

CPC COOPERATIVE PATENT CLASSIFICATION

C07F ACYCLIC, CARBOCYCLIC OR HETEROCYCLIC COMPOUNDS CONTAINING ELEMENTS OTHER THAN CARBON, HYDROGEN, HALOGEN, OXYGEN, NITROGEN, SULFUR, SELENIUM OR TELLURIUM (metal-containing porphyrins [C07D 487/22](#))

NOTES

1. Attention is drawn to Note (3) [C07](#), which defines the last place priority rule applied in the range of subclasses [C07C-C07K](#) and within these subclasses.
2. Attention is drawn to Note (6) following the title of class [C07](#).
3. Attention is drawn to Note (3) after the title of section [C](#), which Note indicates to which version of the periodic table of chemical elements the IPC refers.
4. In this subclass, organic acid salts, alcoholates, phenates, chelates or mercaptides are classified as the parent compounds.
5. Compounds containing Se or Te are classified with their sulfur homologues
6. A hydrocarbon chain is considered to be terminated by a heteroatom or by a carbon atom having three bonds to heteroatoms with at the most one to halogen
7. When groups, e.g. aromatic or aliphatic groups, are mentioned without further indications, it means that the group concerned can be further substituted. Otherwise it will be indicated, e.g. [C07F 9/11](#) with hydroxyalkyl compounds without further substituents on alkyl.

WARNING

The following IPC groups are not used in the CPC scheme. Subject matter covered by these groups are classified in the following CPC groups:

[C07F 9/6593](#)

covered by

[C07F 9/65815](#)

| | | | |
|-------------|---|-------------|--|
| 1/00 | Compounds containing elements of Groups 1 or 11 of the Periodic System | 5/05 | . . Cyclic compounds having at least one ring containing boron but no carbon in the ring |
| 1/005 | . {without C-Metal linkages} | 5/06 | . Aluminium compounds |
| 1/02 | . Lithium compounds | 5/061 | . . {with C-aluminium linkage} |
| 1/04 | . Sodium compounds | 5/062 | . . . {Al linked exclusively to C} |
| 1/06 | . Potassium compounds | 5/063 | {compounds containing only Al, C, H and Al is not a ring element} |
| 1/08 | . Copper compounds | 5/064 | . . . {compounds with an Al-Halogen linkage} |
| 1/10 | . Silver compounds | 5/065 | . . . {compounds with an Al-H linkage} |
| 1/12 | . Gold compounds | 5/066 | . . . {compounds with Al linked to an element other than Al, C, H or halogen (this includes Al-cyanide linkage)} |
| 3/00 | Compounds containing elements of Groups 2 or 12 of the Periodic System | 5/067 | {compounds with Al also linked to H or halogen} |
| 3/003 | . {without C-Metal linkages} | 5/068 | {preparation of alum(in)oxanes} |
| 3/006 | . {Beryllium compounds} | 5/069 | . . {without C-aluminium linkages} |
| 3/02 | . Magnesium compounds | 7/00 | Compounds containing elements of Groups 4 or 14 of the Periodic System |
| 3/04 | . Calcium compounds | 7/003 | . {without C-Metal linkages} |
| 3/06 | . Zinc compounds | 7/006 | . . {of Group 4 of the Periodic System} |
| 3/08 | . Cadmium compounds | 7/02 | . Silicon compounds |
| 3/10 | . Mercury compounds | 7/025 | . . {without C-silicon linkages} |
| 3/103 | . . {without C-Mercury linkages} | 7/04 | . . Esters of silicic acids |
| 3/106 | . . {Aliphatic substances containing mercury} | 7/045 | . . . {Esters of monosilicic acid} |
| 3/12 | . . Aromatic substances containing mercury | 7/06 | . . . with hydroxyaryl compounds |
| 3/14 | . . Heterocyclic substances containing mercury | 7/07 | . . . Cyclic esters |
| 5/00 | Compounds containing elements of Groups 3 or 13 of the Periodic System | 7/08 | . . Compounds having one or more C-Si linkages |
| 5/003 | . {without C-Metal linkages} | 7/0801 | . . . {General processes} |
| 5/006 | . {Addition and condensation products with amines or phosphines} | 7/0803 | . . . {Compounds with Si-C or Si-Si linkages} |
| 5/02 | . Boron compounds | 7/0805 | {comprising only Si, C or H atoms} |
| 5/022 | . . {without C-boron linkages} | 7/0807 | {comprising Si as a ring atom} |
| 5/025 | . . {Boronic and borinic acid compounds} | 7/0809 | {comprising no Si as a ring atom} |
| 5/027 | . . {Organoboranes and organoborohydrides} | 7/081 | {comprising at least one atom selected from the elements N, O, halogen, S, Se or Te} |
| 5/04 | . . Esters of boric acids | | |

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|--------|-----------|--|--|-----------|--|
| 7/0812 | | {comprising a heterocyclic ring} | 7/0876 | | {Reactions involving the formation of bonds to a Si atom of a Si-O-Si sequence other than a bond of the Si-O-Si linkage} |
| 7/0814 | | {said ring is substituted at a C ring atom by Si} | 7/0878 | | {Si-C bond} |
| 7/0816 | | {said ring comprising Si as a ring atom} | 7/0879 | | {Hydrosilylation reactions} |
| 7/0818 | | {comprising no heterocyclic ring} | 7/0881 | | {Other reactions} |
| 7/082 | | {comprising at least one atom selected from elements other than Si, C, H, N, O, halogen, S, Se or Te} | 7/0883 | | {Si-halogen bond} |
| 7/0821 | | {comprising at least one Si-Si linkage} | 7/0885 | | {Si-OX bond (X = C or H)} |
| 7/0823 | | {comprising at least one Si-cyano linkage} | 7/0887 | | {Si-Q bond (Q different from O, C or halogen)} |
| 7/0825 | | {Preparations of compounds not comprising Si-Si or Si-cyano linkages} | 7/0889 | | {Reactions not involving the Si atom of the Si-O-Si sequence} |
| 7/0827 | | {Syntheses with formation of a Si-C bond} | 7/089 | | {Treatments not covered by a preceding group} |
| 7/0829 | | {Hydrosilylation reactions} | 7/0892 | | {Compounds with a Si-O-N linkage} |
| 7/083 | | {Syntheses without formation of a Si-C bond} | 7/0894 | | {Compounds with a Si-O-O linkage} |
| 7/0832 | | {Other preparations} | 7/0896 | | {Compounds with a Si-H linkage} |
| 7/0834 | | {Compounds having one or more O-Si linkage (for compounds with C-O-Si linkages see C07F 7/18)} | 7/0898 | | {Compounds with a Si-S linkage} |
| 7/0836 | | {Compounds with one or more Si-OH or Si-O-metal linkage} | 7/10 | | Containing nitrogen {having a Si-N linkage} |
| 7/0838 | | {Compounds with one or more Si-O-Si sequences} | 7/12 | | Organo silicon halides |
| 7/084 | | {containing a ring comprising a Si-O-Si sequence (compounds with a ring containing only alternating Si and O atoms, i.e. cyclosiloxanes C07F 7/21)} | 7/121 | | {Preparation or treatment not provided for in C07F 7/14 , C07F 7/16 or C07F 7/20 } |
| 7/0841 | | {also comprising a C atom} | NOTE | | |
| 7/0843 | | {also comprising an atom different from Si, O and C} | The silicon atom involved in the reaction that is attached or becomes attached to the highest number of halide atoms determines classification | | |
| 7/0845 | | {not containing a ring comprising a Si-O-Si sequence} | 7/122 | | {by reactions involving the formation of Si-C linkages (hydrosilylation reactions C07F 7/14 ; direct synthesis C07F 7/16)} |
| 7/0847 | | {a Si atom of a Si-O-Si sequence being attached only to -O-Si or to a C atom} | 7/123 | | {by reactions involving the formation of Si-halogen linkages} |
| 7/0849 | | {this C atom being part of a group which contains only C and H} | 7/125 | | {by reactions involving both Si-C and Si-halogen linkages, the Si-C and Si-halogen linkages can be to the same or to different Si atoms, e.g. redistribution reactions} |
| 7/085 | | {this C atom being part of a group which contains halogen} | 7/126 | | {by reactions involving the formation of Si-Y linkages, where Y is not a carbon or halogen atom} |
| 7/0852 | | {this C atom being part of a group which contains O} | 7/127 | | {by reactions not affecting the linkages to the silicon atom} |
| 7/0854 | | {this C atom being part of a group which contains N} | 7/128 | | {by reactions covered by more than one of the groups C07F 7/122 - C07F 7/127 and of which the starting material is unknown or insufficiently determined} |
| 7/0856 | | {this C atom being part of a group which contains an element other than C, H, O, N and halogen} | 7/14 | | Preparation thereof from {optionally substituted} halogenated silanes and hydrocarbons { hydrosilylation reactions } |
| 7/0858 | | {a Si atom of a Si-O-Si sequence having linkages other than Si-O-Si or bonds other than Si-C} | 7/16 | | Preparation thereof from silicon and halogenated hydrocarbons { direct synthesis } |
| 7/0859 | | {Si-OX bond, X = H or C} | 7/18 | | Compounds having one or more C-Si linkages as well as one or more C-O-Si linkages |
| 7/0861 | | {Si-Halogen bond} | 7/1804 | | {Compounds having Si-O-C linkages (Si-O-acyl linkages C07F 7/1896)} |
| 7/0863 | | {Si-N bond} | 7/1808 | | {the Si-C and Si-O-C linkages being at different Si atoms} |
| 7/0865 | | {Si-O-N bond} | 7/1812 | | {having (C1)a-Si-(OC2)b linkages, a and b each being ≥ 1 and $a+b = 4$, C1 and C2 being hydrocarbon or substituted hydrocarbon radicals} |
| 7/0867 | | {Si-H bond} | 7/1816 | | {a and b being alternatively specified} |
| 7/0869 | | {Si-Q bond, Q different from O, N, H and halogen} | | | |
| 7/087 | | {Compounds of unknown structure containing a Si-O-Si sequence} | | | |
| 7/0872 | | {Preparation and treatment thereof} | | | |
| 7/0874 | | {Reactions involving a bond of the Si-O-Si linkage} | | | |

