

# CPC COOPERATIVE PATENT CLASSIFICATION

## C CHEMISTRY; METALLURGY

(NOTES omitted)

### CHEMISTRY

#### C07 ORGANIC CHEMISTRY

(NOTES omitted)

#### 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) after class [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. Therapeutic activity of compounds is further classified in subclass [A61P](#).
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.}

##### 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:  
[C07F 9/6593](#) covered by [C07F 9/65815](#)
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.

<b>1/00</b>	<b>Compounds containing elements of Groups 1 or 11 of the Periodic Table</b>	5/003	. {without C-Metal linkages}
1/005	. {without C-Metal linkages}	5/02	. Boron compounds
1/02	. Lithium compounds	5/022	. . {without C-boron linkages}
1/04	. Sodium compounds	5/025	. . {Boronic and borinic acid compounds}
1/06	. Potassium compounds	5/027	. . {Organoboranes and organoborohydrides}
1/08	. Copper compounds	5/04	. . Esters of boric acids
1/10	. Silver compounds	5/05	. . Cyclic compounds having at least one ring containing boron but no carbon in the ring
1/12	. Gold compounds	5/06	. Aluminium compounds
<b>3/00</b>	<b>Compounds containing elements of Groups 2 or 12 of the Periodic Table</b>	5/061	. . {with C-aluminium linkage}
3/003	. {without C-Metal linkages}	5/062	. . . {Al linked exclusively to C}
3/006	. {Beryllium compounds}	5/064	. . . {compounds with an Al-Halogen linkage}
3/02	. Magnesium compounds	5/065	. . . {compounds with an Al-H linkage}
3/04	. Calcium compounds	5/066	. . . {compounds with Al linked to an element other than Al, C, H or halogen (this includes Al-cyanide linkage)}
3/06	. Zinc compounds	5/067	. . . . {compounds with Al also linked to H or halogen}
3/08	. Cadmium compounds	5/068	. . . . {preparation of alum(in)oxanes}
3/10	. Mercury compounds	5/069	. . {without C-aluminium linkages}
3/103	. . {without C-Mercury linkages}	<b>7/00</b>	<b>Compounds containing elements of Groups 4 or 14 of the Periodic Table</b>
3/12	. . Aromatic substances containing mercury	7/003	. {without C-Metal linkages}
3/14	. . Heterocyclic substances containing mercury		
<b>5/00</b>	<b>Compounds containing elements of Groups 3 or 13 of the Periodic Table</b>		

