

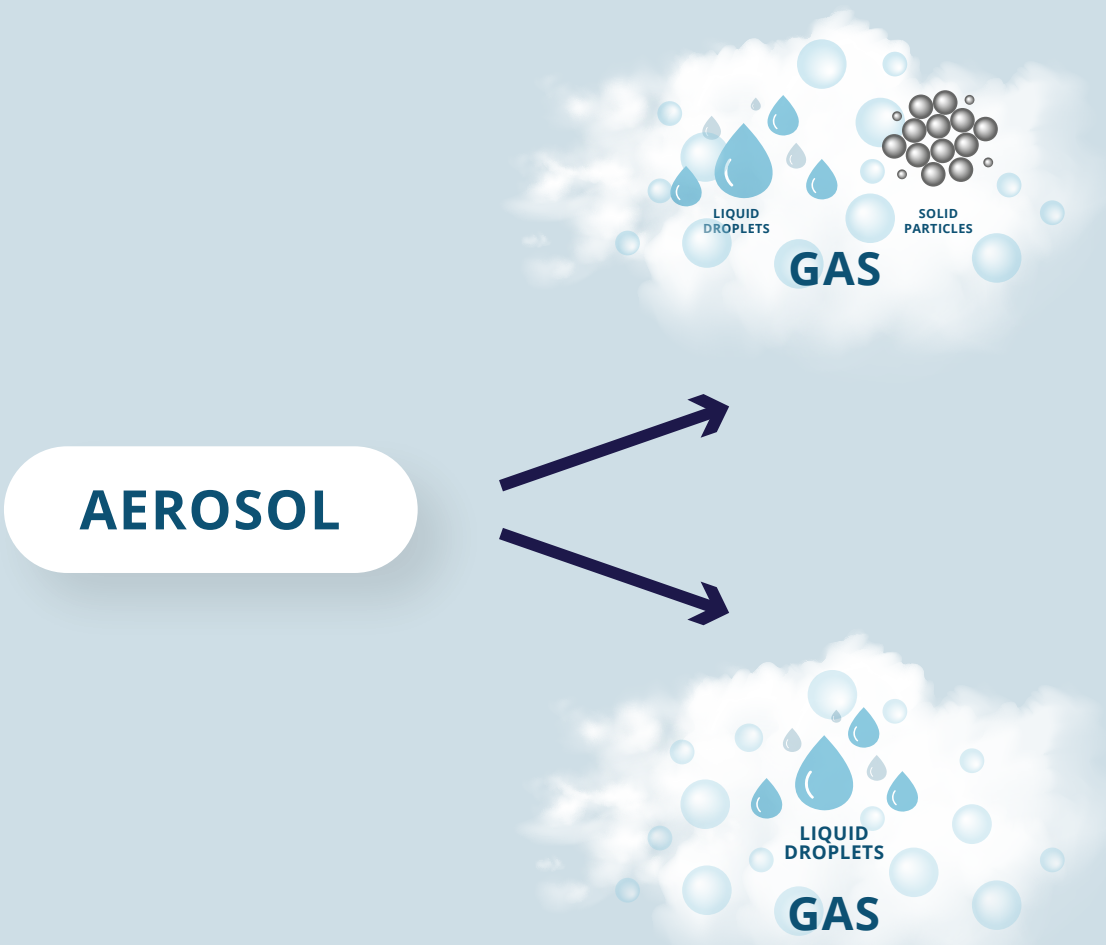


DIFFERENCE BETWEEN CIGARETTE SMOKE AND HEATED TOBACCO PRODUCT (HTP) AEROSOL

They are both Aerosols, but the differences are significant

An aerosol is a mixture of solid particles and/or liquid droplets in air or another gas.

Some examples of aerosols are smoke, smog, deodorant spray, clouds.