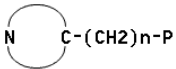
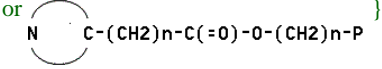
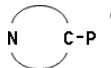
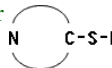
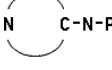
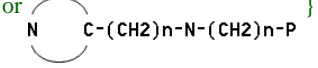
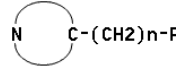
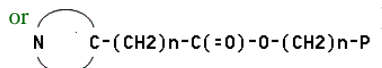
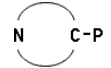
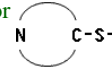
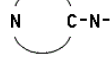
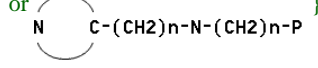
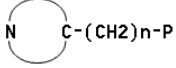
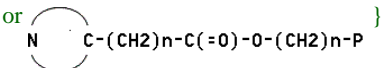
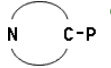
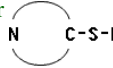
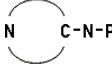
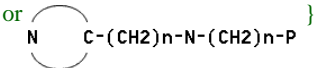
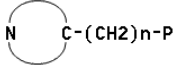
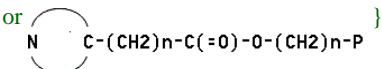

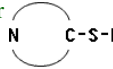
- 7/182 {C1 containing aliphatic or cycloaliphatic unsaturated bonds or heteroatoms}
- 7/1824 {C2 containing aliphatic or cycloaliphatic unsaturated bonds or heteroatoms}
- 7/1828 {C1 and C2 containing aliphatic or cycloaliphatic unsaturated bonds or heteroatoms}
- 7/1832 {compounds not provided for in [C07F 7/182](#) - [C07F 7/1824](#)}
- 7/1836 {a being 1, b being 3}
- 7/184 {a being 2, b being 2}
- 7/1844 {a being 3, b being 1}
- 7/1848 {C1 being an unsubstituted acyclic saturated hydrocarbon radical containing less than six carbon atoms, a benzyl radical, a phenyl radical, or a methyl substituted phenyl radical}
- 7/1852 {C2 being an acyclic, arylaliphatic or a non-condensed aromatic radical containing only carbon, hydrogen, halogen, oxygen, nitrogen or sulfur}
- 7/1856 {C2 containing cycloaliphatic, heterocyclic or condensed aromatic rings}
- 7/186 {C2 containing an azetidine radical or condensed azetidine radical}
- 7/1864 {C2 containing elements other than carbon, hydrogen, halogen, oxygen, nitrogen or sulfur}
- 7/1868 {having (C1)a-Si-(OC2)b linkages, a and b each being ≥ 1 and $a+b \neq 4$ (C1 and C2 being hydrocarbon or substituted hydrocarbon radicals)}
- 7/1872 {Preparation; Treatments not provided for in [C07F 7/20](#)}
- 7/1876 {by reactions involving the formation of Si-C linkages}
- 7/188 {by reactions involving the formation of Si-O linkages}
- 7/1884 {by dismutation}
- 7/1888 {by reactions involving the formation of other Si-linkages, e.g. Si-N}
- 7/1892 {by reactions not provided for in [C07F 7/1876](#) - [C07F 7/1888](#)}
- 7/1896 {Compounds having one or more Si-O-acyl linkages}
- 7/20 . . . Purification, separation
- 7/21 . . . Cyclic compounds having at least one ring containing silicon, but no carbon in the ring
- 7/22 . . . Tin compounds
- 7/2204 . . {Not belonging to the groups [C07F 7/2208](#) - [C07F 7/2296](#)}
- 7/2208 . . {Compounds having tin linked only to carbon, hydrogen and/or halogen}
- 7/2212 . . . {Compounds having only tin-carbon linkages}
- 7/2216 . . . {Compounds having one or more tin-halogen linkages}
- 7/222 . . . {Compounds having one or more tin-hydrogen linkages}
- 7/2224 . . {Compounds having one or more tin-oxygen linkages}
- 7/2228 . . . {Compounds not belonging to the groups [C07F 7/2232](#) - [C07F 7/2252](#)}
- 7/2232 . . . {Compounds having one or more Sn-O-R linkages (R=H or C, except if C belongs to a carboxyl group)}
- 7/2236 . . . {Compounds with a Sn=O linkage}
- 7/224 {Stannoic acids and their esters}
- 7/2244 . . . {Tin esters of organic acids}
- 7/2248 . . . {Tin esters of inorganic acids}
- 7/2252 . . . {Compounds with a Sn-O-metal linkage}
- 7/2256 {Compounds containing a Sn-O-Sn linkage}
- 7/226 . . {Compounds with one or more Sn-S linkages}
- 7/2264 . . . {Compounds not belonging to group [C07F 7/2268](#) - [C07F 7/2276](#)}
- 7/2268 . . . {Compounds having one or more Sn-S-R linkages (R=H or C, except if C belongs to a carboxyl group)}
- 7/2272 . . . {Esters of thiocarboxylic acids and their derivatives}
- 7/2276 . . . {Compounds with one or more Sn-S-metal linkages}
- 7/228 {Compounds with one or more Sn-S-Sn linkages}
- 7/2284 . . {Compounds with one or more Sn-N linkages}
- 7/2288 . . {Compounds with one or more Sn-metal linkages}
- 7/2292 . . . {Compounds with one or more Sn-Sn linkages}
- 7/2296 . . {Purification, stabilisation, isolation}
- 7/24 . . . Lead compounds
- 7/26 . . . Tetra-alkyl lead compounds
- 7/28 . . . Titanium compounds
- 7/30 . . . Germanium compounds
- 9/00 Compounds containing elements of Groups 5 or 15 of the Periodic System**
- 9/005 . . {Compounds of elements of Group 5 of the Periodic System without metal-carbon linkages}
- 9/02 . . Phosphorus compounds (sugar phosphates [C07H 11/04](#); nucleotides [C07H 19/00](#), [C07H 21/00](#); nucleic acids [C07H 21/00](#))
- 9/025 . . {Purification; Separation; Stabilisation; Desodorisation of organo-phosphorus compounds (of natural phosphatides [C07F 9/103](#); phosphines [C07F 9/5095](#))}
- 9/04 . . Reaction products of phosphorus sulfur compounds with hydrocarbons
- 9/06 . . without P-C bonds
- 9/062 . . . {Organo-phosphoranes without P-C bonds}
- 9/065 {Phosphoranes containing the structure P=N-}
- 9/067 {Polyphosphazenes containing the structure [P=N-n] (cyclic compounds [C07F 9/65812](#))}
- 9/08 . . . Esters of oxyacids of phosphorus ([C07F 9/062](#) takes precedence)}
- 9/09 Esters of phosphoric acids
- 9/091 {with hydroxyalkyl compounds with further substituents on alkyl}
- 9/092 {substituted by B, Si or a metal}
- 9/093 {Polyol derivatives esterified at least twice by phosphoric rests}
- 9/094 {with arylalkanols}

