

## **Association of European Candle Makers Position Paper on Emission of Particulates from Candles**

### Introduction

Some parts of the media have recently commented that candles emit airborne particulates which can have a detrimental effect on people's health. Although large concentrations of fine particulates in the air can lead to a number of respiratory problems, the particulates emitted from candles are larger in size and do not reach the lower airways or deep into the lungs. Under normal circumstances candles used in the proper manner do not pose a risk. To better explain this situation, the Association of European Candle Makers has prepared this position paper and guidance on candle use.

### Particulate Emissions

Airborne particulates also known as total suspended particulates (TSP) include many organic and inorganic substances. They can be produced from both natural sources such as volcanoes and man-made sources such as power plants, incinerators, vehicular traffic, and domestic heating. They can be composed of a wide range of chemicals including organic and elemental carbon, metals, nitrates and sulphates. Exposure to excessive TSP has been documented to result in health effects including chronic obstructive pulmonary disease and other respiratory problems.

The composition of the particulates is very important. The particle size is also a critical factor in determining the potential hazard of the TSP. While larger particles are normally filtered out in the nose and upper respiratory tract, smaller particles are able to penetrate more deeply into the respiratory system reaching the lower airways and deep into the lungs.

Studies conducted by the international scientific community in recent decades have documented significant changes in quality of air in confined living spaces (indoors), with a gradual increase in pollutants in absolute terms. The concentration of TSP and the high number of hours spent by the average population in indoor environments, can lead to exposures even higher than outdoors. As such it is not possible to rule out potential adverse effects on human health.

Indoor sources of particulate matter (PM) typically include cigarette smoke, emissions from stoves, cooking, cleaning agents and cleaning activities, and re-suspension of particles from floors or carpets due to foot traffic (Jones et al, 2000). It has also been shown that the use of candles is one of the possible point sources of airborne particulates in indoor spaces.

In recent times, attention has focused more on the finer particulate matter known as PM<sub>2,5</sub>. PM<sub>2,5</sub> is particulate matter that is 2.5 micrometers in diameter and smaller, or about 1/30th the diameter of a human hair. PM<sub>2,5</sub> is considered a more predictive indicator in relation to risks to health, compared to PM<sub>10</sub> (particulate matter that is 10 micrometers in diameter and smaller). The available data do not identify concentration levels below which adverse effects are not expected to health, but the recent update of the WHO Air Quality (Update of WHO air quality guidelines, Michal Krzyzanowski & Aaron Cohen, 29 May 2008) has recommended a guideline value for short-term exposure (24h, 99 percentile) for PM<sub>2,5</sub> of 25 µg/m<sup>3</sup>.

The contribution of a candle to the PM<sub>2,5</sub> exposure in indoor air can be estimated in regard to the suggested WHO guideline value. A study run by Milan Polytechnic (Milano 2010) on unfragranced candles considered different exposure scenarios ranging from 1 to 4 candles used, from 0,1 to 0,4 air changes per hour in a 25 to 40 m<sup>3</sup> room size. The resulting contribution of PM<sub>2,5</sub> from candles are in the range from 1 µg/m<sup>3</sup> to 7 µg/m<sup>3</sup>. **So a candle contribution to indoor PM pollution is 4 % of the WHO guideline value for a standard room of 40 m<sup>3</sup>.**

As in the past the European candle industry is fully involved with the EU competent authorities to investigate further the health effects of candles emissions and generate the information needed to assure the consumers the minimum health impact possible.

### Guidance on candle use

The European candle industry has contributed to the preparation of standards to ensure lower levels of airborne particulates from candles. CEN standard EN 15426 describes the requirements and a simple method for measuring the sooting behaviour of candles and restricts the level of soot that should be found in tested candles.

In addition, the following steps should be taken by candle users to minimise the risk to their health:

#### *Candle Preparation*

- Trim the wick to 5mm before lighting. A longer wick can cause irregular burning.
- Avoid any foreign matter (wick trimmings, matches etc) in the wax pool.
- Use a candleholder adjusted to the candle size.
- Place the candleholder on a stable and heat-resistant surface.
- Make sure the room is well ventilated.
- Keep clear of any air currents (drafts, ceiling fans etc) to prevent uneven burning, dripping, and even sooting.
- Always be acquainted with the manufacturer's recommendations, for correct use and burning time.

#### *Candle Burning*

- Never touch or move a burning candle, especially when the wax is hot and liquid.
- Extinguish the candle if it has the following abnormal behaviour: high flame, flickering, uneven burning, sooting, excessive dripping. Let it cool down, follow the previous recommendations, and relight.

- Avoid burning a candle all the way down. Ideally, stop using it when 50mm of wax remains in the case of a candle and 12mm for a container.
- Never light a candle on or near anything that could catch fire.
- Never leave a burning candle unattended.
- At all times, keep candles out of the reach of children and pets, they can be knocked over and create a fire.

### *Safe Extinguishing*

- Always use a candle snuffer to extinguish a candle. This avoids hot wax dripping and splattering.
- Never use water to put out a candle. The thermal shock might cause a glass container to break, and the water could also cause hot wax splatter.
- Always wait for complete extinguishing before touching or moving the candle, and leaving it unattended.