In Cigarettes

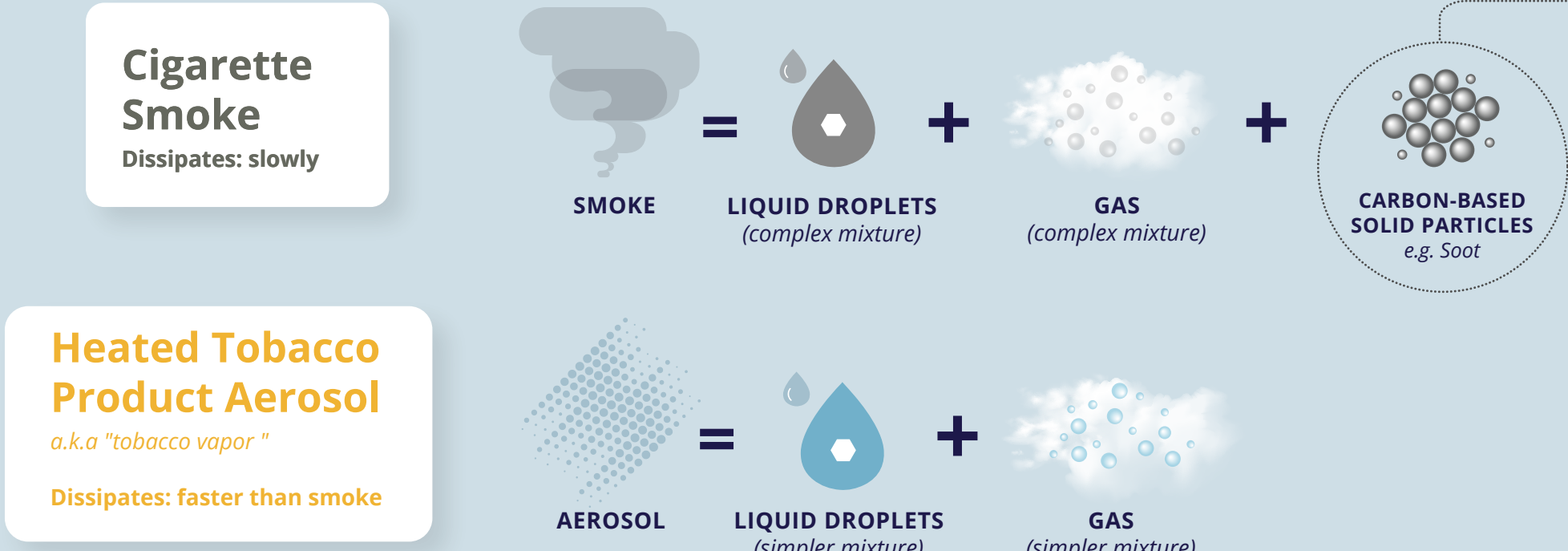
Smoke contains solid particles and liquid droplets therefore it is an aerosol. However, it is a complex mixture that contains a large number of carbon-based solid particles and **thousands of chemicals** and formed during combustion. Around 100 of these have been recognized as harmful chemicals by health authorities.

BUT NOT ALL AEROSOLS ARE SMOKE

In Heated Tobacco Products

HTPs generate aerosols containing **liquid droplets and gas**. They are not smoke as there is no combustion.

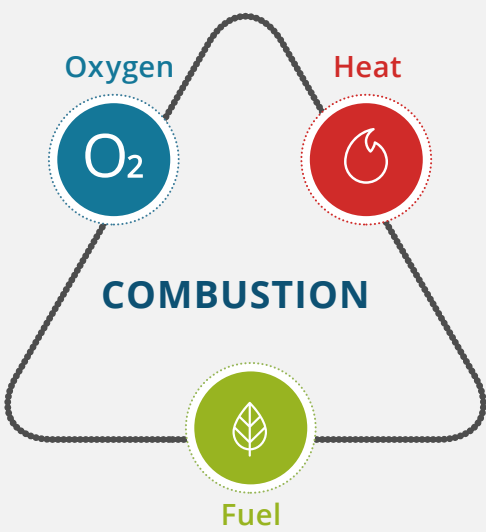
AEROSOLS DERIVED FROM TOBACCO



Carbon-based solid particles

These particles in smoke are generated during combustion and can adversely affect health when inhaled.