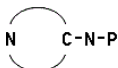
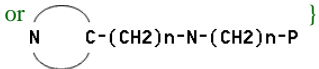
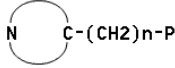
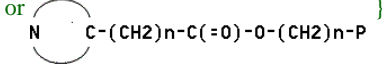
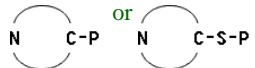
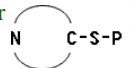
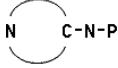
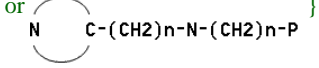
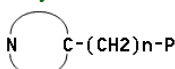
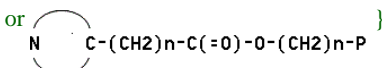
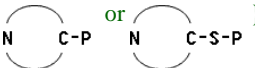
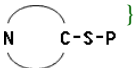
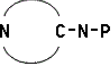
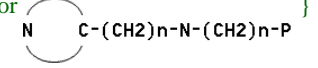
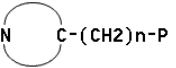
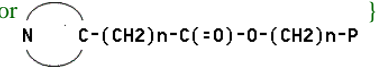
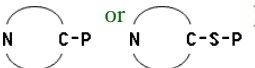
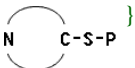
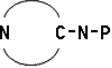
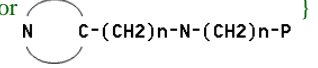
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|--------|-----------|--|--------|-----------|--|
| 9/095 | | {Compounds containing the structure P(=O)-O-acyl, P(=O)-O-heteroatom, P(=O)-O-CN} | 9/1658 | | {Esters of thiopolyphosphoric acids or anhydrides} |
| 9/096 | | {Compounds containing the structure P(=O)-O-C(=X)- (X = O, S, Se)} | 9/17 | | with hydroxyalkyl compounds without further substituents on alkyl |
| 9/097 | | {Compounds containing the structure P(=O)-O-N} | 9/173 | | with unsaturated acyclic alcohols |
| 9/098 | | {Esters of polyphosphoric acids or anhydrides} | 9/177 | | with cycloaliphatic alcohols |
| 9/10 | | Phosphatides, e.g. lecithin | 9/18 | | with hydroxyaryl compounds |
| 9/103 | | {Extraction or purification by physical or chemical treatment of natural phosphatides; Preparation of compositions containing phosphatides of unknown structure} | 9/20 | | containing P-halide groups |
| 9/106 | | {Adducts, complexes, salts of phosphatides} | 9/2003 | | {containing the structure Hal-P-X-unsaturated acyclic rest} |
| 9/11 | | with hydroxyalkyl compounds without further substituents on alkyl | 9/2006 | | {containing the structure Hal-P-X-aryl} |
| 9/113 | | with unsaturated acyclic alcohols | 9/201 | | Esters of thiophosphorus acids |
| 9/117 | | with cycloaliphatic alcohols | 9/2015 | | {with hydroxyalkyl compounds with further substituents on alkyl} |
| 9/12 | | with hydroxyaryl compounds | 9/202 | | with hydroxyl compounds without further substituents on alkyl |
| 9/14 | | containing P(=O)-halide groups | 9/203 | | with unsaturated acyclic alcohols |
| 9/1403 | | {containing the structure Hal-P(=O)-O-unsaturated acyclic rest} | 9/204 | | with cycloaliphatic alcohols |
| 9/1406 | | {containing the structure Hal-P(=O)-O-aryl} | 9/205 | | with hydroxyaryl compounds |
| 9/141 | | Esters of phosphorous acids | 9/206 | | containing P-halide groups |
| 9/1411 | | {with hydroxyalkyl compounds with further substituents on alkyl} | 9/22 | | Amides of acids of phosphorus |
| 9/1412 | | {Polyol derivatives esterified at least twice by phosphorous acid rests} | 9/222 | | {Amides of phosphoric acids} |
| 9/1414 | | {with arylalkanols} | 9/224 | | {Phosphorus triamides} |
| 9/1415 | | {Compounds containing the structure P-O-acyl, P-O-heteroatom, P-O-CN} | 9/226 | | {containing the structure P-isocyanates} |
| 9/1417 | | {Compounds containing the structure P-O-C(=X)- (X = O, S, Se)} | 9/228 | | {containing the structure P-N-N, e.g. azides, hydrazides} |
| 9/1418 | | {Compounds containing the structure P-O-N} | 9/24 | | Esteramides |
| 9/142 | | with hydroxyalkyl compounds without further substituents on alkyl | 9/2404 | | {the ester moiety containing a substituent or a structure which is considered as characteristic} |
| 9/143 | | with unsaturated acyclic alcohols | 9/2408 | | {of hydroxyalkyl compounds} |
| 9/144 | | with cycloaliphatic alcohols | 9/2412 | | {of unsaturated acyclic alcohols} |
| 9/145 | | with hydroxyaryl compounds | 9/2416 | | {of cycloaliphatic alcohols} |
| 9/146 | | containing P-halide groups | 9/242 | | {of hydroxyaryl compounds} |
| 9/16 | | Esters of thiophosphoric acids or thiophosphorous acids | 9/2425 | | {containing the structure (RX)(RR'N)P(=Y)-Z-(C)n-Z'-P(=Y)(XR)2 (X = O, S, NR; Y = O, S, electron pair; Z = O, S; Z' = O, S)} |
| 9/165 | | Esters of thiophosphoric acids | 9/2429 | | {of arylalkanols} |
| 9/1651 | | {with hydroxyalkyl compounds with further substituents on alkyl} | 9/2433 | | {Compounds containing the structure N-P(=X)n-X-acyl, N-P(=X)n-X-heteroatom, N-P(=X)n-X-CN (X = O, S, Se; n = 0, 1)} |
| 9/1652 | | {Polyol derivatives esterified at least twice by (thio)phosphoric acid esters} | 9/2437 | | {Compounds containing the structure N-P(=X)n-S-(S)x-(X = O, S, Se; n=0,1; x>=1)} |
| 9/1653 | | {with arylalkanols} | 9/2441 | | {containing the structure N-P(=X)n-X-C(=X) (X = O, S, Se; n = 0, 1)} |
| 9/1654 | | {Compounds containing the structure P(=X)n-X-acyl, P(=X)n-X-heteroatom, P(=X)n-X-CN (X = O, S, Se; n = 0, 1)} | 9/2445 | | {containing the structure N-P(=X)n-X-N (X = O, S, Se; n = 0, 1)} |
| 9/1655 | | {Compounds containing the structure P(=X)n-S-(S)x- (X = O, S, Se; n=0,1; x>=1)} | 9/245 | | {containing the structure N-P(=X)n-X-P (X = O, S, Se; n = 0, 1)} |
| 9/1656 | | {Compounds containing the structure P(=X)n-X-C(=X)- (X = O, S, Se; n = 0, 1)} | 9/2454 | | {the amide moiety containing a substituent or a structure which is considered as characteristic} |
| 9/1657 | | {Compounds containing the structure P(=X)n-X-N (X = O, S, Se; n = 0, 1)} | 9/2458 | | {of aliphatic amines} |
| | | | 9/2462 | | {of unsaturated acyclic amines} |
| | | | 9/2466 | | {of cycloaliphatic amines} |
| | | | 9/247 | | {of aromatic amines (N-C aromatic linkage)} |
| | | | 9/2475 | | {of aralkylamines} |

