

## Definition: Non-Precursor Organic Compounds

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**Introduction** This document provides a list of Non-Precursor Organic Compounds (NPOC) compounds which are compounds having negligible photochemical reactivity.

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**Table of NPOC** The list of negligible photochemical reactivity compounds is provided in [40 CFR 51.100\(s\)\(1\)](#). This list has been arranged in a more convenient format in the attached Table I.

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**Approval**

Name & Title	Signature	Date
Brian Bateman, Director of Engineering	<b>Signed by Brian Bateman</b>	2/28/2008

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## Definition: Non-Precursor Organic Compounds, Continued

TABLE 1. NON-PRECURSOR ORGANIC COMPOUNDS (NPOC)

EPA has determined that the following organic compounds have negligible photochemical reactivity (§51.100(s) last amended 1-21-09); consequently, these compounds are NPOC's by the District's definition.

Formula or Shorthand	Compound Name and Synonyms (See NOTE 1)	Common Product Names
CH <sub>4</sub> C <sub>2</sub> H <sub>6</sub>	Methane Ethane	
CH <sub>3</sub> COCH <sub>3</sub> CO(OCH <sub>3</sub> ) <sub>2</sub> CH <sub>3</sub> CO <sub>2</sub> CH <sub>3</sub> CHO <sub>2</sub> CH <sub>3</sub> C <sub>4</sub> H <sub>6</sub> O <sub>3</sub> CH <sub>3</sub> COOC(CH <sub>3</sub> ) <sub>3</sub>	acetone dimethyl carbonate methyl acetate methyl formate propylene carbonate t-butyl acetate (TBAc) <b>SEE NOTE 2</b>	
CH <sub>2</sub> Cl <sub>2</sub> C <sub>2</sub> H <sub>3</sub> Cl <sub>3</sub> C <sub>2</sub> Cl <sub>4</sub>	methylene chloride (dichloromethane) 1,1,1-trichloroethane (methyl chloroform) perchloroethylene (tetrachloroethylene)	
CFC-11 CFC-12 CFC-113 CFC-114 CFC-115	trichlorofluoromethane dichlorodifluoromethane 1,1,2-trichloro-1,1,2,2-trifluoroethane 1,2-dichloro 1,1,2,2-tetrafluoroethane chloropentafluoroethane	Freon
HCFC-22 HCFC-31 HCFC-123 HCFC-123a HCFC-124 HCFC-141b HCFC-142b HCFC-151a HCFC-225ca HCFC-225cb	chlorodifluoromethane (CHClF <sub>2</sub> ) chlorofluoromethane (CH <sub>2</sub> ClF) 1,1,1-trifluoro 2,2-dichloroethane 1,2-dichloro-1,1,2-trifluoroethane 2-chloro-1,1,1,2-tetrafluoroethane 1,1-dichloro 1-fluoroethane 1-chloro 1,1-difluoroethane 1-chloro-1-fluoroethane 3,3-dichloro-1,1,1,2,2-pentafluoropropane 1,3-dichloro-1,1,2,2,3-pentafluoropropane	
HFC-23 HFC-32 HFC-125 HFC-134 HFC-134a HFC-143a HFC-152a	trifluoromethane difluoromethane pentafluoroethane 1,1,2,2-tetrafluoroethane 1,1,1,2-tetrafluoroethane 1,1,1-trifluoroethane 1,1-difluoroethane	

