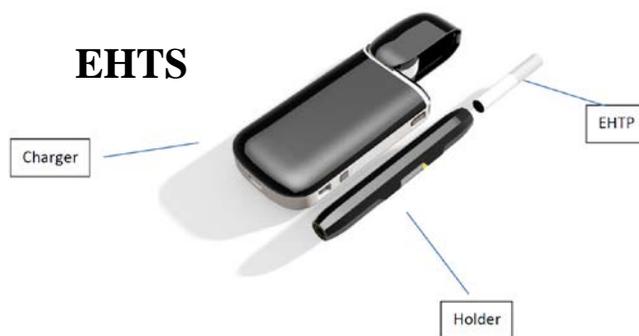


Philip Morris International (PMI) has developed a patented Electrically Heated Tobacco System (EHTS) that heats a specifically designed tobacco product (Electrically Heated Tobacco Product or EHTP). The EHTP contains tobacco¹ material in the form of a plug that undergoes a controlled heating process to produce a vapor (aerosol). The tobacco is only heated and is not burnt as happens in a lit cigarette.



PMI retained Professor Valerio Cozzani in an independent capacity to review and analyze scientific data on the thermal processes taking place in the EHTS during aerosol generation. Professor Valerio Cozzani is an expert in combustion (burning) and pyrolysis (thermal breakdown) of biomass (materials obtained from plants) and is a faculty member of the Chemical Engineering department at the University of Bologna, Italy,

Professor Cozzani issued two expert opinions:

1. The first addresses the scientific definition of combustion, indicators of tobacco combustion, and analyzes as to whether any combustion processes occur when the Holder heats the tobacco material in the EHTP.
2. The second addresses the scientific definition of smoke and analyzes whether the EHTS operation produces smoke when the Holder heats the tobacco material in the EHTP.

1. Expert Opinion on Combustion

To support his expert opinion, Professor Cozzani performed a literature search with respect to the scientific definition of combustion and the indicators of biomass and tobacco combustion. He then reviewed the operation of the EHTS and analyzed experimental data on the EHTS provided by PMI (that includes data generated by an independent analytical laboratory) to assess whether any combustion processes occur.

¹ The EHTP does not contain tobacco cut-filler (tobacco leaf cut in small pieces found in cigarettes) or pipe tobacco. All of the tobacco in the EHTP is reconstituted (cast-leaf) tobacco made from tobacco powder, water, glycerin, guar gum and cellulose fibers.

The expert opinion of Professor Cozzani concludes that no combustion processes occur in the tobacco material when the Holder heats the EHTP to produce an aerosol.

Unlike a cigarette, where the combustion of tobacco at high temperature results in the formation of smoke and ash, the EHTS does not generate the conditions necessary to combust the tobacco material in the EHTP. The aerosol produced when an EHTP is heated results from vaporization of an aerosol former, water and some tobacco constituents.

Professor Cozzani's expert opinion is based on the following findings from his assessment:

- The temperatures reported for the EHTP during use are far below those required for the combustion of tobacco to occur;
- The key characteristics of combustion (e.g., the formation of relevant amounts of nitrogen oxides and the generation of heat) are absent in the EHTP.

2. Expert Opinion on Smoke

To support his expert opinion, Professor Cozzani performed a literature search with respect to the scientific definition of smoke. He then reviewed the operation of the EHTS and analyzed experimental data on the EHTS provided by PMI (that includes data generated by an independent analytical laboratory) to assess whether the EHTS operation produces smoke.

The expert opinion of Professor Cozzani concludes that the most comprehensive and accurate scientific definition of smoke is provided by Standard 92B of the US National Fire Protection Association and that the EHTS operation does not produce smoke.

Standard 92B defines that smoke is composed of airborne solid, liquid particulates and gases evolved when a material undergoes pyrolysis or combustion, together with a quantity of air that is entrained or otherwise mixed into the mass.

Professor Cozzani's expert opinion that the EHTS operation does not produce smoke is based on the following findings from his assessment:

- the aerosol produced by EHTS operation is formed principally by vaporization processes as proven by its chemical characterization
- the absence of combustion processes in the EHTP tobacco substrate
- very limited pyrolysis phenomena present in the EHTP tobacco substrate during EHTP operation, which do not have a relevant influence on the aerosol formed: less than 2% by weight of the aerosol components may derive from the pyrolysis of the tobacco substrate which would not be sufficient to characterize the aerosol as "smoke"

As a result of the above findings, Professor Cozzani determined that the aerosol produced is not derived from a smoke forming process and cannot be classified as smoke.