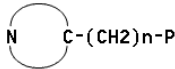
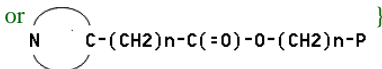

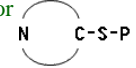
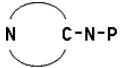
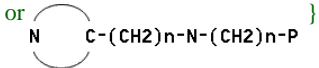
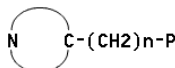
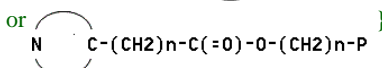

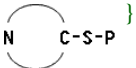
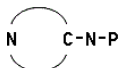
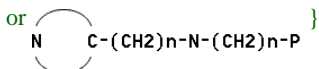
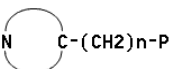
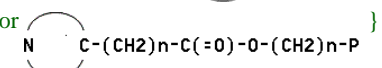

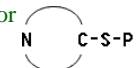
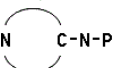
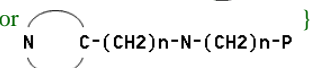
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|--------|-----------|---|--------|-----------|--|
| 9/2479 | | {Compounds containing the structure $P(=X)n-N$ -acyl, $P(=X)n-N$ -heteroatom, $P(=X)n-N-CN$ ($X = O, S, Se; n = 0, 1$)} | 9/38 | . . . | Phosphonic acids $RP(=O)(OH)_2$; Thiophosphonic acids {, i.e. $RP(=X)(XH)_2$ ($X = S, Se$)} |
| 9/2483 | | {containing the structure $P(=X)n-N-S$ ($X = O, S, Se; n = 0, 1$)} | 9/3804 | | {not used, see subgroups} |
| 9/2487 | | {containing the structure $P(=X)n-N-C(=X)$ ($X = O, S, Se; n = 0, 1$)} | 9/3808 | | {Acyclic saturated acids which can have further substituents on alkyl} |
| 9/2491 | | {containing the structure $P(=X)n-N-N$ ($X = O, S, Se; n = 0, 1$)} | 9/3813 | | {N-Phosphonomethylglycine; Salts or complexes thereof} |
| 9/2495 | | {containing the structure $P(=X)n-N-P$ ($X = O, S, Se; n = 0, 1$)} | 9/3817 | | {Acids containing the structure $(RX)_2P(=X)-alk-N...P$ ($X = O, S, Se$)} |
| 9/26 | | containing P-halide groups | 9/3821 | | {substituted by B, Si, P or a metal (C07F 9/3839 takes precedence)} |
| 9/28 | . . | with one or more P-C bonds | 9/3826 | | {Acyclic unsaturated acids} |
| 9/30 | . . . | Phosphinic acids $R_2P(=O)(OH)$; Thiophosphinic acids {, i.e. $R_2P(=X)(XH)$ ($X = S, Se$)} | 9/383 | | {Cycloaliphatic acids} |
| 9/301 | | {Acyclic saturated acids which can have further substituents on alkyl} | 9/3834 | | {Aromatic acids (P-C aromatic linkage)} |
| 9/302 | | {Acyclic unsaturated acids} | 9/3839 | | {Polyphosphonic acids} |
| 9/303 | | {Cycloaliphatic acids} | 9/3843 | | {containing no further substituents than $-PO_3H_2$ groups} |
| 9/304 | | {Aromatic acids (P-C aromatic linkage)} | 9/3847 | | {Acyclic unsaturated derivatives} |
| 9/305 | | {Poly(thio)phosphinic acids} | 9/3852 | | {Cycloaliphatic derivatives} |
| 9/306 | | {Arylalkanephosphinic acids, e.g. $Ar-(CH_2)_n-P(=X)(R)(XH)$, ($X = O, S, Se; n \geq 1$)} | 9/3856 | | {containing halogen or nitro(so) substituents} |
| 9/307 | | {Acids containing the structure $-C(=X)-P(=X)(R)(XH)$ or $NC-P(=X)(R)(XH)$, ($X = O, S, Se$)} | 9/386 | | {containing hydroxy substituents in the hydrocarbon radicals} |
| 9/308 | | {Pyrophosphinic acids; Phosphinic acid anhydrides} | 9/3865 | | {containing sulfur substituents} |
| 9/32 | | Esters thereof | 9/3869 | | {containing carboxylic acid or carboxylic acid derivative substituents} |
| 9/3205 | | {the acid moiety containing a substituent or a structure which is considered as characteristic} | 9/3873 | | {containing nitrogen substituents, e.g. $N.....H$ or N-hydrocarbon rest which can be substituted by halogen or nitro(so), $N.....O$, $N.....S$, $N.....C(=X)-$ ($X = O, S$), $N.....N$, $N...C(=X)...N$ ($X = O, S$)} |
| 9/3211 | | {Esters of acyclic saturated acids which can have further substituents on alkyl} | 9/3878 | | {containing substituents selected from B, Si, P (other than $-PO_3H_2$ groups) or a metal} |
| 9/3217 | | {Esters of acyclic unsaturated acids} | 9/3882 | | {Arylalkanephosphonic acids (C07F 9/3839 takes precedence)} |
| 9/3223 | | {Esters of cycloaliphatic acids} | 9/3886 | | {Acids containing the structure $-C(=X)-P(=X)(XH)_2$ or $NC-P(=X)(XH)_2$, ($X = O, S, Se$)} |
| 9/3229 | | {Esters of aromatic acids (P-C aromatic linkage)} | 9/3891 | | {Acids containing the structure $-C(=X)-P(=X)(XH)_2$, ($X = O, S, Se$)} |
| 9/3235 | | {Esters of poly(thio)phosphinic acids} | 9/3895 | | {Pyrophosphonic acids; phosphonic acid anhydrides} |
| 9/3241 | | {Esters of arylalkanephosphinic acids} | 9/40 | | Esters thereof |
| 9/3247 | | {Esters of acids containing the structure $-C(=X)-P(=X)(R)(XH)$ or $NC-P(=X)(R)(XH)$, ($X = O, S, Se$)} | 9/4003 | | {the acid moiety containing a substituent or a structure which is considered as characteristic} |
| 9/3252 | | {containing the structure $-C(=X)-P(=X)(R)(XR)$, ($X = O, S, Se$)} | 9/4006 | | {Esters of acyclic acids which can have further substituents on alkyl} |
| 9/3258 | | {the ester moiety containing a substituent or a structure which is considered as characteristic} | 9/4009 | | {Esters containing the structure $(RX)_2P(=X)-alk-N...P$ ($X = O, S, Se$)} |
| 9/3264 | | {Esters with hydroxyalkyl compounds} | 9/4012 | | {substituted by B, Si, P or a metal (C07F 9/4025 takes precedence)} |
| 9/327 | | {Esters with unsaturated acyclic alcohols} | 9/4015 | | {Esters of acyclic unsaturated acids} |
| 9/3276 | | {Esters with cycloaliphatic alcohols} | 9/4018 | | {Esters of cycloaliphatic acids} |
| 9/3282 | | {Esters with hydroxyaryl compounds} | 9/4021 | | {Esters of aromatic acids (P-C aromatic linkage)} |
| 9/3288 | | {Esters with arylalkanols} | 9/4025 | | {Esters of poly(thio)phosphonic acids} |
| 9/3294 | | {Compounds containing the structure $R_2P(=X)-X$ -acyl, $R_2P(=X)-X$ -heteroatom, $R_2P(=X)-X-CN$ ($X = O, S, Se$)} | 9/4028 | | {containing no further substituents than $-PO_3H_2$ groups in free or esterified form} |
| 9/34 | | Halides thereof | 9/4031 | | {Acyclic unsaturated derivatives} |
| 9/36 | | Amides thereof | | | |