<b>Formula or Shorthand</b>	<b>Compound Name and Synonyms (See NOTE 1)</b>	<b>Common Product Names</b>
HFC-161	ethylfluoride	
HFC-227ea	1,1,1,2,3,3,3-heptafluoropropane	
HFC-236ea	1,1,1,2,3,3-hexafluoropropane	
HFC-236fa	1,1,1,3,3,3-hexafluoropropane	
HFC-245ca	1,1,2,2,3-pentafluoropropane	
HFC-245ea	1,1,2,3,3-pentafluoropropane	
HFC-245eb	1,1,1,2,3-pentafluoropropane	
HFC-245fa	1,1,1,3,3-pentafluoropropane	
HFC-365mfc	1,1,1,3,3-pentafluorobutane	
HFC-43-10mee	1,1,1,2,3,4,4,5,5,5-decafluoropentane	Dupont Vertrel XF
$C_3F_7OCH_3$	1,1,1,2,2,3,3-heptafluoro-3-methoxy-propane	HFE-7000
$C_4F_9OCH_3$	1,1,1,2,2,3,3,4,4-nonafluoro-4-methoxybutane (perfluoro-n-butyl methyl ether or HFE's)	part of 3M HFE-7100
$(CF_3)_2CFCH_2OC H_3$	2-(difluoromethoxymethyl)-1,1,1,2,3,3,3-heptafluoropropane (perfluoro-isobutyl methyl ether or HFE's)	part of 3M HFE-7100
$C_4F_9OC_2H_5$	1-ethoxy-1,1,2,2,3,3,4,4,4-nonafluorbutane (perfluoro-n-butyl ethyl ether or HFE's)	part of 3M HFE-7200
$(CF_3)_2CFCH_2OC_2 H_5$	2-(ethoxydifluoromethyl)-1,1,1,2,3,3,3-heptafluoropropane (perfluoro-isobutyl ethyl ether or HFE's)	
$C_5F_{10}OCH_3CF_3$	(1) 1,1,1,2,2,3,4,5,5,5-decafluoro-3-methoxy-4-trifluoromethyl-pentane	HFE-7300
$C_6F_{12}OC_2H_5CF_3$	3-ethoxy-1,1,1,2,3,4,4,5,5,6,6,6-dodecafluoro-2-(trifluoromethyl) hexane	HFE-7500
PCBTF	Parachlorobenzotrifluoride	
	cyclic, branched, or linear completely methylated siloxanes	
FC or PFC	perfluorocarbon compounds which fall into these classes: (i) Cyclic, branched, or linear, completely fluorinated alkanes; (ii) Cyclic, branched, or linear, completely fluorinated ethers with no unsaturations; (iii) Cyclic, branched, or linear, completely fluorinated tertiary amines with no unsaturations; and (iv) Sulfur containing perfluorocarbons with no unsaturations and with sulfur bonds only to carbon and fluorine.	3M PF-5060

Note 1. This list of compounds was rearranged from the original Federal Register text (40 CFR 51.100(s)(1)) for easier identification. The compounds are not listed in the order approved nor in order of photochemical reactivity.

Note 2. These compounds are excluded from VOC emissions and VOC content limits only, but record keeping and reporting requirements still apply. Also, these compounds must still be included in inventories and ozone modeling per 40 CFR 51.100(s)(5).

[EPA revised the NPOC definitions on 1-21-09.]

TABLE II. PROPOSED NON-PRECURSOR ORGANIC COMPOUNDS

EPA has proposed to exclude the following compounds from their definition of VOC as published in the Federal Register on [insert date when a proposal occurs]. If EPA has published their intent to exclude a compound from the definition of VOC, the compound should be considered to be an NPOC for the engineering evaluation, but engineers should add a permit condition requiring a modification of the source if EPA withdraws the exclusion during the public comment period.

Formula or Shorthand	Compound Name and Synonyms	Common Product Names

TABLE III. COMPOUNDS UNDER GOING EPA REVIEW FOR PHOTOCHEMICAL REACTIVITY

Manufacturers of the following compounds have petitioned EPA to list these compounds as negligibly reactive and to exclude them from EPA's definition of VOC. This list was updated by EPA on 9-30-99. These compounds should be considered to be POC's until EPA publishes their decision about the photochemical reactivity of the compounds in the Federal Register.