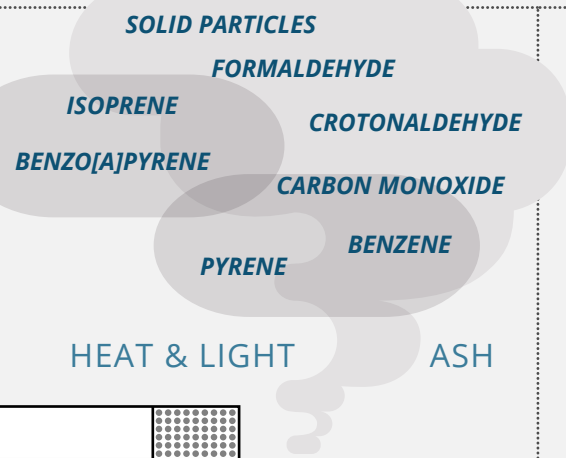
SMOKE IS A RESULT OF COMBUSTION



For combustion to occur, three things need to be present: a fuel to be burned, source of oxygen and a source of heat.

SMOKE

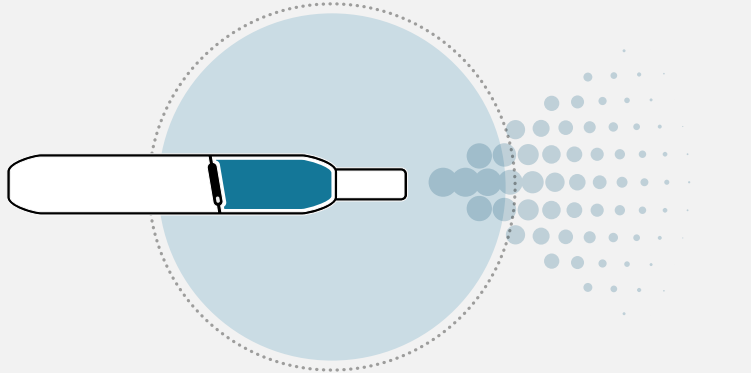
Contains high levels of harmful chemicals, most of which are formed during combustion, also known as burning.



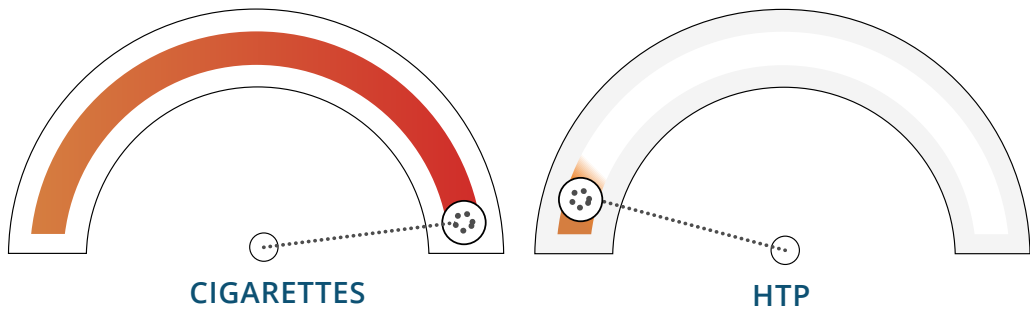
In a cigarette, burning occurs at very high temperatures reaching up to 900°C, creating ash, heat and light (energy) and smoke.

HEATED TOBACCO PRODUCTS DO NOT COMBUST TOBACCO

and therefore produces an aerosol that is not smoke.



HEATED TOBACCO PRODUCTS EMIT FEWER & LOWER LEVELS OF HARMFUL CHEMICALS*



Without combustion, the composition of the HTP aerosol is fundamentally different from cigarette smoke. It's based on liquid droplets formed by condensation and the levels of harmful chemicals are significantly reduced.

F A C T S

Smoke

Inhalation of smoke is dangerous - it can be toxic or irritating.

Cigarette smoke contains over 6000 chemicals, many of which are harmful or potentially harmful.

≈ 100 of these have been associated with smoking-related diseases by health authorities (FDA)¹.

Smoke-free products even if they don't generate smoke, are not risk-free.

Vapor

For simplification purposes HTP aerosols are known as tobacco vapor. The term vapor is commonly associated with smoke-free products, although a misnomer.