| | | | | | |
|--------|-----------|--|--------|-----------|---|
| 9/4034 | | {Cycloaliphatic derivatives} | 9/4426 | | {Amides of arylalkanephosphonic acids} |
| 9/4037 | | {containing halogen or nitro(so) substituents} | 9/443 | | {Amides of acids containing the structure -C(=Y)-P(=X)(XR)-N or NC-(P(=X)(XR)-N)} |
| 9/404 | | {containing hydroxy substituents in the hydrocarbon radicals} | 9/4434 | | {the ester moiety containing a substituent or a structure which is considered as characteristic} |
| 9/4043 | | {containing sulfur substituents} | 9/4438 | | {Ester with hydroxyalkyl compounds} |
| 9/4046 | | {containing carboxylic acid or carboxylic acid derivative substituents} | 9/4442 | | {Esters with unsaturated acyclic alcohols} |
| 9/405 | | {containing nitrogen substituents, e.g. N.....H or N-hydrocarbon rest which can be substituted by halogen or nitro(so), N.....O, N.....S, N.....C(=X)-(X = O, S), N.....N, N...C(=X)...N (X = O, S)} | 9/4446 | | {Esters with cycloaliphatic alcohols} |
| 9/4053 | | {containing substituents selected from B, Si, P (other than -PO ₃ H ₂ groups in free or esterified form), or a metal} | 9/4449 | | {Esters with hydroxyaryl compounds} |
| 9/4056 | | {Esters of arylalkanephosphonic acids (C07F 9/4025 takes precedence)} | 9/4453 | | {Esters with arylalkanols} |
| 9/4059 | | {n-C(=O)-(CH ₂) ^m -Ar, (X, Y = O, S, Se; n>=1, m>=0)} | 9/4457 | | {Compounds containing the structure C-P(=X)(X-acyl)-N, C-P(=X)(X-heteroatom)-N or C-P(=X)(X-CN)-N (X, Y = O, S)} |
| 9/4062 | | {Esters of acids containing the structure -C(=X)-P(=X)(XR) ₂ or NC-P(=X)(XR) ₂ , (X = O, S, Se)} | 9/4461 | | {the amide moiety containing a substituent or a structure which is considered as characteristic} |
| 9/4065 | | {Esters of acids containing the structure -C(=X)-P(=X)(XR) ₂ , (X = O, S, Se)} | 9/4465 | | {of aliphatic amines} |
| 9/4068 | | {Esters of pyrophosphonic acids; Esters of phosphonic acid anhydrides} | 9/4469 | | {of unsaturated acyclic amines} |
| 9/4071 | | {the ester moiety containing a substituent or a structure which is considered as characteristic} | 9/4473 | | {of cycloaliphatic amines} |
| 9/4075 | | {Esters with hydroxyalkyl compounds} | 9/4476 | | {of aromatic amines (N-C aromatic linkage)} |
| 9/4078 | | {Esters with unsaturated acyclic alcohols} | 9/448 | | {of aralkylamines} |
| 9/4081 | | {Esters with cycloaliphatic alcohols} | 9/4484 | | {Compounds containing the structure C-P(=X)(N-acyl)-X, C-P(=X)(N-heteroatom)-X or C-P(=X)(N-CN)-X (X = O, S, Se)} |
| 9/4084 | | {Esters with hydroxyaryl compounds} | 9/4488 | | {Compounds containing the structure P(=X)(N-S-) (X = O, S, Se)} |
| 9/4087 | | {Esters with arylalkanols} | 9/4492 | | {Compounds containing the structure P(=X)(N-C(=X)-) (X = O, S, Se)} |
| 9/409 | | {Compounds containing the structure P(=X)-X-acyl, P(=X)-X-heteroatom, P(=X)-X-CN (X = O, S, Se)} | 9/4496 | | {Compounds containing the structure P(=X)(N-N-) (X = O, S, Se)} |
| 9/4093 | | {Compounds containing the structure P(=X)-X-C(=X)- (X = O, S, Se)} | 9/46 | . . . | Phosphinous acids R ₂ =P-OH; Thiophosphinous acids; Aminophosphines R ₂ -P-NH ₂ {including R ₂ P(=O)H; derivatives thereof} |
| 9/4096 | | {Compounds containing the structure P(=X)-X-N (X = O, S, Se)} | 9/48 | . . . | Phosphonous acids R-P(OH) ₂ ; Thiophosphonous acids {including RHP(=O)(OH); Derivatives thereof} |
| 9/42 | | Halides thereof | 9/4808 | | {the acid moiety containing a substituent or structure which is considered as characteristic} |
| 9/425 | | {Acid or estermonohalides thereof, e.g. RP(=X)(YR)(Hal) (X, Y = O, S; R = H, or hydrocarbon group)} | 9/4816 | | {Acyclic saturated acids or derivatives which can have further substituents on alkyl} |
| 9/44 | | Amides thereof | 9/4825 | | {Acyclic unsaturated acids or derivatives} |
| 9/4403 | | {the acid moiety containing a substituent or a structure which is considered as characteristic} | 9/4833 | | {Cycloaliphatic acids or derivatives} |
| 9/4407 | | {Amides of acyclic saturated acids which can have further substituents on alkyl} | 9/4841 | | {Aromatic acids or derivatives (P-C aromatic linkage)} |
| 9/4411 | | {Amides of acyclic unsaturated acids} | 9/485 | | {Polyphosphonous acids or derivatives} |
| 9/4415 | | {Amides of cycloaliphatic acids} | 9/4858 | | {Acids or derivatives containing the structure -C(=X)-P(XR) ₂ or NC-P(XR) ₂ (X = O, S, Se)} |
| 9/4419 | | {Amides of aromatic acids (P-C aromatic linkage)} | 9/4866 | | {the ester moiety containing a substituent or structure which is considered as characteristic} |
| 9/4423 | | {Amides of poly (thio)phosphonic acids} | 9/4875 | | {Esters with hydroxy aryl compounds} |
| | | | 9/4883 | | {Amides or esteramides thereof, e.g. RP(NR' ₂) ₂ or RP(XR')(NR'' ₂) (X = O, S)} |

