hub mounted speed sensors}
19/088	. . {using conductive beads}	23/0422	. . . . {characterised by the type of signal transmission means}
19/12	. Puncture preventing arrangements	23/0423	. . . . . {Photo-electric, infrared or visible light means}
19/122	. . {disposed inside of the inner liner}	23/0425	. . . . . {Means comprising permanent magnets, e.g. Hall-effect or Reed-switches}
19/125	. . {disposed removably on the tyre}	23/0427	. . . . . {Near field transmission with inductive or capacitive coupling means}
19/127	. . {for inner tubes}	23/0428	. . . . . {using passive wheel mounted resonance circuits}
23/00	Devices for measuring, signalling, controlling, or distributing tyre pressure or temperature, specially adapted for mounting on vehicles; Arrangement of tyre inflating devices on vehicles, e.g. of pumps or of tanks; Tyre cooling arrangements	23/043	. . . . . {using transformer type signal transducers, e.g. rotary transformers}
23/001	. {Devices for manually or automatically controlling or distributing tyre pressure whilst the vehicle is moving}	23/0432	. . . . . {using vehicle structural parts as signal path, e.g. chassis, axle or fender}
23/002	. . {by monitoring conditions other than tyre pressure or deformation}	23/0433	. . . . . {Radio signals}
23/003	. . {comprising rotational joints between vehicle-mounted pressure sources and the tyres}	23/0435	. . . . . {Vehicle body mounted circuits, e.g. transceiver or antenna fixed to central console, door, roof, mirror or fender}
23/00305	. . . {Wheel circumventing supply lines, e.g. not through or about the axles}	23/0437	. . . . . . {Means for detecting electromagnetic field changes not being part of the signal transmission <i>per se</i> , e.g. strength, direction, propagation or masking}
23/00309	. . . {characterised by the location of the components, e.g. valves, sealings, conduits or sensors}		
23/00318	. . . . {on the wheels or the hubs}		
23/00327	. . . . . {integrally with the hub caps}		
23/00336	. . . . {on the axles}		
23/00345	. . . {Details of the rotational joints}		
23/00347	. . . . {comprising two or more feedthrough}		
23/00354	. . . {Details of valves}		
23/00363	. . . {Details of sealings}		
23/00372	. . . {characterised by fluid diagrams}		
23/00381	. . . {specially adapted for steerable wheels}		

23/0438	. . . . .	{comprising signal transmission means, e.g. for a bidirectional communication with a corresponding wheel mounted receiver}	23/0479	. . . .	{Communicating with external units being not part of the vehicle, e.g. tools for diagnostic, mobile phones, electronic keys or service stations}
23/044	. . . . .	{Near field triggers, e.g. magnets or triggers with 125 KHz}	23/0481	. . . .	{System diagnostic, e.g. monitoring battery voltage, detecting hardware detachments or identifying wireless transmission failures}
23/0442	. . . . .	{the transmitted signal comprises further information, e.g. instruction codes, sensor characteristics or identification data}	23/0483	. . . .	{Wireless routers between wheel mounted transmitters and chassis mounted receivers}
23/0444	. . . . .	{Antenna structures, control or arrangements thereof, e.g. for directional antennas, diversity antenna, antenna multiplexing or antennas integrated in fenders}	23/0484	. . . .	{Detecting an ongoing tyre inflation}
23/0445	. . . . .	{Means for changing operating mode, e.g. sleep mode, factory mode or energy saving mode}	23/0486	. . .	{comprising additional sensors in the wheel or tyre mounted monitoring device, e.g. movement sensors, microphones or earth magnetic field sensors}
23/0447	. . . . .	{Wheel or tyre mounted circuits}	23/0488	. . . .	{Movement sensor, e.g. for sensing angular speed, acceleration or centripetal force}
23/0449	. . . . .	{Passive transducers, e.g. using surface acoustic waves, backscatter technology or pressure sensitive resonators (near field passive transducers B60C 23/0428)}	23/0489	. . . .	{for detecting the actual angular position of the monitoring device while the wheel is turning}
