Table IR-8.1 Acceptable common names and fully systematic (additive) names for oxoacid and related structures. (March 2004)

This Table includes compounds containing oxygen and hydrogen and at least one other element and with at least one OH group; certain isomers; and examples of corresponding partially and fully dehydronated anions. Formulae are given in the classical oxoacid format with the 'acid' (oxygen-bound) hydrogens listed first, followed by the central atom(s), then the hydrogen atoms bound directly to the central atom, and then the oxygen atoms (*e.g.* HBH_2O, $H_2P_2H_2O_5$), *except* for chain compounds such as *e.g.* HOCN. In most cases formulae are also written as for coordination entities, assembled according to the principles of Chapter IR-7 (*e.g.* the Table gives 'HBH$_2$O = [BH$_2$(OH)]' and 'H$_2$SO$_4$ = [SO$_2$(OH)$_2$]'). More names of oxoanions are given in Table IX.

Note that Section P-42 of Ref. 1 lists a great many inorganic oxoacid structures for use as parent structures in the naming of organic derivatives, *cf.* the discussion in Section IR-8.1. Most of those structures, but not all, are included here; a number of di- and polynuclear acids are not explicitly included.

Formula	*Common name* (*unless otherwise stated*)	*Fully systematic additive name(s)*
$H_3BO_3 = [B(OH)_3]$	boric acid [a]	trihydroxidoboron
$H_2BO_3^- = [BO(OH)_2]^-$	dihydrogenborate	dihydroxidooxidoborate(1−)
$HBO_3^{2-} = [BO_2(OH)]^{2-}$	hydrogenborate	hydroxidodioxidoborate(2−)
$[BO_3]^{3-}$	borate	trioxidoborate(3−)
$(HBO_2)_n = (B(OH)O)_n$	metaboric acid	*catena*-poly[hydroxidoboron-μ-oxido]
$(BO_2^-)_n = (OBO)_n^{n-}$	metaborate	*catena*-poly[(oxidoborate-μ-oxido)(1−)]
$H_2BHO_2 = [BH(OH)_2]$	boronic acid	hydridodihydroxidoboron
$HBH_2O = [BH_2(OH)]$	borinic acid	dihydridohydroxidoboron
$H_2CO_3 = [CO(OH)_2]$	carbonic acid	dihydroxidooxidocarbon
$HCO_3^- = [CO_2(OH)]^-$	hydrogencarbonate	hydroxidodioxidocarbonate(1−)
$[CO_3]^{2-}$	carbonate	trioxidocarbonate(2−)
HOCN = [C(N)OH]	cyanic acid	hydroxidonitridocarbon
HNCO = [C(NH)O]	isocyanic acid	oxidoazanediidocarbon, (hydridonitrato)oxidocarbon

$OCN^- = [C(N)O]^-$	cyanate	nitridooxidocarbonate(1−)
$HONC = [N(C)OH]$	(iso)fulminic acid [b]	carbidohydroxidonitrogen
$HCNO = [C(H)NO]$	(iso)fulminic acid, formonitrile-*N*-oxide [b]	hydridonitrosyl-κ*N*-carbon, hydrido(oxidonitrato-*N*)carbon
$ONC^- = [N(C)O]^-$	fulminate	carbidooxidonitrate(1−)
$H_4SiO_4 = [Si(OH)_4]$	silicic acid [a]	tetrahydroxidosilicon
$[SiO_4]^{4-}$	silicate	tetraoxidosilicate(4−)
$(H_2SiO_3)_n = (Si(OH)_2O)_n$	metasilicic acid	*catena*-poly[dihydroxidosilicon-μ-oxido]
$(SiO_3)_n^{2n-}$	metasilicate	*catena*-poly[dioxidosilicate-μ-oxido(1−)]
$H_2Si_2O_7 = [(HO)Si(O)_2OSi(O)_2(OH)]$	disilicic acid [c]	μ-oxido-bis(hydroxidodioxidosilicon)
$[Si_2O_7]^{6-} = [O_3SiOSiO_3]^{6-}$	disilicate	μ-oxido-bis(trioxidosilicate)(6−)
$H_2NO_3^+ = [NO(OH)_2]^+$	[d]	dihydroxidooxidonitrogen(1+), trihydrogen(trioxidonitrate)(1+)
$HNO_3 = [NO_2(OH)]$	nitric acid	hydroxidodioxidonitrogen
$[NO_3]^-$	nitrate	trioxidonitrate(1-)
$H_2NHO = [NH_2OH]$	hydroxylamine [e]	dihydridohydroxidonitrogen
$H_2NHO_3 = [NHO(OH)_2]$	azonic acid	hydridodihydroxidooxidonitrogen
$HNO_2 = [NO(OH)]$	nitrous acid	hydroxidooxidonitrogen
$[NO_2]^-$	nitrite	dioxidonitrate(1−)
$HNH_2O_2 = [NH_2O(OH)]$	azinic acid	dihydridohydroxidooxidonitrogen
$H_2N_2O_2 = [HON=NOH]$	diazenediol [f]	dihydroxido-1κ*O*,2κ*O*-dinitrogen(*N*−*N*), or 1,4-dihydrido-2,3-diazy-1,4-dioxy-[4]catena
$HN_2O_2^- = [HON=NO]^-$	2-hydroxydiazene-1-olate [f]	hydroxido-1κ*O*-oxido-2κ*O*-dinitrate(*N*−*N*)(1−), or 1-hydrido-2,3-diazy-1,4-dioxy-[4]catenate(1−)
$[N_2O_2]^{2-} = [ON=NO]^{2-}$	diazenediolate [f]	dioxido-1κ*O*, 2κ*O*-dinitrate(*N*−*N*)(2−), or