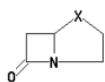
- 9/4891 {Monohalide derivatives RP (XR') (Hal) (X = O, S, N) (dihalide derivatives [C07F 9/52](#))}
- 9/50 . . . Organo-phosphines
- 9/5004 {Acyclic saturated phosphines}
- 9/5009 {substituted by B, Si, P or a metal ([C07F 9/5027](#) takes precedence)}
- 9/5013 {Acyclic unsaturated phosphines}
- 9/5018 {Cycloaliphatic phosphines}
- 9/5022 {Aromatic phosphines (P-C aromatic linkage)}
- 9/5027 {Polyphosphines}
- 9/5031 {Arylalkane phosphines ([C07F 9/5027](#) takes precedence)}
- 9/5036 {Phosphines containing the structure -C(=X)-P or NC-P}
- 9/504 {Organo-phosphines containing a P-P bond}
- 9/5045 {Complexes or chelates of phosphines with metallic compounds or metals}
- 9/505 {Preparation; Separation; Purification; Stabilisation}
- 9/5054 {by a process in which the phosphorus atom is not involved}
- 9/5059 {by addition of phosphorus compounds to alkenes or alkynes}
- 9/5063 {from compounds having the structure P-H or P-Heteroatom, in which one or more of such bonds are converted into P-C bonds ([C07F 9/5059](#) takes precedence)}
- 9/5068 {from starting materials having the structure >P-Hal}
- 9/5072 {from starting materials having the structure P-H ([C07F 9/5059](#) takes precedence)}
- 9/5077 {from starting materials having the structure P-Metal, including R_2P^+ }
- 9/5081 {from starting materials having the structure >P-Het, Het being an heteroatom different from Hal or Metal}
- 9/5086 {from phosphonium salts as starting materials}
- 9/509 {by reduction of pentavalent phosphorus derivatives, e.g. -P=X with X = O, S, Se or -P-Hal₂}
- 9/5095 {Separation; Purification; Stabilisation}
- 9/52 Halophosphines
- 9/53 Organo-phosphine oxides; Organo-phosphine thioxides
- 9/5304 {Acyclic saturated phosphine oxides or thioxides}
- 9/5308 {substituted by B, Si, P or a metal}
- 9/5312 {substituted by a phosphorus atom ([C07F 9/5329](#) takes precedence)}
- 9/5316 {Unsaturated acyclic phosphine oxides or thioxides}
- 9/532 {Cycloaliphatic phosphine oxides or thioxides}
- 9/5325 {Aromatic phosphine oxides or thioxides (P-C aromatic linkage)}
- 9/5329 {Polyphosphine oxides or thioxides}
- 9/5333 {Arylalkane phosphine oxides or thioxides ([C07F 9/5329](#) takes precedence)}
- 9/5337 {Phosphine oxides or thioxides containing the structure -C(=X)-P(=X) or NC-P(=X) (X = O, S, Se)}
- 9/5341 {Organo-phosphine oxides or thioxides containing a P-P bond}
- 9/5345 {Complexes or chelates of phosphine-oxides or thioxides with metallic compounds or metals}
- 9/535 Organo-phosphoranes
- 9/5352 {Phosphoranes containing the structure P=C-}
- 9/5355 {Phosphoranes containing the structure P=N-}
- 9/5357 {Polyphosphazenes containing the structure [P=N-n] (cyclic compounds [C07F 9/65812](#))}
- 9/54 Quarternary phosphonium compounds
- 9/5407 {Acyclic saturated phosphonium compounds}
- 9/5414 {substituted by B, Si, P or a metal}
- 9/5421 {substituted by a phosphorus atom ([C07F 9/5449](#) takes precedence)}
- 9/5428 {Acyclic unsaturated phosphonium compounds}
- 9/5435 {Cycloaliphatic phosphonium compounds}
- 9/5442 {Aromatic phosphonium compounds (P-C aromatic linkage)}
- 9/5449 {Polyphosphonium compounds}
- 9/5456 {Arylalkane phosphonium compounds}
- 9/5463 {Compounds of the type "quasi-phosphonium", e.g. (C)a-P-(Y)b wherein a +b=4, b>=1 and Y=heteroatom, generally N or O}
- 9/547 . . . Heterocyclic compounds, e.g. containing phosphorus as a ring hetero atom
- 9/5475 . . . {having nitrogen and selenium with or without oxygen or sulfur as ring hetero atoms; having nitrogen and tellurium with or without oxygen or sulfur as ring hetero atoms}
- 9/553 . . . having one nitrogen atom as the only ring hetero atom
- 9/5532 {Seven-(or more) membered rings}
- 9/5535 {condensed with carbocyclic rings or ring systems}
- 9/5537 {the heteroring containing the structure -C(=O)-N-C(=O)- (both carbon atoms belong to the heteroring)}
- 9/564 Three-membered rings
- 9/568 Four-membered rings
- 9/5683 {the phosphorus atom is bonded to a cyclic nitrogen atom, directly, through one or more heteroatoms or through a hydrocarbon chain which may be broken by one or more heteroatoms}
- 9/5686 {condensed with carbocyclic rings or ring systems}
- 9/572 Five-membered rings
- 9/5721 {the phosphorus atom is bonded to a cyclic nitrogen atom, directly, through one or more heteroatoms or through a hydrocarbon chain which may be broken by one or more heteroatoms}

- 9/5722 {the phosphorus atom is bonded to a cyclic carbon atom, other than directly, through a heteroatom, or through a hydrocarbon chain which may be broken by at least one nitrogen atom, e.g. 
- or 
- 9/5723 {the phosphorus atom is bonded to a cyclic carbon atom, directly or through a heteroatom other than nitrogen, e.g.  or 
- 9/5725 {bonded through a heteroatom}
- 9/5726 {directly bonded}
- 9/5727 {the phosphorus atom is bonded to a cyclic carbon atom, through a nitrogen atom or through a hydrocarbon chain which is broken by at least one nitrogen atom, e.g. 
- or 
- 9/5728 {condensed with carbocyclic rings or carbocyclic ring systems}
- 9/576 Six-membered rings
- 9/5765 {condensed with carbocyclic rings or carbocyclic ring systems}
- 9/58 Pyridine rings
- 9/581 {the phosphorus atom is bonded to a cyclic nitrogen atom, directly, through one or more heteroatoms or through a hydrocarbon chain which may be broken by one or more heteroatoms}
- 9/582 {the phosphorus atom is bonded to a cyclic carbon atom, other than directly, through a heteroatom, or through a hydrocarbon chain which may be broken by at least one nitrogen atom, e.g. 
- or 
- 9/584 {the phosphorus atom is bonded to a cyclic carbon atom, directly or through a heteroatom other than nitrogen, e.g.  or 
- 9/585 {bonded through a heteroatom}
- 9/587 {directly bonded}
- 9/588 {the phosphorus atom is bonded to a cyclic carbon atom, through a nitrogen atom or through a hydrocarbon chain which is broken by at least one nitrogen atom, e.g. 
- or 
- 9/59 Hydrogenated pyridine rings
- 9/591 {the phosphorus atom is bonded to a cyclic nitrogen atom, directly, through one or more heteroatoms or through a hydrocarbon chain which may be broken by one or more heteroatoms}
- 9/592 {the phosphorus atom is bonded to a cyclic carbon atom, other than directly, through a heteroatom, or through a hydrocarbon chain which may be broken by at least one nitrogen atom, e.g. 
- or 
- 9/594 {the phosphorus atom is bonded to a cyclic carbon atom, directly or through a heteroatom other than nitrogen, e.g.  or 
- 9/595 {bonded through a heteroatom}
- 9/597 {directly bonded}
- 9/598 {the phosphorus atom is bonded to a cyclic carbon atom, through a nitrogen atom or through a hydrocarbon chain which is broken by at least one nitrogen atom, e.g. 
- or 
- 9/60 Quinoline or hydrogenated quinoline ring systems
- 9/62 Isoquinoline or hydrogenated isoquinoline ring systems
- 9/64 Acridine or hydrogenated acridine ring systems
- 9/645 having two nitrogen atoms as the only ring heteroatoms
- 9/6503 Five-membered rings
- 9/65031 {having the nitrogen atoms in the positions 1 and 2}
- 9/65032 {the phosphorus atom is bonded to a cyclic nitrogen atom, directly, through one or more heteroatoms or through a hydrocarbon chain which may be broken by one or more heteroatoms}
- 9/65033 {the phosphorus atom is bonded to a cyclic carbon atom, other than directly, through a heteroatom, or through a hydrocarbon chain which may be broken by at least one nitrogen atom, e.g. 
- or 
- 9/65034 {the phosphorus atom is bonded to a cyclic carbon atom, directly or through a heteroatom other than nitrogen, e.g.  or 
- 9/65035 {bonded through a heteroatom}
- 9/65036 {directly bonded}