23/045	. . . . .	{Means for detecting electromagnetic field changes being not part of the signal transmission <i>per se</i> , e.g. strength, direction, propagation or masking}	23/0491	. . .	{Constructional details of means for attaching the control device}
23/0452	. . . . .	{Antenna structure, control or arrangement (vehicle tyre mounted antennas H01Q 1/2241)}	23/0493	. . . .	{for attachment on the tyre}
23/0454	. . . . .	{Means for changing operation mode, e.g. sleep mode, factory mode or energy save mode}	23/0494	. . . .	{Valve stem attachments positioned inside the tyre chamber}
23/0455	. . . . .	{Transmission control of wireless signals}	23/0496	. . . .	{Valve stem attachments positioned outside of the tyre chamber}
23/0457	. . . . .	{self triggered by timer}	23/0498	. . . .	{for rim attachments (B60C 23/0494 , B60C 23/0496 take precedence)}
23/0459	. . . . .	{self triggered by motion sensor}	23/04985	. . . . .	{using straps surrounding the rims}
23/0461	. . . . .	{externally triggered, e.g. by wireless request signal, magnet or manual switch}	23/06	. . .	Signalling devices actuated by deformation of the tyre {, e.g. tyre mounted deformation sensors or indirect determination of tyre deformation based on wheel speed, wheel-centre to ground distance or inclination of wheel axle}
23/0462	. . . . .	{Structure of transmission protocol}	23/061	. . .	{by monitoring wheel speed (measuring distance traversed on the ground by vehicles G01C 22/00)}
23/0464	. . . . .	{to avoid signal interference}	23/062	. . .	{Frequency spectrum analysis of wheel speed signals, e.g. using Fourier transformation}
23/0466	. . . . .	{with signals sent by transmitters mounted on adjacent vehicles}	23/063	. .	{Generating directly an audible signal by deformation of the tyre (by touching the ground B60C 23/085)}
23/0467	. . . . .	{Electric contact means, e.g. slip-rings, rollers, brushes}	23/064	. .	{comprising tyre mounted deformation sensors, e.g. to determine road contact area}
23/0469	. . . . .	{Transmission by sound, e.g. ultra-sound}	23/065	. .	{by monitoring vibrations in tyres or suspensions (B60C 23/062 takes precedence)}
23/0471	. . . .	{System initialisation, e.g. upload or calibration of operating parameters}	23/066	. .	{by monitoring wheel-centre to ground distance}
23/0472	. . . .	{to manually allocate ID codes or mounting positions, e.g. by service technicians}	23/067	. .	{by monitoring chassis to ground distance}
23/0474	. . . .	{Measurement control, e.g. setting measurement rate or calibrating of sensors; Further processing of measured values, e.g. filtering, compensating or slope monitoring}	23/068	. .	{by monitoring chassis to tyre distance}
23/0476	. . . .	{Temperature compensation of measured pressure values}	23/08	. .	by touching the ground
23/0477	. . . .	{Evaluating waveform of pressure readings}	23/085	. . .	{putting directly into action an audible signal}
			23/10	. .	Arrangement of tyre-inflating pumps mounted on vehicles
			23/105	. .	{the pump being mounted in the saddle-pillar of a bicycle}
			23/12	. .	operated by a running wheel
			23/121	. . .	{the pumps being mounted on the tyres}
			23/123	. . . .	{Elongate peristaltic pumps}
			23/124	. . . .	{Bladders}
			23/126	. . .	{the pumps being mounted on the wheel rims}
			23/127	. . .	{the pumps being mounted on the hubs}
			23/129	. . .	{the pumps being mounted on wheel spokes}
			23/131	. . .	{activated by force of gravity}
			23/133	. . .	{activated by centrifugal force}

- 23/135 . . . {activated due to tyre deformation}
- 23/137 . . . {comprising cam driven pistons}
- 23/14 . . operated by the prime mover of the vehicle
- 23/16 . Arrangement of air tanks mounted on vehicles
- 23/18 . Tyre cooling arrangements {, e.g. heat shields (wheels with cooling fins [B60B 19/10](#))}
- 23/19 . . for dissipating heat
- 23/20 . Devices for measuring or signalling tyre temperature {only}
- 25/00 Apparatus or tools adapted for mounting, removing or inspecting tyres (testing of tyres [G01M 17/02](#))**
- 25/002 . {Inspecting tyres}
- 25/005 . . {inside surface}