		2,3-diazy-1,4-dioxy-[4]catenate(2−)
$H_3PO_4 = [PO(OH)_3]$	phosphoric acid [a]	trihydroxidooxidophosphorus
$H_2PO_4^- = [PO_2(OH)_2]^-$	dihydrogenphosphate	dihydroxidodioxidophosphate(1−)
$HPO_4^{2-} = [PO_3(OH)]^{2-}$	hydrogenphosphate	hydroxidotrioxidophosphate(2−)
$[PO_4]^{3-}$	phosphate	tetraoxidophosphate(3−)
$H_2PHO_3 = [PHO(OH)_2]$	phosphonic acid [g]	hydridodihydroxidooxidophosphorus
$[PHO_2(OH)]^-$	hydrogenphosphonate	hydridohydroxidodioxidophosphate(1−)
$[PHO_3]^{2-}$	phosphonate	hydridotrioxidophosphate(2−)
$H_3PO_3 = [P(OH)_3]$	phosphorous acid [g]	trihydroxidophosphorus
$H_2PO_3^- = [PO(OH)_2]^-$	dihydrogenphosphite	dihydroxidooxidophosphate(1−)
$HPO_3^{2-} = [PO_2(OH)]^{2-}$	hydrogenphosphite	hydroxidodioxidophosphate(2−)
$[PO_3]^{3-}$	phosphite	trioxidophosphate(3−)
$HPO_2 = [P(O)OH]$	hydroxyphosphanone [h]	hydroxidooxidophosphorus
$HPO_2 = [P(H)O_2]$	λ^5-phosphanedione [h]	hydroxidooxidophosphorus
$H_2PHO_2 = [PH(OH)_2]$	phosphonous acid	hydridodihydroxidophosphorus
$HPH_2O_2 = [PH_2O(OH)]$	phosphinic acid	dihydridohydroxidooxidophosphorus
$HPH_2O = [PH_2(OH)]$	phosphinous acid	dihydridohydroxidophosphorus
$H_4P_2O_7 = [(HO)_2P(O)OP(O)(OH)_2]$	diphosphoric acid [c]	μ-oxido-bis(dihydroxidooxidophosphorus)
$(HPO_3)_n = (P(O)(OH)O)_n$	metaphosphoric acid	*catena*-poly[hydroxidooxidophosphorus-μ-oxido]
$H_4P_2O_6 = [(HO)_2P(O)P(O)(OH)_2]$	hypodiphosphoric acid	bis[dihydroxidooxidophosphorus](*P*–*P*)
$H_2P_2H_2O_5 = [(HO)P(H)(O)OP(H)(O)(OH)]$	diphosphonic acid	μ-oxido-bis(hydridohydroxidooxidophosphorus)
$P_2H_2O_5^{2-} = [O_2P(H)OP(H)(O)_2]^{2-}$	diphosphonate	μ-oxido-bis(hydridodioxidophosphate)(2−)
$H_3P_3O_9$	*cyclo*-triphosphoric acid	tri-μ-oxido-tris[hydroxidooxidophosphorus], or 2,4,6-trihydroxido-2,4,6-trioxido-1,3,5-trioxy-2,4,6-triphosphy-[6]cycle
$H_5P_3O_{10}$	*catena*-triphosphoric acid,	pentahydroxido-1κ^2*O*,2κ*O*,3κ^2*O*-di-μ-oxido-trioxido-