Scientifically, vapor is the gas phase of a substance that is normally a liquid or solid at ordinary temperatures. In smoke-free products, however the term vapor is commonly used to describe the aerosol generated which consists of droplets suspended in a gas.

REDUCING AND CONTROLLING THE TEMPERATURE IS KEY TO AVOID COMBUSTION



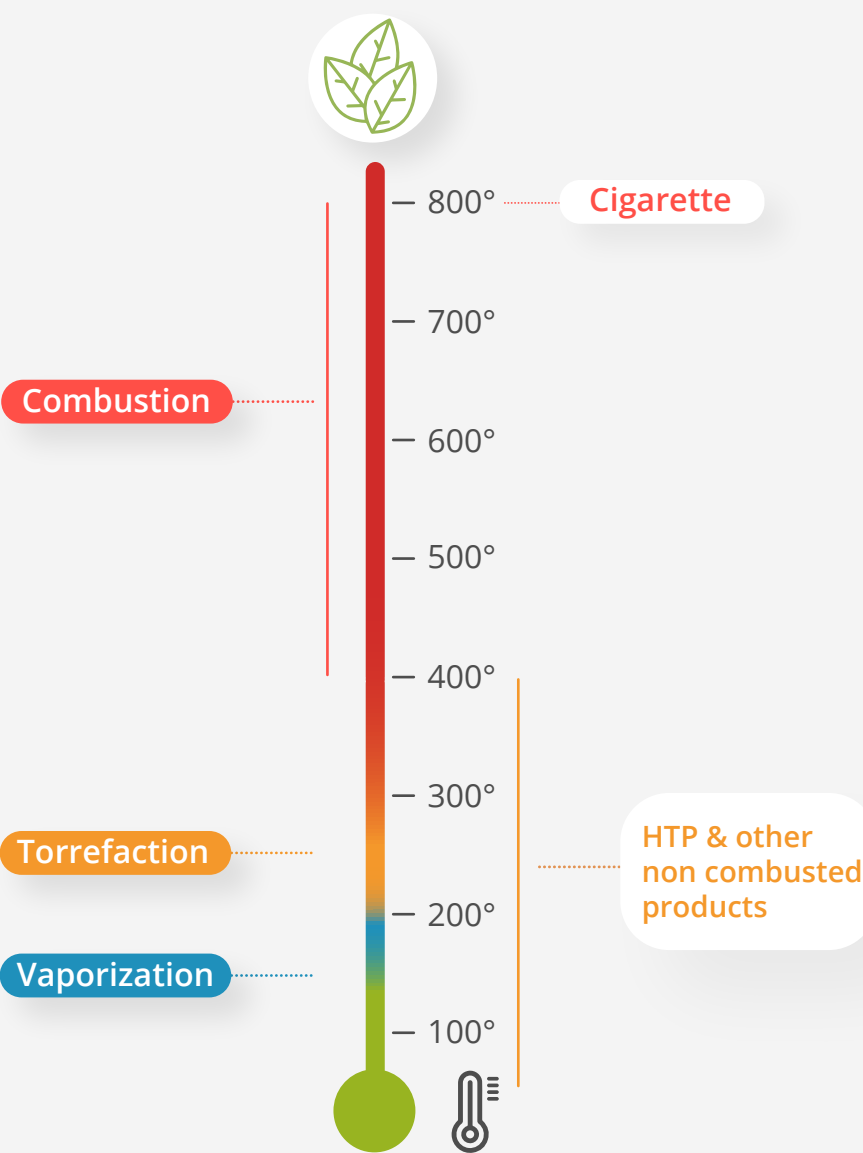
Combustion and high-temperature pyrolysis forms smoke particles, in addition to substances transferred by vaporization and low-temperature thermal degradation.