- 25/007 . . {outside surface (measuring profile depth [G01B 11/22](#))}
- 25/01 . for removing tyres from or mounting tyres on wheels
- 25/015 . . {for only breaking the beads}
- 25/02 . . Tyre levers or the like, e.g. hand-held
- 25/025 . . . {with a jack}
- 25/04 . . . pivotal about the wheel axis, or movable along the rim edge, e.g. rollable
- 25/05 . . Machines
- 25/0503 . . . {for mounting only}
- 25/0506 . . . {for demounting only}
- 25/0509 . . . {for inserting additional parts, e.g. support rings, sensors}
- 25/0512 . . . {Integrated systems performing multiple operations, e.g. assembly lines}
- 25/0515 . . . {Automated devices, e.g. mounting robots}
- 25/0518 . . . {Horizontal wheel axis in working position}
- 25/0521 . . . {Handling of rim or tyre, e.g. lifting and positioning devices}
- 25/0524 . . . {Separating tyres from rims, e.g. by destroying}
- 25/0527 . . . {Adapting to different wheel diameters, i.e. distance between support and tool}
- 25/053 . . . {Support of wheel parts during machine operation}
- 25/0533 {Fixing the tyre only, e.g. gripping the tread portion for inserting the rim}
- 25/0536 {axially fixing the rim, e.g. pulling devices}
- 25/0539 {radially fixing the rim, e.g. with gripping claws}
- 25/0542 {with self-centering means, e.g. cones}
- 25/0545 {with rotary motion of tool or tyre support, e.g. turntables}
- 25/0548 . . . {equipped with sensing means, e.g. for positioning, measuring or controlling}
- 25/0551 {mechanical}
- 25/0554 {optical, e.g. cameras}
- 25/0557 {thermal}
- 25/056 {measuring speed, acceleration or forces}
- 25/0563 . . . {Tools interacting with the tyre and moved in relation to the tyre during operation}
- 25/0566 {rolling only}
- 25/0569 {gliding only}
- 25/0572 {pressing only}
- 25/0575 {levering only}
- 25/0578 {hooking only}
- 25/0581 {Translational tool trajectory only}
- 25/0584 {Predetermined tool path, e.g. coulisse, multi-link}
- 25/0587 {Programmed tool path, e.g. robot arm with multiple degrees of freedom}
- 25/059 {Conjoint tool operations, i.e. at least two tools cooperating simultaneously}
- 25/0593 {Multi-functional tools for performing at least two operations, e.g. bead breaking and bead seeking}
- 25/0596 . . . {Soaping devices}
- 25/12 . . . for only seating the beads
- 25/122 acting on the tyre tread
- 25/125 . . . for only breaking the beads
- 25/128 acting axially on the whole circumference of the bead or side wall
- 25/13 acting axially on a part of the bead or side wall only at localised regions of the bead or side wall
- 25/132 . . . for removing and mounting tyres (for only seating the beads [B60C 25/12](#); for only breaking the beads [B60C 25/125](#) {; for locating provisionally the beads of tubeless tyres against the sealing surfaces of the rims [B60C 25/145](#)})
- 25/135 having a tyre support or a tool, movable along wheel axis
- 25/138 with rotary motion of tool or tyre support
- 25/14 . Apparatus or tools for spreading {or locating} tyre beads
- 25/142 . . {Devices for tightening or expanding the felly, devices for spreading the tyres}
- 25/145 . . {for locating provisionally the beads of tubeless tyres against the sealing surfaces of the rims, e.g. air filling bell}
- 25/147 . . {Safety cages for inflation}
- 25/15 . . with means for inverting the tyre
- 25/16 . {Tools for repairing damaged tyres}
- 25/18 . Tools for mounting or demounting air valves
- 25/185 . . {Automated devices, e.g. robots}
- 25/20 . Tools for attaching metallic tyres, e.g. iron tyres upon wooden rims
- 27/00 Non-skid devices temporarily attachable to resilient tyres or resiliently-tyred wheels**
- 27/003 . {Mounting aids, e.g. auxiliary tensioning tools, slotted ramps}
- 27/006 . {provided with protective parts, e.g. rubber elements to protect the rim portion}
- 27/02 . extending over restricted arcuate part of tread ([B60C 27/20](#) takes precedence)
- 27/0207 . . {involving lugs or rings taking up wear, e.g. chain links, chain connectors (chain couplings for, e.g. hoisting [F16G 15/00](#))}
- 27/0215 . . . {Profiled links, e.g. cross-section other than round}
