Hot Box Vapors Usage Test

Test for Combustion By-Products , Carbon Dioxide & Carbon Monoxide

Usage Test of Extraction Hardware conducted for Hot Box Vapors

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Executive Summary

Testing for CO and CO_2 in the vapor created by the Hot Box Vapors: Extraction Hardware during the use will determine if the organic matter is merely heated or actually combusted. When "pure" vaporization of oils and crystallized substance suspended in organic matter occurs through controlled heating, there are no harmful by-products as found during the combustion of these materials in a attempt to unshackle the desired vapors. For the extraction to remain pure, the oil or organic matter must be heated to a high enough temperature to liberate the trapped oils and crystals without causing a suspension oil, organic matter, or even the base essential oil or crystals themselves to combust. When any substance containing both carbon and hydrogen combusts the main by-product is carbon dioxide (CO_2). Carbon monoxide is almost always produced during combustion as well due to a lack of oxygen during the core combustion process.

Test Method

Test Setups

The equipment supplied for the testing consists of an Extraction Hardware setup for use with a 120 VAC circuit, a Hand Piece into which the organic matter to undergo heating is placed. Developed instructions for use of the Extraction Hardware are also provided (Appendix C).

Test Apparatus

Radio Shack Auto-Range Digital Multimeter - Model 22-163

Sears Analog Ammeter / Voltmeter - 82404

GasTech Instruments GT Series Portable CO and CO_2 Combustion Analyzer Setup with 0-20% CO_2 Sensor and a 0-1000 PPM CO Sensor.

Testing Procedure

Two main tests are completed:

The first sample air drawn through an Extraction Hardware that has been allowed to preheat for more than fifteen minutes.

The Second test includes the presence of organic matter to accurately acquire samples that are identical to the Vaporizer's intended use. This test focuses on the removal of crystallized substances from organic matter.

Test Results

The Extraction Hardware's energy consumption results are 0.26 amps at 120.2 VAC both during warmup and during the testing procedure.

The data from one shows neither CO nor CO2 found in the sample of air drawn through the Extraction Hardware with the Hand Piece empty of organic matter.

The data form test two has the same results as teas one. After heating up the vaporizer for 15 minutes, 0.05 grams of shredded organic matter are placed into a clean Hand Piece. The Hand Piece is then placed against the vaporizer, and sample is drawn for a continuous (2) minutes. This sample passes immediately through a carbon monoxide and carbon dioxide sensor. During these sample and testing no evidence of combustion is found. The levels of CO and CO2 remain null or negligible through out the sample period.

To further test the device in its actual usage, a sample is taken using the lungs and then exhaled into the CO and CO2 test instruments. This sample shows the presence of CO2 in amounts typically found in human exhalation with still no presence of CO (Appendix A).

Discussion

The first test demonstrates that the apparatus on its own does not burn (combust) matter, and provides a zero point from which to base additional test analyses. In order to cover the wide spectrum of substances that will be used for the Extraction Hardware, the assumption that the heating of essential oils for the purpose of vaporizing the essential oil into a gaseous form would be similar if not less noxious than the heating of organic matter. Inauthentic essential or "perfume" oils are synthetic and are excluded from testing.