7/02	. Silicon compounds	7/122	. . . . . {by reactions involving the formation of Si-C linkages ( <a href="#">hydrosilylation reactions C07F 7/14</a> ; <a href="#">direct synthesis C07F 7/16</a> )}
7/025	. . {without C-silicon linkages}	7/123	. . . . . {by reactions involving the formation of Si-halogen linkages}
7/04	. . Esters of silicic acids	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}
7/06	. . . with hydroxyaryl compounds	7/126	. . . . . {by reactions involving the formation of Si-Y linkages, where Y is not a carbon or halogen atom}
7/07	. . . Cyclic esters	7/127	. . . . . {by reactions not affecting the linkages to the silicon atom}
7/08	. . Compounds having one or more C—Si linkages	7/128	. . . . . {by reactions covered by more than one of the groups <a href="#">C07F 7/122</a> - <a href="#">C07F 7/127</a> and of which the starting material is unknown or insufficiently determined}
7/0801	. . . {General processes}	7/14	. . . . Preparation thereof from {optionally substituted} halogenated silanes and hydrocarbons { <a href="#">hydrosilylation reactions</a> }
7/0803	. . . {Compounds with Si-C or Si-Si linkages}	7/16	. . . . Preparation thereof from silicon and halogenated hydrocarbons { <a href="#">direct synthesis</a> }
7/0805	. . . . {comprising only Si, C or H atoms}	7/18	. . . Compounds having one or more C—Si linkages as well as one or more C—O—Si linkages
7/0807	. . . . . {comprising Si as a ring atom}	7/1804	. . . . {Compounds having Si-O-C linkages ( <a href="#">Si-O-acyl linkages C07F 7/1896</a> )}
7/081	. . . . {comprising at least one atom selected from the elements N, O, halogen, S, Se or Te}	7/1872	. . . . . {Preparation; Treatments not provided for in <a href="#">C07F 7/20</a> }
7/0812	. . . . . {comprising a heterocyclic ring}	7/1876	. . . . . {by reactions involving the formation of Si-C linkages}
7/0814	. . . . . {said ring is substituted at a C ring atom by Si}	7/188	. . . . . {by reactions involving the formation of Si-O linkages}
7/0816	. . . . . {said ring comprising Si as a ring atom}	7/1884	. . . . . {by dismutation}
7/0825	. . . . {Preparations of compounds not comprising Si-Si or Si-cyano linkages}	7/1888	. . . . . {by reactions involving the formation of other Si-linkages, e.g. Si-N}
7/0827	. . . . . {Syntheses with formation of a Si-C bond}	7/1892	. . . . . {by reactions not provided for in <a href="#">C07F 7/1876</a> - <a href="#">C07F 7/1888</a> }
7/0829	. . . . . {Hydrosilylation reactions}	7/1896	. . . . {Compounds having one or more Si-O-acyl linkages}
7/083	. . . . . {Syntheses without formation of a Si-C bond}	7/20	. . . Purification, separation
7/0832	. . . . . {Other preparations}	7/21	. . Cyclic compounds having at least one ring containing silicon, but no carbon in the ring
7/0834	. . . {Compounds having one or more O-Si linkage ( <a href="#">for compounds with C-O-Si linkages see C07F 7/18</a> )}	7/22	. Tin compounds
7/0836	. . . . {Compounds with one or more Si-OH or Si-O-metal linkage}	7/2204	. . {Not belonging to the groups <a href="#">C07F 7/2208</a> - <a href="#">C07F 7/2296</a> }
7/0838	. . . . {Compounds with one or more Si-O-Si sequences ( <a href="#">compounds with a ring containing only alternating Si and O atoms, i.e. cyclosilanes C07F 7/21</a> )}	7/2208	. . {Compounds having tin linked only to carbon, hydrogen and/or halogen}
7/087	. . . . . {Compounds of unknown structure containing a Si-O-Si sequence}	7/2224	. . {Compounds having one or more tin-oxygen linkages}
7/0872	. . . . . {Preparation and treatment thereof}	7/226	. . {Compounds with one or more Sn-S linkages}
7/0874	. . . . . {Reactions involving a bond of the Si-O-Si linkage}	7/2284	. . {Compounds with one or more Sn-N linkages}
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}	7/2288	. . {Compounds with one or more Sn-metal linkages}
7/0878	. . . . . {Si-C bond}	7/2296	. . {Purification, stabilisation, isolation}
7/0879	. . . . . {Hydrosilylation reactions}	7/24	. Lead compounds
7/0889	. . . . . {Reactions not involving the Si atom of the Si-O-Si sequence}	7/26	. . Tetra-alkyl lead compounds
7/089	. . . . . {Treatments not covered by a preceding group}	7/28	. Titanium compounds
7/0892	. . . . {Compounds with a Si-O-N linkage}	7/30	. Germanium compounds
7/0894	. . . . {Compounds with a Si-O-O linkage}		
7/0896	. . . {Compounds with a Si-H linkage}		
7/0898	. . . {Compounds with a Si-S linkage}		
7/10	. . . containing nitrogen {having a Si-N linkage}		
7/12	. . . Organo silicon halides		
7/121	. . . . {Preparation or treatment not provided for in <a href="#">C07F 7/14</a> , <a href="#">C07F 7/16</a> or <a href="#">C07F 7/20</a> }		

