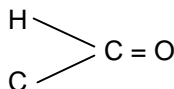


# Tobacco Smoke Components: Carbonyls

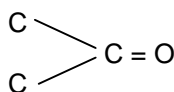
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Tobacco smoke contains chemicals known as “carbonyls”. Carbonyls are organic chemicals which contain an oxygen doubly-bonded to a carbon: C = O.

Aldehydes and ketones are carbonyls. The difference between an aldehyde and a ketone is the atoms attached to the oxygenated carbon. The oxygenated carbon in an aldehyde also has a hydrogen atom bonded to it:



While the oxygenated carbon in a ketone has two carbons attached to it:



Aldehydes can be recognized by the suffix “al” or “aldehyde”. Ketones can be recognized by the suffix “one” or “ketone”.

Tobacco smoke contains many carbonyls. Some, like formaldehyde, may cause cancer and other deadly illness. Others, like acetone, are mild irritants.

Below is a list of some carbonyls present in tobacco smoke.

Common Name	Also Known As	Health Effects <sup>1</sup>	Composition
Acetaldehyde	Ethanal	Possible Carcinogen	H <sub>3</sub> C-CHO
Acetone	Methyl Ketone	Irritant	(CH <sub>3</sub> ) <sub>2</sub> C=O
Acrolein	2-Propenal	Severe Irritant	H <sub>2</sub> C=CHCHO
Butyraldehyde	n-Butanal	Mutagen, Irritant <sup>2</sup>	H <sub>3</sub> C(CH <sub>2</sub> ) <sub>2</sub> CHO
Crotonaldehyde	2-Butenal	Possible Carcinogen	H <sub>3</sub> C(HC=CH)CHO
Formaldehyde	Methanal	Suspected Carcinogen	H <sub>2</sub> C=O
Methyl Ethyl Ketone	2-Butanone	Irritant	H <sub>3</sub> CCH <sub>2</sub> (C=O)CH <sub>3</sub>
Propionaldehyde	Propanal	Irritant <sup>3</sup>	H <sub>3</sub> CCH <sub>2</sub> CHO

<sup>1</sup> ACGIH American Conference of Governmental Industrial Hygienists 1996.

<sup>2</sup> TRI Database, Right to Know Act, New Jersey. <http://www.rtk.net>

<sup>3</sup> Material Safety Data Sheets