	triphosphoric acid [c]	1κ*O*,2κ*O*,3κ*O*-triphosphorus, or μ-[hydroxidotrioxidophosphato(2−)-1κ*O*,2κ*O*]-bis(dihydroxidooxidophosphorus), or 1,7-dihydrido-2,4,6-trihydroxido-2,4,6-trioxido-1,3,5,7-tetraoxy-2,4,6-triphosphy-[7]catena
$H_3AsO_4 = [AsO(OH)_3]$	arsenic acid, arsoric acid [i]	trihydroxidooxidoarsenic
$H_2AsHO_3 = [AsHO(OH)_2]$	arsonic acid	hydridodihydroxidooxidoarsenic
$H_3AsO_3 = [As(OH)_3]$	arsenous acid, arsorous acid [i]	trihydroxidoarsenic
$H_2AsHO_2 = [AsH(OH)_2]$	arsonous acid	hydridodihydroxidoarsenic
$HAsH_2O_2 = [AsH_2O(OH)]$	arsinic acid	dihydridohydroxidooxidoarsenic
$HAsH_2O = [AsH_2(OH)]$	arsinous acid	dihydridohydroxidoarsenic
$H_3SbO_4 = [SbO(OH)_3]$	antimonic acid, stiboric acid [i]	trihydroxidooxidoantimony
$H_3SbO_3 = [Sb(OH)_3]$	antimonous acid, stiborous acid [i]	trihydroxidoantimony
$H_2SbHO_3 = [SbHO(OH)_2]$	stibonic acid	hydridodihydroxidooxidoantimony
$H_2SbHO_2 = [SbH(OH)_2]$	stibonous acid	hydridodihydroxidoantimony
$HSbH_2O_2 = [SbH_2O(OH)]$	stibinic acid	dihydridohydroxidooxidoantimony
$HSbH_2O = [SbH_2(OH)]$	stibinous acid	dihydridohydroxidoantimony
$H_3SO_4^+ = [SO(OH)_3]^+$	[d]	trihydroxidooxidosulfur(1+), trihydrogen(tetraoxidosulfate)(1+)
$H_2SO_4 = [SO_2(OH)_2]$	sulfuric acid	dihydroxidodioxidosulfur
$HSO_4^- = [SO_3(OH)]^-$	hydrogensulfate	hydroxidotrioxidosulfate(1−)
$[SO_4]^{2-}$	sulfate	tetraoxidosulfate(2−)
$HSHO_3 = [SHO_2(OH)]$	sulfonic acid [j]	hydridohydroxidodioxidosulfur
$H_2SO_3 = [SO(OH)_2]$	sulfurous acid	dihydroxidooxidosulfur
$HSO_3^- = [SO_2(OH)]^-$	hydrogensulfite	hydroxidodioxidosulfate(1−)