**NOTE**

The silicon atom involved in the reaction that is attached or becomes attached to the highest number of halide atoms determines classification

**9/00 Compounds containing elements of Groups 5 or 15 of the Periodic Table**

9/005	. {Compounds of elements of Group 5 of the Periodic Table without metal-carbon linkages}	9/1418	. . . . . {Compounds containing the structure P-O-N}
9/02	. Phosphorus compounds (sugar phosphates C07H 11/04; nucleotides C07H 19/00, C07H 21/00; nucleic acids C07H 21/00)	9/142	. . . . . with hydroxyalkyl compounds without further substituents on alkyl
9/025	. . {Purification; Separation; Stabilisation; Desodorisation of organo-phosphorus compounds (of natural phosphatides C07F 9/103; phosphines C07F 9/5095)}	9/143	. . . . . with unsaturated acyclic alcohols
9/04	. . Reaction products of phosphorus sulfur compounds with hydrocarbons	9/144	. . . . . with cycloaliphatic alcohols
9/06	. . without P—C bonds	9/145	. . . . . with hydroxyaryl compounds
9/062	. . . {Organo-phosphoranes without P-C bonds}	9/146	. . . . . containing P-halide groups
9/065	. . . . {Phosphoranes containing the structure P=N-}	9/16	. . . Esters of thiophosphoric acids or thiophosphorous acids
9/067	. . . . . {Polyphosphazenes containing the structure [P=N-n] (cyclic compounds C07F 9/65812)}	9/165	. . . . . Esters of thiophosphoric acids
9/08	. . . Esters of oxyacids of phosphorus {(C07F 9/062 takes precedence)}	9/1651	. . . . . {with hydroxyalkyl compounds with further substituents on alkyl}
9/09	. . . . Esters of phosphoric acids	9/1652	. . . . . {Polyol derivatives esterified at least twice by thiophosphoric acid groups}
9/091	. . . . . {with hydroxyalkyl compounds with further substituents on alkyl}	9/1653	. . . . . {with arylalkanols}
9/092	. . . . . {substituted by B, Si or a metal}	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)}
9/093	. . . . . {Polyol derivatives esterified at least twice by phosphoric acid groups}	9/1655	. . . . . {Compounds containing the structure P(=X)n-S-(S)x- (X = O, S, Se; n=0,1; x>=1)}
9/094	. . . . . {with arylalkanols}	9/1656	. . . . . {Compounds containing the structure P(=X)n-X-C(=X)- (X = O, S, Se; n = 0, 1)}
9/095	. . . . . {Compounds containing the structure P(=O)-O-acyl, P(=O)-O-heteroatom, P(=O)-O-CN}	9/1657	. . . . . {Compounds containing the structure P(=X)n-X-N (X = O, S, Se; n = 0, 1)}
9/096	. . . . . {Compounds containing the structure P(=O)-O-C(=X)- (X = O, S, Se)}	9/1658	. . . . . {Esters of thiopolyphosphoric acids or anhydrides}
9/097	. . . . . {Compounds containing the structure P(=O)-O-N}	9/17	. . . . . with hydroxyalkyl compounds without further substituents on alkyl
9/098	. . . . . {Esters of polyphosphoric acids or anhydrides}	9/173	. . . . . with unsaturated acyclic alcohols
9/10	. . . . . Phosphatides, e.g. lecithin	9/177	. . . . . with cycloaliphatic alcohols
9/103	. . . . . {Extraction or purification by physical or chemical treatment of natural phosphatides; Preparation of compositions containing phosphatides of unknown structure}	9/18	. . . . . with hydroxyaryl compounds
9/106	. . . . . {Adducts, complexes, salts of phosphatides}	9/20	. . . . . containing P-halide groups
9/11	. . . . . with hydroxyalkyl compounds without further substituents on alkyl	9/2003	. . . . . {containing the structure Hal-P-X-unsaturated acyclic group}
9/113	. . . . . with unsaturated acyclic alcohols	9/2006	. . . . . {containing the structure Hal-P-X-aryl}
9/117	. . . . . with cycloaliphatic alcohols	9/201	. . . . Esters of thiophosphorus acids
9/12	. . . . . with hydroxyaryl compounds	9/2015	. . . . . {with hydroxyalkyl compounds with further substituents on alkyl}
9/14	. . . . . containing P(=O)-halide groups	9/202	. . . . . with hydroxyl compounds without further substituents on alkyl
9/1403	. . . . . {containing the structure Hal-P(=O)-O-unsaturated acyclic group}	9/203	. . . . . with unsaturated acyclic alcohols
9/1406	. . . . . {containing the structure Hal-P(=O)-O-aryl}	9/204	. . . . . with cycloaliphatic alcohols
9/141	. . . . Esters of phosphorous acids	9/205	. . . . . with hydroxyaryl compounds
9/1411	. . . . . {with hydroxyalkyl compounds with further substituents on alkyl}	9/206	. . . . . containing P-halide groups
9/1412	. . . . . {Polyol derivatives esterified at least twice by phosphorous acid groups}	9/22	. . . Amides of acids of phosphorus
9/1414	. . . . . {with arylalkanols}	9/222	. . . . {Amides of phosphoric acids}
9/1415	. . . . . {Compounds containing the structure P-O-acyl, P-O-heteroatom, P-O-CN}	9/224	. . . . {Phosphorus triamides}
9/1417	. . . . . {Compounds containing the structure P-O-C(=X)- (X = O, S, Se)}	9/226	. . . . {containing the structure P-isocyanates}
		9/228	. . . . {containing the structure P-N-N, e.g. azides, hydrazides}
		9/24	. . . . Esteramides
		9/2404	. . . . . {the ester moiety containing a substituent or a structure which is considered as characteristic}
		9/2408	. . . . . {of hydroxyalkyl compounds}
		9/2412	. . . . . {of unsaturated acyclic alcohols}
		9/2416	. . . . . {of cycloaliphatic alcohols}
		9/242	. . . . . {of hydroxyaryl compounds}