Formula or Shorthand	Compound Name and Synonyms	Common Product Names
COS	carbonyl sulfide	
CS <sub>2</sub>	carbon disulfide	
CH <sub>3</sub> Br	methyl bromide (bromomethane)	
BrCH <sub>2</sub> Cl	chlorobromomethane	
CH <sub>3</sub> CH <sub>2</sub> CH <sub>2</sub> Br	1-bromopropane (n-propyl bromide)	
C <sub>12</sub> H <sub>26</sub> to C <sub>18</sub> H <sub>38</sub>	n-alkanes (C12 – C18)	
	Technical white oils	
C <sub>6</sub> H <sub>5</sub> F <sub>3</sub>	benzotrifluoride (toluene trifluoride or trifluoromethylbenzene)	
ClHC:CHCl	trans-1,2-dichloroethylene (acetylene dichloride or dichloroacetylene)	
	dimethyl succinate	
	dimethyl glutarate	
CH <sub>3</sub> CN	acetonitrile (methyl cyanide)	
CH <sub>3</sub> C <sub>6</sub> H <sub>3</sub> (NCO) <sub>2</sub>	toluene diisocyanate (TDI)	
CH <sub>2</sub> (C <sub>6</sub> H <sub>4</sub> NCO) <sub>2</sub>	methylene diphenyl diisocyanate (MDI)	

This section was last amended by EPA on January 21, 2009.

40 CFR Part 51.100 Definitions

- (s) *Volatile organic compounds (VOC)* means any compound of carbon, excluding carbon monoxide, carbon dioxide, carbonic acid, metallic carbides or carbonates, and ammonium carbonate, which participates in atmospheric photochemical reactions.
- (1) This includes any such organic compound other than the following, which have been determined to have negligible photochemical reactivity: methane; ethane; methylene chloride (dichloromethane); 1,1,1-trichloroethane (methyl chloroform); 1,1,2-trichloro-1,2,2-trifluoroethane (CFC-113); trichlorofluoromethane (CFC-11); dichlorodifluoromethane (CFC-12); chlorodifluoromethane (HCFC-22); trifluoromethane (HFC-23); 1,2-dichloro 1,1,2,2-tetrafluoroethane (CFC-114); chloropentafluoroethane (CFC-115); 1,1,1-trifluoro 2,2-dichloroethane (HCFC-123); 1,1,1,2-tetrafluoroethane (HFC-134a); 1,1-dichloro 1-fluoroethane (HCFC-141b); 1-chloro 1,1-difluoroethane (HCFC-142b); 2-chloro-1,1,1,2-tetrafluoroethane (HCFC-124); pentafluoroethane (HFC-125); 1,1,2,2-tetrafluoroethane (HFC-134); 1,1,1-trifluoroethane (HFC-143a); 1,1-difluoroethane (HFC-152a); parachlorobenzotrifluoride (PCBTF); cyclic, branched, or linear completely methylated siloxanes; acetone; perchloroethylene (tetrachloroethylene); 3,3-dichloro-1,1,1,2,2-pentafluoropropane (HCFC-225ca); 1,3-dichloro-1,1,2,2,3-pentafluoropropane (HCFC-225cb); 1,1,1,2,3,4,4,5,5,5-decafluoropentane (HFC 43-10mee); difluoromethane (HFC-32); ethylfluoride (HFC-161); 1,1,1,3,3,3-hexafluoropropane (HFC-236fa); 1,1,2,2,3-pentafluoropropane (HFC-245ca); 1,1,2,3,3-pentafluoropropane (HFC-245ea); 1,1,1,2,3-pentafluoropropane (HFC-245eb); 1,1,1,3,3-pentafluoropropane (HFC-245fa); 1,1,1,2,3,3-hexafluoropropane (HFC-236ea); 1,1,1,3,3-pentafluorobutane (HFC-365mfc); chlorofluoromethane (HCFC-31); 1-chloro-1-fluoroethane (HCFC-151a); 1,2-dichloro-1,1,2-trifluoroethane (HCFC-123a); 1,1,1,2,2,3,3,4,4-nonafluoro-4-methoxy-butane ( $C_4F_9OCH_3$  or HFE-7100); 2-(difluoromethoxymethyl)-1,1,1,2,3,3,3-heptafluoropropane ( $(CF_3)_2CF_2OCH_3$ ); 1-ethoxy-1,1,2,2,3,3,4,4,4-nonafluorobutane ( $C_4F_9OC_2H_5$  or HFE-7200); 2-(ethoxydifluoromethyl)-1,1,1,2,3,3,3-heptafluoropropane ( $(CF_3)_2CF_2OC_2H_5$ ); methyl acetate; 1,1,1,2,2,3,3-heptafluoro-3-methoxy-propane ( $n-C_3F_7OCH_3$ , HFE-7000); 3-ethoxy-1,1,1,2,3,4,4,5,5,6,6,6-dodecafluoro-2-(trifluoromethyl) hexane (HFE-7500); 1,1,1,2,3,3,3-heptafluoropropane (HFC 227ea); methyl formate ( $HCOOCH_3$ ); (1) 1,1,1,2,2,3,4,5,5,5-decafluoro-3-methoxy-4-trifluoromethyl-pentane (HFE-7300); propylene carbonate; dimethyl carbonate; and perfluorocarbon compounds which fall into these classes:
- (i) Cyclic, branched, or linear, completely fluorinated alkanes;
  - (ii) Cyclic, branched, or linear, completely fluorinated ethers with no unsaturations;
  - (iii) Cyclic, branched, or linear, completely fluorinated tertiary amines with no unsaturations; and