$[SO_3]^{2-}$	sulfite	trioxidosulfate(2−)
$HSHO_2 = [SHO(OH)]$	sulfinic acid [j]	hydridohydroxidooxidosulfur
$H_2SO_2 = [S(OH)_2]$	sulfanediol [k]	dihydroxidosulfur
$[SO_2]^{2-}$	sulfanediolate [k]	dioxidosulfate(2−)
$HSOH = [SH(OH)]$	sulfanol [k]	hydridohydroxidosulfur
$HSO^- = [SHO]^-$	sulfanolate [k]	hydridooxidosulfate(1−)
$H_2S_2O_7 = [(HO)S(O)_2OS(O)_2(OH)]$	disulfuric acid [c]	μ-oxido-bis(hydroxidodioxidosulfur)
$[S_2O_7]^{2-} = [(O)_3SOS(O)_3]^{2-}$	disulfate	μ-oxido-bis(trioxidosulfate)(2−)
$H_2S_2O_6 = [(HO)(O)_2SS(O)_2(OH)]$	dithionic acid [c,l]	bis(hydroxidodioxidosulfur)(*S*−*S*), or 1,4-dihydrido-2,2,3,3-tetraoxido-1,4-dioxy-2,3-disulfy-[4]catena
$[S_2O_6]^{2-} = [O_3SSO_3]^{2-}$	dithionate	bis(trioxidosulfate)(*S*−*S*)(2−), or 2,2,3,3-tetraoxido-1,4-dioxy-2,3-disulfy-[4]catenate(2−)
$H_2S_3O_6 = [(HO)(O)_2SSS(O)_2(OH)]$	trithionic acid [c,m]	1,5-dihydrido-2,2,4,4-tetraoxido-1,5-dioxy-2,3,4-trisulfy-[5]catena
$H_2S_4O_6 = [(HO)(O)_2SSSS(O)_2(OH)]$	tetrathionic acid [c,m]	1,6-dihydrido-2,2,5,5-tetraoxido-1,6-dioxy-2,3,4,5-tetrasulfy-[6]catena
$H_2S_2O_5 = [(HO)(O)_2SS(O)OH]$	disulfurous acid [n]	dihydroxido-1κ*O*,2κ*O*-trioxido-1κ^2*O*,2κ*O*-disulfur(*S*−*S*)
$[S_2O_5]^{2-} = [O(O)_2SS(O)O]^{2-}$	disulfite [n]	pentaoxido-1κ^3*O*,2κ^2*O*-disulfate(*S*−*S*)(2−)
$H_2S_2O_4 = [(HO)(O)SS(O)(OH)]$	dithionous acid [c,l]	bis(hydroxidooxidosulfur)(*S*−*S*), or 1,4-dihydrido-2,3-dioxido-1,4-dioxy-2,3-disulfy-[4]catena
$[S_2O_4]^{2-} = [O_2SSO_2]^{2-}$	dithionite	bis(dioxidosulfate)(*S*−*S*)(2−), or 2,3-dioxido-1,4-dioxy-2,3-disulfy-[4]catenate(2−)
$H_2SeO_4 = [SeO_2(OH)_2]$	selenic acid	dihydroxidodioxidoselenium
$[SeO_4]^{2-}$	selenate	tetraoxidoselenate(2−)
$H_2SeO_3 = [SeHO_2(OH)]$ [o]	selenonic acid [j,o]	hydridohydroxidodioxidoselenium
$H_2SeO_3 = [SeO(OH)_2]$ [o]	selenous acid [o]	dihydroxidooxidoselenium
$[SeO_3]^{2-}$	selenite	trioxidoselenate(2−)

$HSeHO_2$ = [SeHO(OH)]	seleninic acid [j]	hydridohydroxidooxidoselenium
H_6TeO_6 = [$Te(OH)_6$]	orthotelluric acid [a]	hexahydroxidotellurium
$[TeO_6]^{6-}$	orthotellurate [a]	hexaoxidotellurate(6−)
H_2TeO_4 = [$TeO_2(OH)_2$]	telluric acid [a]	dihydroxidodioxidotellurium
$[TeO_4]^{2-}$	tellurate [a]	tetraoxidotellurate(2−)
H_2TeO_3 = [$TeO(OH)_2$]	tellurous acid	dihydroxidooxidotellurium
$HTeHO_3$ = [$TeHO_2(OH)$]	telluronic acid [j]	hydridohydroxidodioxidotellurium
$HTeHO_2$ = [TeHO(OH)]	tellurinic acid [j]	hydridohydroxidooxidotellurium
$HClO_4$ = [$ClO_3(OH)$]	perchloric acid	hydroxidotrioxidochlorine
$[ClO_4]^-$	perchlorate	tetraoxidochlorate(1−)
$HClO_3$ = [$ClO_2(OH)$]	chloric acid	hydroxidodioxidochlorine
$[ClO_3]^-$	chlorate	trioxidochlorate(1−)
$HClO_2$ = [ClO(OH)]	chlorous acid	hydroxidooxidochlorine
$[ClO_2]^-$	chlorite	dioxidochlorate(1−)
HClO = [ClOH]	hypochlorous acid	hydroxidochlorine
$[ClO]^-$	hypochlorite	oxidochlorate(1−)
$HBrO_4$ = [$BrO_3(OH)$]	perbromic acid	hydroxidotrioxidobromine
$[BrO_4]^-$	perbromate	tetraoxidobromate(1−)
$HBrO_3$ = [$BrO_2(OH)$]	bromic acid	hydroxidodioxidobromine
$[BrO_3]^-$	bromate	trioxidobromate(1−)
$HBrO_2$ = [BrO(OH)]	bromous acid	hydroxidooxidobromine
$[BrO_2]^-$	bromite	dioxidobromate(1−)
HBrO = [BrOH]	hypobromous acid	hydroxidobromine