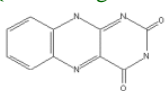
9/2425	. . . . .	{containing the structure (RX) (RR'N)P(=Y)-Z-(C) <sub>n</sub> -Z'-P(=Y)(XR) <sub>2</sub> (X = O, S, NR; Y = O, S, electron pair; Z = O, S; Z' = O, S)}	9/3223	. . . . .	{Esters of cycloaliphatic acids}
9/2429	. . . . .	{of arylalkanols}	9/3229	. . . . .	{Esters of aromatic acids (P-C aromatic linkage)}
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)}	9/3235	. . . . .	{Esters of poly(thio)phosphinic acids}
9/2437	. . . . .	{Compounds containing the structure N-P(=X)n-S(S)x-(X = O, S, Se; n=0,1; x>=1)}	9/3241	. . . . .	{Esters of arylalkanephosphinic acids}
9/2441	. . . . .	{containing the structure N-P(=X)n-X-C(=X) (X = O, S, Se; n = 0, 1)}	9/3247	. . . . .	{Esters of acids containing the structure -C(=X)-P(=X)(R)(XH) or NC-P(=X)(R)(XH), (X = O, S, Se)}
9/2445	. . . . .	{containing the structure N-P(=X)n-X-N (X = O, S, Se; n = 0, 1)}	9/3252	. . . . .	{containing the structure -C(=X)-P(=X)(R)(XR), (X = O, S, Se)}
9/245	. . . . .	{containing the structure N-P(=X)n-X-P (X = O, S, Se; n = 0, 1)}	9/3258	. . . . .	{the ester moiety containing a substituent or a structure which is considered as characteristic}
9/2454	. . . . .	{the amide moiety containing a substituent or a structure which is considered as characteristic}	9/3264	. . . . .	{Esters with hydroxyalkyl compounds}
9/2458	. . . . .	{of aliphatic amines}	9/327	. . . . .	{Esters with unsaturated acyclic alcohols}
9/2462	. . . . .	{of unsaturated acyclic amines}	9/3276	. . . . .	{Esters with cycloaliphatic alcohols}
9/2466	. . . . .	{of cycloaliphatic amines}	9/3282	. . . . .	{Esters with hydroxyaryl compounds}
9/247	. . . . .	{of aromatic amines (N-C aromatic linkage)}	9/3288	. . . . .	{Esters with arylalkanols}
9/2475	. . . . .	{of aralkylamines}	9/3294	. . . . .	{Compounds containing the structure R <sub>2</sub> P(=X)-X-acyl, R <sub>2</sub> P(=X)-X-heteroatom, R <sub>2</sub> P(=X)-X-CN (X = O, S, Se)}
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)}	9/34	. . . . .	Halides thereof
9/2483	. . . . .	{containing the structure P(=X)n-N-S (X = O, S, Se; n = 0, 1)}	9/36	. . . . .	Amides thereof
9/2487	. . . . .	{containing the structure P(=X)n-N-C(=X) (X = O, S, Se; n = 0, 1)}	9/38	. . . . .	Phosphonic acids [RP(=O)(OH) <sub>2</sub> ]; Thiophosphonic acids {; [RP(=X <sub>1</sub> )(X <sub>2</sub> H) <sub>2</sub> (X <sub>1</sub> , X <sub>2</sub> are each independently O, S or Se)]}
9/2491	. . . . .	{containing the structure P(=X)n-N-N (X = O, S, Se; n = 0, 1)}	9/3804	. . . . .	{not used, see subgroups}