- 9/65037 {the phosphorus atom is bonded to a cyclic carbon atom, through a nitrogen atom or through a hydrocarbon chain which is broken by at least one nitrogen atom, e.g. 
- or 
- 9/65038 {condensed with carbocyclic rings or carbocyclic ring systems}
- 9/6506 having the nitrogen atoms in positions 1 and 3
- 9/65061 {the phosphorus atom is bonded to a cyclic nitrogen atom, directly, through one or more heteroatoms or through a hydrocarbon chain which may be broken by one or more heteroatoms}
- 9/65062 {the phosphorus atom is bonded to a cyclic carbon atom, other than directly, through a heteroatom, or through a hydrocarbon chain which may be broken by at least one nitrogen atom, e.g. 
- or 
- 9/65063 {the phosphorus atom is bonded to a cyclic carbon atom, directly or through a heteroatom other than nitrogen, e.g. 
- or 
- 9/65065 {bonded through a heteroatom}
- 9/65066 {directly bonded}
- 9/65067 {the phosphorus atom is bonded to a cyclic carbon atom, through a nitrogen atom or through a hydrocarbon chain which is broken by at least one nitrogen atom, e.g. 
- or 
- 9/65068 {condensed with carbocyclic rings or carbocyclic ring systems}
- 9/6509 Six-membered rings
- 9/650905 {having the nitrogen atoms in the positions 1 and 2}
- 9/650911 {the phosphorus atom is bonded to a cyclic nitrogen atom, directly, through one or more heteroatoms or through a hydrocarbon chain which may be broken by one or more heteroatoms}
- 9/650917 {the phosphorus atom is bonded to a cyclic carbon atom, other than directly, through a heteroatom, or through a hydrocarbon chain which may be broken by at least one nitrogen atom, e.g. 
- or 
- 9/650923 {the phosphorus atom is bonded to a cyclic carbon atom, directly or through a heteroatom other than nitrogen, e.g. 
- or 
- 9/650929 {bonded through a heteroatom}
- 9/650935 {directly bonded}
- 9/650941 {the phosphorus atom is bonded to a cyclic carbon atom, through a nitrogen atom or through a hydrocarbon chain which is broken by at least one nitrogen atom, e.g. 
- or 
- 9/650947 {condensed with carbocyclic rings or carbocyclic ring systems}
- 9/650952 {having the nitrogen atoms in the position 1 and 4}
- 9/650958 {the phosphorus atom is bonded to a cyclic nitrogen atom, directly, through one or more heteroatoms or through a hydrocarbon chain which may be broken by one or more heteroatoms}
- 9/650964 {the phosphorus atom is bonded to a cyclic carbon atom, other than directly, through a heteroatom, or through a hydrocarbon chain which may be broken by at least one nitrogen atom, e.g. 
- or 
- 9/65097 {the phosphorus atom is bonded to a cyclic carbon atom, directly or through a heteroatom other than nitrogen, e.g. 
- or 
- 9/650976 {bonded through a heteroatom}
- 9/650982 {directly bonded}
- 9/650988 {the phosphorus atom is bonded to a cyclic carbon atom, through a nitrogen atom or through a hydrocarbon chain which is broken by at least one nitrogen atom, e.g. 
- or 
- 9/650994 {condensed with carbocyclic rings or carbocyclic ring systems}
- 9/6512 having the nitrogen atoms in positions 1 and 3
- 9/65121 {the phosphorus atom is bonded to a cyclic nitrogen atom, directly, through one or more heteroatoms or through a hydrocarbon chain which may be broken by one or more heteroatoms}

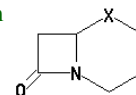
- 9/65122 { the phosphorus atom is bonded to a cyclic carbon atom, other than directly, through a heteroatom, or through a hydrocarbon chain which may be broken by at least one nitrogen atom, e.g.  or  }
- 9/65123 { the phosphorus atom is bonded to a cyclic carbon atom, directly or through a heteroatom other than nitrogen, e.g.  or  }
- 9/65125 { bonded through a heteroatom }
- 9/65126 { directly bonded }
- 9/65127 { the phosphorus atom is bonded to a cyclic carbon atom, through a nitrogen atom or through a hydrocarbon chain which is broken by at least one nitrogen atom, e.g.  or  }
- 9/65128 { condensed with carbocyclic rings or carbocyclic ring systems }
- 9/6515 having three nitrogen atoms as the only ring hetero atoms
- 9/6518 Five-membered rings
- 9/65181 { the phosphorus atom is bonded to a cyclic nitrogen atom, directly, through one or more heteroatoms or through a hydrocarbon chain which may be broken by one or more heteroatoms }
- 9/65182 { the phosphorus atom is bonded to a cyclic carbon atom, other than directly, through a heteroatom, or through a hydrocarbon chain which may be broken by at least one nitrogen atom, e.g.  or  }
- 9/65183 { the phosphorus atom is bonded to a cyclic carbon atom, directly or through a heteroatom other than nitrogen, e.g.  or  }
- 9/65185 { bonded through a heteroatom }
- 9/65186 { directly bonded }
- 9/65187 { the phosphorus atom is bonded to a cyclic carbon atom, through a nitrogen atom or through a hydrocarbon chain which is broken by at least one nitrogen atom, e.g.  or  }
- 9/65188 { condensed with carbocyclic rings or carbocyclic ring systems }
- 9/6521 Six-membered rings
- 9/65211 { the phosphorus atom is bonded to a cyclic nitrogen atom, directly, through one or more heteroatoms or through a hydrocarbon chain which may be broken by one or more heteroatoms }
- 9/65212 { the phosphorus atom is bonded to a cyclic carbon atom, other than directly, through a heteroatom, or through a hydrocarbon chain which may be broken by at least one nitrogen atom, e.g.  or  }
- 9/65213 { the phosphorus atom is bonded to a cyclic carbon atom, directly or through a heteroatom other than nitrogen, e.g.  or  }
- 9/65215 { bonded through a heteroatom }
- 9/65216 { directly bonded }
- 9/65217 { the phosphorus atom is bonded to a cyclic carbon atom, through a nitrogen atom or through a hydrocarbon chain which is broken by at least one nitrogen atom, e.g.  or  }
- 9/65218 { condensed with carbocyclic rings or carbocyclic ring systems }
- 9/6524 having four or more nitrogen atoms as the only ring hetero atoms
- 9/6527 having nitrogen and oxygen atoms as the only ring hetero atoms
- 9/653 Five-membered rings
- 9/65306 { containing two nitrogen atoms }
- 9/65312 { having the two nitrogen atoms in positions 1 and 2 }
- 9/65318 { having the two nitrogen atoms in positions 1 and 3 }
- 9/65324 { condensed with carbocyclic rings or carbocyclic ring systems }
- 9/6533 Six-membered rings
- 9/65335 { condensed with carbocyclic rings or carbocyclic ring systems }
- 9/6536 having nitrogen and sulfur atoms with or without oxygen atoms, as the only ring hetero atoms
- 9/6539 Five-membered rings
- 9/65392 { containing two nitrogen atoms }
- 9/65395 { having the two nitrogen atoms in positions 1 and 2 }
- 9/65397 { having the two nitrogen atoms in positions 1 and 3 }
- 9/6541 condensed with carbocyclic rings or {carbocyclic} ring systems
- 9/6544 Six-membered rings
- 9/6547 condensed with carbocyclic rings or {carbocyclic} ring systems
- 9/655 having oxygen atoms, with or without sulfur, selenium, or tellurium atoms, as the only ring hetero atoms

- 9/65502 {the oxygen atom being part of a three-membered ring}
- 9/65505 {Phosphonic acids containing oxirane groups; esters thereof}
- 9/65507 {condensed with carbocyclic rings or carbocyclic ring systems}
- 9/6551 {the oxygen atom being part of a four-membered ring}
- 9/65512 {condensed with carbocyclic rings or carbocyclic ring systems}
- 9/65515 {the oxygen atom being part of a five-membered ring}
- 9/65517 {condensed with carbocyclic rings or carbocyclic ring systems}
- 9/6552 {the oxygen atom being part of a six-membered ring}
- 9/65522 {condensed with carbocyclic rings or carbocyclic ring systems}
- 9/65525 {the oxygen atom being part of a seven-(or more) membered ring}
- 9/65527 {condensed with carbocyclic rings or carbocyclic ring systems}
- 9/6553 having sulfur atoms, with or without selenium or tellurium atoms, as the only ring hetero atoms
- 9/655309 {the sulfur atom being part of a three-membered ring}
- 9/655318 {condensed with carbocyclic rings or carbocyclic ring systems}
- 9/655327 {the sulfur atom being part of a four-membered ring}
- 9/655336 {condensed with carbocyclic rings or carbocyclic ring systems}
- 9/655345 {the sulfur atom being part of a five-membered ring}
- 9/655354 {condensed with carbocyclic rings or carbocyclic ring systems}
- 9/655363 {the sulfur atom being part of a six-membered ring}
- 9/655372 {condensed with carbocyclic rings or carbocyclic ring systems}
- 9/655381 {the sulfur atom being part of a seven-(or more) membered ring}
- 9/65539 {condensed with carbocyclic rings or carbocyclic ring systems}
- 9/6558 containing at least two different or differently substituted hetero rings neither condensed among themselves nor condensed with a common carbocyclic ring or ring system
- 9/65583 {each of the hetero rings containing nitrogen as ring hetero atom}
- 9/65586 {at least one of the hetero rings does not contain nitrogen as ring hetero atom}
- 9/6561 containing systems of two or more relevant hetero rings condensed among themselves or condensed with a common carbocyclic ring or ring system, with or without other non-condensed hetero rings
- 9/65611 {containing the ring system