- (iv) Sulfur containing perfluorocarbons with no unsaturations and with sulfur bonds only to carbon and fluorine.
- (2) For purposes of determining compliance with emissions limits, VOC will be measured by the test methods in the approved State implementation plan (SIP) or 40 CFR part 60, appendix A, as applicable. Where such a method also measures compounds with negligible photochemical reactivity, these negligibility-reactive compounds may be excluded as VOC if the amount of such compounds is accurately quantified, and such exclusion is approved by the enforcement authority.
  - (3) As a precondition to excluding these compounds as VOC or at any time thereafter, the enforcement authority may require an owner or operator to provide monitoring or testing methods and results demonstrating, to the satisfaction of the enforcement authority, the amount of negligibly-reactive compounds in the source's emissions.
  - (4) For purposes of Federal enforcement for a specific source, the EPA shall use the test methods specified in the applicable EPA-approved SIP, in a permit issued pursuant to a program approved or promulgated under title V of the Act, or under 40 CFR part 51, subpart I or appendix S, or under 40 CFR parts 52 or 60. The EPA shall not be bound by any State determination as to appropriate methods for testing or monitoring negligibly-reactive compounds if such determination is not reflected in any of the above provisions.
  - (5) The following compound(s) are VOC for purposes of all recordkeeping, emissions reporting, photochemical dispersion modeling and inventory requirements which apply to VOC and shall be uniquely identified in emission reports, but are not VOC for purposes of VOC emissions limitations or VOC content requirements: t-butyl acetate.
  - (6) For the purposes of determining compliance with California's aerosol coatings reactivity-based regulation, (as described in the California Code of Regulations, Title 17, Division 3, Chapter 1, Subchapter 8.5, Article 3), any organic compound in the volatile portion of an aerosol coating is counted towards that product's reactivity-based limit. Therefore, the compounds identified in paragraph (s) of this section as negligibly reactive and excluded from EPA's definition of VOCs are to be counted towards a product's reactivity limit for the purposes of determining compliance with California's aerosol coatings reactivity-based regulation.
  - (7) For the purposes of determining compliance with EPA's aerosol coatings reactivity based regulation (as described in 40 CFR part 59—National Volatile Organic Compound Emission Standards for Consumer and Commercial Products) any organic compound in the volatile portion of an aerosol coating is counted towards the product's reactivity-based limit, as provided in part 59, subpart E. Therefore, the compounds that are used in aerosol coating products and that are identified in paragraph (s) of this section as negligibly reactive and excluded from EPA's definition of VOC are to be counted towards a product's reactivity limit for the purposes of determining compliance with EPA's aerosol coatings reactivity-based national regulation, as provided in part 59, subpart E.