9/2495	. . . . .	{containing the structure P(=X)n-N-P (X = O, S, Se; n = 0, 1)}	9/3808	. . . . .	{Acyclic saturated acids which can have further substituents on alkyl}
9/26	. . . . .	containing P-halide groups	9/3813	. . . . .	{N-Phosphonomethylglycine; Salts or complexes thereof}
9/28	. . . . .	with one or more P—C bonds	9/3817	. . . . .	{Acids containing the structure (RX)2P(=X)-alk-N...P (X = O, S, Se)}
9/30	. . . . .	Phosphinic acids [R <sub>2</sub> P(=O)(OH)]; Thiophosphonic acids {; [R <sub>2</sub> P(=X <sub>1</sub> )(X <sub>2</sub> H) (X <sub>1</sub> , X <sub>2</sub> are each independently O, S or Se)]}	9/3821	. . . . .	{substituted by B, Si, P or a metal ( <a href="#">C07F 9/3839</a> takes precedence)}
9/301	. . . . .	{Acyclic saturated acids which can have further substituents on alkyl}	9/3826	. . . . .	{Acyclic unsaturated acids}
9/302	. . . . .	{Acyclic unsaturated acids}	9/383	. . . . .	{Cycloaliphatic acids}
9/303	. . . . .	{Cycloaliphatic acids}	9/3834	. . . . .	{Aromatic acids (P-C aromatic linkage)}
9/304	. . . . .	{Aromatic acids (P-C aromatic linkage)}	9/3839	. . . . .	{Polyphosphonic acids}
9/305	. . . . .	{Poly(thio)phosphinic acids}	9/3843	. . . . .	{containing no further substituents than -PO <sub>3</sub> H <sub>2</sub> groups}
9/306	. . . . .	{Arylalkanephosphinic acids, e.g. Ar-(CH <sub>2</sub> ) <sub>n</sub> -P(=X)(R)(XH), (X = O, S, Se; n>=1)}	9/3847	. . . . .	{Acyclic unsaturated derivatives}
9/307	. . . . .	{Acids containing the structure -C(=X)-P(=X)(R)(XH) or NC-P(=X)(R)(XH), (X = O, S, Se)}	9/3852	. . . . .	{Cycloaliphatic derivatives}
9/308	. . . . .	{Pyrophosphinic acids; Phosphinic acid anhydrides}	9/3856	. . . . .	{containing halogen or nitro(so) substituents}
9/32	. . . . .	Esters thereof	9/386	. . . . .	{containing hydroxy substituents in the hydrocarbon radicals}
9/3205	. . . . .	{the acid moiety containing a substituent or a structure which is considered as characteristic}	9/3865	. . . . .	{containing sulfur substituents}
9/3211	. . . . .	{Esters of acyclic saturated acids which can have further substituents on alkyl}	9/3869	. . . . .	{containing carboxylic acid or carboxylic acid derivative substituents}
9/3217	. . . . .	{Esters of acyclic unsaturated acids}	9/3873	. . . . .	{containing nitrogen substituent, e.g. N.....H or N-hydrocarbon group 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)}
			9/3878	. . . . .	{containing substituents selected from B, Si, P (other than -PO <sub>3</sub> H <sub>2</sub> groups) or a metal}
			9/3882	. . . . .	{Arylalkanephosphonic acids ( <a href="#">C07F 9/3839</a> takes precedence)}