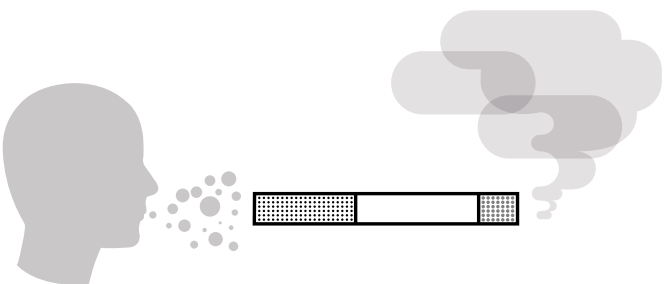
Thermal degradation and vaporization continue. HTP aerosol droplets are generated by condensation of vaporized substances.



Vaporization and thermal degradation begin to occur. It's possible to have nicotine and some flavors.

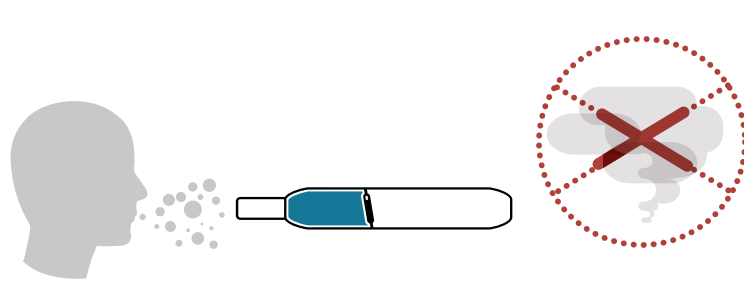


SECOND HAND AEROSOL



SIDESTREAM SMOKE + EXHALED MAINSTREAM SMOKE

Smoke affects smokers and those around them. A lit cigarette produces smoke whether you puff on it or not. ≈ 85% of second-hand smoke is formed without puffing.



EXHALED MAINSTREAM AEROSOL

The aerosol emitted to the environment when using HTPs is predominantly from exhalation of mainstream aerosol constituents, including water, glycerin, and nicotine at levels that do not negatively impact the quality of the air.

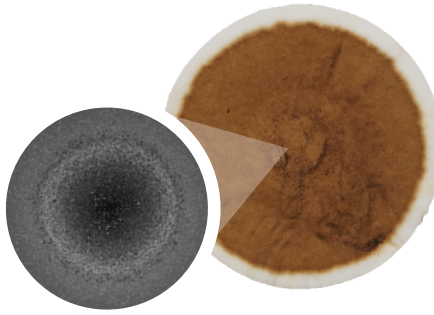


FROM THE LAB

Visual difference between particulate matter of cigarette smoke and HTP aerosol

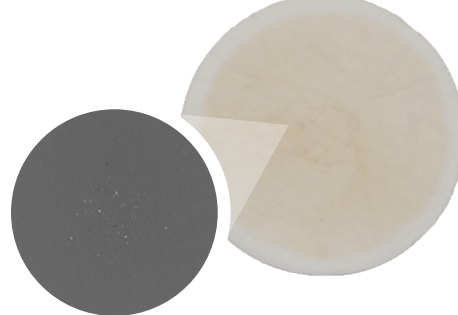
CIGARETTE SMOKE

CIGARETTES GENERATE SOLID CARBON PARTICLES THROUGH COMBUSTION.



HTP AEROSOL

DOES NOT GENERATE SOLID CARBON PARTICLES.²



Note: Images after collection on 44mm Cambridge filter pads following the ISO 20778:2018 puffing regime. Number of puffs: 10 per cigarette sticks, 12 per heatsticks.



- Examples of some of the various HTPs that exist in different countries include IQOS, Ploom, glo, and PAX products.

- The reduction in the levels of harmful and potentially harmful chemicals is subject to scientific substantiation for each product.

* A reduction in emissions is not the same as a reduction in risk.

**HPHCs- Harmful and Potentially Harmful Constituents (Chemicals).

References:

1. Harmful and Potentially Harmful Constituents (HPHCs), FDA, <https://www.fda.gov/tobacco-products/products-ingredients-components/harmful-and-potentially-harmful-constituents-hphcs>
2. Pratte, P.C., S.; Goujon Ginglinger, C., Investigation of solid particles in the mainstream aerosol of the Tobacco Heating System THS2.2 and mainstream smoke of a 3R4F reference cigarette. Human & Experimental Toxicology, 2017, 36(11); p. 1115-1120. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5639962/>