- 27/0223 . . . {Studded links, i.e. traction enhancing parts located on the link or inserted into the link}
- 27/023 . . {provided with radial arms for supporting the ground engaging parts on the wheel}
- 27/0238 . . {provided with tensioning means}
- 27/0246 . . . {Resilient pretension}
- 27/0253 . . . {Centrifugal forces for tensioning while driving}
- 27/0261 . . {provided with fastening means}

27/0269	. . . {acting on the wheel, e.g. on the rim or wheel bolts}	29/06	. Accessories for tyre-inflating valves, e.g. housings, guards, covers for valve caps, locks, not otherwise provided for {(B60C 23/0496 takes precedence; tools for screwing and unscrewing valve caps B25B 27/0057; pump connectors F04B 33/005)}
27/0276	. . . . {through apertures in the rim, e.g. fastening from one lateral side to the other lateral side of the rim; extending axially through the rim}	29/062	. . {for filling a tyre with particular materials, e.g. liquids (B60C 5/004, B60C 5/005 take precedence)}
27/0284	. . . {acting on the tread portion, e.g. special fixing agents, fastened in the groove of the tyre}	29/064	. . {Hose connections for pneumatic tyres, e.g. to spare wheels}
27/0292	. . . {acting on the sidewall of the tyre}	29/066	. . {Valve caps}
27/04	. . the ground-engaging part being rigid	29/068	. . {Pressure relief devices, i.e. safety devices for overpressure}
27/045	. . . {involving retractable devices (fixing of spade lugs B60B 15/00)}	99/00	Subject matter not provided for in other groups of this subclass
27/06	. extending over the complete circumference of the tread, e.g. made of chains {or cables} (B60C 27/20 takes precedence)	99/003	. {Tyre heating arrangements}
27/061	. . {provided with radial arms for supporting the ground engaging parts on the tread}	99/006	. {Computer aided tyre design or simulation}
27/062	. . {provided with fastening means}	2200/00	Tyres specially adapted for particular applications
27/063	. . . {acting on the wheel, e.g. on the rim or wheel bolts}	2200/02	. for aircrafts
27/064	. . . {through apertures in the rim, e.g. fastening from one lateral side to the other lateral side of the rim; extending axially through the rim}	2200/04	. for road vehicles, e.g. passenger cars
27/065	. . . {acting on the tread portion, e.g. special fixing agents, fastened in the groove of the tyre}	2200/06	. for heavy duty vehicles
27/066	. . . {acting on the sidewall of the tyre}	2200/065	. . for construction vehicles
27/067	. . {Special chain layout, i.e. distribution of chain portions over the tread, e.g. arranged in polygon pattern}	2200/08	. for agricultural vehicles
27/068	. . {the ground-engaging part being rigid}	2200/10	. for motorcycles, scooters or the like
27/08	. . involving lugs or rings taking up wear {, e.g. chain links, chain connectors }	2200/12	. for bicycles
27/083	. . . {Profiled links, i.e. cross-section other than round, e.g. hexagonal}	2200/14	. for off-road use
27/086	. . . {Studded links, i.e. traction enhancing parts located on the link or inserted into the link}		
27/10	. . having tensioning means		
27/12	. . . resilient {pretension}		
27/125	. . . . {Centrifugal forces for tensioning while driving}		
27/14	. . automatically attachable		
27/145	. . . {the anti-skid device being wound around the wheel by its rotation from a point connected to the body frame of the vehicle}		
27/16	. . formed of close material, e.g. leather {or synthetic mats}		
27/18	. . . the material being fabric, e.g. woven wire {or textile}		
27/20	. having ground-engaging plate-like elements		
27/22	. for tandem tyres		
29/00	Arrangements of tyre-inflating valves to tyres or rims; Accessories for tyre-inflating valves, not otherwise provided for (tools for mounting or demounting valves B60C 25/18)		
29/002	. {characterised by particular features of the valve core}		
29/005	. {characterised by particular features of the valve stem}		
29/007	. {for tyres with segmental sections or for multi-chamber tyres}		
29/02	. Connection to rims		
29/04	. Connection to tyres {or inner tubes}		