9/3886	. . . . .	{ Acids containing the structure -C(=X)-P(=X)(XH) <sub>2</sub> or NC-P(=X)(XH) <sub>2</sub> , (X = O, S, Se)}	9/4081	. . . . .	{ Esters with cycloaliphatic alcohols }
9/3891	. . . . .	{ Acids containing the structure -C(=X)-P(=X)(XH) <sub>2</sub> , (X = O, S, Se)}	9/4084	. . . . .	{ Esters with hydroxyaryl compounds }
9/3895	. . . . .	{ Pyrophosphonic acids; phosphonic acid anhydrides }	9/4087	. . . . .	{ Esters with arylalkanols }
9/40	. . . . .	Esters thereof	9/409	. . . . .	{ Compounds containing the structure P(=X)-X-acyl, P(=X)-X-heteroatom, P(=X)-X-CN (X = O, S, Se)}
9/4003	. . . . .	{ the acid moiety containing a substituent or a structure which is considered as characteristic }	9/4093	. . . . .	{ Compounds containing the structure P(=X)-X-C(=X)- (X = O, S, Se)}
9/4006	. . . . .	{ Esters of acyclic acids which can have further substituents on alkyl }	9/4096	. . . . .	{ Compounds containing the structure P(=X)-X-N (X = O, S, Se)}
9/4009	. . . . .	{ Esters containing the structure (RX) <sub>2</sub> P(=X)-alk-N...P (X = O, S, Se)}	9/42	. . . . .	Halides thereof
9/4012	. . . . .	{ substituted by B, Si, P or a metal (C07F 9/4025 takes precedence) }	9/425	. . . . .	{ Acid or estermonohalides thereof, e.g. RP(=X)(YR)(Hal) (X, Y = O, S; R = H, or hydrocarbon group) }
9/4015	. . . . .	{ Esters of acyclic unsaturated acids }	9/44	. . . . .	Amides thereof
9/4018	. . . . .	{ Esters of cycloaliphatic acids }	9/4403	. . . . .	{ the acid moiety containing a substituent or a structure which is considered as characteristic }
9/4021	. . . . .	{ Esters of aromatic acids (P-C aromatic linkage) }	9/4407	. . . . .	{ Amides of acyclic saturated acids which can have further substituents on alkyl }
9/4025	. . . . .	{ Esters of poly(thio)phosphonic acids }	9/4411	. . . . .	{ Amides of acyclic unsaturated acids }
9/4028	. . . . .	{ containing no further substituents than -PO <sub>3</sub> H <sub>2</sub> groups in free or esterified form }	9/4415	. . . . .	{ Amides of cycloaliphatic acids }
9/4031	. . . . .	{ Acyclic unsaturated derivatives }	9/4419	. . . . .	{ Amides of aromatic acids (P-C aromatic linkage) }
9/4034	. . . . .	{ Cycloaliphatic derivatives }	9/4423	. . . . .	{ Amides of poly (thio)phosphonic acids }
9/4037	. . . . .	{ containing halogen or nitro(so) substituents }	9/4426	. . . . .	{ Amides of arylalkanephosphonic acids }
9/404	. . . . .	{ containing hydroxy substituents in the hydrocarbon radicals }	9/443	. . . . .	{ Amides of acids containing the structure -C(=Y)-P(=X)(XR)-N or NC-(P(=X)(XR)-N ) }