$[BrO]^-$	hypobromite	oxidobromate(1−)
$H_5IO_6 = [IO(OH)_5]$	orthoperiodic acid [a]	pentahydroxidooxidoiodine
$[IO_6]^{5-}$	orthoperiodate [a]	hexaoxidoiodate(5−)
$HIO_4 = [IO_3(OH)]$	periodic acid [a]	hydroxidotrioxidoiodine
$[IO_4]^-$	periodate [a]	tetraoxidoiodate(1−)
$HIO_3 = [IO_2(OH)]$	iodic acid	hydroxidodioxidoiodine
$[IO_3]^-$	iodate	trioxidoiodate(1−)
$HIO_2 = [IO(OH)]$	iodous acid	hydroxidooxidoiodine
$[IO_2]^-$	iodite	dioxidoiodate(1−)
HIO = [IOH]	hypoiodous acid	hydroxidoiodine
$[IO]^-$	hypoiodite	oxidoiodate(1−)

[a] The prefix 'ortho' has not been used consistently in the past (including in Chapter I-9 of Ref. 1). Here, it has been removed in the cases of boric acid, silicic acid and phosphoric acid where there is no ambiguity in the names without 'ortho'. The only cases where 'ortho' distinguishes between two different compounds are the telluric and periodic acids (and corresponding anions).

[b] The names 'fulminic acid' and 'isofulminic acid' have been used inconsistently in the past. The compound originally named fulminic acid is HCNO, which is not an oxoacid, while the esters usually called 'fulminates' in organic chemistry are RONC, corresponding to the oxoacid HONC. The name 'formonitrile-*N*-oxide' and the additive names in the right hand column specify the structures unambiguously. (See also Table IX under entries for CHNO and CNO).

[c] The oligomeric series can be continued, *e.g.* diphosphoric acid, triphosphoric acid, *etc.*; dithionic acid, trithionic acid, tetrathionic acid, *etc.*; dithionous, trithionous, *etc.*

[d] The names 'nitric acidium', 'sulfuric acidium', *etc.* for the hydronated acids represent a hybrid of several nomenclatures and are difficult to translate into certain languages. They are no longer recommended.

[e] The substitutive name would be 'azanol'. However, for preferred names for certain organic derivatives, NH_2OH itself is regarded as a parent with the name 'hydroxylamine'. See Ref. 1, Section P-68.3.1.1.

[f] These are fully systematic substitutive names. The traditional names 'hyponitrous acid' and 'hyponitrite' are not recommended; the systematics otherwise adhered to for use of the prefix 'hypo' would have prescribed 'hypodinitrous' and 'hypodinitrite'.

[g] The name 'phosphorous acid' and the formula H_3PO_3 have been used in the literature for both [$P(OH)_3$] and [$PHO(OH)_2$]. The present choice of names for these two structures is in accord with the parent names given in Sections P-42.3 and P-42.4 of Ref. 1.

[h] These are substitutive names. The situation is similar to that described in footnote g, but no 'acid' names are commonly used for the two isomers of HPO_2.

[i] The names 'arsoric', 'arsorous', 'stiboric' and 'stiborous' are included because they are used as parent names in Ref. 1 (Section P-42.4).

[j] Caution is needed if using the names 'sulfonic acid', 'sulfinic acid', 'selenonic acid', *etc*. for these compounds. Substitutive nomenclature prescribes using substitution into parent hydrides rather than into the acids when naming corresponding functional derivatives, *e.g*. 'trisulfanedisulfonic acid' (*not* 'trisulfanediyl...'), *cf*. footnote m; 'methaneseleninic acid' (*not* methyl-'); *etc*. Note that the substituent groups 'sulfonyl', 'sulfinyl', *etc*., are $-S(O)_2-$, $-S(O)-$, *etc*., *not* HS(O)<, HS(O)−, *etc*.

[k] These are fully systematic substitutive names. Names based on the traditional names 'sulfoxylic acid' for $S(OH)_2$ and 'sulfenic acid' for HSOH, and indeed these names themselves, are no longer recommended.

[l] Systematic use of the prefix 'hypo' would give the names 'hypodisulfuric acid' for dithionic acid and 'hypodisulfurous acid ' for dithionous acid.

[m] The homologues trithionic acid, tetrathionic acid, *etc*., may be alternatively named by substitutive nomenclature as 'sulfanedisulfonic acid', 'disulfanedisulfonic acid', *etc*.

[n] This common name presents a problem because the unsymmetrical structure is not the structure which would otherwise be associated with the 'diacid' construction ('disulfurous acid' would systematically be [HO(O)SOS(O)OH]). The use of an additive name eliminates this potential confusion, but the problem with the use of 'disulfurous acid' as a parent name persists in the naming of organic derivatives.

[o] The formula H_2SeO_3 has been used in the literature for both selenonic acid and selenous acid. The present choice of names for the two structures shown is in accord with the parent names given in Sections P-42.1 and P-42.4 of Ref. 1.