

## Manufacturers – How to Avoid Candle Fires

There are many different factors that can contribute towards candle fires. This document exists to highlight some of the known (and possible) contributing factors.

It may be that you will first learn that you have a candle fire problem is with a spike in customer complaints. Unfortunately it appears to be difficult, if not impossible, to determine in the Lab if a particular candle has an elevated risk. The actual candle fire complaints may only be observed in an exceedingly low number of candles sold. Even so, just one candle fire is a cause for concern – for the customer, the manufacturer and the industry.

There may not be a single reason why a particular candle might catch fire. It may well have been the results of a combination of factors. Attempts should be made to reduce these risk factors.

### Secondary Ignition

This is a common cause of candle fires. Contaminants in the wax pool can act as secondary wicks, increasing the amount of flame present, leading to the whole wax pool catching fire.



Matchsticks thrown into the wax pool are obviously a danger and may be found in the bottom of the candle if it is returned by a customer. Another possible contaminant is fluff/dust if the candle has been left for several months before burning.

Manufacturer added inclusions such as seeds, petals, dried fruit, crystals etc. are very obviously risky.

### Fragrances

Fragrance can often play a role.

- Candle fires are more likely with high fragrance content.
- Low flash point fragrances will also increase the likelihood.
- Candle sweating. Related to the fragrance content, volatility and where stored/used. There may be a thin film of fragrance on the surface of the wax.
- Some fragrances are more prone to clubbing. This may lead to bigger flames and/or carbon deposits in the wax pool.

- Was the fragrance mixed-in sufficiently? If not, some candles may have a very high fragrance content.
- It is not unknown for customers to add essential oils to 'boost' a candle.

### Sustainers

Candle fires sometimes occur when the flame reaches the bottom of the container and the small amount of wax remaining is heated to higher temperatures. Any contaminants in the wax pool are also more likely to catch fire at this point. This is why many manufacturers recommend that customers do not burn the last ~1cm of wax. However, the likelihood of customers reading the instructions and doing so is remote. It is much better to engineer the safety into the candle by using tall (5 – 11 mm) sustainers.

- Tall sustainers result in the flame extinguishing before the flame reaches the bottom of the candle.
- It is important that the sustainer is glued to the bottom of the container. Otherwise, wax can get in under the sustainer and be carried up the wick, defeating the object of using a taller sustainer.
- Care should be taken when crimping the wicks that no holes are made in the neck of the sustainer. Otherwise, wax can enter the hole and the wick will continue to burn.
- IKEA changed to 5 – 7mm sustainers 14 years ago for safety reasons.

### Multi-Wick Container Candles

Using too large a wick in a candle will obviously increase the risk of a candle fire. However, this is even more so for multi-wick candles. As more heat is generated in the container, there is more chance of a candle fire. Try to use the smallest wick that will give a good burn.

### Candle holders

Sometimes a candle fire, particularly tealights, can occur because of a candle holder. There are a number of reasons that this may occur:

- The candle holder is unsafe and is itself flammable.
- The candle holder (e.g. wax melter or tealight holder) retains too much heat and the whole candle catches fire.
- Customer misuse. E.g. the customer placed multiple tealights in a holder designed for a single tealight.

### 'Explosions'

Other incidents may initially sound like a candle fire but are actually quite different. These are often described as 'explosions'. These are typically a result of the glassware breaking and are most likely to occur at the end of a burn. Pieces of glass can travel a metre or more. This can also be a result of the wick falling against the glass. To avoid glass breakages, ensure the glass/ceramic is suitable for candles. Can your glass supplier provide you with an annealing certificate? Has the glass had any thermal shock testing?