9/4043	. . . . .	{ containing sulfur substituents }	9/4434	. . . . .	{ the ester moiety containing a substituent or a structure which is considered as characteristic }
9/4046	. . . . .	{ containing carboxylic acid or carboxylic acid derivative substituents }	9/4438	. . . . .	{ Ester with hydroxyalkyl compounds }
9/405	. . . . .	{ containing nitrogen substituent, e.g. N.....H or N-hydrocarbon group 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) }	9/4442	. . . . .	{ Esters with unsaturated acyclic alcohols }
9/4053	. . . . .	{ containing substituents selected from B, Si, P (other than -PO <sub>3</sub> H <sub>2</sub> groups in free or esterified form), or a metal }	9/4446	. . . . .	{ Esters with cycloaliphatic alcohols }
9/4056	. . . . .	{ Esters of arylalkanephosphonic acids (C07F 9/4025 takes precedence) }	9/4449	. . . . .	{ Esters with hydroxyaryl compounds }
9/4059	. . . . .	{ Compounds containing the structure (RY) <sub>2</sub> P(=X)-(CH <sub>2</sub> ) <sub>n</sub> -C(=O)-(CH <sub>2</sub> ) <sub>m</sub> -Ar, (X, Y = O, S, Se; n>=1, m>=0) }	9/4453	. . . . .	{ Esters with arylalkanols }
9/4062	. . . . .	{ Esters of acids containing the structure -C(=X)-P(=X)(XR) <sub>2</sub> or NC-P(=X)(XR) <sub>2</sub> , (X = O, S, Se) }	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) }
9/4065	. . . . .	{ Esters of acids containing the structure -C(=X)-P(=X)(XR) <sub>2</sub> , (X = O, S, Se) }	9/4461	. . . . .	{ the amide moiety containing a substituent or a structure which is considered as characteristic }
9/4068	. . . . .	{ Esters of pyrophosphonic acids; Esters of phosphonic acid anhydrides }	9/4465	. . . . .	{ of aliphatic amines }
9/4071	. . . . .	{ the ester moiety containing a substituent or a structure which is considered as characteristic }	9/4469	. . . . .	{ of unsaturated acyclic amines }
9/4075	. . . . .	{ Esters with hydroxyalkyl compounds }	9/4473	. . . . .	{ of cycloaliphatic amines }
9/4078	. . . . .	{ Esters with unsaturated acyclic alcohols }	9/4476	. . . . .	{ of aromatic amines (N-C aromatic linkage) }
			9/448	. . . . .	{ of aralkylamines }
			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) }
			9/4488	. . . . .	{ Compounds containing the structure P(=X)(N-S-) (X = O, S, Se) }
			9/4492	. . . . .	{ Compounds containing the structure P(=X)(N-C(=X)-) (X = O, S, Se) }
			9/4496	. . . . .	{ Compounds containing the structure P(=X)(N-N-) (X = O, S, Se) }