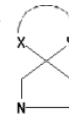
(X = CH₂, O, S, NH) optionally with an additional double bond and/or substituents, e.g. penicillins and analogs}

- 9/65613 {containing the ring system



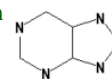
(X = CH₂, O, S, NH) optionally with an additional double bond and/or substituents, e.g. cephalosporins and analogs}

- 9/65615 {containing a spiro condensed ring system of the formula



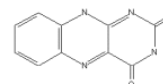
atoms X or Y is a hetero atom, e.g. S}

- 9/65616 {containing the ring system



having three or more than three double bonds between ring members or between ring members and non-ring members, e.g. purine or analogs}

- 9/65618 {containing the ring system, e.g. flavins or analogues}



- 9/6564 having phosphorus atoms, with or without nitrogen, oxygen, sulfur, selenium or tellurium atoms, as ring hetero atoms

- 9/6568 having phosphorus atoms as the only ring hetero atoms

- 9/65681 {the ring phosphorus atom being part of a (thio)phosphinic acid or ester thereof}

- 9/65683 {the ring phosphorus atom being part of a phosphine}

- 9/65685 {the ring phosphorus atom being part of a phosphine oxide or thioxide}

- 9/65686 {the ring phosphorus atom being part of an organo-phosphorane}

- 9/65688 {the ring phosphorus atom being part of a phosphonium compound}

- 9/6571 having phosphorus and oxygen atoms as the only ring hetero atoms

- 9/657109 {esters of oxyacids of phosphorus in which one or more exocyclic oxygen atoms have been replaced by (a) sulfur atom(s)}

- 9/657118 {non-condensed with carbocyclic rings or heterocyclic rings or ring systems}

- 9/657127 {condensed with carbocyclic or heterocyclic rings or ring systems}

- 9/657136 {the molecule containing more than one cyclic phosphorus atom}

- 9/657145 {the cyclic phosphorus atom belonging to more than one ring system}

- 9/657154 {Cyclic esteramides of oxyacids of phosphorus}

- 9/657163 {the ring phosphorus atom being bound to at least one carbon atom}

- 9/657172 {the ring phosphorus atom and one oxygen atom being part of a (thio)phosphinic acid ester:



(X = O, S)}

- 9/657181 {the ring phosphorus atom and, at least, one ring oxygen atom being part of a (thio)phosphonic acid derivative}

- 9/65719 {the ring phosphorus atom and, at least, one ring oxygen atom being part of a (thio)phosphonous acid derivative}
- 9/6574 Esters of oxyacids of phosphorus
{(C07F 9/657163 takes precedence)}
- 9/65742 {non-condensed with carbocyclic rings or heterocyclic rings or ring systems}
- 9/65744 {condensed with carbocyclic or heterocyclic rings or ring systems}
- 9/65746 {the molecule containing more than one cyclic phosphorus atom}
- 9/65748 {the cyclic phosphorus atom belonging to more than one ring system}
- 9/6578 having phosphorus and sulfur atoms with or without oxygen atoms, as ring hetero atoms
- 9/65785 {the ring phosphorus atom and, at least, one ring sulfur atom being part of a thiophosphonic acid derivative}
- 9/6581 having phosphorus and nitrogen atoms with or without oxygen or sulfur atoms, as ring hetero atoms
- 9/65811 {having four or more phosphorus atoms as ring hetero atoms}
- 9/65812 {Cyclic phosphazenes [P=N-n, n>=3]}
- 9/65814 {n = 3 or 4}
- 9/65815 {n = 3}
- 9/65817 {n = 4}
- 9/65818 {n > 4}
- 9/6584 having one phosphorus atom as ring hetero atom
- 9/65842 {Cyclic amide derivatives of acids of phosphorus, in which one nitrogen atom belongs to the ring}
- 9/65844 {the phosphorus atom being part of a five-membered ring which may be condensed with another ring system}
- 9/65846 {the phosphorus atom being part of a six-membered ring which may be condensed with another ring system}
- 9/65848 {Cyclic amide derivatives of acids of phosphorus, in which two nitrogen atoms belong to the ring}
- 9/6587 having two phosphorus atoms as ring hetero atoms in the same ring
- 9/659 having three phosphorus atoms as ring hetero atoms in the same ring
{(C07F 9/65812 takes precedence)}
- 9/6596 having atoms other than oxygen, sulfur, selenium, tellurium, nitrogen or phosphorus as ring hetero atoms
- 9/66 Arsenic compounds
- 9/68 without As-C bonds
- 9/70 Organo-arsenic compounds
- 9/703 {Complex metallic compounds}
- 9/706 {Heterocyclic compounds containing As in the ring}
- 9/72 Aliphatic compounds
- 9/723 {As bound only to carbon, hydrogen and/or oxygen}
- 9/726 {Compounds with chains of As}
- 9/74 Aromatic compounds
- 9/743 {As bound only to carbon, hydrogen and/or oxygen}
- 9/746 {Compounds with chains of As}
- 9/76 containing hydroxyl groups
- 9/78 containing amino groups
- 9/80 Heterocyclic compounds
- 9/803 {As bound only to carbon, hydrogen and/or oxygen}
- 9/806 {Compounds with chains of As}
- 9/82 Arsenic compounds containing one or more pyridine rings
- 9/84 Arsenic compounds containing one or more quinoline ring systems
- 9/86 Arsenic compounds containing one or more isoquinoline ring systems
- 9/88 Arsenic compounds containing one or more acridine ring systems
- 9/90 Antimony compounds
- 9/902 {Compounds without antimony-carbon linkages}
- 9/904 {Aliphatic compounds}
- 9/906 {Heterocyclic compounds}
- 9/908 {Complex compounds}
- 9/92 Aromatic compounds
- 9/94 Bismuth compounds
- 11/00 Compounds containing elements of Groups 6 or 16 of the Periodic System**
- 11/005 {compounds without a metal-carbon linkage}
- 13/00 Compounds containing elements of Groups 7 or 17 of the Periodic System**
- 13/005 {Compounds without a metal-carbon linkage}
- 15/00 Compounds containing elements of Groups 8, 9, 10 or 18 of the Periodic System**
- 15/0006 {compounds of the platinum group}
- 15/0013 {without a metal-carbon linkage}
- 15/002 {Osmium compounds}
- 15/0026 {without a metal-carbon linkage}
- 15/0033 {Iridium compounds}
- 15/004 {without a metal-carbon linkage}
- 15/0046 {Ruthenium compounds}
- 15/0053 {without a metal-carbon linkage}
- 15/006 {Palladium compounds}
- 15/0066 {without a metal-carbon linkage}
- 15/0073 {Rhodium compounds}
- 15/008 {without a metal-carbon linkage}
- 15/0086 {Platinum compounds}
- 15/0093 {without a metal-carbon linkage}
- 15/02 Iron compounds
- 15/025 {without a metal-carbon linkage}
- 15/03 Sideramines; The corresponding desferri compounds
- 15/04 Nickel compounds
- 15/045 {without a metal-carbon linkage}
- 15/06 Cobalt compounds
- 15/065 {without a metal-carbon linkage}
- 17/00 Metallocenes**
- 17/02 of metals of Groups 8, 9 or 10 of the Periodic System
- 19/00 Metal compounds according to more than one of main groups C07F 1/00 - C07F 17/00**
- 19/005 {without metal-C linkages}