- 9/46 . . . Phosphinous acids [R<sub>2</sub>POH], [R<sub>2</sub>P(=O)H]; Thiophosphinous acids {including [R<sub>2</sub>PSH]; [R<sub>2</sub>P(=S)H]; Aminophosphines [R<sub>2</sub>PNH<sub>2</sub>]; Derivatives thereof}
- 9/48 . . . Phosphonous acids [RP(OH)<sub>2</sub>] {including [RHP(=O)(OH)]}; Thiophosphonous acids {including [RP(SH)<sub>2</sub>], [RHP(=S)(SH)]; Derivatives thereof}
- 9/4808 . . . . {the acid moiety containing a substituent or structure which is considered as characteristic}
- 9/4816 . . . . {Acyclic saturated acids or derivatives which can have further substituents on alkyl}
- 9/4825 . . . . {Acyclic unsaturated acids or derivatives}
- 9/4833 . . . . {Cycloaliphatic acids or derivatives}
- 9/4841 . . . . {Aromatic acids or derivatives (P-C aromatic linkage)}
- 9/485 . . . . {Polyphosphonous acids or derivatives}
- 9/4858 . . . . {Acids or derivatives containing the structure -C(=X)-P(XR)<sub>2</sub> or NC-P(XR)<sub>2</sub> (X = O, S, Se)}
- 9/4866 . . . . {the ester moiety containing a substituent or structure which is considered as characteristic}
- 9/4875 . . . . {Esters with hydroxy aryl compounds}
- 9/4883 . . . . {Amides or esteramides thereof, e.g. RP(NR')<sub>2</sub> or RP(XR')(NR')<sub>2</sub> (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<sub>2</sub>PM<sup>+</sup>}
- 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-Hal<sub>2</sub>}
- 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-]<sub>n</sub> (cyclic phosphazenes [C07F 9/65812](#))}
- 9/54 . . . Quaternary 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)<sub>a</sub>-P-(Y)<sub>b</sub> 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
- 9/5686 . . . . {condensed with carbocyclic rings or ring systems}
- 9/572 . . . . Five-membered rings
- 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
- 9/59 . . . . . Hydrogenated pyridine rings
- 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 hetero atoms
- 9/6503 . . . . Five-membered rings
- 9/65031 . . . . . {having the nitrogen atoms in the positions 1 and 2}
- 9/65038 . . . . . {condensed with carbocyclic rings or carbocyclic ring systems}
- 9/6506 . . . . . having the nitrogen atoms in positions 1 and 3
- 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}
- 9/650947 . . . . . {condensed with carbocyclic rings or carbocyclic ring systems}
- 9/650952 . . . . . {having the nitrogen atoms in the positions 1 and 4}
- 9/650994 . . . . . {condensed with carbocyclic rings or carbocyclic ring systems}
- 9/6512 . . . . . having the nitrogen atoms in positions 1 and 3
- 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
- 9/65188 . . . . . {condensed with carbocyclic rings or carbocyclic ring systems}
- 9/6521 . . . . Six-membered rings
- 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 = CH<sub>2</sub>, O, S, NH) optionally with an additional double bond and/or substituents, e.g. penicillins and analogs}
- 9/65613 . . . . {containing the ring system 
- (X = CH<sub>2</sub>, 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  where at least one of the 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-]<sub>n</sub>, 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
- 9/72 . . . . . Aliphatic compounds
- 9/74 . . . . . Aromatic compounds
- 9/76 . . . . . containing hydroxyl groups
- 9/78 . . . . . containing amino groups
- 9/80 . . . . . Heterocyclic compounds
- 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}
- 9/92 . . . . . Aromatic compounds
- 9/94 . . . . . Bismuth compounds
- 11/00 Compounds containing elements of Groups 6 or 16 of the Periodic Table**
- 11/005 . . . . . {compounds without a metal-carbon linkage}
- 13/00 Compounds containing elements of Groups 7 or 17 of the Periodic Table**
- 13/005 . . . . . {Compounds without a metal-carbon linkage}
- 15/00 Compounds containing elements of Groups 8, 9, 10 or 18 of the Periodic Table**
- 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 Metalloenes**
- 17/02 . . . . . of metals of Groups 8, 9 or 10 of the Periodic Table
- 19/00 Metal compounds according to more than one of main groups C07F 1/00 - C07F 17/00**
- 19/005 . . . . . {without metal-C linkages}